Low-Income and Minority Homeownership
Volume 9, Number 2 • 2007

U.S. Department of Housing and Urban Development
Office of Policy Development and Research

Cityscape: A Journal of Policy Development and Research strives to share HUD-funded and other research on housing and urban policy issues with scholars, government officials, and others involved in setting policy and determining the direction of future research.

Cityscape focuses on innovative ideas, policies, and programs that show promise in revitalizing cities and regions, renewing their infrastructure, and creating economic opportunities. A typical issue consists of articles that examine various aspects of a theme of particular interest to our audience.

PD&R

Cityscape

A Journal of Policy Development and Research

Low-Income and Minority Homeownership
Volume 9, Number 2 • 2007

U.S. Department of Housing and Urban Development
Office of Policy Development and Research

Cityscape is published three times a year by the Office of Policy Development and Research (PD&R), U.S. Department of Housing and Urban Development (HUD). Portions of the journal may be reprinted if proper credit is given.

Inquiries may be addressed to the Managing Editor at Office of Policy Development and Research, Room 8126, U.S. Department of Housing and Urban Development, 451 Seventh Street SW, Washington, DC 20410; tel. 202–708–0544.

Visit PD&R's website, www.huduser.org, to find this report and others sponsored by PD&R. Other services of HUD USER, PD&R's research information service, include listservs, special interest and bimonthly publications (best practices and significant studies from other sources), access to public use databases, and a hotline (800–245–2691) for help with accessing the information you need.

Contents

Guest Editors' Introduction

Harold L. Bunce
William J. Reeder
U.S. Department of Housing and Urban Development

This issue of *Cityscape* focuses on research on low-income and minority homeownership. Aided by economic expansion, historically low mortgage interest rates, and proactive efforts by industry and government, homeownership in America increased over the past decade to nearly 69 percent. Minority homeownership has also been increasing, but the homeownership rate for minorities remains significantly behind that for Whites. In the first quarter of 2007, 75.3 percent of Whites owned their home compared with only 51.3 percent of minorities, thus leaving a homeownership gap of 24.0 percentage points. Also worth noting is that households with a very low income had a homeownership rate that was 37 percentage points below the rate for high-income households.

The Bush administration has consistently held homeownership in high regard as an important policy issue. In 2002, President Bush put forth a challenge to the housing industry—from home builders and lenders to nonprofit organizations—to narrow the minority homeownership gap by working to create 5.5 million new minority homeowners by the end of this decade. Since the start of the President's initiative in 2002, the nation has realized a net increase of more than 2.5 million minority homeowners.

Three-Pronged Strategy

In 2003, HUD's Office of Policy Development and Research engaged in a three-pronged research strategy to increase its base of information about low-income and minority homeownership. This three-pronged approach is detailed as follows:

1. A first series of studies focused on identifying and understanding the major causes of the racial and income gaps in homeownership. This research confirmed that downpayment and closing cost constraints continue to be the single greatest obstacle to homeownership for many households and that efforts such as the American Dream Downpayment Initiative can help families overcome this hurdle.

2. A second series of studies focused on the homeownership experience of low-income and minority families over time. This research confirmed that low-income and minority households are making good initial choices in the homes they buy and that they are obtaining good-quality housing in decent neighborhoods. The study concluded that low-income and minority homeowners are as likely as others to reap the traditional benefits of homeownership.

An important set of findings for understanding existing racial gaps in homeownership, however, concerned the sustainability of homeownership: after minorities become first-time homeowners, they are more likely than nonminorities to return to being renters. This finding highlighted the importance of counseling and other programs aimed at helping families maintain homeownership.

3. The current homeownership rate for Hispanics is only 50.1 percent, approximately 25 percentage points lower than that for Whites. Thus, a third series of research studies examined barriers that Hispanics face in obtaining homeownership. That research examined the trends in the homeownership gap between Hispanics and other groups; the nature and causes of this gap, with an emphasis on special problems faced by Hispanics in the home purchase and mortgage markets; and what is known about the effectiveness of programs designed to help Hispanics become homeowners.

In This Issue

This issue of *Cityscape* may serve as an important reference for all interested in understanding the barriers and homeownership gaps that minorities and low-income families face in the U.S. housing and mortgage markets and the efforts of both government and private-sector entities to reduce these barriers.

We begin this issue of *Cityscape* with "Homeownership Gaps Among Low-Income and Minority Households," by Donald R. Haurin, Christopher E. Herbert, and Stuart S. Rosenthal. This article provides a synthesis of what is known about the determinants of gaps in homeownership rates by income, racial, and ethnic status. The concentration is on comparing non-Hispanic White ownership rates with those of African Americans, Hispanics, and Asians.

The next article, "Factors Affecting Hispanic Homeownership: A Review of the Literature," by Alvaro Cortes, Christopher E. Herbert, Erin Wilson, and Elizabeth Clay, describes the demographic and socioeconomic characteristics of the U.S. Hispanic population and how these characteristics relate to the Hispanic homeownership gap. The article also identifies the main barriers to Hispanic homeownership, including both demographic and socioeconomic attributes of the Hispanic population and a variety of housing market factors, such as the supply of mortgage financing.

Continuing the theme of potential hurdles for minority homebuyers, Thomas P. Boehm and Alan Schlottmann contribute "Mortgage Pricing Differentials Across Hispanic, African-American, and White Households: Evidence From the American Housing Survey." A principal goal of this article is to examine the extent to which differences in the interest rates obtained by homeowners of different race/ethnicity and income levels can be explained by differences in the characteristics of the borrowers, the properties, and the loans themselves.

In the next article, Zhu Xiao Di and Xiaodong Liu examine "The Importance of Wealth and Income in the Transition to Homeownership." They investigate the probability of becoming a homeowner during a 15-year period, using Panel Study of Income Dynamics data. As might be expected, the findings confirm that both household income and wealth are important to the transition to homeownership, with wealth being a more important predictor than income regarding whether minorities become homeowners.

The concluding article, by Christopher E. Herbert and Winnie Tsen, utilizes Survey of Income and Program Participation data to investigate "The Potential of Downpayment Assistance for Increasing Homeownership Among Minority and Low-Income Households." The results suggest that downpayment assistance programs that provide even modest amounts of assistance can significantly impact the number of low-income and minority households that buy homes.

Conclusion

Over the past decade, government and industry groups have made enormous efforts to improve homeownership opportunities for low-income and minority homebuyers. Industry underwriting guidelines have been made more flexible to deal with the special circumstances of low-income and minority groups, and new affordable mortgage products have been introduced and targeted to disadvantaged groups. Despite these efforts, more improvement is needed if we are to continue making progress. It is hoped that the research presented in this publication will lead to further innovation and support for programs and policies that promote minority and low-income homeownership.

Homeownership Gaps Among Low-Income and Minority Households

Donald R. Haurin
The Ohio State University

Christopher E. Herbert
Abt Associates Inc.

Stuart S. Rosenthal
Syracuse University

Abstract

Although homeownership rates currently stand at historically high levels for all segments of the U.S. population, large gaps in homeownership rates remain when comparing various groups of the population. As of the third quarter of 2006, the non-Hispanic White (hereafter, White) homeownership rate was 76 percent while African-American and Hispanic homeownership rates were below 50 percent and the Asian homeownership rate was 60 percent. The homeownership gap between African-American and White households was larger in 2006 than it was in 1990, while the homeownership gap between Hispanics and Whites was only slightly smaller in 2006 than it was in 1990. Households with very low incomes had a homeownership rate that was 37 percentage points below the rate for high-income households. These gaps have changed little over the past 50 years. The primary goal of this study is to synthesize what is known about the determinants of gaps in homeownership rates by income status and racial and ethnic status. We first present a conceptual framework for analyzing the determinants of homeownership. We then review the literature that identifies the relative importance of various contributing factors to observed homeownership gaps, separating the factors into those that are observed and those that are part of an unexplained residual that represents unmeasured factors such as discrimination, lack of information about the homebuying and mortgage financing processes, and omitted socioeconomic variables.

Introduction

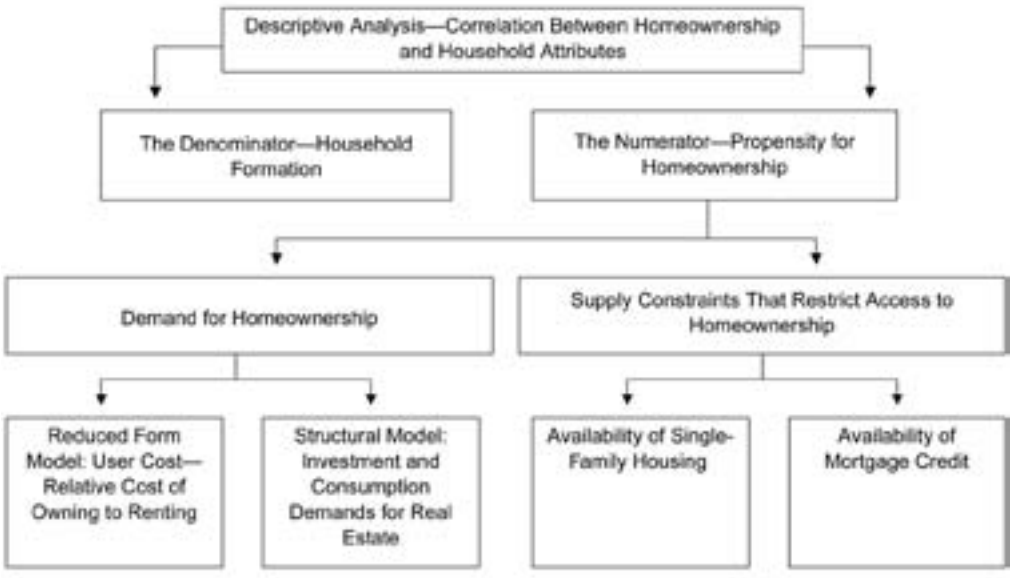
The primary goal of this study is to synthesize what is known about the determinants of gaps in homeownership rates by income status and racial and ethnic status. Our focus is on comparing non-Hispanic White (hereafter, White) homeownership rates with those of African Americans, Hispanics, and Asians. We first present a conceptual framework for analyzing the determinants of homeownership. This framework is used to identify which factors contribute to observed homeownership differentials. We then review the literature that identifies the relative importance of various contributing factors to overall observed homeownership gaps.[1] Homeownership gaps are separated into two components: one is the share of the gap that is explained by observed differences in socioeconomic variables among income groups and racial and ethnic groups and the other is an unexplained residual that represents unmeasured factors that include discrimination, lack of information about the homebuying and mortgage financing processes, and omitted socioeconomic variables. We report the consensus opinion about the size of each component and identify areas in need of further study.

Conceptual Framework of the Determinants of Homeownership Gaps

What explains the differences in homeownership rates among households? Exhibit 1 describes our framework. We begin with a discussion of the role of household formation, an often-overlooked factor in the discussion of gaps in homeownership rates. Next, the propensity for homeownership is separated into demand and supply factors. Under the category of demand factors, we discuss the user cost approach and the consumption-investment model of households' choice of whether to

Exhibit 1

Conceptual Framework



own or rent. Regarding the supply side, both the location of single-family dwellings and mortgage market constraints may affect homeownership rates.

Household Formation

Although often overlooked, differences in the propensity to form a household could contribute to gaps in homeownership rates. Factors contributing to differences in household headship rates include differences in marriage, divorce, and widowhood rates; differences in the typical age that a youth leaves the parental home; and differences in tendencies to reside in group quarters such as college dormitories and prisons. Our review of the literature finds that substantial changes in these factors have occurred during the past 30 years and substantial differences in headship rates are present when comparing income groups and racial and ethnic groups. We conclude that household formation is potentially very important to the explanation of why gaps in homeownership are present and how these gaps have changed, but the existing literature that measures the impact is sparse.

We begin with some definitions. A housing unit is counted as owner occupied if the owner lives in the dwelling unit. If the owner is absent and the unit is occupied, then the unit is counted as renter occupied.[2] By definition, the number of households equals the total number of occupied housing units. A household includes all individuals living in a housing unit. Thus, a household may consist of an individual, a family, a group of unrelated individuals, multiple families, or mixtures of families and individuals living in the same housing unit. A housing unit is separate living quarters with direct access to the outside through common halls. Residents excluded from the count of households include institutionalized individuals in group quarters such as nursing homes, prisons, and mental hospitals and noninstitutionalized individuals in group quarters such as dormitories, military quarters, and religious quarters. Thus, individuals living in census-defined group quarters are excluded from the count of households.

Under these definitions, comparisons of homeownership rates among racial and ethnic groups and changes in homeownership rates must be interpreted with care. For example, an increase in the homeownership rate occurs if the number of owners remains constant but the number of households shrinks. The number of households shrinks if two individuals living apart marry and live in a single dwelling or if two individuals living apart double up and share a single dwelling unit. If both households were renting before the move, this change boosts the homeownership rate even if the new couple lives in a rental unit. If the couple chooses to own, the homeownership rate is further increased. Differences in the rate of homeownership among various income, racial, and ethnic groups could be explained, in part, by differences in the amount of doubling up, marriage, divorce or separation, and living with parents or other relatives or by the share of the population living in group quarters.

Theoretical insights about household formation are derived from both economic and sociological perspectives. Garasky, Haurin, and Haurin (2001) argue that African Americans and Hispanics face discrimination in the housing market, limiting their choice of dwellings. Compared to White youths, who do not face such discrimination, this limitation may delay minority youth homeleaving and increase the likelihood that minority youths live in groups after leaving their parents' homes. Haurin, Hendershott, and Kim (1993) argue that the cost of independent living is an

important determinant of whether a youth leaves the parental home, where this cost is measured by the cost of both renting and home purchase in the locality. Ermisch and Di Salvo (1997) and Ermisch (1999) show that, given empirically reasonable assumptions about the price elasticity of demand for housing, higher housing costs will lead youths to remain longer in their parents' homes. Haurin, Hendershott, and Kim (1993) argue that the likelihood of a youth forming a household depends upon the youth's ability to earn income as measured by his or her wage or income.[3] Garasky, Haurin, and Haurin (2001) extend this model to examine grouping up versus living alone. They argue that the greater a youth's income is and the lower housing prices are, the higher the proportion of youths who will choose to live alone. These arguments suggest that youths with low-earnings ability and youths living in high-housing-cost localities will tend to remain longer in their parents' home, and, when they exit the parental home, will be more likely to live in groups. Both factors tend to reduce the headship rate for low-income and minority youths, where the headship rate is defined as the ratio of household heads to the total population.[4]

Another factor driving differences in headship rates are differences over time or among groups in the rates of marriage, partnering (defined as unmarried couples living together), and remarriage. Divorce, for example, creates two households from one, unless one of the individuals decides to live with an existing household (for example, relatives, friends, or another partner). Marriage, in contrast, merges two households into a single unit.

As alluded to earlier, a related factor concerns the definition of which individuals are included in the count of households. Individuals living in census-designated "group living arrangements" are excluded from the count of households and thus from the calculation of the homeownership rate. If individuals move from living alone to a college dorm, military housing, or prison, the count of households falls. Because young adults are most likely to be drawn from the renter population, such movements generally will cause homeownership rates to increase. Racial differentials in the rates of living in group arrangements could affect homeownership gaps.[5]

Hendershott (1987) studied the impact of household formation on the homeownership rate in the 1960–85 period. He reported that headship rates increased for all age categories during this time period. Also, substantial changes occurred in the age distribution due to the baby boom and subsequent baby bust that impacted the overall U.S. headship rate. Hendershott found that the impact of these changes in headship on the homeownership rate was potentially fairly large relative to the magnitude of changes in overall homeownership rates. If the age distribution and the homeownership rates of specific household types had remained constant from 1960 to 1985, the homeownership rate would have fallen by 5.3 percentage points from 62.3 to 57.0 percent. Instead, the observed homeownership rate rose from 62.3 to 63.8 percent because of the substantial increase in average age and changes in the homeownership tendencies of specific household types (for example, married couples). Hendershott did not analyze homeownership or headship rates by income level, race, or ethnicity; thus he shed no light on our topic. His finding that the changes in household formation had an impact on the homeownership rate of 6.8 percentage points, holding constant the tendency to own a home for a family of given characteristics, however, shows the potentially large impact that changes in headship rates can have on homeownership rates.

A recent study by Haurin and Rosenthal (in press) revisited this issue and found that although changes in headship behavior have occurred since 1970 and these changes have affected home-

ownership rates, the net effects have been somewhat modest. They found that African-American homeownership rates in 2000 would have been roughly 3 to 5 percentage points higher, especially for individuals in their 20s and 30s, if African Americans formed households as White families do. For Hispanic families, the opposite holds true: Hispanic homeownership rates would be 2 to 4 percentage points lower, especially for individuals in their 20s and 30s, if Hispanic families formed households in a manner comparable to that of White families. Thus, differences in headship behavior help to increase the size of the White–African-American homeownership gap, while the reverse is true for White-Hispanic gaps in homeownership rates. These effects are modest, however, relative to the size of the overall gaps.

User Cost and the Relative Cost of Owning to Renting

The most common approach to modeling the tenure choice decision is the user cost method. In this approach, the relative cost of owning compared with renting is calculated and used as a key explanatory variable in a model of housing tenure choice (conditional on household formation). The relative cost can be interpreted as the cost to an owner occupier of one dollar's worth of housing in the rental market. For many owner occupiers, that cost is less than one dollar because of expected home price appreciation and a variety of local and federal tax policies that implicitly favor homeownership. When the relative cost of owning is low compared with the cost of renting—holding constant the quality of the housing unit—households are more likely to become owner occupiers. We characterize this method as a reduced form model because user cost studies typically do not distinguish between consumption motives for owning real estate and investment portfolio motives for owning the primary home. Early examples of the user cost approach include studies by Laidler (1969), Aaron (1970), and Rosen (1979). The user cost varies across households because of differences in multiple factors, such as the effective marginal income tax rates (a measure of the sensitivity of the family to the favorable tax treatment of homeownership), the expected length of stay in the home (which affects the discounted transaction cost of buying and selling real estate), maintenance and depreciation costs, and the expected appreciation of the value of the home.

In the United States, homeowners are not taxed on imputed rent[6] from their dwellings and are allowed to deduct mortgage interest and property tax payments but are not allowed to deduct maintenance expenditures. In contrast, landlords are taxed on their cash rent but are allowed deductions for mortgage interest, property taxes, and maintenance. Assuming competitive rental markets, tax provisions that favor landlords are passed on to tenants while owner occupiers benefit directly from the favorable tax treatment of homeownership. On balance, Rosen (1979), King (1980), and others have shown that the net effect of these tax provisions is to subsidize the cost of homeownership relative to rental housing for many families. Using data from the 1981 American Housing Survey (AHS), Hoyt and Rosenthal (1990) estimated that the average cost to a U.S. owner occupier of one dollar of housing is roughly 73.5 cents. Moreover, because the value of the favorable tax treatment of homeownership increases with the family's marginal income tax rate, this figure differs across households.[7]

A second source of variation in the user cost of housing is the expected capital gain on the home. Historically, house price movements have been quite variable across regions. In the long run, however, efficiency in the real estate market would impose some discipline on these house price

movements and ensure that risk-adjusted rates of return would be similar across locations. Over a shorter time horizon, however, it is likely that expected capital gains on housing would differ across regions and cities. This would give rise to regional differences in the user cost of owner-occupied housing.[8] In principle, of course, capital gains benefit both landlords and, by extension, renters, as well as owner occupiers. Historically, however, the tax code has treated capital gains for owner occupiers more generously than for landlords.[9] As a result, higher expected capital gains likely reduce the user cost of owner-occupied housing, especially for families in higher tax brackets.

The above argument depends implicitly on the time horizon of the prospective owner occupier, a horizon that in turn is sensitive to the anticipated length of stay in the home. Length of stay in the home also has a direct and powerful effect on the relative cost of owning to renting. When buying and selling their homes, owner occupiers incur substantial transaction costs, which renters do not incur. REALTORS®, for example, typically charge 6 percent of the house value for their services. Add to this substantial legal fees, administrative costs, and taxes, and Linneman (1986) estimated that the cost of buying and selling a home is roughly 12 percent of the property value. The discounted value of these transaction costs, however, declines with length of stay in the home. Rosenthal (1988) formally incorporated these transaction costs into a user cost measure of owner-occupied housing and found evidence consistent with the idea that transaction costs and tax-related costs both have a similar influence on homeownership decisions.[10]

A number of other variations and modifications to the user cost of owner-occupied housing are present in the literature. Other economic and demographic variables are often included in the model in an ad hoc manner. All such studies, however, share certain features. First, they rely heavily on the tax code to generate variation across households in the relative cost of owning to renting. Second, investment motives for owning real estate are rarely taken explicitly into account. Some studies incorporate investment aspects in the user cost measure by including the opportunity cost of housing equity as the foregone return on alternative financial investments, but related dimensions of risk and uncertainty are largely ignored (exceptions include Chinloy [1991] and Hendershott [1997]). Instead, most user cost studies implicitly portray households as seeking the least expensive quality adjusted price for housing services, and, in that respect, implicitly treat housing as a pure consumption good. A different approach to modeling the decision to own or rent the home is based on more explicit consideration of the investment aspect of housing, which is presented in the next section.

Investment and Consumption Demands for Real Estate

In this section, we present a theoretical framework of the tenure decision developed by Henderson and Ioannides (1983, 1987) that focuses on the interplay of investment and consumption demand for housing. If the investment demand for housing for a given household is large relative to consumption demand, the household could choose to own a home that satisfies its portfolio motives, including the option to rent out any remaining unwanted space (for example, a basement suite or second house). Alternatively, if a household's consumption demand is large relative to investment demand (for example, when household size is large but the household believes house prices will decline), purchasing a home sufficient to satisfy the consumption needs of the household would

constitute a bad investment. In this case, the household is financially better off if it satisfies its consumption demand by choosing to rent its principal residence.[11]

The Henderson-Ioannides model, although stylized, offers guidance on organizing the demand side of the literature on the determinants of housing tenure choice and homeownership gaps. On the consumption side, all the usual determinants of consumer demand are likely to apply (for example, household size, income, and control and security of the dwelling) and thus need little elaboration. On the investment side, we noted previously that a number of factors affect the rate of return on housing investments such as tax treatment, transaction costs, maintenance and depreciation, and appreciation rate. Ioannides and Rosenthal (1994) found that investment demand is more sensitive to wealth and income than is consumption demand, although consumption demand is more sensitive to demographic variables and proximity to urban suburbs.[12] These last findings have particular implications when using the model to explain gaps in homeownership rates as will become apparent in the following paragraphs.

An important component of the consumption-investment model is the inclusion of risk as an important factor in a household's tenure choice decision. The characteristics of the housing stock may vary across geographic locations in a manner that affects the risk and return on homeownership and resulting homeownership rates. The risk of substantial maintenance and renovation costs is greater in older housing (Emrath, 1995, 1997). This housing is typically located in inner-city areas. Furthermore, inner-city areas tend to be populated by low-income and minority households. Because low-income households are less able than other households are to absorb financial shocks such as catastrophic housing repair bills, they are less likely to prefer owner occupation of housing located in inner-city areas. Evidence shows that the variance of house price changes is larger for houses with relatively low prices (Belsky and Duda, 2002), suggesting the risk of investment is greater for these houses. Because low-priced houses are mostly purchased by low-income households, the Henderson-Ioannides model suggests that this high variance will deter the likelihood that these properties will be owner occupied. Sinai and Souleles (2005) suggested that owner-occupied housing provides implicit insurance against housing rent appreciation. Thus, in cities prone to bursts of housing rent appreciation (such as large cities with land supply constraints), a benefit of owner-occupied housing is the protection one gains against such effects. The researchers found evidence to support the idea that cities subject to historically higher levels of housing rent volatility have higher homeownership rates for particular age groups. Among households under roughly age 40, no evidence exists of differences in homeownership rates between those living in high-rent-volatility cities and those living in low-rent-volatility cities. Beginning at about age 38, however, households living in high-volatility cities become increasingly likely to own compared with households living in low-volatility cities, with the difference peaking at about 5 percentage points at age 68. Thereafter, differences diminish and disappear altogether by age 80.

Another factor that explains observed racial and ethnic gaps in homeownership rates is differences in household incomes. It is likely that investment demand rises with income faster than it does with consumption demand, suggesting the likelihood that homeownership will rise with income. Also, the tax advantages of homeownership rise with household income. On average, African-American and Hispanic households have markedly lower incomes than White households and, thus, we should expect that these minorities are more likely to be renters.[13] A related factor is

income risk. Haurin (1991) found that households with high expected volatility of future income tend to rent even after controlling for other factors. Davidoff (2006) provided similar evidence by demonstrating that individuals with incomes closely tied to the local real estate market were less likely to be owner occupiers than renters, all other things being equal. In addition, Rosenthal (2002) found that households that know what their income will be 1 year ahead are 6 percentage points more likely to own, while households in which the household head works full-time are 10 percentage points more likely to own.[14] Together, results from these studies suggest that job stability and income security are important predictors of the demand for homeownership. Such behavior on the part of households is rational because a household with an uncertain income stream and/or insecure employment is likely to be more risk averse. Because housing is a potentially risky asset, homeownership is less appealing for such households. Moreover, given that African-American and Hispanic unemployment rates have been persistently higher than unemployment rates for comparable White households, these factors would clearly contribute to elevated homeownership rates of White households compared with those of minorities.

Similarly, African Americans and Hispanics are less wealthy than Whites are. Although greater wealth likely increases both investment and consumption demand for real estate, it seems likely that increased wealth raises investment demand more than consumption demand does and thus high-wealth households are more likely to be owners.

Lower mobility implies that the transaction costs of owning a home can be spread out over a longer period. In the user cost framework, spreading out the transaction costs reduces the per annum relative cost of owning compared with renting, increasing the likelihood of homeownership. Similarly, lower per annum transaction costs increase the rate of return on investing in owner-occupied housing, and that in turn increases investment demand. Accordingly, the investment-consumption model also predicts that lower mobility rates imply higher homeownership rates. Quigley (1987) reported that married households are less mobile than single-headed households. Moreover, as was noted previously, African-American households have a substantially lower marriage rate than White households have. These differences contribute to differences in mobility rates by race and ethnicity. The 1-year and 5-year mobility rates for Hispanics are greater than those for Whites; the 1-year rate for African Americans is also greater than that for Whites, although the 5-year rate is about the same for both African Americans and Whites (Haurin and Gill, 2002; Herbert et al., 2005; Schachter, 2004). On balance, both the user cost and investment-consumption models predict that lower mobility among married and White households helps to explain higher rates of homeownership among these groups compared with the homeownership rates of unmarried and non-White households.

Both the user cost and investment-consumption models also suggest that expected house price appreciation and capital gains should influence the likelihood of homeownership. Although the empirical literature about house price appreciation is relatively well developed, few articles specifically focus on racial and ethnic differences in appreciation rates. The limited attention to racial and ethnic differences in house price appreciation presumably reflects implicit assumptions that house price appreciation rates are similar for White and non-White households. But, in a discriminatory environment, this may not be the case. Suppose, for example, that in-movement of minority households contributes to "White flight" from the local neighborhood because of discriminatory

attitudes. Under these conditions, the arrival of minority households would reduce demand for housing in the neighborhood, resulting in a decline (or lower rate of increase) in real property values, all other things being equal. On the other hand, limited housing supply for minority households could lead to greater sensitivity of house prices (at least in the short run) to variations in demand. For example, an influx of minority households to inner-city areas already populated by minorities could lead to a strong appreciation of house prices in these areas. Hispanic immigrants settling in predominately Hispanic areas of cities could precipitate this effect.

Pollakowski, Stegman, and Rohe (1991); Badcock (1989); and Kiel and Carson (1990) found that low- and high-value houses have similar appreciation rates; both these rates are higher than those of mid-value houses. Li and Rosenblatt (1997) argued that appreciation rates are likely to vary if the housing market is segmented, as may be true when comparing housing in predominately White areas with housing in other areas. Smith and Tesarek (1991); Delaney, Seward, and Smith (1992); Mayer (1993); and Smith and Ho (1996) found that property appreciation rates depend on the local economic climate. Mayer argued that high-price homes appreciate faster on average, but they also are more volatile. Smith and Ho (1996) found that lower price houses are more likely to appreciate as interest rates fall and income and employment rise. Belsky and Duda (2002) studied the period 1982 to 1998 and found that low-priced homes in Boston, Chicago, Denver, and Philadelphia had higher appreciation rates than those of middle- or high-priced homes in these cities. In summary, there appears to be no consensus in these studies about whether house prices rise at the same rate for all homeowners.

Only a few studies focus on racial and ethnic differences in house price appreciation. Coates and Vanderhoff (1993) found that the appreciation rates are similar for White and African-American households, controlling for metropolitan area-level variables, such as population and real income growth rates. They used AHS data for 1974 to 1983 but measured house price appreciation only in 2- and 3-year periods because of data limitations. Kiel and Zabel (1996) also used AHS data, selecting observations in three cities from the period 1975 to 1991 to study neighborhood-level house price appreciation. Comparing appreciation rates of African-American and White households, they found that the results for Chicago, Philadelphia, and Denver differed greatly. Kim (2000) studied Milwaukee and used 36,000 observations of property prices to measure house price appreciation for 111 neighborhoods. Kim found, in general, that the greater a neighborhood's minority population is, the lower its annual house price appreciation is. The range is from 5.7 percent in an all-White neighborhood (holding constant other factors at their mean values) to 1.5 percent in an all-minority neighborhood. Kim also found that annual house price appreciation in the poorest neighborhood is 2.6 percentage points less than it is in the wealthiest neighborhood. No breakout of the minority household category among African Americans, Hispanics, and other minority groups exists. Both of Kim's major findings are relevant for our review. If low-income and minority households' homes appreciate at lower rates than other groups' homes do, then low-income and minority households' return on housing is relatively lower than that of other groups' and their incentive to invest in owner-occupied housing is lower as well. This finding would suggest that at least part of the gap in homeownership rates might be explained by a rational investment decision. The primary drawback of Kim's study is that it is specific to one metropolitan area and the findings cannot be generalized to the national population. Missing from the literature is an analysis of a national sample of house price changes at the neighborhood level for a multidecade

period. This analysis is needed to determine whether differing appreciation rates contribute to differing investment returns for owner-occupied housing by income, race, or ethnicity. The current empirical literature suggests that African-American, Hispanic, and White households in particular cities should expect different rates of house price appreciation, but the expectations are likely city and time-period specific.

The Impact of Supply-Side Determinants on Gaps in Homeownership Rates

The conceptual framework is completed by considering supply-side factors that affect the ability of households to attain homeownership. We discuss three aspects of supply: the supply of mortgage credit, discrimination in mortgage markets, and the location of the supply of single-family houses.

The supply of mortgage credit has a direct effect on the ability of most low-income and minority households to buy a home. We review studies that discuss whether lenders choose to impose a downpayment or ration mortgage credit through interest rates. The nature of the loan contract exposes lenders to default and late-payment risk. Under certain market conditions, lenders may respond by offering credit at below-market clearing rates and then using credit scores to ration loanable funds to the lowest risk borrowers. We also review the many studies that provide empirical evidence on the extent and manner in which credit barriers restrict access to homeownership. An important finding from these studies is that borrowing constraints have impeded homeownership for younger households, minorities, and low-income households.

Partly in response to concerns about minority access to mortgage credit, beginning in the early 1990s, a variety of very low-downpayment mortgage products became available through conventional lenders. Given that research has consistently found that a lack of wealth is a significant constraint to accessing mortgage financing, these loan products offered the possibility of raising homeownership rates. Despite these mortgage product innovations, the very low level of wealth among minority renters is still a cause of concern. In 1998, half of African-American and Hispanic renters had close to $0 in net wealth.[15] For these households, even very low-downpayment mortgages will likely not be sufficient to make homeownership financially feasible. Moreover, these very low-wealth households may rationally prefer to rent rather than subject themselves to the financial risks that accompany homeownership. Another recent change in the mortgage market is that risk-based pricing is becoming common, with subprime loans growing rapidly. Racial differentials in the use of subprime loans have engendered controversies about their net benefits.

A related set of studies provides evidence of racial discrimination in mortgage markets. Such discrimination provides a different but clearly important explanation for differential access to mortgage credit. Because minorities often are of lower income and wealth and have less secure employment, they may be subject to statistical discrimination in loan markets to the extent that lenders use race and ethnicity as predictors of hard-to-observe risk attributes. Such behavior is illegal in the mortgage market. Nevertheless, a number of studies have provided evidence of discrimination in mortgage markets.

Another supply-side factor is the type of housing stock available in different neighborhoods. Single-family homes tend to be more conducive to owner occupation than older, multifamily buildings are. This observation could arise because of preferences for such housing among

prospective homebuyers; that is, households could view single-family housing and homeownership as complementary goods. In addition, single-family housing does not typically entail common property issues. In contrast, in a multifamily building, the management and maintenance of common space and controls for noise and safety create administrative costs when organizing the units into condominiums suitable for homeownership. For these reasons, access to single-family housing may foster homeownership. We report evidence in the following paragraphs that, among middle and higher income households, racial and ethnic gaps in homeownership largely disappear after controlling for central-city location and the type of structure in which the household resides (for example, single-family or multifamily). It is also documented that minorities of all income levels are more likely to live in high-density central-city housing than comparable White households are.

Credit Rationing. Why might some mortgage lenders turn riskier customers away rather than set higher interest rates? Stiglitz and Weiss (1981) suggested that three things happen when lenders set higher interest rates, one of which is good for lenders, but the other two are potentially costly. First, higher interest rates increase the rate of return on a loan, providing that the borrower pays the loan back in a timely manner. But, with higher interest rates, borrowers with a strong predisposition to make timely loan payments will likely drop out of the pool of prospective loan applicants as they become concerned about their ability to pay the loan back. Borrowers who are more comfortable with the possibility of making late loan payments or even defaulting will remain in the pool. This adverse selection reduces the quality of the pool of prospective loan applicants. With limited information, it is difficult for lenders to distinguish "good" from "bad" loan applicants. In addition, with higher loan rates, higher expected capital gains must be earned to justify homeownership from an investment perspective. Asset market theory and related empirical studies provide compelling evidence that higher expected returns are accompanied by increased price volatility and risk. As a result, with high loan rates, loan applicants have an incentive to invest in riskier housing knowing that their potential losses are truncated by their option to default. In this regard, higher interest rates contribute to borrower behavior that is costly to lenders, a phenomenon that is typically referred to as moral hazard. Because of adverse selection and moral hazard, it is likely that as loan rates increase, at some point the increased return on loan payments made in a timely manner will be offset by higher overall rates of late payments and default. For these reasons, Stiglitz and Weiss (1981) argued that lenders might set loan rates below market clearing levels and use nonrate terms to ration the supply of credit in the face of excess demand for loanable funds.[16]

Of course, lenders do have sufficient information to group loan applicants at least partially on the basis of observable differences in credit risk. For example, lenders are able to distinguish between those loan applicants with a history of problems in paying their credit card bills on time versus those that have a clean credit history. In this instance, Stiglitz and Weiss (1981) suggested that lenders would charge higher interest rates to the less creditworthy group, in effect pricing the perceived difference in risk directly through the interest rate.

Duca and Rosenthal (1994b) argued that fair lending laws and the threat of costly litigation create strong incentives for a given lender to offer similar loan rates to observationally distinguishable borrowers. They argued that this behavior would be especially likely in cases in which lenders thought that credit risk was correlated with politically sensitive characteristics such as race and ethnicity, gender, and age. Under these conditions, one might expect a sorting equilibrium to

emerge in which different lenders specialize in serving loan applicants of different credit risks; for example, a lender may become a specialist in subprime lending. Although lenders specializing in a given risk classification would offer similar loan rates to all prospective applicants meeting those lenders' credit standards, the credit market as a whole would then offer loan rates that would differ across borrowers on the basis of default risk.

Other considerations may preclude such a sorting equilibrium. As an illustration, suppose that non-White loan applicants, on average, pose a higher degree of default risk than White applicants do, given differences in wealth, income, and credit history. If the sorting equilibrium described previously prevailed, some lenders would offer lower interest rates to a largely White pool of borrowers, while other lenders would offer higher interest rates to a disproportionately non-White pool of borrowers. The political and legal obstacles to such differences in the racial and ethnic composition of borrowers across lenders could be large (Rehm, 1991a, 1991b). For example, in response to bad press and community pressure, in the early 1990s, Bank of America, N.A., Chemical Bank, and NationsBank announced plans to increase lending to non-Whites in the midst of gaining approval for mergers with other banks. Moreover, approval of Bank of America, N.A.'s merger by the Federal Reserve Board was conditional on the bank's meeting lending goals in poor neighborhoods (Thomas, 1992: A6).[17]

This discussion is predicated on the idea that lenders treat observationally distinguishable borrowers differently to earn higher returns. In that regard, the discussion satisfies definitions of "statistical" discrimination. Statistical discrimination occurs when lenders treat loan applicants less favorably on the basis of observable demographic attributes, such as race and ethnicity or gender in situations in which such traits are potential predictors of higher rates of late payments and default. As noted by Ladd (1998), in the mortgage and consumer loan market, statistical discrimination is illegal even though the expected return on pools of loans issued to two groups that differ on the basis of race and ethnicity or gender may differ (Ross and Yinger, 2002; Yinger, 1998).

Another change in mortgage markets over the past decade that has tended to reduce constraints imposed by conventional underwriting is the growth in subprime mortgage lending. Between 1993 and 2001, the number of loans reported under the Home Mortgage Disclosure Act (HMDA) by lenders primarily engaged in subprime lending increased 10-fold, from 100,000 to more than a million loans for refinancing and home purchases. Subprime loans provide borrowers an opportunity to obtain mortgage funding even if they have impaired credit, have income levels that are low compared with their housing costs or total debt levels, or seek loan amounts that exceed the value of their home. Before the advent of subprime lending, it was difficult for homebuyers or homeowners to find sources of mortgage financing if they failed to meet conventional underwriting guidelines. Although subprime lending increases borrowing opportunities for some households, borrowers face higher interest rates and fees to compensate lenders for the higher risks of these loans.

During the 1990s, most subprime loans were used to refinance existing mortgages and so were not used to spur increases in homeownership. In recent years, the number of subprime loans for home purchases has grown fairly rapidly—particularly among minority homebuyers—which means these loans could potentially contribute to increases in homeownership rates. Avery, Brevoort, and Canner (2006) reported that in 2005, 54.7 percent of the conventional home purchase loans originated

to African Americans were identified in HMDA data as high-cost loans, as were 46.1 percent of the conventional home purchase loans originated to Hispanics.[18]

Although subprime lending activity among minorities has increased markedly in recent years, we should emphasize that it is not clear whether this trend represents an increase in the availability of mortgage financing or whether minorities are paying more than necessary for their loans. A wealth of anecdotal evidence indicates that alongside the growth in subprime loans has come an increase in predatory practices that take advantage of borrowers' lack of familiarity with the mortgage market. These practices include charging fees and interest rates far in excess of that needed to offset risk; see, for example, the joint report on predatory lending by the U.S. Department of the Treasury and the U.S. Department of Housing and Urban Development (2000). In some cases, these loans also may be underwritten without regard to a borrower's ability to repay the loan, thus making default and foreclosure more likely. These predatory loans also include loan terms and conditions that limit borrowers' ability to get out of these problem loans. A number of studies have found that subprime lending appears to be disproportionately concentrated in African-American and Hispanic neighborhoods because subprime lenders have higher market shares in high-income minority areas than they do in low-income White areas (Scheessele, 2002). In many instances, however, these studies suffer from a lack of information about credit risk that is needed to demonstrate that subprime lending is inappropriately concentrated in minority neighborhoods. Exceptions include studies by Bocian, Ernst, and Li (2006) and Calem, Gillen, and Wachter (2004). Bocian, Ernst, and Li (2006) merged HMDA data with detailed information on borrower and loan characteristics from a large national database of subprime mortgage originations, including the borrowers' credit scores. They found that both African Americans and Latinos were one-third more likely than Whites with the same credit scores to get a high-cost loan. Calem, Gillen, and Wachter (2004) examined HMDA lending in Chicago and Philadelphia using better measures of neighborhood credit risk than those used in previous studies and found that, at least for African Americans, subprime lending shares are not fully explained by measures of risk at the neighborhood level. Although none of these studies are definitive, based on the limited evidence thus far, it is not clear whether the advent of subprime lending has had a positive impact on homeownership, given the higher interest rates, fees, and foreclosure risk associated with these loans.

The empirical literature presents convincing evidence that lack of wealth reduces the likelihood of attaining homeownership even if it is rational for the household to make the investment (Duca and Rosenthal, 1991, 1994a; Engelhardt, 1996; Haurin, Hendershott, and Wachter, 1997; Linneman and Wachter, 1989; Zorn, 1989). Mortgage lenders have traditionally required buyers to contribute to the purchase of a home. The purpose of the downpayment is to have the buyer share the risk of price fluctuations and thus ensure that buyers have an incentive to maintain the property and to avoid the cost of a foreclosure. Masnick (2001) reported that loan-to-value (LTV) ratios were relatively low in the early part of the 20th century, typically 50 percent in the late 1920s. In the 1930s, government-backed mortgages were developed and Fannie Mae came into existence. In the 1970s, the standard downpayment was expected to be 20 percent of the purchase price, with selected exceptions. Throughout the 1990s, the minimal required downpayment continued to fall. Freddie Mac introduced the Affordable Gold programs in 1992, consisting of a 5-percent downpayment program. Freddie Mac's Affordable Gold 97 program further reduced the downpayment requirement to 3 percent. Downpayment reductions to 0 percent have also been achieved.[19]

Homeownership may also be impeded by barriers that reduce access to credit, such as a lack of history for meeting past debt obligations, high current levels of debt, or a lack of documented income to support the extension of credit. A recent study by Rosenthal (2002) used data from the 1998 Survey of Consumer Finances to estimate the demand for homeownership while controlling for the influence of credit barriers. Central to the study are a set of survey questions that enabled the researcher to determine, a priori, whether the individual household perceived itself to have been subject to binding credit barriers of any type (for example, mortgage, auto credit, and consumer credit). Then, controlling for sample selection, Rosenthal (2002) estimated the demand for homeownership among households not subject to credit barriers and used the results to predict the demand for homeownership for the entire sample. Comparing predicted to actual homeownership rates provides an estimate of the influence of credit barriers on homeownership. For the U.S. population as a whole, Rosenthal estimated that credit barriers depress homeownership rates by a little more than 4 percentage points. The estimates were 4.1 percentage points for White households, 6.7 percentage points for Hispanic households, and just 1.3 percentage points for African American households. Although sampling variation and the normal degree of imprecision in such estimates must be kept in mind, these estimates suggest that credit barriers account for little of the overall racial and ethnic gaps in homeownership. Moreover, given that Rosenthal's study provided only modest controls for credit history (specifically, the study controls for history of late loan and credit card payments and evidence of past bankruptcies), the possibility of omitted variables remains. Omitted household attributes almost always work in the direction of inflating estimated race-related effects in the homeownership literature. These estimates, therefore, may provide an upper bound on the extent to which credit barriers exacerbate racial gaps in homeownership.

Rosenthal also summarized the influence of credit barriers on homeownership rates by income category. Among households in the upper half of the income distribution, credit barriers have little or no discernible effect on homeownership rates. Credit barriers, however, depress homeownership rates by roughly 7 percentage points among individuals in the 10th to the 50th income percentiles and by 11 percentage points among individuals in the bottom income decile. To put these estimates in perspective, Rosenthal also reported that, compared with households in the third income quartile, homeownership rates are 39.4 percentage points lower for households in the bottom decile, 24.9 percentage points lower for households between the 10th and 25th percentiles, and 14.1 percentage points lower for households in the 2nd income quartile. Thus, although credit barriers may account for an important portion of the gap in homeownership rates between households in the third and second income quartiles, in general, something other than credit barriers appears to drive much of the difference in homeownership rates between high- and low-income households.

Why did Rosenthal (2002) find that the influence of credit barriers on homeownership rates was so "low," especially with respect to racial gaps in homeownership? One possibility is the dramatic innovations in the mortgage market that have occurred since the late 1980s, including the dramatic growth in subprime lending described previously. Rosner and Fisher (2002) reported that in 1989, just 7 percent of home mortgages were issued with LTV ratios in excess of 90 percent, but that frequency increased steadily through the 1990s. The increase in high LTV loans reflects the introduction of an entirely new set of mortgage products in the past decade. These loan opportunities complemented the continued presence of longstanding low-downpayment mortgages issued through government-insured programs such as that of the Federal Housing Administration.

How do downpayment constraints affect racial and ethnic gaps in homeownership rates? Numerous studies using different data sets spanning multiple decades show that African Americans and Hispanics have substantially lower wealth than Whites do (Haurin, Hendershott, and Wachter, 1996; Herbert et al., 2005; Lusardi, Cossa, and Krupka, 2000). This difference in wealth, combined with the existence of downpayment constraints, likely contributed to the observed gaps in homeownership rates.

Another way that the downpayment constraint affects homeownership is related to the spatial distribution of minority households compared with that of Whites. Compared with Whites, minorities tend to disproportionately reside in the largest central cities and thus minorities are likely to pay a higher price for the same quality housing than Whites pay. This trend occurs because of the premium associated with proximity to the central business district and because house prices are positively correlated with metropolitan area populations. These higher prices make it more difficult to accumulate the needed downpayment and thus discourage renters from becoming homeowners.

This discouragement effect has been documented by Yoshikawa and Ohtake (1989), who used Japanese data and found that renters in areas with low land prices were more likely to save money to become homeowner and those in high-cost areas were more likely to give up on trying to become homeowners and thus effectively stopped saving money to purchase a home. Also, Engelhardt (1994) found some evidence that the high prices of houses discouraged renters from participating in a Canadian tax-advantaged plan designed to encourage households to save for their downpayments. Haurin, Hendershott, and Wachter (2001) found that as constant-quality house prices increased, renters' savings initially rose but then fell when house prices were very high. Their explanation for the reversal was that when house prices increased to high levels, renters' expectations of becoming homeowners fell.

As noted earlier, the downpayment constraint has been weakened substantially in recent years but the homeownership gap has not decreased in the past decade. Possible explanations include (1) the impact of the wealth constraint was relatively small and thus its elimination would have only a minimal effect (as suggested by Rosenthal [2002]), (2) the effect will take longer to work out because it takes a while for households to recognize the change in the market structure, and (3) the number of White renters near the margin of becoming homeowners was relatively large and thus relaxation of the downpayment constraint increased the number of White owners substantially (for example, moved homeownership forward in the life cycle), while the number of African-American and Hispanic renters near the margin of homeownership was smaller compared with the number of inframarginal minority renters.[20] Thus, relaxing the downpayment constraint would increase the homeownership rate for all households but not close the gap.

Discrimination in the Mortgage Market. We previously commented on statistical discrimination. A very different form of discrimination arises when lenders have a "taste" for discrimination. In this instance, lenders forgo profit-making opportunities to avoid doing business with a particular group of individuals (for example, minority loan applicants). This form of discrimination is illegal and also has been the subject of study. The most prominent approach used by studies in this area is to examine the accept-reject decisions on mortgage loan applications as a function of the characteristics of the loan applicants, including race and ethnicity. Munnell et al. (1996) is the most influential of these studies. Using HMDA data augmented with additional information on the attributes of

the loan applicants, the researchers found that, after controlling for loan applicant characteristics, African-American loan applicants in Boston in the late 1980s were 8 percentage points more likely to have their loan applications rejected than comparable White loan applicants were. The Munnell et al. (1996) study has been subject to numerous critiques. In response, the authors made their data available to other researchers and subsequent exhaustive examination confirmed the essential features of their results (see Carr and Megbolugbe [1993] or Ladd [1998], for example). The broad consensus emerging from these efforts is that discrimination has been present in mortgage lending at least through the 1980s and is likely still present today (Yinger, 1998).

Berkovec et al. (1998) found that African-American mortgage default rates were higher than White default rates after controlling for a variety of household attributes. Using Becker-type arguments (Becker, 1971, 1993), the authors argued that this result was consistent with an environment in which lenders apply less restrictive credit standards to African Americans and more restrictive standards to Whites. In addition, the authors also took care to note that omitted variables could potentially account for their results. A study by Cotterman (2002) that replicates the analysis of Berkovec et al. (1998) but incorporates credit score measures found that the inclusion of this variable generally renders the race effect statistically insignificant. Nevertheless, controversy stemming from the Berkovec et al. (1998) work became sufficiently energetic that the U.S. Department of Housing and Urban Development (1996) devoted an entire issue of *Cityscape* to comments on the work and responses by Berkovec and his co-authors. At the core of the debate were concerns about how omitted variables possibly would confound the interpretation of the outcome from default studies. Ladd (1998) summarized the central issues in this debate well when she wrote—

> … Working in one direction, the presence of the unobservable factors disproportionately increases the likelihood of Blacks defaulting on any approved loan. Working in the other direction, taste-based or profit-motivated discrimination decreases the likelihood of default for Blacks because fewer loans are approved to that group.

In other words, omitted factors related to discrimination could serve to either increase or decrease African-American households' default rates relative to those of comparable White borrowers. For that reason, Ladd (1998) concluded that default studies are hampered by identification problems, but these problems are less severe in the context of accept-reject studies of mortgage applications such as Munnell et al. (1996).

The Availability of a "Suitable" Housing Stock for Homeownership

In 1975, Kain and Quigley (1975) suggested that because African Americans were concentrated in inner-city neighborhoods, residential segregation constrained the type of housing stock available to African-American households and thus might serve to limit homeownership among inner-city minorities.[21]

In part, Kain and Quigley (1975) motivated the idea of supply constraints by drawing an analogy to the then recently developed notion of a spatial mismatch in which suburbanization of manufacturing jobs coupled with suburban housing market discrimination reduces employment opportunities for African-American households. In the context of homeownership, Kain and Quig-

ley (1975) argued that single-family detached housing stock is more conducive to homeownership than multifamily housing is. Thus, if discrimination restricts access to single-family suburban neighborhoods, African Americans will disproportionately locate in central cities. Because central-city areas have higher levels of multifamily housing than the suburbs do, restrictions on access to suburban neighborhoods could limit homeownership rates among minorities. Kain and Quigley (1975) provided support for this idea by demonstrating that differences between African-American and White homeownership rates are higher in metropolitan areas in which the central cities have a lower share of single-family housing stock. They also showed that the share of African-American households living in the suburbs further reduces White–African-American gaps in homeownership rates, although this effect appears to not be as strong as the influence of the availability of central-city, single-family housing stock.

Both the original work by Kain and Quigley (1975) and more recent work by Herbert (1997) focused on a potentially provocative but also relatively little-studied idea: constraints on access to the supply of different types of housing (for example, single-family versus multifamily housing) might contribute to the relatively low rate of homeownership. The purpose of this section is to review the conceptual foundation for these ideas. First, we briefly review well-established arguments for why low-income households concentrate in central cities regardless of race or ethnicity. Next, we recognize that central cities exhibit higher land prices and, as a result, a greater frequency of high-density residential and nonresidential buildings. Discrimination and the historically low-income status of minorities together ensure that minority households will be segregated in central-city locations, reducing proximity to single-family housing. The question then arises concerning why this trend would necessarily reduce minority homeownership rates. Although it is beyond the scope of this study to answer that question, we speculate about some possible answers.

Stratification of Households by Income. A well-established principle in urban theory concerns the tradeoff between proximity to employment and house price. In the simplest economic model, all employment is located in the central city and residential locations differ only in their distance to the downtown area. Assuming that households dislike long commutes, in competitive markets the prices of houses far from the central city fall to compensate for longer commutes and a spatial equilibrium is attained. In practice, this scenario implies that the price per unit of housing is lower in the suburbs than it is in the central city.[22] As shown by Muth (1969), the rate at which quality-adjusted house prices decline with reduced proximity to employment centers is driven by the cost of commuting relative to housing demand. This model predicts that as incomes increase, if housing demand rises more quickly than marginal commuting costs do, high-income households will outbid low-income households for suburban sites suitable for larger homes with larger lots. On the other hand, by grouping lower income households together in multifamily structures, developers of high-density, low-income housing can outbid high-income households for central-city sites, even though such sites are close to the dominant employment center. Glaeser, Kahn, and Rappaport (in press) recently reexamined the idea that tradeoffs between commuting costs and housing demand lead to stratification of high- and low-income households into predominantly suburban and central-city locations. Using the AHS, they presented evidence that the income elasticity of demand for lot size is actually quite low. Unless the income elasticity of commuting costs is similarly low, the researchers argued that some other phenomena must account for the concentration of low-income households in the central cities.[23] In the end, they argued that low-income households

concentrate in the central cities at least in part to take advantage of public transportation essential for households with limited access to automobiles. Glaeser, Kahn, and Rappaport (2000) also presented evidence that services for the poor provided by the central city are more generous than those provided by suburban communities.

A third argument is markedly different; discrimination against minorities is present in the housing market (Turner et al., 2002). For example, "steering" by real estate agents could result in segregated neighborhoods. Given the low-income status of many urban minorities, it seems virtually certain that all three explanations help account for the continued concentration of low-income minority households in the central cities.

Central Cities, Multifamily Housing, and Homeownership Rates. The key question is whether the concentration of minority households in the central cities restricts minority homeownership rates. The "supply constraint" hypothesis posited by Kain and Quigley (1975) and Herbert (1997) argues that reduced minority access to single-family detached housing lowers minority homeownership rates because homeownership and single-family housing are complements. On the other hand, given the low-income status of many minorities, it is entirely possible that central-city minority households disproportionately rent because they prefer to do so, an outcome implied by the tenure choice model discussed earlier.

Using data from the 1999 AHS, we find that among high-income households almost no difference exists in homeownership rates by race and ethnicity among dwellers of single-family detached housing, regardless of location.[24] Nevertheless, the overall homeownership rate for high-income White households is nearly 10 percentage points higher than that for similar African-American and other minority high-income households. That difference is clearly driven by differences in the propensity to live in single-family detached housing and, more generally, to live in neighborhoods in which single-family detached housing is found. Racial and ethnic differences in homeownership are also quite modest among middle-income households after controlling for structure type and location, although these differences are not as small as they are among higher income households. Among low-income households, substantial racial and ethnic differences exist in homeownership rates across the board, regardless of location and housing type.

What could be driving these patterns? Alba, Logan, and Stults (2000) reported that—

> … middle income suburban Blacks live with many more Whites than do poor inner-city Blacks. But their neighborhoods are not the same as those of Whites with the same socioeconomic characteristics … middle class Blacks tend to live with neighbors who are less affluent than they are ….

Suppose that lower income inner-city neighborhoods are more subject to crime and other social ills than higher income neighborhoods are. The lower income neighborhoods would likely be viewed as riskier places in which to invest in owner-occupied housing. Unless such risks were offset by sufficiently high expected returns, we would expect higher income residents of such neighborhoods to exhibit lower homeownership rates than households of comparably high income in middle- and upper-income neighborhoods. Thus, neighborhoods accessible to middle-income and higher income inner-city minorities might be higher risk environments in which to invest in homeownership compared with neighborhoods available to Whites of similar income levels.

Returning to the tenure choice model addressed earlier in this article, all other things being equal, increased risk pushes down the housing investment demand function and reduces the likelihood that households would choose to become homeowners. The factors that cause the outcomes observed by Alba, Logan, and Stults (2000) could indirectly contribute to the observed racial gap in homeownership rates. For example, the underlying causal factors could include minorities facing discrimination in the housing market or racial differences in the taste for neighborhoods.

A related issue is the process governing the organization of units within a multifamily building into a condominium arrangement. Suppose, for example, that administrative costs associated with the organization of multifamily buildings into condominiums are present. Consider also the role of within-building neighborhood externalities and suppose that crime and noisy behavior are more prevalent in lower income buildings than in higher income buildings. Owners of low-income rental units may then prefer to own entire buildings instead of single units. This scenario would give property owners the ability to evict noisy or dangerous tenants. In contrast, in a multifamily condominium arrangement, owners of individual units would have less ability to police disruptive behavior within the building. This scenario might lower demand for the site and reduce the return to property owners because of lower rents. Nevertheless, if crime and noise were less prevalent among occupants of middle and higher income multifamily buildings, then one would expect such buildings to be organized into condominiums at a higher rate.

Empirical Studies of the Supply of Single-Family Housing and Homeownership Rates. McDonald (1974) provided further evidence to support Kain and Quigley's (1975) supply restriction hypothesis. McDonald's (1974) goal was to decompose the shortfall in African-American homeownership rates attributable to discrimination into a portion related to a lack of housing available for homeownership and a portion related to African Americans' inability to obtain mortgage financing. Using data gathered as part of the 1965 Detroit Regional Transportation and Land Use Study, McDonald (1974) estimated a set of simultaneous equations for the choices of homeownership and of occupying a single-family structure (including a duplex). McDonald (1974) argued that if a lack of single-family houses accounts for the entire shortfall in African-American homeownership, the coefficient on the race variable would be significantly different from 0 only in the equation predicting structure type and not in the equation predicting tenure, given structure type. His results suggest that of the total unexplained shortfall in African-American homeownership of 10 percentage points, 5.5 points were related to lower occupancy of single-family structures by African Americans and the remaining 4.5 points were related to lower homeownership of occupied single-family homes. McDonald (1974) attributed this shortfall to African Americans' relative inability to obtain mortgage financing.

Working in the opposite direction, Flippen (2001a) provided evidence that is not consistent with the presence of a single-family housing supply constraint. She examined the impact of segregation in his analysis of the Health and Retirement Study (HRS) for 1992. Using five different measures of segregation for 64 metropolitan areas, she found mixed evidence that the greater segregation is, the lower African-American and Hispanic homeownership is. Flippen (2001a) included the percentage of old dwellings and the percentage single-family dwellings as explanatory variables but neither was significant for African Americans and only the percentage of single-family dwellings was significant for Hispanics. Moreover, she noted that court-ordered busing in the 1970s resulted

in White flight in many central cities. One outcome of these events was an increase in minority access to the existing central-city stock of single-family dwellings as White households vacated such dwellings for the suburbs. Thus, court-ordered busing would serve to relax constraints on the supply of single-family housing for minority households.

Another paper that also casts doubt on the presence of a single-family housing supply constraint is recent work by Deng, Ross, and Wachter (2003). Using 1985 data from the metropolitan version of the AHS for Philadelphia, the authors estimated nested multinomial logit models of housing tenure choice that took neighborhood location within the Philadelphia metropolitan area into account. The study did not find any evidence to support the idea that racial differences in location within the metropolitan area affect homeownership. Research by Herbert (1997), however, indicates that Philadelphia has a much higher concentration of single-family housing in the central city than is typical of major cities in the United States. Moreover, the original Kain and Quigley (1975) work emphasized that it is the combination of segregation in conjunction with a concentration of high-density, central-city housing that restricts homeownership opportunities for minorities. To the extent that Philadelphia is highly segregated but otherwise offers a plentiful supply of central-city, single-family housing, then racial segregation in the Philadelphia housing market would not necessarily be expected to contribute to racial disparities in access to homeownership. Among the 50 metropolitan areas studied by Herbert (1997), Philadelphia was among the areas with the smallest unexplained residual in White homeownership rates compared with African-American homeownership rates. More generally, whether racial segregation in conjunction with high-density, central-city development patterns restricts minority homeownership remains an open question, an area in need of additional research.

Racial Gaps in Homeownership Rates

Despite the gains that minorities have made since the 1960s in both economic affluence and in legal protection from housing market discrimination, over the past 30 years, little improvement in minority homeownership rates has occurred compared with White homeownership rates.[25] Studies of racial and ethnic differences in homeownership rates can be characterized as identifying two broad categories of factors that contribute to minority households having a lower probability of homeownership. One category relates to differences between Whites and minorities in a range of demographic and economic factors. The other category relates to unobserved variables that include discrimination and a lack of households understanding the homebuying and mortgage finance processes.

Early studies of homeownership gaps assumed that the factors influencing households to become homeowners were the same for minorities and Whites and that both groups' behavioral responses to these factors were the same. The studies separated the gap into two components: one due to differences in endowments and the other to an unexplained residual amount. In these studies, the magnitude of the residual shortfall in the probability of homeownership attributed to race rather than endowments ranged up to 20 percentage points depending on the time period and the sample. Subsequent studies dropped these restrictive assumptions and followed a more general technique to decompose the homeownership gap into effects due to differences in socioeconomic variables and the residual amount.

Over time, a downward trend has occurred in the estimated size of the residual component of the White-minority homeownership gaps. Also, studies of newly formed households and recent movers found single-digit gaps in homeownership after differences in endowment were taken into account. The decreasing size of the residual could occur because recent studies have used a more comprehensive set of socioeconomic explanatory variables because the quality of data sets has improved. Or, the decreasing size of the residual could be due to a smaller impact of discrimination in the mortgage and housing markets. The latter conclusion is consistent with the establishment and enforcement of a number of policies that monitor mortgage markets and brokerage services and enforce fair housing laws. To date, most studies that have noted a decline in the residual component of the homeownership gap have attributed this change to reduced discrimination. By contrast, it is also clear that researchers are now including more and better explanatory variables in their analyses and thus reducing the size of the unexplained residual.

Current estimates of the residual gap appear to be in the range of 5 to 10 percentage points. This remaining unexplained gap may be accounted for by potentially important explanatory variables, such as a household's expected mobility, credit history, income variability, willingness to take financial risks, and understanding of the homebuying and mortgage finance processes, that generally have not been captured by these studies. A few recent studies have "explained" the entire racial gap in homeownership. These findings, however, should not be construed as providing evidence that existing antidiscrimination laws are obsolete. Rather, it is possible that the intertemporal decline in and current modest-sized, race-related residuals from homeownership gap studies result, at least in part, from government policies and oversight regarding discriminatory treatment in housing and mortgage markets. By contrast, the degree to which current government legislation has helped reduce the size of race-related disparities in homeownership is unknown.

A general criticism of existing studies is the lack of linkage between the theory of homeownership and the set of explanatory variables included in empirical studies of homeownership gaps. This failure results in the omission of important concepts (for example, income stability) and it complicates the interpretation of included variables. For example, age and marital status become proxies for expected mobility and income becomes a proxy for the tax benefits of homeownership. Furthermore, theory suggests that the effects of variables such as income and its interaction with the tax code should have nonlinear effects. Few studies of gaps in homeownership allow for such nonlinearities.

Another general problem with the literature on homeownership gaps is that it trails advances that have been made in the study of the propensity of a given household to become a homeowner. Most current studies of whether and when households become homeowners adopt an intertemporal approach, using information on changes in household circumstances over time to predict future choices. In contrast, apart from the occasional use of permanent rather than current income, studies of homeownership gaps are typically silent regarding intertemporal aspects of homeownership and instead rely exclusively on current household attributes to predict tenure choice. In many cases, studies of gaps in homeownership appear to have not advanced very much beyond methods used in the 1970s to estimate the probability of homeownership. In contrast, studies of the likelihood that individual households become homeowners have used panel data and related econometric methods for two decades. Although the homeownership literature recognizes that

a household's current tenure status will affect its future housing tenure choices, little recognition of this intertemporal dependence is given in the homeownership gaps literature. Although the literature on the propensity for homeownership also recognizes that expectations of future events affect current tenure choice decisions, the literature on homeownership gaps generally fails to take this point into account.

Two broad but compelling conclusions emerge from our review of the literature. First, additional efforts targeting discrimination in housing and mortgage markets and a lack of information about the homebuying process are unlikely to narrow racial gaps in homeownership by more than 5 to 10 percentage points. That in turn implies that future efforts to narrow aggregate White-minority gaps in homeownership should primarily focus on addressing the differences in household circumstances by race—including wealth, income, education levels, and marital status—which account for the large majority of the observed difference in rates. Indeed, that is the conclusion of a recent study by Gabriel and Rosenthal (2005) that examined the determinants of White-minority homeownership gaps from 1983 to 2001 using a common set of data (different years of the Survey of Consumer Finances [SCF]), variables, and methods. In that regard, the fact that so much of the homeownership gap is attributable to the generally lower socioeconomic standing of minorities suggests that policies that address broader societal factors will be needed to close these gaps. Factors that are important to supporting homeownership but may fall outside the range of homeownership policies include enhanced job opportunities, job security, marital status, and household stability. Creating an environment that is conducive to financial and household security for minorities is a challenging task but is one that policymakers must grapple with if they are to substantially reduce current racial gaps in homeownership. A second conclusion from this review is that considerable opportunities are present for further research to expand our knowledge of the determinants of income-related and race- and ethnicity-related gaps in homeownership.

Empirical Studies of Homeownership Gaps

Among earlier empirical studies, the dominant method used to control for race-related effects was to include dummy variables for racial status (for example, African American, Hispanic, and Asian). More recently, a number of studies have begun to adopt a "decomposition" approach that follows methods originated by Oaxaca (1973) and Blinder (1973). Applying this method to housing tenure, homeownership models are estimated separately by race and the coefficients from one group are used to predict the behavior of other groups while also being compared with the actual homeownership rates in the population. This approach separates total differences in homeownership rates into an endowment effect due to differences in household characteristics and a residual effect due to unexplained differences in the group including discriminatory treatment in the market.[26] This approach is more general than simply including racial dummy variables because it implicitly includes an entire set of interactive variables that allow race to modify the influence of all other variables included in the model (for example, income and age). The alternative dummy variable approach, in comparison, implicitly assumes that racial status shifts the propensity for homeownership by the same amount for all individuals belonging to a given race, regardless of income, household composition, and so on. Comparisons of results across decomposition and dummy variable studies should, therefore, keep these differences in mind.

Studies Using the Dummy Variable Approach. The first work to focus on homeownership gaps was provided by Kain and Quigley (1972), who studied households in St. Louis. Controlling for a variety of demographic factors, the researchers found that the likelihood of homeownership among African-American households was 8.8 percentage points lower than the likelihood of homeownership among comparable White households, when using a generalized least squares regression model.[27] Their control variables included income, education, job tenure, marital status, gender, age, household size, number of children, and prior housing tenure status. Clearly, some of the household attributes thought to influence homeownership were omitted and are likely reflected by the race dummy variable. In addition, the race dummy variable may reflect the influence of supply-side constraints, such as restricted access to single-family neighborhoods and mortgage credit.

Roistacher and Goodman (1976) replicated Kain and Quigley's (1972) method using data from the 1971 Panel Study of Income Dynamics (PSID) for the 24 largest metropolitan areas. They found that the race effect, as measured by a coefficient on a dummy variable for African Americans in an ordinary least squares (OLS) regression model, ranged from 17.0 to 19.1 percentage points. Roistacher and Goodman (1976) also estimated a logit model using the same data. When evaluated at the sample means of other variables, the logit model yielded an even greater disparity in homeownership associated with race of 26.3 percentage points. When Roistacher and Goodman (1976) studied a sample of recent movers, however, they found no difference in the likelihood of homeownership by African Americans or Hispanics. This study was the first to suggest that existing gaps would disappear over time as households relocated.[28]

Long and Caudill (1992) analyzed White–African-American differences in homeownership using the 1986 Current Population Survey (CPS). Their explanatory variables include permanent and transitory income, a measure of wealth derived by capitalizing income from investments, the fraction of income received from welfare, and dummy variables for age, employment status, veteran status, household size, the South region, central-city location, and race. They omitted expected house price appreciation, credit histories, mobility, income and job stability, and education. In addition, they deviated from most other studies by restricting their sample to married couples and excluding mobile homes. These restrictions make it difficult to compare Long and Caudill's (1992) results with those of other studies. Using the dummy variable approach, they found that being African American was associated with a 6.3-percentage-point lower probability of homeownership.

Krivo (1986) provided another study using the dummy variable method when she used AHS data from 1981 to study the homeownership gap between White and Hispanic households. Controlling for income, education, age, number of children, region, and urban location, she found that Hispanics were 10 percentage points less likely to own than Whites were. By contrast, Hispanics are not a homogeneous group and the residual component of the gap varied substantially across subgroups, equaling 26 percentage points for Puerto Ricans and 19 percentage points for Cubans but only 4 percentage points for Mexican Americans.[29] Krivo (1986) attributed these gaps to location, discrimination that causes segregation (for example, less-than-preferential treatment by real estate agents and mortgage lenders), and immigrant status and housing cost. Unlike other studies employing dummy variables for race, Krivo's study (1986) also explored differences in the explanatory power of individual household attributes both between Hispanics and Whites and across Hispanic subgroups. Nevertheless, she did not use the Oaxaca-Blinder method to decompose

the total gap into separate parts that were attributable to differences in endowments and to an unexplained residual.

Haurin and Morrow-Jones (2006), using 2005 survey data from Columbus, Ohio, focused on the role that the amount of information households had about the housing and mortgage markets played in the households' tenure decisions. They first estimated a standard model using typical explanatory variables (age, marital status, education, income, wealth, gender, immigrant status, and house price) and found a White–African-American residual of 15 percentage points. They then augmented the list of variables to include a measure of credit quality, the likelihood of moving, and a new measure of real estate market knowledge (all were statistically significant). The coefficient of the African-American dummy variable falls in value from 15 to 6 percentage points. Their final estimation that treated the real estate knowledge variable as endogenous further reduced the size of the dummy variable for African Americans to 3.5 percentage points, and it is not statistically significant. What factors explain the total gap in homeownership rates? Haurin and Morrow-Jones (2006) found that both credit quality and information about the real estate market are important and each explains at least 7 percentage points of the gap (the rest of the gap is explained by the standard set of explanatory variables). Although this study is limited to one geographic area and considers only White–African-American comparisons of homeownership rates, its findings suggest that in the current housing market environment, the impact of discrimination on the homeownership gap is minimal.[30] This study also emphasizes the importance of racial differences in the quantity of information about the housing and mortgage markets that renters have and the role that this information plays in facilitating homeownership.

The role that information about the real estate and mortgage markets plays in tenure choice decisions also is emphasized in two studies that found that Hispanics are less likely to have accurate information about homeownership than other populations are (Fannie Mae, 2003; Lee, Tornatzky, and Torres, 2004). This lack of understanding includes information about the homebuying process, the importance of a person's financial history, and the mortgage qualification process. There also is evidence that Hispanics have a lower level of financial literacy than other populations have and tend to distrust mainstream financial institutions (Congressional Hispanic Caucus Institute, 2004). The lack of a relationship with a financial institution leads some Hispanics to seek advice from informal sources such as a family member or friend or to rely on "cultural brokers" such as bilingual real estate agents, housing advocates, or lenders (Ratner, 1996). In some cases, these advisors are not a good source of advice. Focus groups conducted in 11 cities throughout the country suggest that Hispanics are quick to trust "anyone who speaks their language and knows their community," but often these trusted sources turn out to be predatory lenders and real estate agents (Congressional Hispanic Caucus Institute, 2004).

Recent evidence suggests that many Hispanics have poor credit, which hinders their ability to become homeowners. In a recent study, Bostic, Calem, and Wachter (2004) used data from the SCF (1989, 1995, 1998, and 2001 surveys) to assess trends in credit quality across various segments of the U.S. population stratified by demographic characteristics and they quantified the extent to which credit quality constraints play an important role in a household's decision to pursue homeownership opportunities. The researchers identified an individual as constrained by credit if his or her score was below 660 (or the 25th percentile of the score distribution).[31] Overall,

the study suggests that median credit scores across all individuals in the national sample increased from 721.3 in 1989 to 730.1 in 2001. The percentage of individuals who were credit constrained also increased slightly, from 19.3 percent to 24.5 percent, during the study period. The median score among Hispanics decreased from 695 in 1989 to 670 in 2001. The proportion of Hispanics who fell below the 660 threshold increased significantly from 25.4 to 48.5 during the same time period. Moreover, these results are especially dramatic for Hispanic renters. The predicted score decreased significantly for Hispanic renters from 685.2 to 623.7, and the proportion of credit-constrained Hispanics increased dramatically from 20.5 percent to 63.3 percent. The study, however, does not shed any light on the cause of these trends. Among the possibilities offered by the authors are that the large increases in homeownership during the 1990s occurred primarily among the highest credit quality renters among low-income and minority groups, which has deteriorated the average credit quality among remaining renters. The authors also speculated that changes in the characteristics of recent immigrants, who are more likely to be renters, may have contributed to the deterioration of credit quality among renters. Clearly, declining credit quality of minority renters will tend to keep homeownership gaps at high levels.

Studies Using the Oaxaca-Blinder Decomposition Approach. Silberman, Yochum, and Ihlanfeldt (1982) argued that past discrimination might restrict current opportunities and decisions to own a home. In addition, they argued that, although older households are less likely to change their behaviors even if laws and discriminatory practices change, younger households will respond to a changing environment. To examine these issues they evaluated homeownership probabilities for White and African-American households using PSID data for 1974 and 1978. Their primary approach was to estimate separate probit equations for African Americans and Whites and then statistically decompose the total racial difference in propensity to buy into a part related to differences in household characteristics and a part related to an unexplained residual. Although they found a large residual racial gap in homeownership of 22.5 percentage points in 1974, the race effect fell to 18.3 percentage points by 1978. In addition, the researchers tested their hypothesis that new households would be more responsive to changes in their environment (for example, new laws and less discrimination) by examining the propensity of newly formed households to become homeowners. Consistent with their arguments, the residual homeownership race effect was smaller for new households: 15.9 percentage points in 1974 and 8.2 percentage points in 1978. Based on the decline in race-related effects over their sample horizon, the researchers concluded that the influence of discrimination on homeownership diminished after 1974.

Wachter and Megbolugbe (1992) applied a modeling approach developed by Goodman (1988) to the 1989 AHS. They included a large set of explanatory variables, including measures of the relative costs of owning and renting; the expected appreciation in value of the occupied housing units; permanent and transitory income; and measures of race, age, marital status, and gender of the household head. They estimated separate models for African Americans and Whites and found a 6-percentage-point lower rate of homeownership for African Americans than for Whites after controlling for household endowments and related socioeconomic characteristics. This estimate is distinctive in that it is lower than estimates in most previous studies using data from a roughly similar time period. They also estimated separate models for Hispanics and non-Hispanics and found that of a total difference in homeownership rates of 40 percentage points, only 9 percentage points were unexplained by household attributes. Their approach differs from most other studies,

however, by not accounting for the race of either Hispanics or non-Hispanics in their estimated equations.

Myers and Chung (1996) focused on gaps in homeownership among preretirement White and African-American households ages 51 to 62 using data from the HRS for 1992. A distinctive feature of this data set is that it includes information about households' tolerance for risk. The HRS also provides controls for a large number of other household variables, including age, marital status, gender, number of dependents, income, education, health, religion, region, and a measure of cognitive ability. Not included in the Myers and Chung (1996) study were data on household wealth, mobility, expected house price appreciation, and income and job stability. Myers and Chung (1996) found that having a longer planning horizon had a positive effect on homeownership while risk-bearing preferences had no effect. Using the now-standard decomposition of the gap in homeownership, they found that the total 22.9 percentage point White–African-American gap was split into a 13.6 percentage point endowment component and a 9.2 percentage point discrimination and missing variables component.

Flippen (2001b) also used data from the 1992 HRS to study racial differences in homeownership rates among Whites, African Americans, and Hispanics. She included data on inheritances, age, marital status, number of children, health, cognitive ability, education, income, occupation, self-employment, retirement status, number of prior layoffs, retirement status, expected years of life remaining, region, urban location, risk tolerance, and length of planning period. This list is the most comprehensive of all studies published through 2001 and it includes proxies for hard-to-measure concepts such as income uncertainty and risk aversion. Even with all these controls, Flippen found that African Americans and Hispanics were significantly less likely than Whites were to be homeowners using the dummy variable approach. She then ran the equations separately and decomposed the 25-percentage-point White–African-American gap in homeownership into the part due to differences in endowments (24 percentage points) and the part due to the residual (1 percentage point). Thus, the part of the gap due to discrimination or other omitted factors had shrunk to a very small amount. Flippen then further decomposed the impact of endowments into the effect of each explanatory variable by assessing the impact on the gap of substituting the mean for Whites for a particular variable into the Black equation. Among the endowments, the contributions to the White-African-American gap in order of importance were marital status, income, occupation, health, inheritances, and education. The gap in White-Hispanic homeownership was 27 percentage points, of which endowment differences explained 21 percentage points, leaving a residual component of 6 percentage points. Differences in income and employment characteristics were the most important endowment factors for Hispanics.

A number of studies have focused on explaining the White-Asian homeownership gap (Coulson, 1999; Painter, Gabriel, and Myers, 2001). Coulson (1999) used a national sample (the 1996 CPS) to explain the disparity in White-Asian homeownership rates and found that all the differences in ownership could be explained by differences in age, location in high-cost states, and immigrant status. After all explanatory variables were controlled, Asians' homeownership rate became greater than that of Whites. Coulson and Kang (2001) and Painter, Yang, and Yu (2002) studied ethnic groups with Asian origins. Coulson and Kang (2001) used CPS data from 1996 to 1999 and defined five areas of origin for Asians: Japan, People's Republic of China (PRC), Korea/Singapore/

Hong Kong/Taiwan, Indian/Pakistan/ Bangladesh, and "other Asian." Observed homeownerships rates ranged from 39 to 63 percent. Explanatory variables in the homeownership estimation included income, age, education, marital status, gender, number of children, location (central city or suburban), ratio of owner house prices to rental rates, immigrant and citizenship status, and years in the United States. This set of variables explained the homeownership gaps quite well. Japanese, PRC, and "other" Asians experienced homeownership rates that were about 4 percentage points higher than predicted. Homeownership rates were about 7 percentage points lower than predicted for Asians from India, Pakistan, and Bangladesh and about 3 percentage points lower than predicted for Asians from Korea, Singapore, Hong Kong, and Taiwan.

Painter, Yang, and Yu (2002) used the 5-percent sample of the 1990 decennial census microdata and separated Asians into Chinese, Filipino, Japanese, Korean, Asian Indian, and "other Asian" groups. Their sample was drawn from three consolidated metropolitan areas: Los Angeles, San Francisco, and New York. These three areas contained about half of all Asians in the United States in 1990. Included as control variables in the researchers' explanation of differences in homeownership rates were age, marital status, education, household size, permanent and transitory income, house prices and rental rates, immigrant status, and duration of time in the United States. Homeownership was estimated only for recent movers, creating the possibility of sample selection bias. This problem was addressed by using the standard truncated bivariate model. One equation modeled the move-stay decision and the other modeled the homeownership decision.

Using the decomposition method, the researchers found that ethnic Chinese were 18 to 23 percentage points more likely to be homeowners than Whites were, all other things being equal. Asian Indians also were more likely to own than Whites were in all three locations, but the differences in homeownership rates were only 2 to 8 percentage points. Differences in homeownership rates when comparing Filipinos and Koreans with Whites were small and when comparing "other Asians" with Whites, the differences were 1 to 4 percentage points lower. Only Japanese in New York had a substantially lower homeownership rate than comparable Whites. The researchers argued that this difference was due to many Japanese in New York being students or business employees on temporary assignments. The explanatory variables that were the most important in explaining the gap depend on the particular group. Immigrant status is important, suggesting that the White-Asian homeownership gaps may close in coming decades as the recent large wave of immigrants is assimilated—although continued high rates of Asian immigration would serve to maintain the observed homeownership gaps.

Studies That Estimate Trends in Homeownership Gaps. Long and Caudill (1992) estimated a homeownership model using samples of married couples from the 1970 and 1980 decennial censuses and the 1986 CPS to provide an assessment of trends in unexplained White–African-American differences in homeownership. The results of their analysis suggest that race-related residual differences in homeownership rates declined over the 16-year period. They noted the 1970 White–African-American gap was 20.8 percentage points and claimed that it fell to 14.3 percentage points in 1986. Their measure of the total gap is lower than that for all households because of the restriction of their sample to married couples and, perhaps, because of the comparison of census data with CPS data. The researchers found that in 1970, 7.1 percentage points of the gap was due to racial differences (discrimination and other omitted variables) and that this

proportion of the gap fell to 2.6 percentage points by 1986. They concluded that, "housing market discrimination which restricts the opportunities for Blacks to own homes is relatively unimportant today, at least for Black households whose structure matches that of most White households (that is, husband-and-wife households)."

Gyourko and Linneman (1997) compared changes in homeownership rates for African Americans and other minorities between 1960 and 1990 to examine whether similarities occurred in the experience of racial minorities in homeownership trends. Using census data, the researchers showed that aggregate homeownership rates among non-African-American minorities increased by about the same amount as that of African-American households between 1960 and 1970 and between 1980 and 1990. Between 1970 and 1980, however, homeownership rates among African Americans increased by 3.2 percentage points, but, among other minorities, homeownership declined by 0.6 percentage points. The divergence of rates in the 1970s is due to multiple factors, but an important one is the difference in the composition of minorities in terms of share of natives and immigrants. In particular, the rate of immigration of non-African-American minorities was substantially larger than that of African Americans. Because recent immigrants tend to have relatively low homeownership rates, this difference in part explains the divergence in rates.

Gyourko, Linneman, and Wachter (1999) also examined changes over time in the effect of minority status on homeownership rates using the SCF (1962, 1977, and 1983 surveys).[32] They reported results for the typical White household and measured the impact of race by the change in the predicted probability of owning when race was changed to non-White. Results were reported for two different household types: wealth constrained and unconstrained. Among households without wealth constraints, minorities have a slightly higher predicted homeownership rate (holding other variables constant) than Whites do. For wealth-constrained households, the shortfall in homeownership due to race dropped sharply, from 25 to 6 percentage points, between 1962 and 1977 and then rose to 12 percentage points in 1983. A limitation of the study is that all minorities are grouped together, which confounds efforts to interpret the findings. A change occurring from 1962 to 1983 in the composition of the minority population could account for the variation in estimates from the different years. For example, African Americans far outnumbered other minority groups in 1962, but, by 1983, the Hispanic and Asian population had grown considerably and included substantial numbers of recent immigrants. Gyourko, Linneman, and Wachter (1999) concluded that, because little racial difference occurred in the likelihood of homeownership among households not subject to a wealth constraint, discrimination was not an important explanation for racial differences in homeownership after differences in endowments were taken into account. Instead, they contended that racial differences in homeownership were largely due to differences in wealth. An important concern about this study, however, is that the researchers treated wealth as exogenous even though the desire for homeownership has the potential to affect a household's level of wealth.

Bostic and Surette (2001) studied changes in homeownership among Whites, African Americans, and Hispanics between 1989 and 1998, when the U.S. average homeownership rate grew by 2.3 percentage points, or 8 million households. Using CPS data, they focused on household heads ages 22 to 60 and separated into five income categories. In 1989, the observed White–African-American gap was 28.8 percentage points, falling 2.0 percentage points by 1998. Over the same period, the

gap in the Hispanic homeownership rate fell by 1 percentage point. Bostic and Surette (2001) argued that the changes in the homeownership rate and the gaps could be due to one of three general factors: changes in household socioeconomic characteristics; changes in the regulatory environment (for example, the Community Reinvestment Act, Home Mortgage Disclosure Act, or the U.S. Department of Housing and Urban Development's affordable housing goals for Fannie Mae and Freddie Mac); or technological developments, such as credit scoring. In 1989, the component of the White–African-American gap not attributable to the explanatory variables ranged from 9.8 to 16.9 percentage points, depending on the income quintile. These gaps fell over the next decade by –0.6 to 6.0 percentage points; the reduction averaged 3.1 percentage points, somewhat larger than the change in the observed total gap. The comparable results for Hispanics were –0.1- to 4.4-percentage-point reductions in the gaps, averaging 2.1 percentage points. No clear pattern emerged of the size of the reduction in this residual gap across different income categories.

Collins and Margo (2001) studied changes in the homeownership gap between African-American and White male household heads ages 20 to 64 during the 20th century. For their data set, the gap decreased from 24.3 to 21.9 percentage points between 1900 and 1940. It then jumped to 27.3 percentage points in 1960, and subsequently fell to 19.6 percentage points in 1980, where it remained stable through 1990. The researchers used an OLS model, estimated separately for each census year, to explain homeownership with the following explanatory variables included in the model: African American; occupational status; age; literacy; geographic location (farm, urban, or suburban areas); region; marital status; household size; whether the household includes more than one family; native-born interregional migrants; and foreign-born status. Many sensible explanatory variables were omitted because of the limitations created by using census data, especially that from the early 1900s. The coefficient of the African-American indictor variable declined fairly steadily from 1900 to 1990, implying that unexplained factors causing the gap decreased in importance over time. This insight is relatively powerful because Collins and Margo (2001) included the same list of explanatory variables in every census year regression. Their analysis suggests that the cause of the increase in the gap between 1940 and 1960 was mostly due to a change in the levels of the explanatory variables, particularly the level of urbanization of African Americans (suggesting the importance of supply-side effects). The rest of the change was due to changes in behavioral responses to the explanatory variables, particularly education. After 1960, only 40 percent of the reduction in the gap was explained by changes in endowments or behavioral responses; thus, the majority of the reduction was due to unmeasured factors. The researchers noted that this finding is consistent with fair housing policies having had a positive impact on homeownership rates for African Americans.

Multiple limitations of the Collins and Margo (2001) study exist. First, the elimination of female-headed households from the sample, combined with the increase in the percentage of households that are female headed over time, masks substantial changes in the homeownership rate. Clearly, the overall homeownership rate was pulled down after 1960 by the increase in the percentage of households that are headed by single females. The analysis was limited to households under age 65, a restriction that likely reduced the size of the gap because of the high homeownership rate of household heads age 65 or older and the longer average lifespan of Whites. Finally, the list of variables omitted from the analysis is large.

Another study focusing on the same wide sweep of time is Masnick (2001). The researcher included all households in the analysis, not just male household heads ages 20 to 64, he found different trends during the 20th century than Collins and Margo(2001) did, most importantly a much larger gap in 1980 and 1990. Masnick's (2001) most important contribution is noting the durability of the White–African-American gap for an age-specific cohort as the member's age. For example, if the gap was particularly small for a cohort ages 20 to 29 in year t, then the gap tends to remain small in years t + 10, t + 20, and so on. At any point in time, the total observed gap for a racial group is the weighted average of current age cohorts' gaps. Thus, given the tendency of gaps for specific cohorts to continue over time, trends in homeownership rates and gaps depend on the gaps of the cohorts that are "exiting" the population and those that are entering the population.

Although research on the sustainability of homeownership is in its infancy, it is plausible that cohort-specific gaps persist over time because current homeownership tends to increase the likelihood of future homeownership. The implication is that if, for example, a public policy is implemented that increases the homeownership rate of young African-American households compared with that of White households, then this policy may impact the homeownership gap not only during the implementation period but also throughout these individuals' lifetimes. Furthermore, and more speculatively, if intergenerational transmission of tendencies to become a homeowner occurs, the impact of the public policy could be transmitted from one age cohort to its children.[33]

Gabriel and Rosenthal (2005) used data from the SCF to identify the factors associated with homeownership trends by race and ethnicity between 1983 and 2001. Their models controlled for household demographic characteristics and geographic location and also incorporated information on whether a household was constrained in its access to credit. The researchers found that roughly half of the average gap in Hispanic homeownership over the period they studied was explained by available variables (14 percentage points out of a total gap of 30 percentage points). The remaining portion of the gap is attributable to factors not captured in their models, including immigrant status and discriminatory treatment. Gabriel and Rosenthal (2005) also examined White–African-American gaps in homeownership rates but found that the included variables in their models explained a much larger share of the observed differences compared with gaps in Hispanic homeownership rates. On average, the included variables accounted for 19 percentage points of the total gap of 26 percentage points. The larger unexplained Hispanic gap may well reflect the barriers faced by the large share of immigrants among Hispanics. Credit barriers account for no more than 5 percentage points of the remaining gap. This observation suggests that policymakers will need to look beyond innovations in mortgage finance if their goal is to further expand homeownership.

Summary

Homeownership rates are, by definition, equal to the number of owner-occupier households in the population divided by the total number of households present. Thus, the propensity to form a household could contribute to income-related and racial- and ethnic-related gaps in homeownership rates, but in a complicated manner. For example, we know that African-American marital rates are far lower than White marital rates. That difference serves to increase the number of African-American households relative to White households. But, because single-headed households are typically more likely to rent than married households are, lower African-American marriage

rates likely have a less-than-proportionate impact on the number of African-American homeowner families. Because African-American marital status likely increases the numerator in the homeownership rate calculation by less than the denominator, the influence of marital status on household formation likely lowers African-American homeownership rates relative to those of Whites. More generally, our knowledge of the influence of household formation on homeownership gaps is in its infancy and requires further study.

Once a household is formed, what drives the decision to own versus rent a home? As a broad characterization, two conditions must be met in order for a household to become an owner occupier. The household must want to own its home, given its current financial and social status, and the household must be able to own a home. Because housing is a durable asset, demand for homeownership is sensitive to investment considerations and, therefore, is subject to all the considerations and factors that influence a household's preferred portfolio. In that regard, households sensitive to financial risk, such as low-income households, are less likely to want to own a home, all other things being equal. In addition, the return on homeownership is especially sensitive to household mobility, given the very high transaction costs of selling an owner-occupied home compared with moving from a rental unit. Evidence reported in this article suggests that among renters, lower income households are more mobile. This observation further implies that lower income households will be less likely to want to own their homes. Additionally, the federal tax code provides generous subsidies to homeowners by failing to tax imputed rent and allowing deductions for mortgage interest and property tax payments. Nevertheless, the benefits from such favorable tax treatment accrue disproportionately to higher income households with higher marginal income tax rates and a greater propensity to itemize. The tax code, too, therefore, contributes to higher homeownership rates among high-income households than lower income households. Because minorities typically have lower income than Whites do, these considerations contribute to racial and ethnic gaps in homeownership rates as well.

On the other hand, credible arguments and evidence in the literature suggest that constraints beyond the control of individual households may restrict access to homeownership for some households. Such "supply" constraints could arise in two different but related markets. First, in the housing market, a small number of studies have suggested that single-family housing is more conducive to homeownership. This link could arise because of preferences for such housing among prospective homebuyers; single-family housing and homeownership could be viewed by households as complementary goods. In addition, single-family housing does not typically entail common property issues. In contrast, in a multifamily building, the management of common space and controls for noise and the like create administrative costs when organizing the units into condominiums suitable for homeownership. For these reasons, access to single-family housing may foster homeownership.

We note that minorities of all income levels are more likely to live in high-density, central-city housing than comparable White households are. Obviously a correlation of spatial location and homeownership rates exists and the above argument suggests there could be a causal relationship. If causality exists, then to the extent that discrimination and related segregation in the housing market restricts minority access to single-family neighborhoods, segregation contributes to racial and ethnic gaps in homeownership. Further study of this issue is needed.

Restricted access to mortgage credit is a second explanation for why some households ready to become homeowners remain renters. Because minorities often have lower income and wealth and less secure employment, they may be subject to statistical discrimination in loan markets to the extent that lenders use race and ethnicity as predictors of hard-to-observe risk attributes. Such behavior is illegal in the mortgage market. Nevertheless, a number of studies have provided evidence of discrimination in mortgage markets. Beginning in the early 1990s, a variety of very low-downpayment mortgage products developed partly in response to concerns about minority access to mortgage credit became available through conventional lenders. The particular problem targeted was the very low level of wealth among minority renters. Minority households that rent, however, may rationally prefer to rent rather than subject themselves to the financial risks that accompany homeownership, even if homeownership is obtainable with a low-downpayment loan. Thus, contrary to the beliefs of the early 1990s, very low-downpayment loans may not close the homeownership gap.

Initial studies of the gap in homeownership focused on White–African-American differences; the analysis later was expanded to include Hispanic and Asian homeownership gaps. These early researchers assumed that the factors influencing households to become homeowners were the same for African Americans and Whites and that both groups' behavioral responses to these factors were the same. The studies separated the gap into two components: one due to differences in endowments and the other due to an unexplained residual amount. The magnitude of the residual shortfall in the probability of homeownership attributed to race rather than endowments has ranged over samples from about 5 to 20 percentage points. In general, a downward trend has occurred in the unexplained portion of homeownership rate differences over time. This trend could have occurred because recent studies have used a more comprehensive set of socioeconomic explanatory variables as the quality of data sets improved. Another explanation for the trend is a smaller impact of discrimination (which is very difficult to observe directly) in the mortgage and housing markets. This reduction of the residual also is consistent with the establishment over time of a number of policies that monitor mortgage markets and brokerage services and enforce fair housing laws. To date, most studies that have noted a decline in the residual component of the homeownership gap have attributed this change to reduced discrimination. It is clear to us, however, that researchers are now including more and better explanatory variables in their analyses. Nevertheless, some recent studies fully explain the gap in homeownership, suggesting that the effect of discrimination in the housing and mortgage markets on the homeownership rate is now minimal.

Conclusions and Topics in Need of Further Research

Two broad but compelling conclusions emerge from our review of the literature of income-, racial-, and ethnic-related homeownership gaps. First, additional efforts targeting discrimination in housing and mortgage markets or targeting renters' lack of information about the homebuying process are very unlikely to narrow racial gaps in homeownership by more than 10 percentage points. This conclusion implies that future efforts to narrow aggregate White-minority gaps should primarily focus on addressing the differences in household circumstances by race and ethnicity—including wealth, income, and marital status—that account for a large majority of observed differences in homeownership rates. Some of these factors can be addressed by efforts to reduce barriers to

homeownership associated with income and wealth (such as below-market interest rate mortgages or low-downpayment programs). Nevertheless, the fact that so much of the homeownership gap is attributable to the generally lower socioeconomic standing of minorities suggests that policies that address broader societal factors will also be needed to close these gaps over time. The factors that are important to supporting homeownership, but may fall outside the range of homeownership policies, include enhanced job opportunities, job security, and household stability. Creating an environment conducive to financial and family security for minorities is a challenging task but is one that policymakers must grapple with if they are to substantially reduce current racial gaps in homeownership.

A second conclusion from this review is that considerable opportunities are present for further research to expand our knowledge of the determinants of race- and income-related gaps in homeownership. For example, although the stability of household income is understood to be an important determinant of homeownership, very little research has focused on the manner and extent to which employment and income stability affect both the demand for homeownership and the constraints imposed on low-income and minority households. Studies in this area are needed to understand the extent to which some households rationally choose to rent when faced with an unstable flow of future income.

As the conceptual framework makes clear, the demand for homeownership is strongly influenced by the investment demand for housing. Although this trend is well understood, there is a shortage of literature that examines how the investment returns from housing vary by income and race. For example, a household's expected length of stay will have a significant effect on the investment return from homeownership. Nevertheless, although many studies of household mobility exist, few link differences in expected mobility by race and income to gaps in homeownership rates.

Variations in investment return by race may also contribute to racial gaps in homeownership rates. If house values increase less for homes owned by minority households than for homes owned by White households, then the expected return from owning is reduced along with the propensity for homeownership. These concerns can arise when preferences for neighborhood racial composition give rise to tipping effects whereby in-movement of a discriminated group (for example, African Americans) prompts an exodus from the neighborhood (for example, White flight), thereby reducing property values. Patterns of racial segregation may also limit housing appreciation in minority neighborhoods if few Whites seek to buy homes in these areas. In contrast, if minorities face a limited spatial choice set for residential location and if an influx of minority households to predominantly minority neighborhoods occurs, then house price appreciation rates could be relatively high. Research is needed to investigate the national picture of house price appreciation rates by income, race, and ethnicity and the role that these factors may play in reducing minority homeownership.

House price volatility is an important source of risk in homeownership. Few studies that we are aware of, however, assess the intertemporal variance of the price of low-priced homes and houses in areas primarily populated by minorities. Further study is needed to identify the degree of risk to which low-income households are exposed when they purchase low-priced homes.

Another issue that may differentially affect the financial risk and returns to homeownership for low-income households is the cost of home maintenance. It is well known that older housing is subject to higher levels of maintenance costs on average and also a greater risk of potentially very high maintenance expenses; however, it is not known whether these factors contribute to income- and race-related gaps in homeownership.

Also, although the impact of favorable tax treatment of homeownership on overall homeownership rates has been studied, the impact of favorable tax treatment on racial gaps in homeownership rates is in need of further study. The tax code is obviously a policy tool and its impact on the gap should be accounted for when modifications to tax laws are considered.

In general, studies of household decisions to own a home tend to be based on more advanced models than those of gaps in homeownership rates. For example, current theoretical and empirical models of household decisions to own a home often adopt an intertemporal optimization framework that recognizes the long-term nature of homeownership decisions. Further work is needed to adapt similar models to studies of gaps in homeownership rates.

Along these same lines, although the literature on household decisions to own a home recognizes that a household's current tenure status affects its future housing tenure choices, little recognition of this fact exists in the homeownership gaps literature. One consequence of the importance of past homeownership attainment on future tenure choices is that cohort-specific gaps appear to persist over time. This observation is important for housing policy because programs that increase the homeownership rate of young low-income and minority households may have long-term effects throughout these individuals' lifetimes. Nevertheless, research on this topic is basically nonexistent.

Another intertemporal aspect of tenure choice suggested by several studies is the hypothesis that that intergenerational transmission of the tendency to become a homeowner occurs. Aside from the obvious transmission of wealth across generations, another possible motivation for such phenomena would be intergenerational transmission of information about both the benefits of homeownership and how to navigate the real estate brokerage and mortgage markets. If this hypothesis is true, policies that close the White-minority homeownership gap may have a long-term effect by boosting the homeownership rate of the next generation of minorities. Hard evidence related to this idea is scant and implies the need for further study.

On the supply side, a fair amount of research has investigated the impact of mortgage finance barriers on homeownership; however, relatively little research has examined the impact of spatial limits on access to affordable and attractive homeownership options on low-income and minority homeownership rates. In the early 1970s, one study argued that racial segregation in conjunction with high-density, central-city housing restricted homeownership opportunities for minorities. Little attention has been given to this issue since it was first proposed, despite the fact that residential segregation by race is still quite high in many areas. A related deficiency in the literature is the absence of any study that carefully documents the administrative costs associated with organizing multifamily buildings into condominiums. Are these costs higher if the tenants have low incomes? Are they higher in localities with high crime rates or highly mobile households? How do these costs vary with the type of building and neighborhood? These issues have never been carefully researched but warrant further attention.

Another important supply-side question is the role of manufactured homes as an affordable homeownership option. Units of this type constitute a large (8.2 percent) and growing share of the nation's owner-occupied housing stock and this sector has been one of the keys to homeownership growth in the 1990s. This growth in ownership of manufactured housing has been particularly strong for low-income and African-American households. This observation suggests that manufactured housing has a substantial role to play in explaining and helping to close homeownership gaps by race and ethnicity, particularly if financing issues for manufactured housing are addressed. Further study is needed of the profiles of new owners of manufactured homes, the duration of ownership of manufactured housing, and the factors that explain the differences in the likelihood of owning manufactured housing analyzed among different income groups and racial and ethnic groups.

Finally, an important omission in the literature is the very limited amount of research that has sought to evaluate the effectiveness of specific homeownership policies. Policymakers therefore should consider including evaluation efforts as part of homeownership programs. The emphasis in policy circles on efforts to address wealth constraints and on education and counseling further highlights the two areas in which evaluative research would be most beneficial.

Acknowledgments

The authors gratefully acknowledge financial support from the Office of Policy Development and Research, U.S. Department of Housing and Urban Development (HUD). The authors also thank Mark Duda for his role in drafting the larger report from which this article was developed and Harold L. Bunce, William J. Reeder, Sue G. Neal, and Barry L. Steffen of HUD; Eric Belsky of Harvard University's Joint Center for Housing Studies; and Fred Eggers for their careful and thoughtful review of earlier drafts of the report from which this article was developed.

Authors

Donald R. Haurin is a professor of economics at The Ohio State University.

Christopher E. Herbert is a senior associate in the Social and Economic Policy Division, Abt Associates Inc.

Stuart S. Rosenthal is a professor of economics at Syracuse University and a senior research associate in the university's Center for Policy Research.

Notes

1. A review of homeownership gaps that focuses on Hispanics is Cortes et al. (2006).
2. For example, a two-family home (duplex) occupied by the owner in one unit and a renter in the other has one owned unit and one rental unit.
3. Haurin, Hendershott, and Kim (1993) distinguished potential earnings from actual earnings because a youth's actual earnings depend on labor supply, a choice variable influenced by the living arrangement that is selected.

4. Differences among groups in the average age of homeleaving also affect both the headship rate of the group and the propensity for homeownership. Earlier homeleaving by youths, for example, likely implies more renters, depressing the group's ownership rate. Earlier homeleaving may also lead to a higher incidence of grouping up, which would mitigate the impact of early homeleaving on the number of households associated with a given portion of the population.

5. Data compiled by the Bureau of Justice Statistics (Beck and Harrison 2001) indicates that the rate of incarceration (in federal and state prisons) per 100,000 people increased by 77 percent from 1990 to 2000 and it is much higher for African-American males compared with White and Hispanic males. The rate of incarceration approaches 10 percent of the African-American male population for those ages 25 to 29.

6. "Imputed rent" is the market value of the housing services consumed by the owner occupier. It is imputed because the owner does not make any explicit payments for these services.

7. Hoyt and Rosenthal (1992) assumed that all owner occupiers itemize and take advantage of deductions for mortgage interest and property tax payments. Follain and Ling (1991), however, showed that many owner occupiers do not itemize but instead take the standard deduction. For these households, owner-occupied housing is less heavily subsidized than the estimate reported previously would suggest but likely is still less expensive than rental housing because of the failure to tax imputed rent.

8. Studies by Case and Shiller (1989), Meese and Wallace (1994), and Rosenthal (1999) all found evidence consistent with the idea that over a short time horizon the possibility for arbitrage opportunities may exist in real estate markets but over a longer time horizon such opportunities appear to disappear.

9. Prior to 1986, homeowner capital gains were taxed at a rate equal to 40 percent of the family's marginal income tax rate. Nevertheless, filers were allowed a one-time exemption from capital gains tax if they were older than 55. After 1986, homeowner capital gains were taxed at a rate equal to the family's marginal income tax rate but marginal income tax rates were also lowered. The net effect, however, was a substantial increase in the typical tax rate on homeowner capital gains (see Hoyt and Rosenthal [1992]). Finally, beginning in 1998, the U.S. government effectively did away with the capital gains tax on homeowners of all ages for gains up to $250,000 for single filers and $500,000 for married couples filing joint returns.

10. A number of studies have also assumed various values for the transaction costs of owners, including Goodman (1995)—5 to 10 percent of current income; Cunningham and Hendershott (1984)—12 percent of house value; and Rosenthal (1988)—7 percent of future house value, discounted to the present. Malatesta and Hess (1986) used a small sample to estimate that the average transaction cost of a relocating homeowner equals about 12 percent of house value. Haurin and Gill (2002) used a sample of military members and found that the transaction cost of selling a home is the sum of 3 percent of house value and 4 percent of household earnings. In addition, Shelton (1968) suggested that because of these transaction costs homeownership should be avoided if a household's planned length of stay in a dwelling is less than 3.5 years.

11. A graphical presentation of this model is contained in Herbert et al. (2005) and a mathematical model and the resulting predictions are described in appendix A. A test of the model is contained in Ioannides and Rosenthal (1994).

12. This differs from Arrondel and Lefebvre (2001), who found little difference in the determinants of the housing investment and consumption demand functions for France.

13. African-American households tend to use the conventional mortgage market less than White households do: more use of "rent to own" and seller financing occurs in African-American than in White households. Thus, although we know of no studies that quantify this claim, it is possible that that the amount of formal mortgage interest paid by African-American households is lower than that paid by Whites, all other things being equal. The implication is that African Americans' tax advantage is lower than that of Whites, explaining part of the gap in ownership.

14. These estimates were obtained using data from the 1998 Survey of Consumer Finances and were derived from a model that also controls for a host of household attributes as well as the influence of credit constraints and the density of development in the neighborhood.

15. Low wealth among immigrant Hispanics also is affected by large remittance flows to relatives living in the immigrants' home country. For example, remittances to Central America doubled from $1.8 billion in 1996 to $3.6 billion in 2001 compared with an estimated $2.0 billion in foreign direct investment and $2.1 billion in official development assistance in 2001 (Inter-American Dialogue, 2004).

16. See appendix B in Herbert et al. (2005) for a detailed discussion of this model.

17. For a discussion of related issues in the subprime mortgage market, see Bunce et al. (2001).

18. Since 2004, the Home Mortgage Disclosure Act (HMDA) data reported by lenders has identified high-cost loans as first-lien loans that were originated with interest rates more than 3 percentage points above the rate on Treasury bonds with a comparable term. This high-cost indicator has become the predominant means of identifying subprime mortgages in the HMDA data.

19. For example, Neighborhood Advantage Zero Down™ is an affordable mortgage product offered by Bank of America, N.A. In 1998, it was available in 23 states and the District of Columbia. Neighborhood Advantage Zero Down™ is a conventional mortgage that requires no downpayment. In addition, closing costs can be paid for by a gift or by the seller or can be financed (Bank of America, 1998).

20. In addition, if an offsetting decline in wealth held by minority households in the 1990s occurred, the impact of new low-downpayment loans would be reduced. This scenario seems unlikely given the strong economy. A more realistic issue is that higher loan-to-value ratios imply higher monthly mortgage payments and, thus, higher house-payment-to-income ratios. Although lender standards on such ratios also were relaxed somewhat in the 1990s, for many families, low-downpayment loans could imply debt service ratios that would be unappealing.

21. Evidence that discrimination exists in the housing market that restricts minorities' choices is contained in fair housing audit studies (Yinger, 1986).

22. More generally, employment can occur anywhere in the metropolitan area, but the principle still holds that in competitive markets land prices adjust to compensate for differential proximity to employment centers.

23. Wheaton (1977) was the first to argue that the two effects identified by Muth (1969) offset each other and thus other factors determine locational choice.

24. Detailed tables are presented in Herbert et al. (2005).

25. Although the issue of homeownership differences across the income distribution also is an important issue, income has not been the primary focus of most work evaluating homeownership differences. As a result, this section primarily deals with the large amount of literature that has analyzed the causes of gaps in homeownership by race. Nonetheless, income is always one of the factors controlled for in these studies.

26. More specifically, the decomposition process entails applying the estimated coefficients predicting White homeownership to the characteristics of African-American households. The average predicted probability of homeownership for all African-American households provides an estimate of the African-American homeownership rate assuming African-American choices were made in the same way as White choices. Subtracting this estimated African-American homeownership rate from the overall White homeownership rate provides an estimate of the "endowment" effect; that is, the difference in rates due to differences in household characteristics or endowments. The "residual effect" is the remaining difference between the actual African-American homeownership rate and the overall African-American homeownership rate predicted using the White model. Also see appendix C in Herbert et al. (2005).

27. Substituting permanent for current income caused that racial gap to jump to 19.4 percentage points.

28. A number of studies of homeownership conducted during the 1970s examined tenure decisions of recent movers to account for the lag between a decision to change tenure and the time when the change actually occurs given the high transaction costs associated with purchasing or selling a home. Kain and Quigley (1972), Ladenson (1978), and Silberman, Yochum, and Ihlanfeldt (1982) examined the tenure choice of recent movers. It was assumed that recent movers more accurately reflected a household's optimal tenure choice, which was thought to be particularly important during a period when there were rapid changes in legal protections for minorities and prejudicial attitudes. In recent years it has become less common to focus only on recent movers, with the implicit assumption being that on average the temporary disequilibrium between a household's current and desired tenure does not bias overall findings about the factors determining tenure choice.

29. Cortes et al. (2006), in a recent report, thoroughly reviewed the differential ownership rates of Hispanics by country of origin. They noted that in 2000 the ownership rates varied from

60 percent for Spaniards to 58 percent for Cubans, 34 percent for Puerto Ricans, and 20 percent for Dominicans.

30. There continues to be evidence of incidents of discrimination in both the rental and homeownership markets (Ross and Yinger, 2002). Also, even when faced with discrimination in the real estate or mortgage market, a minority household could continue to search, eventually finding a nondiscriminatory agent or lender.

31. The researchers had access to a data set that included credit scores and a variety of household characteristics. Using these data, they developed a statistical model to predict a credit score using household characteristics that were available in the Survey of Consumer Finances (SCF), including detailed information on assets and liabilities; use of financial services; income; housing status (renter and homeowner); and demographic characteristics (age, years of education, marital status, number of dependents, and race and ethnicity). They then applied the estimated model to SCF data in each of the 4 years. The cutoff of scores below 660 to represent those who are credit constrained is based on the authors' review of information on the use of credit scores by mortgage lenders as reported by Fair Isaac Corporation at www.ficoguide.com.

32. This study is an extension of work by Linneman and Wachter (1989) that examined the importance of borrowing constraints in determining homeownership.

33. For supportive empirical evidence see Boehm and Schlottmann (1999).

References

Aaron, Henry. 1970. "Income Taxes and Housing," *American Economic Review* 60 (5): 789–806.

Alba, Richard D., John R. Logan, and Brian J. Stults. 2000. "How Segregated Are Middle Class Blacks?" *Social Problems* 47 (4): 543–558.

Arrondel, Luc, and Bruno Lefebvre. 2001. "Consumption and Investment Motives in Housing Wealth Accumulation: A French Study," *Journal of Urban Economics* 50: 112–137.

Avery, Robert B., Kenneth P. Brevoort, and Glenn B. Canner. 2006. "Higher Priced Home Lending and the 2005 HMDA Data," *Federal Reserve Bulletin*, September 8.

Badcock, Blair A. 1989. "Homeownership and the Accumulation of Real Wealth," *Environment and Planning D: Society and Space* 7: 69–91.

Bank of America. 1998. "Bank of America Launches First Ever Widely Available Zero Down Payment Mortgage," news release, March 2.

Beck, Allen J., and Paige M. Harrison. 2001. "Prisoners in 2000," *Bureau of Justice Statistics Bulletin*, August. U.S. Department of Justice.

Becker, Gary. 1993. "The Evidence Against Banks Doesn't Prove Bias," *Business Week* (April 19): 18.

———. 1971. *The Economics of Discrimination,* 2nd ed. Chicago: University of Chicago Press.

Belsky, Eric S., and Mark Duda. 2002. "Asset Appreciation, Time of Purchase and Sale, and the Return to Low Income Homeowners." In *Low Income Homeownership: Examining the Unexamined Goal*, edited by N. Retsinas and E. Belsky. Washington, DC: Brookings Institution Press: 208–238.

Berkovec, James A., Glenn B. Canner, Stuart A. Gabriel, and Timothy H. Hannan. 1998. "Discrimination, Competition, and Loan Performance in FHA Mortgage Lending," *Review of Economics and Statistics* 80 (2): 241–250.

Blinder, Alan S. 1973. "Wage Discrimination: Reduced Form and Structural Estimates," *Journal of Human Resources* 18 (4): 436–455.

Bocian, Debbie Gruenstein, Keith S. Ernst, and Wei Li. 2006. *Unfair Lending: The Effect of Race and Ethnicity on the Price of Subprime Mortgages*. Washington, DC: The Center for Responsible Lending.

Boehm, Thomas P., and Alan M. Schlottmann. 1999. "Does Homeownership by Parents Have an Economic Impact on Their Children?" *Journal of Housing Economics* 8: 217–232.

Bostic, Raphael W., Paul S. Calem, and Susan Wachter. 2004. Hitting the Wall: Credit as an Impediment to Homeownership. Working paper BABC 04-5. Harvard University, Joint Center for Housing Studies.

Bostic, Raphael W., and Brian J. Surette. 2001. "Have the Doors Opened Wider? Trends in Homeownership Rates by Race and Income," *Journal of Real Estate Finance and Economics* 23: 411–434.

Bunce, Harold, Debbie Gruenstein, Chris Herbert, and Randall Scheessele. 2001. "Subprime Foreclosures: The Smoking Gun of Predatory Lending?" In *Housing Policy in the New Millennium Conference Proceedings*, edited by Susan M. Wachter and R. Leo Penne. Washington, DC: U.S. Department of Housing and Urban Development: 257–270.

Calem, Paul S., Kevin Gillen, and Susan Wachter. 2004. "The Neighborhood Distribution of Subprime Mortgage Lending," *Journal of Real Estate Finance and Economics* 29 (4): 393–410.

Carr, James, and Isaac Megbolugbe. 1993. *A Research Note on the Federal Reserve Bank of Boston Study on Mortgage Lending.* Washington, DC: Federal National Mortgage Association, Office of Housing Research.

Case, Karl E., and Robert J. Shiller. 1989. "The Efficiency of the Market for Single Family Homes," *American Economic Review* 79: 125–137.

Chinloy, Peter. 1991. "Risk and the User Cost of Housing Services," *AREUEA Journal* 19: 516–531.

Coates, Douglas, and James Vanderhoff. 1993. "Race of the Homeowners and Appreciation of Single Family Homes in the United States," *Journal of Real Estate Finance and Economics* 7: 205–212.

Collins, William J., and Robert A. Margo. 2001. "Race and Home Ownership: A Century-Long View," *Explorations in Economic History* 38: 68–92.

Congressional Hispanic Caucus Institute. 2004. *Focus Group Findings: Cross-Site Report.* Washington, DC: Mosaica, the Center for Nonprofit Development and Pluralism.

Cortes, Alvaro, Christopher E. Herbert, Erin Wilson, and Elizabeth Clay. 2006. *Improving Homeownership Opportunities for Hispanic Families: A Review of the Literature*. Cambridge, MA: Abt Associates Inc.

Cotterman, Robert F. 2002. *New Evidence on the Relationship Between Race and Mortgage Default: The Importance of Credit History Data.* Washington, DC: U.S. Department of Housing and Urban Development.

Coulson, N. Edward. 1999. "Why Are Hispanic and Asian-American Homeownership Rates So Low? Immigration and Other Factors," *Journal of Urban Economics* 45: 209–227.

Coulson, N. Edward, and Mina Kang. 2001. The Heterogeneity of Asian-American Homeownership. Working paper. Pennsylvania State University, Department of Economics.

Cunningham, Donald F., and Patric H. Hendershott. 1984. "Pricing FHA Mortgage Default Insurance," *Housing Finance Review* 3: 373–392.

Davidoff, Thomas. 2006. "Labor Income, Housing Prices, and Homeownership," *Journal of Urban Economics* 59: 209–235.

Delaney, Charles J., J. Allen Seward, and Marc T. Smith. 1992. "An Empirical Analysis of Housing Price Appreciation in a Market Stratified by Size and Value of the Housing Stock," *Journal of Real Estate Research* 7: 195–205.

Deng, Yongheng, Stephen L. Ross, and Susan M. Wachter. 2003. "Racial Differences in Homeownership: The Effect of Residential Location," *Regional Science and Urban Economics* 33 (5): 517–556.

Duca, John V., and Stuart S. Rosenthal. 1994a. "Borrowing Constraints and Access to Owner-Occupied Housing," *Regional Science and Urban Economics* 24: 301–322.

———. 1994b. "Do Mortgage Rates Vary Based on Household Default Characteristics? Evidence on Rate Sorting and Credit Rationing," *Journal of Real Estate Finance and Economics* 8 (2): 99–113.

———. 1991. "An Empirical Test of Credit Rationing in the Mortgage Market," *Journal of Urban Economics* 29 (March): 218–234.

Emrath, Paul. 1997. "Home Vintage and Operating Costs," *Housing Economics* (November): 5–8.

———. 1995. "Operating Costs of New and Existing Homes," *Housing Economics* (July): 5–8.

Engelhardt, Gary V. 1996. "Consumption, Down Payment, and Liquidity Constraints," *Journal of Money, Credit, and Banking* 28: 255–271.

———. 1994. "House Prices and the Decision to Save for Down Payments," *Journal of Urban Economics* 36: 209–237.

Ermisch, John F. 1999. "Prices, Parents, and Young People's Household Formation," *Journal of Urban Economics* 45: 47–71.

Ermisch, John F., and Pamela Di Salvo. 1997. "The Economic Determinants of Young People's Household Formation," *Economica* 64: 627–644.

Fannie Mae. 2003. *Understanding America's Homeownership Gaps: 2003 Fannie Mae National Housing Survey*. Washington, DC: Fannie Mae.

Flippen, Chenoa A. 2001a. "Racial and Ethnic Inequality in Homeownership and Housing Equity," *The Sociological Quarterly* 42: 121–149.

———. 2001b. "Residential Segregation and Minority Home Ownership," *Social Science Research* 30: 337–362.

Follain, James R., and David C. Ling. 1991. "The Federal Tax Subsidy to Housing and the Reduced Value of the Mortgage Interest Deduction," *National Tax Journal* 44: 147–168.

Gabriel, Stuart, and Stuart Rosenthal. 2005. "Homeownership in the 1990s: Aggregate Trends and Racial Disparities," *Journal of Urban Economics* 57 (1): 101–127.

Garasky, Steven, R. Jean Haurin, and Donald R. Haurin. 2001. "Group Living Decisions as Youths Transition to Adulthood," *Journal of Population Economics* 14: 329–349.

Glaeser, Edward, Matthew E. Kahn, and Jordan Rappaport. In press. "Why Do the Poor Live in Cities? The Role of Public Transportation," *Journal of Urban Economics*.

Goodman, Allen C. 1995. "A Dynamic Equilibrium Model of Housing Demand and Mobility With Transaction Costs," *Journal of Housing Economics* 4: 307–327.

———. 1988. "An Econometric Model of Housing Price, Permanent Income, Tenure Choice, and Housing Demand," *Journal of Urban Economics* 23: 327–353.

Gyourko, Joseph, and Peter Linneman. 1997. "The Changing Influences of Education, Income, Family Structure, and Race on Homeownership by Age Over Time," *Journal of Housing Research* 8: 1–25.

Gyourko, Joseph, Peter Linneman, and Susan Wachter. 1999. "Analyzing the Relationship Between Race, Wealth and Homeownership in America," *Journal of Housing Economics* 8: 63–89.

Haurin, Donald R. 1991. "Income Variability, Homeownership, and Housing Demand," *Journal of Housing Economics* 1 (1): 60–74.

Haurin, Donald R., and H. Leroy Gill. 2002. "The Impact of Transaction Costs and the Expected Length of Stay on Homeownership," *Journal of Urban Economics* 51: 563–584.

Haurin, Donald R., Patric Hendershott, and Susan Wachter. 2001. Expected Homeownership and Real Wealth Accumulation. Working paper. The Ohio State University, Department of Economics.

———. 1997. "Borrowing Constraints and the Tenure Choice of Young Households," *Journal of Housing Research* 8: 137–154.

———. 1996. "Wealth Accumulation and Housing Choices of Young Households: An Exploratory Investigation," *Journal of Housing Research* 7: 33–57.

Haurin, Donald R., Patric H. Hendershott, and Dongwook Kim. 1993. "The Impact of Real Rents and Wages on Household Formation," *Review of Economics and Statistics* 75: 284–293.

Haurin, Donald R., and Hazel Morrow-Jones. 2006. "The Impact of Real Estate Market Knowledge on Tenure Choice: A Comparison of African American and White Households," *Housing Policy Debate* 17 (4): 625–653.

Haurin, Donald R., and Stuart Rosenthal. In press. "The Influence of Household Formation on Homeownership Rates Across Time and Race," *Real Estate Economics*.

Hendershott, Patric H. 1997. "Uses of Equilibrium Models in Real Estate Research," *Journal of Property Research* 14: 1–13.

———. 1987. "Household Formation and Homeownership: Impacts of Demographic, Sociological, and Economic Factors," *Housing Finance Review* 7: 201–224.

Henderson, J. Vernon, and Yannis Ioannides. 1987. "Owner-Occupancy: Investment vs. Consumption Demand," *Journal of Urban Economics* 21: 228–241.

———. 1983. "A Model of Housing Tenure Choice," *American Economic Review* 73: 98–113.

Herbert, Christopher E. 1997. "Limited Choices: The Effect of Residential Segregation on Homeownership Among Blacks." Ph.D. diss., Harvard University.

Herbert, Christopher E., Donald R. Haurin, Stuart S. Rosenthal, and Mark Duda. 2005. "Homeownership Gaps Among Low Income and Minority Borrowers and Neighborhoods." Washington, DC: U.S. Department of Housing and Urban Development. http://www.huduser.org/publications/HOMEOWN/HGapsAmongLInMBnN.html.

Hoyt, William, and Stuart Rosenthal. 1992. "Owner-Occupied Housing, Capital Gains, and the Tax Reform Act of 1986," *Journal of Urban Economics* 32: 119–139.

———. 1990. "Capital Gains Taxation and the Demand for Owner-Occupied Housing," *Review of Economics and Statistics* 72: 45–54.

Inter-American Dialogue. 2004. *All in the Family: Latin America's Most Important International Financial Flow.* Report of the Inter-American Dialogue Task Force on Remittances. Washington, DC: Inter-American Dialogue.

Ioannides, Yannis M., and Stuart S. Rosenthal. 1994. "Estimating the Consumption and Investment Demands for Housing and Their Effect on Housing Tenure Status," *Review of Economics and Statistics* 76 (1): 127–141.

Kain, John F., and John M. Quigley. 1975. *Housing Markets and Racial Discrimination: A Microeconomic Analysis*. New York: Columbia University Press.

———. 1972. "Housing Market Discrimination, Homeownership, and Savings Behavior," *American Economic Review* 62: 263–277.

Kiel, Katherine A., and Richard T. Carson. 1990. "An Examination of Systematical Differences in the Appreciation of Individual Housing Units," *Journal of Real Estate Research* 5: 301–317.

Kiel, Katherine A., and Jeffrey E. Zabel. 1996. "House Price Differentials in U.S. Cities: Household and Neighborhood Racial Effects," *Journal of Housing Economics* 5: 143–165.

Kim, Sunwoong. 2000. "Race and Home Price Appreciation in Urban Neighborhoods: Evidence from Milwaukee, Wisconsin," *The Review of Black Political Economy* 28 (2): 9–28.

King, Mervyn. 1980. "An Econometric Model of Tenure Choice and Demand for Housing as a Joint Decision," *Journal of Public Economics* 14: 137–159.

Krivo, Lauren J. 1986. "Home Ownership Differences Between Hispanics and Anglos in the United States," *Social Problems* 13: 319–335.

Ladd, Helen. 1998. "Evidence on Discrimination in Mortgage Lending," *Journal of Economic Perspectives* 12 (2): 41–62.

Ladenson, Mark L. 1978. "Race and Sex Discrimination in Housing: The Evidence From Probabilities of Homeownership," *Southern Economic Journal* 45 (2): 559–575.

Laidler, David. 1969. "Income Tax Incentives for Owner-Occupied Housing." In *The Taxation of Income From Capital*, edited by Arnold C. Harberger and Martin J. Bailey. Washington, DC: Brookings Institution: 50–76.

Lee, Jongho, Louis G. Tornatzky, and Celina Torres. 2004. *El Sueño de Su Casa: The Homeownership Potential of Mexican-Heritage Families*. Los Angeles: University of Southern California, The Tomás Rivera Policy Institute. 27 p.

Li, Ying, and Eric Rosenblatt. 1997. "Can Urban Indicators Predict House Price Appreciation?" *Real Estate Economics* 25: 85–101.

Linneman, Peter D. 1986. "An Empirical Test of the Efficiency of the Housing Market," *Journal of Urban Economics* 20: 140–154.

Linneman, Peter D., and Susan M. Wachter. 1989. "The Impacts of Borrowing Constraints on Homeownership," *AREUEA Journal* 17: 389–402.

Long, James E., and Steven B. Caudill. 1992. "Racial Differences in Homeownership and Housing Wealth, 1970–1986," *Economic Inquiry* 30: 83–100.

Lusardi, Annamaria, Ricardo Cossa, and Erin L. Krupka. 2000. Savings of Young Parents. Working paper 2000-23. Federal Reserve Bank of Chicago.

Malatesta, Paul H., and Alan C. Hess. 1986. "Discount Mortgage Financing and Housing Prices," *Housing Finance Review* 5: 25–41.

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

Mayer, Christopher J. 1993. "Taxes, Income Distribution, and the Real Estate Cycle: Why All Houses Do Not Appreciate at the Same Rate," *New England Economic Review* (May/June): 39–50.

McDonald, John F. 1974. "Housing Market Discrimination, Homeownership, and Savings Behavior: Comment," *American Economic Review* 64: 225–229.

Meese, Richard, and Nancy Wallace. 1994. "Testing the Present Value Relation for Housing Prices: Should I Leave My House in San Francisco?" *Journal of Urban Economics* 35 (3): 245–266.

Munnell, Alicia H., Geoffrey M.B. Tootell, Lynn E. Browne, and James McEneaney. 1996. "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review* 86 (1): 25–53.

Muth, Richard. 1969. *Cities and Housing: The Spatial Pattern of Urban Residential Land Use*. Chicago: University of Chicago Press.

Myers, Samuel L., and Chanjin Chung. 1996. "Racial Differences in Home Ownership and Home Equity Among Preretirement-Aged Households," *The Gerontologist* 36: 350–360.

Oaxaca, Ronald. 1973. "Male-Female Wage Differentials in Urban Labor Markets," *International Economic Review* 14 (3): 693–709.

Painter, Gary, Stuart A. Gabriel, and Dowell Myers. 2001. "Race, Immigrant Status, and the Housing Tenure Choice," *Journal of Urban Economics* 49: 150–167.

Painter, Gary, Lihong Yang, and Zhou Yu. 2002. Heterogeneity in Asian American Homeownership: The Impact of Household Endowments and Immigrant Status. Working paper. University of Southern California, Lusk Center for Real Estate Research.

Pollakowski, Henry O., Michael A. Stegman, and William Rohe. 1991. "Rates of Return on Housing of Low and Moderate-Income Owners," *AREUEA Journal* 19: 417–425.

Quigley, John. 1987. "Interest Rate Variations, Mortgage Prepayments and Household Mobility," *Review of Economics and Statistics* 69 (4): 636–643.

Ratner, Mitchell. 1996. "Many Routes to Homeownership: A Four-Site Ethnographic Study of Minority and Immigrant Experiences," *Housing Policy Debate* 7 (1): 103–145.

Rehm, Barbara A. 1991a. "ABA Rebuts Bias Charge in Fed Study on Lending," *American Banker* (October 15): 1–19.

———. 1991b. "Data on Bias in Lending Spark Demands for Action," *American Banker* (October 22): 1–9.

Roistacher, Elizabeth A., and John L. Goodman. 1976. "Race and Home Ownership: Is Discrimination Disappearing?" *Economic Inquiry* 14: 59–70.

Rosen, Harvey S. 1979. "Housing Decisions and the U.S. Income Tax: An Econometric Analysis," *Journal of Public Economics* 11: 1–24.

Rosenthal, Stuart S. 2002. "Eliminating Credit Barriers to Increase Homeownership: How Far Can We Go?" In *Low Income Homeownership: Examining the Unexamined Goal*, edited by Eric Belsky and Nicolas Retsina. Washington, DC: Brookings Institution Press: 111–145.

———. 1999. "Residential Buildings and the Cost of Construction: New Evidence on the Efficiency of the Housing Market," *Review of Economics and Statistics* 81 (2): 288–302.

———. 1988. "A Residence Time Model of Housing Markets," *Journal of Public Economics* 36: 87–109.

Rosner, Josh, and Graham Fisher. 2002. "Housing in the New Millennium: A Home Without Equity Is Just a Rental with Debt." Paper presented at the American Real Estate and Urban Economics Mid-Year Meetings, Washington, DC, May.

Ross, Stephen L., and John Yinger. 2002. *Color of Credit: Mortgage Discrimination, Research Methods, and Fair Lending Enforcement.* Cambridge, MA: MIT Press.

Schachter, Jason P. 2004. "Geographic Mobility: 2002 to 2003," *Current Population Reports* (P20-549 series). Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau.

Scheessele, Randall M. 2002. Black and White Disparities in Subprime Mortgage Lending. Housing Finance Working Paper Series, HF-014. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Shelton, J.P. 1968. "The Cost of Renting Versus Owning a Home," *Land Economics* 44: 59–72.

Silberman, Jonathan, Gilbert Yochum, and Keith Ihlanfeldt. 1982. "Racial Differentials in Home Purchase: The Evidence From Newly Formed Households," *Economic Inquiry* 20: 443–457.

Sinai, Todd, and Nicholas Souleles. 2005. "Owner Occupied Housing as Insurance Against Rent Risk," *Quarterly Journal of Economics* 120 (2): 763–789.

Smith, Barton A., and William P. Tesarek. 1991. "House Prices and Regional Real Estate Cycles: Market Adjustments in Houston," *AREUEA Journal* 19: 396–416.

Smith, Lawrence B., and Michael H.C. Ho. 1996. "The Relative Price Differential Between Higher and Lower Priced Homes," *Journal of Housing Economics* 5: 1–17.

Stiglitz, Joseph E., and Andrew Weiss. 1981. "Credit Rationing in Markets With Imperfect Information," *American Economic Review* 71: 393–410.

Thomas, Paulette. 1992. "Bank America, Security Pacific Merger Cleared," *Wall Street Journal* (March 24): A3–A6.

Turner, Margery Austin, et al. 2002. *Discrimination in Metropolitan Housing Markets: National Results From Phase I HDS 2000*. Washington, DC: U.S. Department of Housing and Urban Development.

U.S. Department of Housing and Urban Development. 1996. *Cityscape: A Journal of Policy and Development and Research, Race and Default in Credit Markets: A Colloquy* 2 (1). Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy and Development Research.

U.S. Department of Treasury and U.S. Department of Housing and Urban Development. 2000. *Curbing Predatory Home Mortgage Lending*. Washington, DC: U.S. Department of Treasury; U.S. Department of Housing and Urban Development. 119 p.

Wachter, Susan M., and Isaac F. Megbolugbe. 1992. "Racial and Ethnic Disparities in Homeownership," *Housing Policy Debate* 3 (2): 333–370.

Wheaton, William. 1977. "Residential Decentralization, Land Rents and the Benefits of Urban Transportation," *American Economic Review* 67 (2): 138–145.

Yinger, John. 1998. "Housing Discrimination Is Still Worth Worrying About," *Housing Policy Debate* 9 (4): 893–927.

———. 1986. "Measuring Racial Discrimination With Fair Housing Audits: Caught in the Act," *American Economic Review* 76 (5): 881–893.

Yoshikawa, Hiroshi, and Fumio Ohtake. 1989. "Housing Demand and the Saving Rate in Japan," *European Economic Review* 33: 997–1030.

Zorn, Peter M. 1989. "Mobility-Tenure Decisions and Financial Credit: Do Mortgage Qualification Requirements Constrain Homeownership?" *AREUEA Journal* 17: 1–16.

Factors Affecting Hispanic Homeownership: A Review of the Literature

Alvaro Cortes
Christopher E. Herbert
Erin Wilson
Abt Associates Inc.

Elizabeth Clay
Massachusetts Institute of Technology

Abstract

Homeownership rates have reached unprecedented levels in the United States. According to 2005 Current Population Survey data, virtually every segment of the population has higher homeownership rates than they did a decade ago—although the gains have been largest among Hispanics. Yet, despite the rapid growth in Hispanic homeownership over the past decade, the gap between non-Hispanic White and Hispanic homeownership rates is still 26 percentage points. In light of these statistics, this article has two goals: (1) to describe the demographic and socioeconomic characteristics of the U.S. Hispanic population and how these characteristics relate to the Hispanic homeownership gap and (2) to identify the main barriers to Hispanic homeownership, including barriers associated with the lack of information about the homebuying process, the real estate and housing markets, and the financial and mortgage markets. To accomplish these goals, the article reviews the existing literature and incorporates key information on Hispanic households derived from the decennial census and other publicly available national data sets. This article is derived from a more detailed review of Hispanic homeownership gaps (Cortes et al., 2006), and the reader is referred to this study for greater details on the data and literature cited in this article.

Introduction

Promoting homeownership has long been an objective of housing policy in the United States and is reflected in a wide variety of federal, state, and local programs and policies. The Internal Revenue

Service, U.S. Department of Housing and Urban Development, state housing finance agencies, and local community development corporations are among the numerous stakeholders that promote homeownership through a variety of programs. Underlying these programs is the belief that homeownership provides important benefits to both individuals and communities.[1]

Today, the benefits of homeownership are being increasingly realized as U.S. homeownership rates soar to unprecedented levels, although not all segments of the population are benefiting equally. According to 2005 Current Population Survey (CPS) data, virtually every segment of the population has higher homeownership rates than they did a decade ago—although the gains have been largest among Hispanics. Between 1993 and the fourth quarter of 2005, ownership rates rose by 5.8 percentage points among non-Hispanic Whites, 6.6 percentage points among African Americans, and 10.6 percentage points among Hispanics. Yet, despite these gains, sizable gaps in homeownership rates persist among Hispanics compared with non-Hispanic Whites. As of the fourth quarter of 2005, 76.0 percent of non-Hispanic Whites were homeowners compared with 50.0 percent of Hispanics. Thus, despite the rapid growth in Hispanic homeownership over the past decade, the gap between non-Hispanic White and Hispanic homeownership rates is still 26.0 percentage points.

This article examines Hispanic homeownership rates and gaps in an effort to understand the major barriers that restrict homeownership opportunities for this demographic group. The article uses decennial census data to provide a brief demographic profile of Hispanics in the United States and highlight key demographic characteristics that are associated with homeownership rates and gaps. The article also uses Census data to briefly discuss major trends that have occurred since 1980 and supplements this discussion with a review of the literature on homeownership that addresses the demographic and socioeconomic characteristics of the Hispanic population that contribute to the gap. The article also delineates the barriers to Hispanic homeownership beyond the demographic and socioeconomic characteristics of Hispanic households and summarizes the literature that investigates these issues. These barriers are associated with the lack of information about the homebuying process, the real estate and housing markets, and the financial and mortgage markets.

Hispanics in the United States

According to 2000 decennial census data, 9.2 million households of Hispanic origin and 35 million Hispanic people reside in the Unites States, representing 8.7 percent of all U.S. households and 12.5 percent of the total U.S. population. About 54 percent of Hispanic households in the United States are of Mexican origin, 12 percent are of Puerto Rican origin, 5 percent are of Cuban origin, and 3 percent are of Dominican origin.[2] South Americans and other Central Americans constitute 10 percent of Hispanic households and "other Hispanics" constitute 15 percent of these households.[3] Approximately 91 percent of Hispanic heads of household are White or "other" race (50 percent White and 41 percent other race), 6 percent are of two or more races, and only 2 percent are Black.[4]

Hispanics in the United States tend to be socioeconomically disadvantaged compared with non-Hispanic households. More than two-fifths of Hispanic households (44 percent) earn less than $30,000 annually, and less than one-quarter earn more than $60,000 a year (22 percent).

By contrast, only one-third of non-Hispanic households (34 percent) earn less than $30,000 and more than one-third (34 percent) earn more than $60,000 annually. Also, Hispanic households have relatively less formal education compared with non-Hispanic households. Almost one-half of Hispanic heads of household (46 percent) have less than a high school education and only one-third have some education beyond high school. Very few Hispanic households have a professional or graduate degree (4 percent). By contrast, about one-sixth of non-Hispanic households (16 percent) have less than a high school education and more than half (56 percent) have some type of education beyond high school. Nearly 10 percent of non-Hispanic households have a graduate or professional degree.

Age and family structures are also significantly different in Hispanic households than those in non-Hispanic households. Hispanic households in the United States are much younger than non-Hispanic households. More than three-fifths of Hispanic households (62 percent) are under age 45 compared with approximately two-fifths of non-Hispanic households (43 percent). A greater percentage of Hispanic heads of household than non-Hispanic household heads are in each of the three youngest age categories: under 30 (21 versus 12 percent), 30 to 34 (14 versus 9 percent), and 35 to 44 (27 versus 22 percent). Also, although most Hispanic (58 percent) and non-Hispanic (54 percent) heads of household are married, Hispanic married couples are more likely to have children than non-Hispanic married couples are. Across all household types, 43 percent of Hispanic households have children compared with 30 percent of non-Hispanic households.

Many Hispanics in the United States are immigrants. Most Hispanic households (53 percent) are foreign born; this percentage is much larger than the proportion of non-Hispanic households (8 percent) that are foreign born. Despite the large proportion of foreign-born households, more than two-thirds of Hispanic households (68 percent) are U.S. citizens. By contrast, nearly all non-Hispanic households (97 percent) are U.S citizens. The large proportion of foreign-born Hispanic households may suggest that a similarly large proportion of Hispanics have poor English-speaking skills; however, only about one-quarter of Hispanic heads of household report that they do not speak English (8 percent) or speak English poorly (18 percent). Most Hispanic households (75 percent) report that they speak English fluently. Among Hispanic immigrant[5] households, most have been in the United States for many years. More than half of these households (54 percent) have lived in the United States for 16 years or more, and few (13 percent) have been in the United States for 5 years or less.

The geographic distribution of Hispanics across the United States is uneven. Hispanics represent 25 percent or more of the total state populations in Arizona, California, New Mexico, and Texas. Hispanics are also heavily concentrated in Colorado, Florida, Nevada, New Jersey, and New York, constituting 12.5 to 24.9 percent of these states' populations. Except for Illinois and Kansas, Hispanics are considerably underrepresented in the Midwest. Regionally, Hispanic households are heavily represented in the West (17 percent), slightly underrepresented in the South and Northeast (8 percent and 7 percent, respectively), and considerably underrepresented in the Midwest (3 percent).

The overwhelming majority (98 percent) of Hispanic households reside in metropolitan areas and few are found in nonmetropolitan areas (2 percent). By contrast, fewer non-Hispanic households are located in metropolitan areas (93 percent) and the proportion of households in nonmetropolitan areas (7 percent) is triple that of Hispanic households.[6] More than half of all Hispanic

households (53 percent) live in one of the 30 largest metropolitan areas in the United States, while one-third of non-Hispanic households (33 percent) live in these areas.

These characteristics are important, not only because they highlight the enormous diversity among Hispanic households, but also because they are critical to understanding how Hispanic homeownership rates and gaps may change over time. Indeed, a number of studies have found that many of these characteristics are associated either positively or negatively with the likelihood that a Hispanic household will become a homeowner.

The Hispanic Homeownership Gap: Contributing Factors[7]

In 2000, more than 105.4 million households were in the United States and approximately 69.8 million were homeowners. Less than half of the 9.1 million Hispanic households were homeowners (45.6 percent) compared with a large majority of the 79 million non-Hispanic Whites (72.5 percent) (see exhibit 1). The homeownership rates for African Americans (46.6 percent), Asians or Pacific Islanders (53.1 percent), and other non-Hispanic racial minorities[8] (51.2 percent) were also considerably lower than the rate for non-Hispanic Whites. As exhibit 1 demonstrates, in 2000, Hispanics had the largest homeownership gap (26.8 percentage points) of any minority group.

Homeownership rates have improved for most groups since the early 1990s. During the decade, the Hispanic homeownership rate increased by 3.5 percentage points from 42.1 percent in 1990, the largest gain among all racial and ethnic minorities and the only rate increase to exceed the increase among non-Hispanic Whites. As a result, the homeownership gap between Hispanics and non-Hispanic Whites narrowed slightly, by 0.11 percentage points, while it increased for African Americans by 0.65 percentage points, for Asians or Pacific Islanders by 2.48 percentage points, and for other non-Hispanics by 5.08 percentage points. Data from the 2005 CPS indicate that gains in Hispanic homeownership rates have continued to outpace gains among non-Hispanic Whites since 2000.

These figures suggest that Hispanics confront significant barriers to homeownership, and homeownership gaps among Hispanic households are persistent over time. Despite the homeownership gains made by Hispanics during the 1990s, the homeownership gap in 2000 was even larger than it was in 1980. Although the gap has narrowed somewhat since 2000, it was still 26.0 percentage points in the fourth quarter of 2005, according to CPS data. This trend raises a critical question: What factors contribute to this persistently large gap?

Although the literature on homeownership rates and gaps by race is extensive, research has only recently focused on Hispanic homeownership rates and gaps in particular. That literature suggests that much of this gap—although by no means all—is related to several key factors: age, income, level of education, net worth, household type, nativity, country of origin, English proficiency, citizenship status, years in the United States, and place of residence.

Exhibit 1

Homeownership Rates and Gaps,[a] 1980–2000

Household Head	1980			1990			2000		
	N	Rate (%)	Gap (%)	N	Rate (%)	Gap (%)	N	Rate (%)	Gap (%)
Hispanic	4,010,898	44.1	– 24.9	5,812,158	42.1	– 26.9	9,187,972	45.6	– 26.8
Non-Hispanic Black	8,284,691	45.4	– 23.6	9,691,699	43.9	– 25.2	11,796,057	46.6	– 25.9
Non-Hispanic Asian/ Pacific Islander	1,022,940	52.5	– 16.5	1,911,257	52.2	– 16.9	3,181,674	53.1	– 19.4
Other Non-Hispanic	485,017	52.6	– 16.4	628,292	52.9	– 16.2	2,236,977	51.2	– 21.3
Non-Hispanic White	66,590,515	69.0		73,664,936	69.1		79,077,421	72.5	
Total	80,394,061	65.0		91,708,342	64.2		105,480,101	66.2	

[a] *Homeownership gaps are calculated in relation to the non-Hispanic White homeownership rate.*

Source: U.S. Census Bureau's Integrated Public Use Microdata Series (IPUMS) using the 1980 1% metropolitan sample, the 1990 1% metropolitan sample, and the 2000 IPUMS 1% metropolitan sample

Age

Decennial census data suggest two important relationships between age and homeownership: (1) homeownership rates rise as householders age and (2) homeownership gaps can persist among specific-age cohorts over time. In all decennial census years, the homeownership rate increases steadily with age. For example, in 2000, the homeownership rate increased from 21 percent for Hispanics less than 30 years old to 60 percent for Hispanics 75 and older. The peak Hispanic homeownership rate is 64 percent among 65-to-74-year-old households. Accordingly, homeownership gaps narrowed with age, although the gap was lowest among the youngest and oldest age groups. Within most of the age groups, minimal change in the gaps occurred between 1980 and 2000.

The association between aging and increasing homeownership is largely driven by two factors. The investment demand for housing is lower among younger householders because they are more mobile than their older counterparts and the high transaction costs of moving make homeownership less attractive (Haurin, Herbert, and Rosenthal, 2007; Herbert et al., 2005). Thus, mobile, younger householders will choose to rent rather than purchase a home. In addition, a strong positive association exists between age and income; on average, incomes increase with age and income, in turn, is positively associated with homeownership. As a result of both factors, the demand for housing is likely to increase with age. Research has also found an independent effect of age on homeownership, after controlling for income and other socioeconomic characteristics (Borjas, 2002; Callis, 2003; Coulson, 1999; Flippen, 2001a; Krivo, 1995, 1986; Masnick, 1997; Myers and Lee, 1998; Myers, Megbolugbe, and Lee, 1998; and Painter, Gabriel, and Myers, 2001), likely reflecting a greater desire for residential stability as people age.

In addition to the effect of age on homeownership rates, an age cohort effect exists on homeownership. For example, 2000 Census data suggest that in 1980 the 45-to-54 age cohort continued to

evince the highest homeownership rates of all age cohorts even as the cohort aged over the next 20 years. In 1990, the 55-to-64 age group demonstrated the highest homeownership rate, and 10 years later the same age cohort (now 65 to 74 years old) also had the highest rate. Similarly, a recent study found that younger cohorts track across successive age groups with persistently lower homeownership rates (Myers and Lee, 1998). This study showed that the decline in homeownership rates among the 34-to-44 age cohort in 1990 was driven by the lower homeownership rates carried into that age bracket by cohorts who were 25 to 34 years old in 1980.

In addition to considering age cohorts, it is also important to consider the year of immigration when examining trends in Hispanic homeownership rates over time. The literature on age cohort effects often nests age (or birth) cohorts within immigration cohorts or year of entry into the United States. The dual-cohort approach is applied to the study of immigrant populations to distinguish between the impact of aging, which may differ by age cohorts, and the effect of longer residency in the United States, which is an assimilation effect. For example, a recent study indicated that the effect of age on homeownership among Hispanic immigrants is weakened (and almost eliminated) by controlling for immigration cohorts (Masnick, 1997). The effect of longer residency (or assimilation effect) will be discussed in more detail in the following sections.

Income

Hispanic households with higher incomes have higher homeownership rates and lower homeownership gaps relative to non-Hispanic White households. Homeownership rates differed substantially between the lowest and highest income households. When Hispanic households are grouped into income declines, homeownership rates in 2000 ranged from 23 percent in the bottom decile to 75 percent in the highest decile. The disparity in Hispanic homeownership rates by income has declined from a 57-percentage point disparity in 1980 but remains large. Homeownership gaps for Hispanic households compared with non-Hispanic White households decline with higher levels of household income, although the differences in gaps have been declining over time. In 1980, the homeownership gap relative to non-Hispanic Whites was 25 percentage points for Hispanics in the lowest income decline compared with 9 percent for the highest income decline. In 2000, the differences in these gaps narrowed to 22 and 15 percentage points, respectively.

These patterns are consistent with previous research that found an independent effect of income on homeownership, especially among Hispanics, even after controlling for numerous socioeconomic characteristics (Krivo, 1986, 1995; Myers and Lee, 1998; and Painter, Gabriel, and Myers, 2001).[9] One study conducted a series of simulations that eliminated the income and educational differentials between native Hispanics and non-Hispanic Whites to estimate the effect on homeownership rates and gaps among a sample of recent mover households from the 1980 and 1990 decennial censuses (Painter, Gabriel, and Myers, 2001). The simulations using 1980 data suggested that nearly the entire homeownership gap was accounted for by these two characteristics, while in 1990 they accounted for 11 percentage points out of a total gap of 16 percentage points. The study also found, however, that in 1990 a sizeable homeownership gap remained among Hispanic immigrants who had arrived in the Unites States in the early 1980s, even after controlling for education and income differences with non-Hispanic Whites. Another study nested income within age cohorts and found a decreasing effect of income across successively older birth cohorts. This finding

suggests that younger adults have less time to accumulate wealth to finance a home purchase and, therefore, are more reliant on current income. In addition, current income is likely to have a minimal direct effect on homeownership among older people because they likely purchased their homes when they were younger (Myers, Megbolugbe, and Lee, 1998).

Level of Education

Homeownership rates are considerably higher and gaps smaller as education level increases. In 1980, the homeownership rate ranged from 41 percent among Hispanic households with less than a high school education to 54 percent among college-educated households. In 1990, the rate similarly rose from 37 percent of Hispanic households with less than a high school education to 58 percent of Hispanic households with an advanced degree. In 2000, a 22-percentage-point difference in homeownership rates existed between poorly educated Hispanic households (40.4 percent) and highly educated Hispanic households (62 percent).

Accordingly, smaller homeownership gaps were associated with greater Hispanic educational attainment. For example, in 2000, the homeownership gap among Hispanics with less than a high school education was 28 percentage points and declined successively by 0.5, 7.3, 1.5, 0.6, and 0.8 percentage points as education levels increased. Therefore, the smallest homeownership gaps occur among those with the highest educational attainment—but even among this group the gap was 17 percentage points.

These trends are consistent with recent empirical work associating the likelihood of becoming a homeowner with educational status. The studies, however, also demonstrate that education levels are positively correlated with other demographic characteristics, which are in turn positively associated with higher homeownership probabilities. Therefore, the decline in homeownership gaps cannot be attributed solely to increases in education levels. To address this issue, researchers estimate statistical models (multivariate regression equations) that control for age, income, country of origin, and other characteristics, thereby isolating the independent impact of education on homeownership. These models suggest that the probability of homeownership among Hispanics is significantly lower (5 percentage points) for households without a high school diploma and significantly higher (3 percentage points) for college-educated households, even after controlling for numerous demographic characteristics (Painter, Gabriel, and Myers, 2001). The effect of education on Hispanic homeownership, however, is influenced by country of origin and birth cohort. For example, Krivo (1986) demonstrated that all Hispanic subpopulations experienced larger effects of education on homeownership than did non-Hispanic Whites, but the difference was statistically significant only among Mexicans and Cubans. Also, Myers, Megbolugbe, and Lee (1998) interacted educational attainment with birth cohorts to show that among native-born males of Mexican origin the effect of not completing high school is less detrimental on achieving homeownership among older cohorts (ages 55 to 74) than younger cohorts (ages 15 to 34). This finding suggests that the effect of educational attainment on achieving homeownership varies by birth cohort.

Net Worth

In 2000, higher household net worth[10] was associated with higher homeownership rates regardless of ethnicity. For both Hispanics and non-Hispanic Whites, the homeownership rate increased

dramatically from about 1 percent among households with $0 net worth to more than 94 percent among households with $50,000 or more of net worth. Although homeownership gaps between Hispanics and non-Hispanic Whites are evident at net-wealth levels of less than $10,000, at net-wealth levels above this level, Hispanics have the same or higher homeownership rates as non-Hispanic Whites. The large overall gaps in Hispanic–non-Hispanic White (hereafter, Hispanic-White) homeownership rates reflect the fact that homeownership gaps fluctuated across the range of net-wealth categories. A much larger share of Hispanics (46 percent) than non-Hispanic Whites (21 percent) are found within the net-worth categories of less than $5,000, and only one-quarter of Hispanic households had a net worth of $50,000 or more.

Net worth (and wealth) is frequently discussed in the literature as a major barrier to homeownership among all households (Collins and Dylla, 2001; Gyourko, Linneman, and Wachter, 1999; Quercia, McCarthy, and Wachter, 2003; and Savage, 1999), especially among low-income households (Haurin, Hendershott, and Wachter, 1996). In one study, in 1995, an estimated one-third of renters could not afford to buy a house selling for half of the regional median housing price because they lacked the wealth to cover downpayments and closing costs. Two-thirds of renters could not afford to buy a modestly priced house because of both inadequate wealth (limiting their ability to cover downpayments and closing costs) and insufficient income (limiting their ability to afford mortgage payments) (Savage, 1999). Low-income renters are particularly at a disadvantage because most of their resources are used to cover basic needs and, thus, they are unlikely to accumulate cash to cover downpayments and closing costs. Low-income renters are also less likely than other households to receive downpayment assistance from family members because of the intergenerational nature of poverty (Englehardt and Mayer, 1998).

Household Type

From 1980 to 2000, homeownership rates were higher for married couples with and without children than any other type of Hispanic household. For example, in 2000, 53 percent of Hispanic married couples with children were homeowners compared only 27 percent of other families with children. Hispanic married couples without children had the highest rate of homeownership during the 20-year period and the rate steadily increased with each decennial census, from 55 percent in 1980 to 61 percent in 2000. By contrast, Hispanic married couples with children experienced a decline in homeownership rates from 1980 to 1990 (from 54 percent to 48 percent), but rebounded in 2000 to 53 percent. Homeownership gaps fluctuated across these household types, ranging from 23 percentage points for other families with children, to 26 percent for married couples without children, and 31 percentage points for married couples with children. Hispanic-White homeownership gaps have generally been highest among married couples than other household types, which suggests that the positive effect of marriage on homeownership is greater among non-Hispanic Whites.

Nevertheless, households composed of married couples have the best chance of being homeowners (Callis, 2003; Coulson, 1999; Flippen, 2001a; Krivo, 1986, 1995; Myers and Lee, 1998; and Painter, Gabriel, and Myers, 2001). Recent studies suggest that marriage is the strongest determinant of homeownership among people of any racial and ethnic background (Myers and Lee, 1998) and is important even after accounting for immigrant characteristics (such as citizenship status) (Callis, 2003).

Nativity, English Proficiency, and Citizenship

Across all decennial census years, homeownership rates were about 8 to 10 percentage points higher among native-born Hispanics[11] than among foreign-born Hispanics. For example, in 2000, nearly 50 percent of native-born Hispanics and 42 percent of foreign-born Hispanics were homeowners. This trend represents an increase since 1980 of 2 percentage points for native-born Hispanics and 3 percentage points for foreign-born Hispanics; however, the gaps between these rates and those of native and foreign-born non-Hispanic Whites changed only slightly over this period. Among native-born Hispanics, the gap widened slightly from approximately 22 percentage points in 1980 to 23 percentage points in 2000, while among foreign-born Hispanics, the gap decreased from nearly 24 percentage points in 1980 to 22 percentage points in 2000.

Few studies have examined the disparity in homeownership rates among native- and foreign-born households. A recent study focused on homeownership in the immigrant population and found that differences in numerous socioeconomic characteristics between natives and immigrants explained relatively little of the gap in homeownership rates (Borjas, 2002). The study demonstrated that differences in the residential location choices made by natives and immigrants played a key role in explaining the homeownership gap between these groups, which is discussed in more in the following sections.

Indeed, nativity has not been found to be a critical variable in predicting homeownership rates among Hispanic households after controlling for numerous socioeconomic characteristics. The effect of nativity on homeownership is weakened by other characteristics such as age cohorts, English language ability, and, especially, length of U.S. residence (Coulson, 1999; Flippen, 2001a; Krivo, 1995; Myers and Lee, 1998; and Painter, Gabriel, and Myers, 2001). In one of these studies, the homeownership rates of immigrants who had resided in the United States for the longest time were indistinguishable from the rates of natives. Another study indicated that, although foreign-born and Spanish-speaking households were less likely than native-born households to be homeowners, immigrants who have been in the United States for longer periods of time are as likely to be homeowners as natives. Thus, the statistical importance of nativity gives way to other factors.

Nativity, however, is related to other factors that are associated with larger differences in homeownership rates. For example, census data show that, across all decades, Hispanics who speak English "very well" or "exclusively" are nearly twice as likely to be homeowners as are those who are less proficient in speaking English. For each decennial census year from 1980 to 2000, the homeownership rate increased from 25, 23, and 28 percent, respectively, among households who do not speak English to 49, 48, and 51 percent, respectively, among Hispanic households that speak English very well.

In addition, homeownership rates for Hispanic citizens are typically 20 percentage points higher than for non-citizens, with naturalized citizens demonstrating higher homeownership rates than other groups. For example, in 2000, the homeownership rate among Hispanic citizens was 52 percent (including 58 percent among naturalized citizens and 50 percent among Hispanics born in the United States) compared with only 32 percent of Hispanic non-citizens. Also, compared with other native-born households, Hispanic households born in the United States consistently evinced the highest homeownership gap, which widened slightly from 22 percentage points in 1980 to

23 percentage points in 2000. In comparison, compared with other naturalized households, naturalized Hispanic households had homeownership gaps that ranged between 15 and 19 percentage points during this time period.

The research on the effect of citizenship on homeownership among all households supports these findings (Callis, 2003; Coulson, 1999; Masnick, 1997). In a descriptive analysis of CPS data, Callis (2003) found in 2002 that naturalized-citizen householders (of all origins) were more likely than native householders to be homeowners in the Midwest, South, and West. Masnick (1997) indicated that among all foreign-born people, citizens are exactly twice as likely as non-citizens to be homeowners, and the more recent the decade of arrival to the United States, the greater the citizens' homeownership rate exceeds that of non-citizens. The effect of immigrant-arrival cohorts on homeownership is discussed next.

Years in the United States

Homeownership rates increased dramatically as time spent in the United States lengthens. In each decennial census year from 1980 to 2000, the ownership rate is about 40 percentage points higher among Hispanics that have been in the United States for 21 years or more compared with those who have been in the U.S. for less than 5 years. For example, in 2000, only 16 percent of Hispanic immigrant households living in the United States for 5 years or less owned homes, while 61 percent of Hispanic immigrant households who had been in the country for 21 years or more were homeowners.

Data also suggest that Hispanic immigrants who arrived during the mid-1990s had the highest homeownership rate (16 percent) in their first 5 years of residency compared with immigrants with similar tenure in the United States who arrived during the mid-1980s (10 percent) and mid-1970s (12 percent). A more detailed examination of homeownership rates among immigrant-arrival cohorts from the 1980, 1990, and 2000 decennial censuses highlights several important trends:

- Homeownership rates increased for all immigrant-arrival cohorts as residency in the United States increased, although earlier immigrant-arrival cohorts had higher rates than more recent immigrants had. For example, 49 percent of Hispanics entering the United States between 1960 and 1964 were homeowners after being in the country for 15 to 20 years compared with 41 percent of the 1970-to-1974 cohort and 43 percent of the 1980-to-1984 cohort after similar periods of time in the United States
- Hispanic immigrants who arrived between 1960 and 1964 consistently had the highest homeownership rate among other Hispanic immigrants throughout the 20-year period. Their homeownership rate was 49 percent in 1980, 54 percent in 1990, and 63 percent in 2000.
- Homeownership rates increased dramatically among Hispanic immigrants who arrived between 1975 and 1979, rising from 13 percent in 1980 to 51 percent in 2000. Immigrants who arrived during the early 1980s had the largest percentage point increase in homeownership rate (nearly 26 percentage points) within a decade of being in the United States

These trends are firmly supported by recent studies on length of residency and immigrant-arrival cohorts that have found a persistent positive effect on homeownership as length of residency increases (Borjas, 2002; Callis, 2003; Coulson, 1999; Krivo, 1995; Masnick, 1997; Myers and Lee,

1998; and Painter, Gabriel, and Myers, 2001). These studies have found length of residence to be significant statistically regardless of other contributing factors such as age group, immigrant status, and country of origin. For example, one such study found that recent arrivals initially have far lower odds of homeownership than do households that have been in the United States for longer periods of time, but this gap is progressively reduced across immigrant-arrival cohorts as duration in the United States increases.

The reasons why recent immigrant waves have lower homeownership probabilities than immigrant-arrival cohorts from several decades ago at a similar length of residence in the United States is likely due to lower endowments, including income, educational level, marital status, and employment skills. That is, recent-immigrant households are more likely than new-immigrant households in the past to be poor, uneducated, headed by singles, and unskilled. As a result, recent immigrants experience greater difficulties than less-recent immigrants do in overcoming the barriers to homeownership.

Country of Origin

Hispanic homeownership rates and gaps vary by country of origin. Dominicans and Puerto Ricans consistently had the lowest homeownership rates and highest homeownership gaps, and Spaniards and Cubans consistently fared better than other Hispanic households. Homeownership rates among Mexican households were slightly higher than the total rate for all Hispanics during the 20-year period but changed little across decennial census years. For example, in 2000, the homeownership rate and gap among Dominicans, Puerto Ricans, Mexicans, Cubans, and Spaniards was 20/52, 34/38, 48/24, 58/15 and 60/12, respectively.

These patterns are supported by studies suggesting that country of origin is a key explanatory variable in predicting homeownership among Hispanic subpopulations (Borjas, 2002; Calis, 2003; Krivo, 1986, 1995; and Masnick, 1997). These studies underscore large differences in skills and economic performance across national origin groups. In one such study, the effect of numerous socioeconomic characteristics was measured across several Hispanic subpopulations and non-Hispanic Whites. The study found that household characteristics did not have the same effect on homeownership across all Hispanic subgroups. For example, the effect of income and education was larger on Mexicans, the impact of marriage was larger on Puerto Ricans, and the presence of children was larger on Cubans, compared with other Hispanic subgroups. Another study demonstrated that the correlation between homeownership and citizenship (discussed previously) was greatest among European and smallest among Mexicans, Dominicans, and Central Americans. Thus, the cumulative effect of the numerous socioeconomic characteristics on homeownership varies among households from different countries of origin.

Place of Residence

According to decennial census data, Hispanic homeownership rates were consistently largest in the South (55 percent in 1980, 52 percent in 1990, and 53 percent in 2000) and lowest in the Northeast (20 percent in 1980, 21 percent in 1990, and 25 percent ion 2000). Rates in the Midwest and West ranged between 44 and 48 percent over the 20-year period. Homeownership rates were consistently higher among households residing in nonmetropolitan areas than in metropolitan

areas. For example, for the three decennial census years, homeownership rates were 53, 50, and 53 percent, respectively, among Hispanic households located in metropolitan areas of the South and 61, 60, and 59 percent, respectively, among households located in nonmetropolitan areas of the South. Similar discrepancies are observed for other regions. These findings are particularly important for understanding Hispanic homeownership rates and gaps, because Hispanics are highly concentrated in metropolitan areas.

Homeownership gaps are much larger in the Northeast and smaller in the South and typically smaller in nonmetropolitan than metropolitan areas. For example, in 2000, the Hispanic-White homeownership gap in the Northeast was 45 percentage points, consisting of a 30-percentage-point gap in nonmetropolitan areas and a 45 percentage point gap in metropolitan areas. In the South, the Hispanic-White gap was 21 percentage points, consisting of a 20-percentage-point gap in nonmetropolitan areas and a 21-percentage-point gap in metropolitan areas.

The low Hispanic homeownership rates in metropolitan areas are due in part to the high cost of housing in these areas relative to Hispanic household income. In the 30 metropolitan areas with the highest proportion of Hispanic households in 2000, Hispanic homeownership rates are higher and gaps are lower in areas where (1) Hispanic median income is a higher proportion of the area median income (AMI) and (2) median housing values are lower. For example, the Hispanic median income as a percentage of AMI was above 80 percent in 9 of the 10 metropolitan areas with the highest homeownership rates. None of the top 10 metropolitan areas with high Hispanic homeownership rates had median housing values above the national median ($159,397). By contrast, Hispanic homeownership rates are much lower in metropolitan areas where the Hispanic median income was a lower proportion of AMI and median housing values were higher. For example, the Hispanic median income as a percentage of AMI was below 80 percent in 7 of the 10 metropolitan areas with the lowest homeownership rates. Half of the metropolitan areas with the lowest homeownership rates had median housing values above the national median.

Indeed, place of residence has consistently been found to be an important factor in determining homeownership (Borjas, 2002); its effect on Hispanic households is unique in two important ways. First, most Hispanics enter the United States through gateway cities, particularly cities in California, Texas, New York, and Florida, that tend to be high-cost housing markets (McArdle, 1995). The weighted average median house value for Hispanics across the 107 metropolitan areas with the highest proportion of Hispanics was $147,987 compared with $121,205 for non-Hispanic Whites in these areas.[12] This observation suggests that Hispanic households are located disproportionately in higher cost housing markets, which contributes to the gap in homeownership rates between Hispanics and non-Hispanic Whites. One recent study even found that expensive housing markets create greater barriers to homeownership for Hispanics than for non-Hispanic Whites (Krivo, 1995).

Second, the concentration of Hispanic households in ethnic enclaves (or barrios) is prevalent. The impact of ethnic enclaves on homeownership opportunities is unclear (Borjas, 2002; Flippen, 2001b). On the one hand, Hispanic barrios may help immigrants circumvent any discrimination otherwise encountered outside the enclave. In this scenario, access to housing and mortgage markets is facilitated by Hispanic REALTORS® and bankers who live in the community. Neighbors with similar preferences and cultures may also make a community more welcoming and desirable, thereby increasing demand for housing. On the other hand, ethnic enclaves could create incen-

tives for immigrants not to leave the community. The attractiveness of these enclaves may result in greater rates of segregation from non-Hispanic Whites, which may, in turn, depress Hispanic homeownership rates by limiting homeownership opportunities or preventing Hispanics from acquiring the skills needed in the larger labor market.

Determinants of Overall Homeownership Gaps Among Hispanics

Many of the factors discussed previously have been found to have clear effects on Hispanic homeownership rates and gaps, but determining which of these factors affect rates and gaps more heavily than other factors do is challenging. Wachter and Megbolugbe (1992) analyzed data from the 1989 American Housing Survey using multivariate regression techniques and found that household characteristics (income, age, education, family type, and gender) and market factors (house prices and geographic location) together explain 78 percent (or 32 percentage points) of the 41-percentage-point gap in homeownership rates between non-Hispanics (including African Americans) and Hispanics. These researchers conclude that income is the single most important characteristic accounting for the Hispanic homeownership gap, followed by martial status and gender. A number of important variables were not included in their statistical models, however, because of limitations with the available data, including wealth, immigration status, and credit history.

Using data from the 1996 CPS to analyze Hispanic homeownership rates, Coulson (1999) was able to include measures of Hispanic immigrant status, how long individuals have lived in the United States, and whether they are citizens. Unlike most studies of racial and ethnic differences in homeownership rates, Coulson's did not include measures of race and ethnicity directly in the regression model. Instead, the estimated homeownership rate for each racial/ethnic group was compared with its actual rate to determine whether the model overpredicts or underpredicts homeownership rates for each group. Coulson found that only a relatively small portion of the difference in homeownership rates between non-Hispanic Whites and Hispanics is unexplained by the household characteristics and housing market variables in the model. Of the 31-percentage-point difference in Hispanic-White homeownership rates, only 2 percentage points are unexplained. The most important explanatory factors among Hispanics include their higher share of immigrants, younger age, and concentration in high-cost housing markets. Coulson further examined these differences for different ethnic groups and found the largest unexplained gaps in homeownership rates are for Puerto Ricans (9 percentage points), followed by Cubans (7 percentage points), and "other" Hispanics (4 percentage points). Mexicans were not found to have any unexplained difference in homeownership rates from non-Hispanic Whites after household and market characteristics are taken into account.

Flippen (2001a) is notable because of the extensive set of explanatory variables used in the study. The study used data from the Health and Retirement Survey from 1992 to study racial differences in homeownership rates among non-Hispanic Whites, African Americans, and Hispanics. The data included information on inheritance amounts; age; marital status; number of children; health status; cognitive ability; levels of education and income; occupation, self-employment, and retirement status; number of prior layoffs; expected years of life remaining; geographic location, including region and urban location; risk tolerance; and length of planning period. Although the list of variables includes proxies for hard-to-measure concepts such as income uncertainty and risk

aversion, the study does not include measures for immigrant status and the sample is limited to individuals between the ages of 51 and 61. The unadjusted gap in Hispanic-White homeownership in the sample was 27 percentage points, of which differences in observable personal characteristics explained 21 percentage points, leaving an unexplained residual gap of 6 percentage points. Differences in income and employment characteristics between Whites and Hispanics were the most important factors, together accounting for half of the overall homeownership rate differences. The geographic concentration of Hispanics in higher cost housing markets, especially in the West and in urban areas, was also found to be important. Since the sample was restricted to a single age group, age was not found to be a factor contributing to lower homeownership rates among Hispanics in the sample.

Finally, Gabriel and Rosenthal (2005) analyzed data from the Survey of Consumer Finances (SCF) to identify the factors associated with homeownership trends by race and ethnicity between 1983 and 2001. The models used in the study control for household demographic characteristics and geographic location but also incorporate information on whether the household is constrained in its access to credit; however, the models do not control for immigrant status. Gabriel and Rosenthal found that roughly half of the average Hispanic gap during the study period was explained by available variables (14 percentage points out of a total gap of 30 percentage points). The remaining portion of the gap is attributable to factors not captured in the models, including immigrant status and discriminatory treatment. Gabriel and Rosenthal also did not attempt to identify the specific household and housing market factors that were most important in producing the overall disparity in White and Hispanic homeownership rates, although credit barriers accounted for between 2 and 5 percentage points of the overall gap.

Barriers to Hispanic Homeownership

As described in the previous section, the socioeconomic and immigrant characteristics of Hispanic households are strongly associated with their homeownership rates and gaps. The relationship between these characteristics and the likelihood that a Hispanic household will become a homeowner, however, does not occur in a vacuum. Institutional and market barriers faced by Hispanic households affect both whether they view homeownership as a real opportunity and whether they are able to navigate through the homebuying process successfully.

These institutional and market forces can be grouped into three types of barriers: (1) lack of information about the homebuying process, (2) real estate and housing markets, and (3) financial and mortgage markets. This section discusses each of these barriers in turn.

Lack of Information About the Homebuying Process

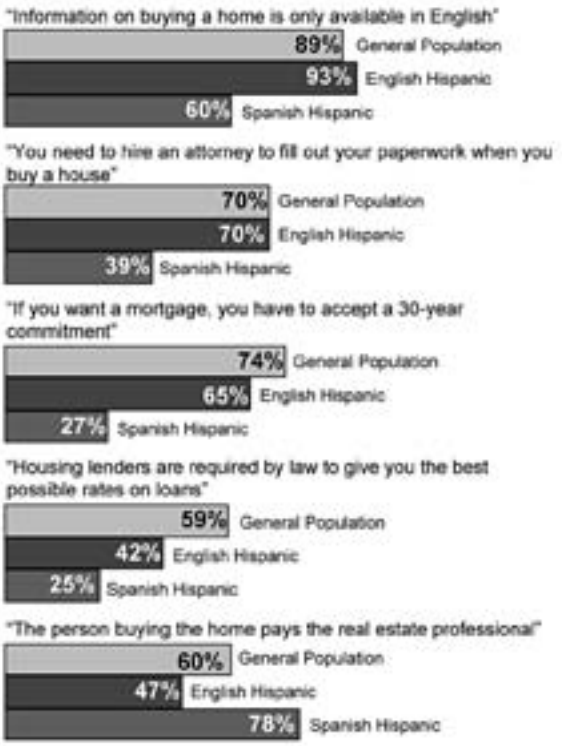
Although Hispanics today have extraordinary faith in homeownership as a desirable investment and a source of personal satisfaction (Congressional Hispanic Caucus Institute, 2004; Fannie Mae, 2003; Ratner, 1996; Schoenholtz and Stanton, 2001), they are less likely to have accurate information about homeownership than other populations (Fannie Mae, 2003; Lee, Tornatzky, and Torres, 2004). The level of understanding about the general homebuying process, the importance of a person's financial history, and mortgage qualification is considerably lower among Hispanics,

especially Spanish-speaking Hispanics, than it is among the general population. Overall, the information gap dissuades some Hispanics from considering homeownership and undermines their confidence in completing the homebuying process successfully.

The Homebuying Process. Fannie Mae's 2003 National Housing Survey found that only 44 percent of Spanish-speaking Hispanics and 64 percent of English-speaking Hispanics have accurate information about the homebuying process compared with 60 percent of African Americans and 69 percent of the total population.[13] As exhibit 2 suggests, when Hispanics, particularly Spanish-speaking Hispanics, are asked specific questions about the homebuying process, they are less likely to have an accurate understanding of the process. For example, most English-speaking Hispanics (58 percent) and a large majority of Spanish-speaking Hispanics (75 percent) believe that housing lenders are required by law to give borrowers the best possible rates on loans. Spanish-speaking Hispanics in particular are less likely than other groups to have accurate information. Of Spanish-speaking Hispanics, 40 percent believe that information on buying a home is available only in English.

Exhibit 2

Percentage Who Know That the Following Statements Are False



Source: Fannie Mae National Housing Survey (2003: 7)

Misconceptions about the U.S. homebuying process are exacerbated by cultural differences and past experiences in the home country. In the United States, the homebuying process is a highly regulated activity, from the point of housing construction or renovation to the point when a buyer closes on a home. By contrast, in Mexico, an estimated 12 to 16 million homes have been built without formal approval, and clouded titles may prevent households from selling or buying homes (Schuetz, Belsky, and Retsinas, 2004). As a result, many homes in Mexico are simply passed along in the family, and members of these households are never exposed to, or learn about, the process of buying a home. Despite knowing very little about the homebuying process, a recent study found that many Hispanic immigrants said that it was much "tougher" to become a homeowner in the United States than in their home country. Many participants in the study expressed the following view: "While America gives you some advantages, it is more difficult to own a home in the United States" (Bendixen and Associates, 2004: 14).

Even for those household members who have gone through the homeownership process in their home county, prior experiences do not always resolve misconceptions about the U.S. homebuying process. Indeed, for many Hispanic immigrants, these misconceptions are worsened by their prior experiences with homebuying in their countries of origin (Schoenholtz and Stanton, 2001). For example, many Hispanic immigrants who come from countries where a very large downpayment (up to 50 percent of the house value) is required to purchase a home assume this requirement applies to the U.S. market as well. According to the National Council of la Raza (2004), this "old country knowledge" deters many Hispanic immigrants from pursuing the homeownership path.

Financial Literacy. Financial literacy—knowing and understanding the basic principles of spending, using credit, saving, and investing—typically is learned through routine interactions with financial institutions, especially banks; however, a number of low-income and immigrant Hispanic households distrust mainstream financial institutions and eschew relations with them (Congressional Hispanic Caucus Institute, 2004). For example, a 1999 survey of residents of low-income neighborhoods in New York and Los Angeles found that 45 percent of Hispanics did not have a transaction account with a bank compared with 31 percent of African Americans and 9 percent of Whites (Dunham, 2001). Focus groups conducted in Alabama and Nevada suggest that Hispanics view banks as "insecure," "unforgiving," and "unwelcoming." Focus group participants describe losing their life savings because of bad banking practices, losing their property to bank foreclosure, and other "horrible" or "disappointing" experiences (Bendixen and Associates, 2004). This distrust is reinforced by financial institutions' lack of outreach to Hispanic communities and the general absence of bilingual and bicultural financial professionals (National Council of La Raza, 2004).

A recent study focusing on homeownership achievement among Mexican-Americans in three major metropolitan areas concluded that the lack of a formal relationship with a bank was a common characteristic of survey respondents who were least able to progress in the homebuying process (Lee, Tornatzky, and Torres, 2004). This study was based on a telephone survey of 1,400 households that divided households into two groups: (1) those actively pursuing homeownership or who had recently purchased a home and (2) those who would like to buy a home but are not actively pursuing this goal at present. The researchers found that a key distinguishing feature of those not actively pursuing homeownership was a lower likelihood of having a bank account. Although 77 percent of those actively seeking a home to buy had an account, only 52 percent of inactive households did. Inactive households were also less likely to have a credit card (40 percent compared with

60 percent of active households). The researchers concluded that this lack of a formal relationship with a financial institution signaled both a lack of comfort and familiarity with formal financial networks and a lack of a credit history, both of which are needed to become a homeowner.

Undocumented Hispanics[14] in particular may exist completely in the informal economy, working in jobs that pay in cash and purchasing all goods and services in cash. According to a recent estimate, approximately 1.5 million undocumented Hispanic households (or 5.8 million undocumented Hispanics) are in the United States. An estimated 216,000 of these households could become homeowners if they had improved access and information to the homebuying process (Paral, 2004).

Whether by habit or necessity, these Hispanics do not interact with formal aspects of American society, especially banks, and tend to rely on the alternative financial sector (Barr, 2004) and personal connections (National Community Reinvestment Coalition, 2003). A research brief on banking for the poor, Barr (2004) noted that, in lieu of bank-based transactions, unbanked households often use check cashers to cash checks; pay bills; and wire funds, tax preparers, and refund anticipation lenders to file for an Earned Income Tax Credit (EITC). Check-cashing fees vary widely nationally, from about 1.5 to 3.5 percent of the face value of the check, which amounts to approximately $1.5 billion in annual fees. Some low-income households, especially households that do not speak English and have difficulty understanding the tax-filing process, rely on tax preparers and refund anticipation lenders, which can consume a considerable portion (an average of 13 percent) of a low-income household's EITC. Overall, the use of the alternative financial sector significantly reduces take-home pay, hinders a household's ability to accumulate wealth and establish credit, and may expose a household to a higher risk of robbery or theft.

The lack of a relationship with a financial institution also leads some Hispanics to seek advice from informal sources such as a family member or friend (Congressional Hispanic Caucus Institute, 2004; Ratner, 1996; Real Estate Center at Texas A&M University, 2004; Toussaint-Comeau and Rhine, 2000) or to rely on "cultural brokers" such as bilingual real estate agents, housing advocates, or lenders (Ratner, 1996). In some cases, these advisors are not a good source of advice or cannot be trusted. Focus groups conducted in 11 cities[15] throughout the country suggest that Hispanics are quick to trust "anyone who speaks their language and knows their community," but often these trusted sources were predatory lenders and Realtors (Congressional Hispanic Caucus Institute, 2004).

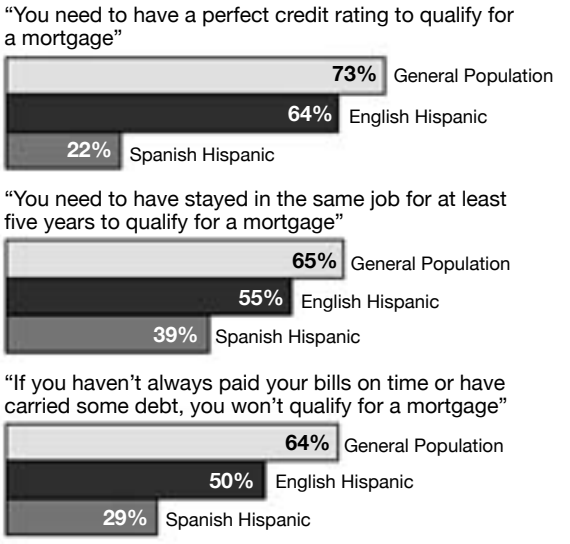
The Mortgage Qualification Process. Surveys of Hispanics in the United States suggest that Hispanics understand the value of establishing a good credit history and they know that a credit history is a key criterion for becoming a homeowner. Hispanics are less clear, however, about what defines a good credit history, what qualifies as acceptable creditworthiness to secure a mortgage, and what steps can be taken to repair their credit history (Bendixen and Associates, 2004; Ratner, 1996). In an ethnographic study of minority pathways to homeownership, several focus group participants believed that their credit rating was downgraded when they paid their bills on time because creditors were making less money. Some participants noted that they were advised to let a few payments slip as a way to build their credit, and others thought that having a loan on an expensive car would improve their credit rating because it demonstrated their ability to pay off a loan.

The lack of understanding about credit is particularly troubling among Hispanics. In Fannie Mae's national survey (2003), credit concerns were the most frequently cited reason why both English-speaking Hispanics (49 percent) and Spanish-speaking Hispanics (46 percent) have not purchased a home. By contrast, 42 percent of African Americans and 39 percent of the general population cite credit concerns as the main reason for not purchasing a home. Nearly half of all Hispanics in the United States worry that their credit is not good enough to qualify for a mortgage. Only 15 percent of Spanish-speaking Hispanics report having a great deal of experience with credit and debt compared with 40 of the total population and 41 percent of English-speaking Hispanics.

As exhibit 3 suggests, many Hispanics, especially Spanish-speaking Hispanics, have inaccurate information about mortgage credit decisions. Almost 80 percent of Spanish-speaking Hispanics believe they need a perfect credit rating to qualify for a mortgage, approximately 60 percent believe they need to stay in the same job for at least 5 years, and 70 percent believe they must always pay their bills on time or carry some debt. These percentages are significantly lower—27, 35, and 36 percent, respectively—among the general population. Overall, two-thirds of the general population correctly answered these three questions on mortgage credit decisions compared with approximately half of English-speaking Hispanics and less that one-third of Spanish-speaking Hispanics.

Exhibit 3

Percentage Who Know That the Following Statements Are False



Source: Fannie Mae National Housing Survey (2003: 10)

Housing Market Barriers

The U.S. housing market experienced a sustained boom from the late 1990s into the first half of the next decade. Fueled by low interest rates and steady residential construction, the boom encompassed all regions of the nation, geographic areas, and a range of submarkets (Joint Center

for Housing Studies, 2004). The housing boom outlasted an economic recession and considerable job losses that occurred during the past few years. Nevertheless, the fear among many observers is that the boom squeezed many homeseekers out of the market as housing prices were rising faster than household incomes. These fears are not completely unfounded. A recent study suggested that, beginning in 2004, at the national level, a median-income, first-time homebuyer with a 10 percent downpayment would no longer qualify for a median-priced home. At the metropolitan level, a median-priced home would remain affordable or nearly affordable for median-income buyers in only 3 of 11 major urban markets (Tong, 2004).

In addition to affordability, another barrier that Hispanics may face in the housing market is discrimination. Although nearly one-third of household growth is attributed to immigration, concerns persist (albeit diminished) about the incidence of discrimination in the housing market, which may continue to limit homeownership opportunities among minorities.

Housing Affordability. The increasingly common perception among Hispanics is that homeownership is an unaffordable dream. A study conducted by Fannie Mae (Tong, 2004) suggests that the confluence of dramatic housing price appreciation with the slow pace of income growth is making homeownership increasingly unaffordable for median-income working households, especially households seeking to purchase a home for the first time. The Fannie Mae study created annual homeownership affordability ratios—the amount of qualifying income required to obtain a median-priced home loan divided by median family income—from 1990 to 2008 (projected) for both the nation and 11 major metropolitan areas. Of the 11 metropolitan areas in the study (all except Seattle), 10 are among the 30 metropolitan areas with the largest number of Hispanic households in the nation. Ratios were created separately for first-time homebuyers and repeat homebuyers.[16] A ratio equal to 100 suggests that a median-income family is just able to afford a median-priced home; ratios above 100 equate to unaffordable conditions while those below 100 equate to affordable conditions. Of course, this ratio analysis is a fairly crude measure of affordability both because it focuses on single points in the income and house price distributions and because it ignores household wealth, which is an important factor in determining whether a household can afford to purchase a home. Nonetheless, it is a useful shorthand measure for comparing affordability across market areas.

Exhibit 4 presents the homeownership affordability ratios among first-time homebuyers for all 11 metropolitan areas in the study. Data in Tong (2004) show that middle-class homebuyers in Atlanta, the District of Columbia, Houston, and Philadelphia are able to afford median-priced homes; each of these metropolitan areas has an affordability ratio below 100. Middle-class families in Chicago are just able to buy a median-priced home (ratio is 100). Families in 6 out of the 11 metropolitan areas (Boston, Denver, Los Angeles, New York, San Francisco, and Seattle) are not able to afford median-priced homes in these markets. With affordability ratios ranging from 118 to 198, middle-class families purchasing a median-priced home would need approximately 1.2 to 2.0 times the AMI to qualify for a mortgage with a 10-percent downpayment.

When using 2000 Integrated Public Use Microdata Series data to produce comparable income measures for Hispanic families,[17] however, none of these metropolitan areas are affordable for Hispanic families earning a median income. For example, the median income among Hispanics families in Atlanta is approximately $42,600, more than $20,000 less than the median family income for all

Exhibit 4

2000 Homeownership Affordability Ratios for First-Time Homebuyers in 11 Large Metropolitan Areas

Metropolitan Area	Income to Qualify for a Mortgage[a]	Median Family Income[b]	Hispanic Median Family Income	Homeownership Affordability Ratio	Hispanic Homeownership Affordability Ratio
Atlanta[c]	$48,800	$63,100	$42,600	77	115
Washington, D.C.[c]	$69,300	$82,800	$50,000	84	139
Houston[c]	$48,900	$56,700	$33,000	86	148
Chicago[c]	$67,700	$67,900	$40,500	100	167
Philadelphia[c]	$52,700	$57,800	$28,000	91	188
Denver[c]	$73,600	$62,100	$36,200	118	203
Seattle	$83,800	$65,800	$40,000	127	210
Los Angeles[c]	$73,400	$52,100	$33,400	141	220
San Francisco[c]	$148,400	$74,900	$49,000	198	303
New York[c]	$88,800	$56,200	$27,600	158	322
Boston[c]	$121,200	$65,500	$29,100	185	416

[a] The qualifying income calculation is based on a 28-percent qualifying ratio for monthly housing payment (principal, interest, taxes, and insurance) to gross monthly income.

[b] Data on estimated median family income come from three sources: the national median-income data from the Census Bureau's Current Population Survey, the metropolitan median-income data from the U.S. Department of Housing and Urban Development, and the occupational average wage data from the Bureau of Labor Statistics' Occupational Employment Statistics Survey. Data on qualifying income for purchasing the median-priced home comes from the NATIONAL ASSOCIATION OF REALTORS®, Federal Housing Finance Board, and the Census Bureau.

[c] Among the 30 metropolitan areas with the largest number of Hispanic households in the nation.

Source: Tong (2004)

families in Atlanta. After adjusting the affordability ratio to reflect Hispanic median family incomes, the homeownership affordability ratio increases in Atlanta to 115. This observation suggests that a first-time Hispanic homebuyer in Atlanta would need to earn 115 percent of the AMI to qualify for a mortgage with a 10-percent downpayment. Hispanics in Denver, Los Angeles, and New York face even greater affordability gaps. The 2000 Hispanic median family income in these housing markets was $36,200, $33,400, and $27,600, respectively. Using these Hispanic median family incomes, the adjusted affordability ratios are 203 in Denver, 220 in Los Angeles, and 322 in New York. These extraordinarily high ratios suggest that a Hispanic median-income family would not be able to purchase a median-priced home in these markets.

As these figures suggest, housing affordability is largely a function of the relationship between incomes and housing prices; but housing affordability among Hispanics is also affected by the degree to which Hispanics are clustered or segregated into particular residential areas. It terms of housing affordability effects, ethnic clustering and segregation perpetuates a dual housing market that in turn engenders supply restrictions in minority neighborhoods. A dual housing market relegates Hispanics and other minorities to neighborhoods near the city core; these neighborhoods are characterized by older, low-quality, multifamily housing that is less suitable for ownership (Harding, Rosenthal, and Sirmans, 2007; Rosenbaum, 1996). Multifamily buildings have less appeal for ownership because they offer less privacy, have higher management costs to coordinate the

activities of all owners, and offer less control because all owners must agree on maintenance and renovation investments. These structural characteristics diminish homeownership opportunities among Hispanics and other minorities and lead to higher housing prices. A shrinking affordable housing stock has also been associated with neighborhood gentrification, limited incentives and financing for affordable housing development, zoning regulations that restrict the development of multifamily units, and environmental regulations that increase building costs (Congressional Hispanic Caucus Institute, 2004).

Racial and Ethnic Discrimination in the Housing Market. Although racial and ethnic discrimination in the housing market has been researched extensively, most research has focused on African-American households.[18] The nature and impact of discrimination among Hispanics is less understood. In theory, discriminatory practices experienced by African Americans similarly apply to Hispanics. For example, during the homebuying process, both Roychoudhury and Goodman (1996) and Ondrich, Stricker, and Yinger (1998) suggest that a real estate agent may discriminate against minorities by—

- Limiting information shared with a potential homebuyer about available housing units or neighborhood amenities.
- Limiting the number of housing units shown to and inspected by a potential homebuyer.
- Limiting information about financing, available financial and mortgage products, and referrals to mortgage professionals.
- Limiting ongoing encouragement or assistance offered to the potential homebuyer.
- Steering a potential homebuyer to certain types of neighborhoods based on the person's socioeconomic and racial characteristics; for example, the real estate agent may steer a minority homeseeker to predominantly minority or integrated neighborhoods and a White homeseeker to predominantly White neighborhoods.

To explore some of these dimensions, the U.S. Department of Housing and Urban Development (HUD) sponsored the largest paired-test study[19] to date. The Housing Discrimination Study 2000 (HDS 2000) conducted by Turner et al. (2002b) is based on 4,600 paired tests conducted in 23 metropolitan areas nationwide.[20] Based on the Hispanic-White paired tests,[21] Turner et al. found that discriminatory treatment experienced by Hispanic homebuyers has declined since 1989 (when HUD last conducted this type of paired-test study of housing discrimination), but many Hispanics still face significant levels of discrimination.

Exhibit 5 presents the overall results from Turner et al. for many of the dimensions highlighted by Roychoudhury and Goodman (1996) and Ondrich, Stricker, and Yinger (1998). The overall consistency indicator—a measure of the extent to which the different forms of treatment consistently favor one tester over another—suggests that non-Hispanic Whites were consistently favored in 19.7 percent of tests and Hispanics were favored in 12.3 percent of the tests. The net consistency measure, which is the difference in favorable treatment between Whites and Hispanics (7.4 percent), is statistically significant, indicating that non-Hispanic Whites were significantly more likely than Hispanics to be consistently favored throughout the home search process. The net consistency

Exhibit 5

Differential Treatment Among Non-Hispanic White Homeseekers and Hispanic Homeseekers, 2000

Overall Indicator	% of Non-Hispanic White Favored	% of Hispanic Favored	Net Measure (%)	Change Since 1989, Net Measure (%)
Housing availability	46.3	44.4	1.9	– 10.5*
Housing inspection	38.3	40.9	– 2.6	– 14.7*
Geographic steering—inspected	14.7	9.7	5.0*	3.5
Financial assistance	38.6	24.2	14.4*	13.1*
Agent encouragement	30.6	27.5	3.1	– 14.5*
Overall consistency measure	19.7	12.3	7.4*	– 3.0

** Indicates significance in net measure and change in net measure at the 95% level (using a two-tailed test).*
Source: Turner et al. (2002b: 3–17; 3–19)

measure dropped slightly (3.0 percentage points) from the findings of HUD's 1989 study, although the decrease is not statistically significant.

Focusing on the indicators that revealed differential treatment among homeseekers, non-Hispanic Whites received more favorable treatment than Hispanics did in terms of receiving information about home financing (financial assistance) and inspecting homes in predominantly non-Hispanic neighborhoods (geographic steering). The issue of financial assistance was the area of greatest disparity in treatment between Whites and Hispanics, with 14.4 percent of Whites receiving more favorable treatment on net. The financial assistance indicator is based on a range of treatments. More specifically, real estate agents were significantly more likely to offer non-Hispanic Whites help with financing (22.2 percent of non-Hispanic Whites favored; 10.5 percent of Hispanics favored), recommend lenders (19.6 percent of non-Hispanic Whites favored; 12.8 percent of Hispanics favored), and discuss downpayment requirements (24.9 percent of non-Hispanic Whites favored; 15.4 percent of Hispanics favored). Financial assistance is the one area in which the discriminatory treatment of Hispanics was statistically significantly worse in 2000 than in 1989, with the net measure for systematic discrimination in financing assistance increasing by 13.1 percent points.

The other indicator in which non-Hispanic Whites were favored was geographic steering. In paired tests, 14.7 percent of non-Hispanic Whites were shown homes in less predominantly Hispanic areas, compared with 9.7 percent of Hispanics. The 5-percentage-point difference in treatment is statistically significant, although the net measure of discrimination did not change significantly from the 1989 measure. This finding suggests that Hispanic homeseekers are slightly more likely to be directed to neighborhoods that primarily consist of minority households.

Turner et al. (2002b) also found, however, that Hispanic and non-Hispanic White homebuyers received comparable treatment along several other indicators in the housing search process, including receiving information about available housing opportunities, the number of housing inspections by the potential homebuyer, and real estate agent encouragement. On several measures, Hispanics were treated more favorably than non-Hispanic Whites were. For example, Hispanics were more likely to be given information on an advertised unit than non-Hispanic Whites were

(15 percent versus 12 percent) and were given the opportunity to inspect more units (38.1 percent Hispanic favored versus 35.7 percent non-Hispanic Whites favored). The change in the net measure across each of these indicators decreased significantly in 2000 from the measures reported in 1989. Thus, there were several areas in which discriminatory treatment of Hispanics appeared to have eased since 1989.[22]

Financial and Mortgage Market Barriers

The push to connect Hispanics, especially immigrants, with mainstream financial resources is mounting among financial institutions and community development organizations. Despite this growing interest, connecting Hispanics to mainstream financial institutions has been challenging and is a significant barrier to Hispanic homeownership. In particular, obtaining mortgage financing is a critical, albeit difficult, stage in the homebuying process and is guided by the mortgage industry's three "C"s: creditworthiness, capacity, and collateral. Creditworthiness is a measure of the kind of credit the borrower has been extended in the past and whether that credit was paid in a timely fashion. Capacity is an income-to-debt measure that gauges a borrower's ability to afford a loan. Collateral is a measure of the size of the borrower's downpayment. Collectively, these measures constitute a borrower's overall credit profile and determine whether a borrower will qualify for a loan. Hispanic borrowers, however, face several barriers to performing well on these measures and thus have problems qualifying for mortgages. These barriers, each of which is discussed in turn in the following sections, include poor credit history, low wealth and income, lack of proper documentation, and racial and ethnic discrimination in mortgage lending.

Poor Credit History. Recent evidence suggests that many Hispanics have poor credit, which hinders their ability to become homeowners. In a recent study, Bostic, Calem, and Wachter, (2004) used data from the Survey of Consumer Finances (1989, 1995, 1998, and 2001 surveys) to assess the trends in credit quality across various segments of the U.S. population stratified by demographic characteristics; Bostic, Calem, and Wachter (2004) also quantified the extent to which credit quality constraints play an important role in a household's decision to pursue homeownership opportunities. The researchers identified an individual as constrained by credit if his or her credit score was below 660 (or the 25th percentile of the score distribution).[23] Overall, the study suggests that median scores across all individuals in the national sample increased from 721.3 in 1989 to 730.1 in 2001. The percentage of individuals who are credit constrained also increased slightly, from 19.3 percent to 24.5 percent during the study period.

These marginal increases for the total national sample, however, mask the results for Hispanics. The median score among Hispanics decreased from 695 in 1989 to 670 in 2001. The proportion of Hispanics who fell below the 660 threshold increased significantly from 25.4 to 48.5 during the same time period. Moreover, these results are especially dramatic for Hispanic renters. The predicted score decreased significantly for Hispanic renters from 685.2 to 623.7, and the proportion of credit-constrained Hispanics increased dramatically from 20.5 percent to 63.3 percent. These results varied among Hispanics renting in central cities, suburbs, and rural areas, but the trends are consistent. For example, the average scores among Hispanic renters living in central cities and rural areas dropped significantly from 681.3 and 689.3, respectively, in 1989 to 624.7 and 624.0, respectively, in 2001. For these same groups, the proportion of individuals who were considered uncreditworthy increased from 27.1 and 6.7 percent, respectively, to 63.1 and 62.2 percent,

respectively. These findings are corroborated by the regression results and suggest that fewer Hispanics, especially renters, are viewed as creditworthy and many more are likely to be subject to more extensive reviews, which could potentially deter them from considering homeownership or completing the homebuying process.

These findings are echoed, albeit less pronounced, in an earlier study that estimates how much homeownership rates might increase for various subgroups of the population if all borrowing constraints were eliminated but households otherwise keep to their budget constraints (Rosenthal, 2002). The study made use of a set of survey questions from the 1998 SCF that enabled the researcher to identify individual households that perceived themselves to have been subject to binding credit barriers of any type (mortgage, auto credit, consumer credit, and so on). Then, controlling for sample selection, the researcher estimated the demand for homeownership among families not subject to credit barriers and used the results to predict the demand for homeownership for the entire sample. Comparing predicted with actual homeownership rates provided an estimate of the influence of credit barriers on homeownership.

For the full sample, the results indicate that the overall homeownership rate would be 4.0 percentage points higher in the absence of credit constraints. The impact of credit barriers on homeownership, however, varied by subgroups in the sample. Among Hispanics, eliminating borrowing constraints is predicted to raise Hispanic homeownership by 6.7 percentage points; this predicted increase is higher than for any other racial/ethnic subgroup in the study.

Poor credit has consistently been identified in focus group research as a primary barrier to Hispanic homeownership (Bendixen and Associates, 2004; Congressional Hispanic Caucus Institute, 2004; Fannie Mae, 2003). These studies suggest that the confluence of numerous factors contribute to this barrier. One factor is a lack of experience with financial establishments and an understanding of how to build and maintain a good credit rating, which was discussed previously. Another factor is the fact that assessing credit history is reliant on a history with credit payments, which currently does not include utility or rent payments, and some Hispanics—especially immigrants (in particular, those who are unbanked and undocumented)—pay for goods and services in cash, which does not contribute to a traditional credit assessment.

Low Wealth and Income. The mortgage approval process also relies heavily on a borrower's wealth and annual income to demonstrate capacity and collateral. A study for the Pew Hispanic Center by Kochhar (2004) analyzed data from the Survey of Income and Program Participation and the SCF to describe the net worth of Hispanics between 1996 and 2002. The study demonstrated that Hispanic (and African-American) households are extremely vulnerable to economic downturns because their low net worth cannot protect them from short-term recessions or spells of unemployment. Overall, a Hispanic household has less than 10 cents in wealth for every dollar owned by a non-Hispanic White household.

Exhibit 6 presents the median net worth among Hispanic and non-Hispanic households by tenure from 1996 and 2002. The median net worth of all Hispanics increased by 14 percent from $6,961 in 1996 to $7,932 in 2002. Net worth increased throughout the time period until the recession of 2001 and rebounded thereafter to 1997 levels. As would be expected, however, Hispanic renters have dramatically less net worth than Hispanic homeowners do. Among Hispanic renters, median

Exhibit 6

Median Net Worth ($) Among Hispanic and Non-Hispanic Households, 1996–2002

Household	1996	1997	1998	1999	2001	2002
Hispanic						
Renters or others	578	570	337	545	774	762
Homeowners	56,767	53,614	49,485	57,928	57,376	62,839
All Hispanics	6,961	7,801	7,167	10,495	6,213	7,932
Non-Hispanic						
Renters or others	2,264	1,935	1,914	2,059	1,816	1,526
Homeowners	111,141	115,222	117,070	123,175	126,261	129,778
All non-Hispanics	59,786	61,171	62,179	67,692	68,248	69,305

Source: Kochhar (2004) tabulations of SIPP data

net wealth rose 32 percent over the period but was still only $762 in 2002. In comparison, during the same period, the median net worth among non-Hispanics increased 16 percent, from $59,786 to $69,305; the latter figure is nearly nine times the net wealth of all Hispanics. Non-Hispanic renters also had significantly lower net worth than non-Hispanic homeowners did, although non-Hispanic renters had about twice the net worth of Hispanic renters in 2002.

Another indication of the degree to which Hispanics are wealth constrained is to consider the share of households with $0 or negative net wealth. The Pew Hispanic Center study found that, as of 2002, 26.0 percent of Hispanics had no positive wealth compared with 13.1 percent of Whites.

Some evidence indicates that a lack of greater connection to financial institutions may limit wealth accumulation among Hispanics. Information tabulated by the Kochhar (2004) from 1996 to 2002 suggests that the most common assets among both Hispanic and non-Hispanic households are a car and a house, although wide disparities exist in the proportion of households that own these assets. But perhaps the most striking disparity is reflected in the proportion of households with interest-earning accounts (including interest-earning checking accounts, savings accounts, money market accounts, and certificates of deposit) at financial institutions. In 2002, 69 percent of non-Hispanic White households reported owning an interest-earning account compared with 42 percent of Hispanics, which is nearly a 30-percentage-point gap. Ownership rates for households holding noninterest-bearing checking accounts are low for both Hispanics (30 percent) and non-Hispanic Whites (36 percent). Ownership rates for households holding other financial assets are particularly low for Hispanics: less than 10 percent of Hispanics own U.S. savings bonds, IRA or Keogh accounts, or stocks or mutual funds, and less than one-fifth own a 401(k) account or thrift savings account. More than 10 percent of Hispanics report having no assets other than unsecured liabilities. By contrast, more than one-third of non-Hispanic White households own stocks or mutual funds, or 401(k) accounts or thrift savings accounts, and 30 percent have IRA or Keogh accounts. Very few non-Hispanic White households (less than 3 percent) report having no assets other than unsecured liabilities. Hispanic households, however, are slightly less likely to own unsecured debt (46 percent) than non-Hispanic White households (53 percent) are.

These findings suggest that homeownership is an enormous part of a household's asset portfolio. Indeed, according to Kochhar, the *average* net worth among all Hispanics is $65,371 (in 2003 dollars) and 61 percent of their mean net worth is in the form of home equity. Interest-earning assets represented less than 6 percent of their mean net worth and checking accounts represented less than 1 percent. Rental property, 401(k) accounts or thrift savings accounts, and stocks or mutual funds each represented about 7 percent of Hispanic mean net worth. In comparison, the mean net worth among non-Hispanic White households ($221,871) is less frequently tied directly to home equity. For these households, about 39 percent of the average net worth is associated with home equity, 22 percent is in the form of stocks and mutual funds, and about 7 percent is associated with each of the following assets: interest-earning accounts, IRA and Keogh accounts, and 401(k) accounts and thrift savings accounts.

Kochhar's results are supported by other research that has been able to quantify net worth by ethnic groups. In an analysis of the Census Bureau's Survey on Income and Program Participation data from 1996 to 2000, Osili and Paulason (2005) suggested that Hispanic immigrants were 4.1 percentage points less likely to own stock and 3.8 percentage points less likely to have a savings account compared with native-born residents, all else being equal. The researchers attributed these differences to the "institutional quality" of the immigrants' home country, which measures the extent to which the country protects private property and provides incentives for investment. Hispanic immigrants from countries with higher levels of institutional quality (for example, Mexico) tend to have more net worth than immigrants from countries with lower levels of institutional quality (for example, El Salvador).

The low wealth accumulation among Hispanic households is explained in large part by the demographic characteristics discussed earlier. It is also strongly associated with annual income. Exhibit 7 shows a steep increase in median net worth and homeownership rates as incomes increase for both Hispanic and non-Hispanic households. Among Hispanics, a sharp increase in median net worth occurs after the third quintile. Hispanics in the fourth income quintile have four times more wealth than Hispanics in the lower quintile; however, the sharp increase is not associated with an unusually large increase in homeownership rates.

Exhibit 7

Median Net Worth ($) and Homeownership Rates (%) of Hispanic and Non-Hispanic Households by Monthly Income Quintile, 2002

Income Quintile[a]	Hispanics		Non-Hispanic	
	Median Net Worth	Homeownership Rate	Median Net Worth	Homeownership Rate
First	1,218	26.8	7,963	48.5
Second	4,466	38.5	40,194	62.3
Third	9,629	52.6	57,080	70.4
Fourth	38,402	64.4	90,361	80.2
Fifth	79,401	72.9	195,018	87.0
All households	7,932	47.3	69,305	70.0

[a] *Monthly income quintiles were estimated from the 2001 SIPP panel and were as follows: less than or equal to $1,380; $1,380 to $2,552; $2,552 to $4,020; $4,020 to $6,434; and more than $6,434.*

Source: Kochhar (2004) tabulations of SIPP data

Low wealth among Hispanics also is affected by large remittance flows to relatives living in an immigrant's home country. Some consider the funds that immigrants send to Latin America and the Caribbean to be more important to these regions' economic and social development than foreign direct investment, portfolio investment, foreign aid, or government and private borrowing.[24] For example, remittances to Central America doubled from $1.8 billion in 1996 to $3.6 billion in 2001, compared with an estimated $2.0 billion in foreign direct investment and $2.1 billion in official development assistance[25] in 2001 (Inter-American Dialogue, 2004).

Although the exact scale of this remittance flow is unclear, it is undoubtedly significant. According to one estimate, immigrants living in the United States sent $25 billion to relatives living in Latin America and Caribbean countries, and total remittances grew by 19 percent between 2002 and 2003 (Singer and Paulson, 2004). Others estimate that immigrants send more than $30 billion a year, which amounts to more than $2,500 a year for each Hispanic household in the United States (Kochhar, 2004). If that amount were saved and invested in the United States, the impact on Hispanic household wealth would be significant. Finally, the Inter-American Dialogue Task Force on Remittances (Inter-American Dialogue, 2004) estimated that immigrants sent $32 billion to these regions in 2002, a 40-percent increase from the amount sent in 2000.

Because many Hispanics eschew relationships with banks, Orozco (2004) found that banks have captured a very small fraction of the remittance market. According to the study, the four largest banks in this field—Citibank, N.A.; Wells Fargo & Company; Harris N.A.; and Bank of America, N.A.—conduct fewer than 10,000 remittances monthly, of which the overwhelming majority go to Mexico. In 2003, however, an estimated 40 million remittance transactions occurred between the United States and Mexico, suggesting that U.S. banks have captured only 3 percent of the remittance market. Thus, Orozco emphasized the potential for banks to offer remittance services to immigrants living in the United States and reach out to immigrants without savings or checking accounts.

Lack of Proper Documentation. Undocumented immigrants seeking a home mortgage may be denied financing because they do not have Social Security numbers (SSNs) or proper proof of employment.[26] The U.S. Immigration and Naturalization Service (INS) estimated in 2000 that 7 million people resided illegally in the United States as undocumented immigrants (U.S. Immigration and Naturalization Service, 2003). Others estimated a population of approximately 7.8 million in 2001 (Kochhar, 2004) and even as high as 9.3 million in 2002 (Passel, Capps, and Fix, 2004).

In terms of undocumented households (rather than population), Paral (2004) used data from the U.S. Citizenship and Immigration Services (formerly the INS) on the number of undocumented Hispanics and information on non-citizen, recent Hispanic immigrants captured by the 2000 decennial census to estimate the number of undocumented Hispanic householders and their characteristics.[27] The researcher also produced estimates by income, age categories, and region. The study found that in 2000, nearly 1.2 million undocumented Hispanic households were in the United States. The vast majority were Mexican but also included 2,500 people from Cuba, 28,000 from the Dominican Republic, 153,000 from Central America, and 113,000 from South America. In comparison, the 2000 decennial census identified a total of 9.2 million Hispanic households residing in the United States. Paral estimated that most households (669,705) were in the 25-to-34 age group category and 419,633 were in the 35-to-44 age group category. Although most of these

households (817,392) earned between $10,000 and $39,999 annually, more than 200,000 earned between $50,000 and $74,999 annually.

In addition, the study estimated the geographic location of undocumented Hispanic households by distributing their numbers across regions and states of the United States based on the location of Hispanic non-citizen renter households that entered the United States during the 1990s. This methodology suggests that 16.6 percent of undocumented Hispanic households are in the Northeast (mostly in New York and New Jersey), 9.9 percent are in the Midwest (especially in Illinois), 38.2 percent are in the South (predominantly in North Carolina, Georgia, Florida, and Texas), and 35.3 percent are in the West (particularly in Arizona and California).

This sizable population is effectively shut out of the homebuying process because undocumented immigrants cannot obtain valid SSNs, which, in turn, prevents them from applying for loans from mainstream lenders and for federally funded homeownership assistance programs. Indeed, focus groups conducted by the Congressional Hispanic Caucus Institute (2004) found that lack of documentation is a significant barrier to homeownership in 7 out of 11 cities: Atlanta, Chicago, Durham, Kansas City, Los Angeles, San Antonio, and New York City. In many of these cities, focus group participants admitted using false SSNs but also stated that they were unable to establish credit histories using these numbers or successfully complete the mortgage application process because the underwriting computer "will likely spit it out" (Congressional Hispanic Caucus Institute, 2004: 16).

Without valid SSNs, Hispanics also have difficulties documenting their wages and employment histories. Lenders expect documentation such as pay stubs to demonstrate sustained employment income, which is needed to satisfy the lender's assessment of the borrower's capacity to repay the loan. Also, because undocumented immigrants do not have valid SSNs and are thus unable to work in the formal economy, many of them work in seasonal positions and change jobs frequently. These Hispanics face additional challenges to documenting their income and employment histories because it is difficult to locate their former employers.

Racial and Ethnic Discrimination. Racial or ethnic discrimination within the financial and mortgage market has been researched extensively, particularly among African-American households. Numerous studies during the 1990s focused on the incidence and severity of discrimination in mortgage lending, which are succinctly summarized by LaCour-Little (1999) and Turner and Skidmore (1999). These summaries suggest that race and ethnicity has a significant effect on whether a household is rejected for a home loan, even after controlling for a variety of demographic and economic indicators. A few studies are particularly noteworthy.

The HUD-sponsored HDS 2000 conducted by Turner et al. (2002b) used paired tests to demonstrate that real estate agents treated non-Hispanic Whites more favorably than they treated Hispanics in terms of providing information about home financing assistance. Similarly, Turner et al. (2002a) applied the paired-testing approach in both Chicago and Los Angeles to investigate whether minorities (African Americans and Hispanics) receive the same treatment and information as Whites do during the preapplication phase of the mortgage application process.

The tests revealed statistically significant patterns of unequal treatment that systematically favored Whites (see exhibit 8). In terms of statistically significant findings, Hispanics in Chicago were

Exhibit 8

Differential Treatment Among Non-Hispanic White Homeseekers and Hispanic Homeseekers, in the Preapplication Phase of the Mortgage Application Process

Overall Indicator	Chicago		Los Angeles	
	% of Non-Hispanic White Favored	% of Hispanic Favored	% of Non-Hispanic White Favored	% of Hispanic Favored
Information provided	7.5	8.8	12.7	1.3**
House homeseekers could afford				
Maximum loan amount	51.9	19.2**	42.9	32.7
Maximum house price	51.0	13.7**	44.0	30.0
Number of products	55.6	27.8**	51.9	34.6
Received positive coaching	40.5	15.2*	39.2	36.7
Received followup	7.6	13.9	6.3	13.9
FHA encouraged	13.0	13.0	15.0	30.0

** Indicates significance at the 90% level or higher.*

*** Indicates significance at the 95% level or higher.*

Source: Turner et al. (2002a: 25–35)

given lower estimates of loan amounts and house prices than they could afford, told about fewer loan products, and offered less coaching than were their non-Hispanic White counterparts. For example, non-Hispanic Whites were quoted higher loan amounts and house prices more than 50 percent of the time, while Hispanics were favored less than 20 percent of the time. Non-Hispanic Whites were told about more loan products 56 percent of the time, while 28 percent of Hispanics were favored in this area. Non-Hispanic Whites were also given more assistance on how they could improve their qualifications as borrowers 41 percent of the time, while Hispanics were favored only 15 percent of the time.

In Los Angeles, Hispanics were given less information about affordable loan amounts and house prices and were informed about fewer products; however, Hispanics received more followup than their non-Hispanic White counterparts did. For example, non-Hispanic White testers were given more information 13 percent of the time, while Hispanics received more information 1.3 percent of the time. In terms of the number of loan products discussed, the incidence of favoritism was statistically insignificant but the study found that the differences in the number of products discussed were significant, with non-Hispanic Whites told about an average of 2.9 products and Hispanics told about only 2.3 products. Similarly, although the incidence of followup among the testers was not statistically significant, the average number of contacts among Whites (0.2) was statistically *lower* than that of Hispanics (0.4).

Discrimination in mortgage lending was also the focus of an earlier study that supplemented Home Mortgage Disclosure Act (HMDA) data in Boston with specific information on the financial, employment, and property characteristics of loan applicants that were relevant to a lending decision (Munnell et al., 1996).[28] The results demonstrated that even after controlling for the usual mortgage underwriting criteria, minorities were more likely to be rejected for a mortgage than Whites were. The study did confirm that minority applicants differ from White applicants in several important ways. Minority applicants have considerably less net wealth, liquid assets, and

income than White applicants do and they also have poorer credit histories. African-American and Hispanic applicants also make lower downpayments and have higher loan-to-value ratios than Whites do. These disadvantages in the loan application process accounted for a large portion of the difference in denial rates—but not all of the difference. The disparity between minority and White denials decreased from 18 percentage points to just more than 8 percentage points after controlling for these economic and property characteristics. Put differently, minority applicants with economic and property characteristics identical to those of White applicants would experience a rejection rate of 28 percent, while White applicants would experience a rejection rate of 20 percent (Munnell et al., 1996: 26).

The study also divided the sample into lenders with high and low volumes of loans made to minorities to determine if loan denial disparities among Whites, African Americans, and Hispanics differed by the size of the lending institution. The study found that race was an important explanatory factor for both types of lenders. Thus, the study concluded that an applicant's financial characteristics play a significant role in explaining loan denial disparities between Whites and minorities, but differential treatment based on race and ethnicity was evident in the mortgage market.[29]

These quantitative studies have been supported by qualitative research. For example, Temkin et al. (1999) conducted an indepth case study of a moderately sized lending institution based on detailed interviews with staff and a review of the institution's HMDA loan data. According to the case study, loan officers (a third of whom were Hispanic) and senior staff all spoke about the importance of fairness and the efforts to make sure that all qualified households were able to qualify for loan. The institution's data showed, however, that Hispanics were 2.5 times more likely to be denied a loan than Whites were, which was a considerably higher denial rate than the average rate within that metropolitan statistical area, even after controlling for an applicant's income and loan product. These researchers could not quantitatively pinpoint a reason for the discrepancy between the reported fair treatment of all applicants by staff and the lender's high denial disparities suggested by its HMDA data but offered three possible explanations: (1) the possibility that a higher rate of unqualified minority applicants applied at this institution, (2) HMDA-based data may be too imprecise to measure discrimination and may generate "false positives," and (3) the lending institution's staff may have good intentions but lack training, monitoring, or feedback mechanisms that ensure fair treatment. Also, after reviewing the lender's managerial practices and procedures, the researchers concluded that the lender fell short of implementing numerous fair lending practices that could have reduced the possibility of differential treatment of minority loan applicants.

Summary

The Hispanic community in the United States is very diverse. Hispanic households come from many different countries and differ across many demographic and socioeconomic characteristics. Some Hispanics are born abroad or speak English poorly, while others are native-born citizens or speak English fluently. A portion of the Hispanic community consists of immigrant households; and some of these households have been in the United States for many years, while others have been in the country for only a few years. In terms of residence, most Hispanic households are located in the South and West, particularly in California and Texas, and a few metropolitan areas in the Northeast have very high concentrations of Hispanic households.

These characteristics are important, not only because they highlight the enormous diversity among Hispanic households, but also because they are critical to understanding how Hispanic homeownership rates and gaps may change over time. This study provided an analysis of decennial census data to explore the relationship between these characteristics and homeownership rates and gaps. The analysis, supported by a literature review, found that age, income, level of education, net worth, household type, nativity, country of origin, degree of social integration (citizenship status and years in the United States), and place of residence were important factors that explained the gap in homeownership rates among Hispanics and non-Hispanic Whites. The data demonstrated that Hispanic homeownership rates increase and gaps decrease as age, income, and wealth, and educational status increase. Marriage was also a strong determinant of homeownership.

Also, among the immigrant-related characteristics, country of origin, citizenship status, and years in the United States were found to be important determinants of Hispanic homeownership. Homeownership rates increased as citizenship and length of stay in the United States increased, but immigrant-arrival cohorts effects were evident. That is, the homeownership rates of more recent immigrant groups have not risen as much over time as that of earlier immigrant-arrival cohorts. The analysis also indicated that the concentration of Hispanics in high-cost housing markets could depress Hispanic homeownership rates in these areas.

The descriptive analysis was supported, in general, by the existing literature on homeownership and was supported, specifically, by the emerging literature on Hispanic homeownership. Research suggests that individual "endowment" factors (such as income, age, education, family type, gender, and characteristics of the housing market where Hispanics reside) explain between half and three quarters of the racial and ethnic gap in homeownership rates among Hispanics. Much of the remaining gap appears to be related to the large share of Hispanics who are immigrants, at least based on the findings of one study that includes the broadest set of variables to explain Hispanic-White homeownership gaps.

The high share of Hispanics who are immigrants contributes to a number of key barriers to Hispanic homeownership, including information gaps about the homebuying process, barriers in the housing market, and barriers in the mortgage application process. This study described these barriers and how they impinge on the homebuying process. For example, information gaps about the homebuying process, the importance of establishing a financial history, and the mortgage qualification process can discourage some Hispanics from pursuing homeownership either because their misunderstandings about the process lead them to believe that homeownership is unaffordable or too complicated, banks are not to be trusted, or they do not qualify for a mortgage due to their credit history. Similarly, housing affordability concerns and the perception of discrimination in the housing market may chill interest in pursuing homeownership by putting it out of the reach of many Hispanic households or by making the housing search excessively difficult. These concerns are exacerbated by poor credit histories, low wealth and income, lack of proper documentation, and the potential for racial and ethnic discrimination in the mortgage application process. These mortgage market barriers can lead to frustration with the mortgage application process and prompt some Hispanics to give up or view homeownership as an unaffordable opportunity. Furthermore, racial and ethnic discrimination in the mortgage application process can limit a household's search for housing and even shut out Hispanics altogether.

Taken as a whole, this article suggests that Hispanics face considerable barriers to homeownership in the United States The ability of homeownership programs—formed at all levels of government and within private and community-based groups—to overcome these barriers remains unclear (Cortes et al., 2006). In particular, our understanding of Hispanic homeownership rates and gaps suffers from two shortcomings. First, most of the existing literature on homeownership focuses on all U.S. households generally and on the gaps among Whites and African Americans. Some of the lessons learned from these studies are applicable to Hispanics, but, as this report suggests, numerous challenges to accessing homeownership opportunities are particular to Hispanics. Second, although not touched upon in this article, the literature on the impact of different policy approaches on increasing homeownership rates among Hispanics is severely lacking. Anecdotal evidence from various communities across the country provides an important starting point from which to craft more informed policies, but the long-term success of homeownership programs that target Hispanics will rely on more rigorous empirical studies.

Acknowledgments

The authors gratefully acknowledge financial support from the Office of Policy Development and Research, U.S. Department of Housing and Urban Development (HUD). The authors also thank Harold L. Bunce and William J. Reeder of the U.S. Department of HUD and Jill Khadduri of Abt Associates Inc., for their careful and thoughtful review of the article.

Authors

Alvaro Cortes is an associate in the Social and Economic Policy Division, Abt Associates Inc.

Christopher E. Herbert is a senior associate in the Social and Economic Policy Division, Abt Associates Inc.

Erin Wilson is a senior analyst in the Social and Economic Policy Division, Abt Associates Inc.

Elizabeth Clay, formerly a research assistant at Abt Associates Inc., is a candidate for a Master in City Planning degree at the Massachusetts Institute of Technology.

Notes

1. For a comprehensive review of the literature examining the extent to which low-income and minority households benefit from homeownership, see Herbert and Belsky (2006).
2. All data presented in the study are weighted to be representative of the population.
3. In the 2000 Census, write-in responses that were not classified into one of the response categories associated with 20 different countries were coded as “Other Central American,” “Other South American,” or “Other Spanish or Latino.” It is unclear what types of write-in responses would be classified as “Other Spanish or Latino.” Most Caribbean countries are not included in the list of 20 response categories, but it is unlikely that people with origins in that these countries collectively constitute 15 percent of Hispanic households in the United States.

4. The racial classification of Hispanics has historically been problematic for the U.S. Census. In the 1980 and 1990 Census reports, Hispanic people were treated as "White" when the "other race" category was recorded in order to maximize historical comparability with previous census. The Integrated Public Use Microdata Series recoded as "White" those who marked "other race" and identified themselves as being of Hispanic origin on the Hispanic origin question.

5. An immigrant is defined as a foreign-born head of household, including a person born in Puerto Rico or another U.S. outlying area or a person born abroad to U.S. parents. In 2000, the number of Hispanic immigrant households totaled 4,819,856.

6. The shares of households in metropolitan areas are based on those households for which metropolitan area status is identified in the microdata sample of the 2000 decennial census. Households living in urban areas with populations of less than 400,000 have their metropolitan area status suppressed for confidentiality. Metropolitan area status is reported for 80 percent of Hispanic households and 51.5 percent of non-Hispanic households.

7. Unless otherwise noted, the figures cites in this section of the article are from the Census Bureau's Integrated Public Use Microdata Series using the 1980 1-percent metropolitan sample, the 1990 1-percent metropolitan sample, or the 2000 1-percent sample.

8. This category includes non-Hispanic household heads who selected two or more race categories on the census.

9. In addition, Flippen (2001a) found that both homeownership rates and housing equity among Hispanic households increase with increased income.

10. Information on net worth is from the 1996 panel of the Survey of Income and Program Participation (Wave 12 Core Microdata File, Inter-University Consortium for Political and Social Research version). Net worth is the difference between the sum of the market value of assets owned by each member of a household and unsecured liabilities associated with each household member. Assets included savings accounts, equity in a home, mutual funds, vehicle ownership, 401(k) plans, and other financial assets. Liabilities included a variety of unsecured liabilities (for example, credit card debt, medical bills, and education loans).

11. A native-born head of household does not include a person born in a U.S. outlying area (for example, Puerto Rico) or a person born abroad to U.S. parents.

12. These figures are derived by using the share of the population of Hispanics and non-Hispanic Whites in each market as a weight in estimating the average house value across these markets. For example, a market where 4 percent of Hispanics reside would have a weight of .04 in estimating the average. If 2 percent of Whites live in that market, the weight for Whites would be .02.

13. The Fannie Mae survey divided Hispanics into two groups based on the use of Spanish in the home. Hispanic respondents who reported Spanish as the most language used most frequently in the home for both speaking and reading were categorized as "Spanish Hispanics," while those that reported English as the most frequently used language were categorized as "English Hispanics." For clarity, the terms "Spanish-speaking" and "English-speaking" Hispanics are used for these two groups in this report.

14. An undocumented person is defined as a foreign-born person who is not a U.S. citizen and does not have legal immigration status.

15. A total of 467 housing advocates and practitioners, industry experts, and Latino consumers participated in focus groups in the following cities: Atlanta, GA; Chicago, IL; Durham, NC; Kansas City, KS; Las Cruces, NM; Las Vegas, NV; Los Angeles, CA; Miami, FL; New York, NY; San Antonio, TX; and San Juan, PR.

16. It is assumed that first-time homebuyers have 10-percent downpayments and repeat buyers have 20-percent downpayments. The mortgage interest rate is assumed to increase by 0.5 percentage points annually.

17. The Fannie Mae study by Tong (2004) uses family median-income data from the U.S. Department of Housing and Urban Development, which does publish separate estimates by race or ethnicity. In order to produce comparable median family income for Hispanics, we used 2000 Integrated Public Use Microdata Series data for a household of four.

18. For a more thorough summary of the literature on racial discrimination in the housing market, see Herbert et al. (2005).

19. In a paired test, two individuals pose as identical homebuyers except one is a minority and the other is White. The two individuals visit real estate agents to inquire about available housing opportunities. The paired-test methodology reveals whether real estate agents treat minorities differently than they treat Whites during the housing search process.

20. The study conducted paired tests for both rental and sales housing markets. We focus on the findings from the sales market. Within the 23 metropolitan areas, Hispanic-only paired tests were conducted in 4 metropolitan areas: Pueblo, CO; San Antonio, TX; San Diego, CA; and Tucson, AZ. Both African-American and Hispanic paired tests were conducted in six metropolitan areas: Austin, TX; Chicago, IL; Denver, CO; Houston, TX; Los Angeles, CA; and New York, NY. African-American only paired testing was conducted in the remaining 10 metropolitan areas.

21. The paired testers were assigned similar characteristics, including number of bedrooms desired by the household, geographic preference, reason for moving, household income (monthly and annual), employment history, household assets and debts, credit status, and tenure at current residence.

22. These results varied somewhat by metropolitan region. Hispanic homeseekers face higher levels of discriminatory behavior from real estate agents in New York City and Austin, Texas. Levels of discriminatory treatment in Chicago, Denver, Houston, Los Angeles, San Antonio, and San Diego were similar to national patterns, while discriminatory treatment was slightly lower in Pueblo, Colorado and Tucson, Arizona.

23. The researchers had access to a data set that included credit scores and a variety of household characteristics. Using these data, they developed a statistical model to predict a credit score using household characteristics that were available in the Survey of Consumer Finances (SCF), including detailed information on assets and liabilities; use of financial services; income; housing status (renter and homeowner); and demographic characteristics (age,

years of education, martial status, number of dependents, and race and ethnicity). They then applied the estimated model to SCF survey data in each of the 4 years. The SCF for these 4 years contains information for more than 200,000 individuals. The cutoff of scores below 660 to represent those who are credit constrained is based on the authors' review of information on the use of credit scores by mortgage lenders as reported by Fair Issac Corporation at www.ficoguide.com.

24. According to the data collected from the Inter-American Development Bank, remittances account for 30 percent, 15 percent, and 12 percent, respectively, of the gross domestic products of Nicaragua, El Salvador, and Honduras.

25. The official development assistance excludes loans from The World Bank and the International Monetary Fund.

26. An undocumented Hispanic is defined as a foreign-born person who is not a U.S. citizen and does not have legal immigration status and therefore is not eligible to obtain a Social Security Number.

27. The report assumes that the decennial census captures most undocumented Hispanic immigrants and that all those who reported they were not citizens and had immigrated since 1980 are representative of undocumented Hispanic immigrants. The authors argue that a comparison of the number of legal immigrants over time with the number of self-reported immigrants captured by the decennial census supports the contention that most undocumented individuals are largely reported in the census. More specifically, Paral notes that the estimated undercount of Hispanics in the 2000 Census is 2.85 percent, including both natives and immigrants; however, Census Bureau analysis of the undercount suggests that the foreign born have a higher undercount rate (Robinson, 2001).

28. The study combines African-American and Hispanic applicants into a single minority category in the analysis.

29. The findings of this study were controversial and subject to intense scrutiny. Critics have pointed to potential problems with omitted variables, data errors, assumptions in their predictive equation, and disentangling endogenous explanatory variables from minority status as explanations for the findings of disparate treatment. Nevertheless, a reanalysis conducted by Ross and Yinger (2002) suggests that the study's findings have emerged intact in the face of most of this scrutiny and that the large differences in loan denial rates between minority and White applicants cannot be explained away by these issues (see Turner and Skidmore, 1999).

References

Barr, Michael. 2004. Banking the Poor: Policies to Bring Low-Income Americans Into the Financial Mainstream. Research Brief, September. Washington, DC: The Brookings Institution.

Bendixen and Associates. 2004. "The Barriers to Banking and Building Credit History for Latin Americans: A Focus Group Study of Un-Banked Hispanics in Mobile, Alabama and Las Vegas, Nevada." Miami, FL: Bendixen and Associates. http://www.bendixenandassociates.com/studies2004.html.

Borjas, George J. 2002. Homeownership in the Immigrant Population. Working Paper No. 02-01. Washington, DC: Research Institute for Housing America.

Bostic, Raphael W., Paul S. Calem, and Susan Wachter. 2004. Hitting the Wall: Credit as an Impediment to Homeownership. Working Paper BABC 04-5. Harvard University, Joint Center for Housing Studies.

Callis, Robert R. 2003. Moving to America—Moving to Homeownership: 1994–2002. *Current Housing Reports*, H121/03-1. U.S. Bureau of the Census.

Collins, Michael, and Doug Dylla. 2001. "Mind the Gap: Issues in Overcoming the Information, Income, Wealth, and Supply Gaps Facing Potential Buyers of Affordable Homes." *Home Ownership Summit: 2000 Research Series*. LISC Center for Home Ownership.

Congressional Hispanic Caucus Institute. 2004. "Focus Group Findings: Cross-Site Report." Washington, DC: Mosaica, the Center for Nonprofit Development and Pluralism.

Cortes, Alvaro, Christopher E. Herbert, Erin Wilson, and Elizabeth Clay. 2006. *Improving Homeownership Opportunities for Hispanic Families.* Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Coulson, N. Edward. 1999. "Why Are Hispanic and Asian-American Homeownership Rates So Low? Immigration and Other Factors," *Journal of Urban Economics* 45: 209–227.

Dunham, Constance R. 2001. "The Role of Banks and Nonbanks in Serving Low- and Moderate-Income Communities." In *Changing Financial Markets and Community Development: A Federal Reserve System Conference*, edited by J.L. Blanton, et al. Richmond, VA: Federal Reserve Bank of Richmond: pp. 31–58.

Englehardt, Gary V., and Christopher J. Mayer. 1998. "Intergenerational Transfers, Borrowing Constraints, and Saving Behavior: Evidence From the Housing Market," *Journal of Urban Economics* 44: 135–157.

Fannie Mae. 2003. *Understanding America's Homeownership Gaps: 2003 Fannie Mae National Housing Survey*. Washington, DC: Fannie Mae.

Flippen, Chenoa A. 2001a. "Racial and Ethnic Inequality in Homeownership and Housing Equity," *The Sociological Quarterly* 42: 121–149.

———. 2001b. "Residential Segregation and Minority Home Ownership," *Social Science Research* 30: 337–362.

Gabriel, Stuart, and Stuart Rosenthal. 2005. "Homeownership in the 1990s: Aggregate Trends and Racial Disparities," *Journal of Urban Economics* 57 (1): 101–127.

Gyourko, Joseph, Peter Linneman, and Susan Wachter. 1999. "Analyzing the Relationship Between Race, Wealth and Homeownership in America," *Journal of Housing Economics* 8: 63–89.

Harding, John, C.F. Sirmans, and Stuart S. Rosenthal. 2007. "Depreciation of Housing Capital, Maintenance, and House Price Inflation: Estimates From a Repeat Sales Model," *Journal of Urban Economics* 61 (2): 193–217.

Haurin, Donald R., Patric Hendershott, and Susan Wachter. 1996. "Wealth Accumulation and Housing Choices of Young Households: An Exploratory Investigation," *Journal of Housing Research* 7: 33–57.

Haurin, Donald R., Christopher E. Herbert, and Stuart S. Rosenthal. 2007. "Homeownership Gaps Among Low-Income and Minority Households," *Cityscape* 9 (10): 5–51.

Herbert, Christopher E., and Eric S. Belsky. 2006. *The Homeownership Experience of Low-Income and Minority Families: A Review and Synthesis of the Literature*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Herbert, Christopher E., Donald Haurin, Stuart S. Rosenthal, and Mark Duda. 2005. *Homeownership Gaps Among Low-Income and Minority Borrowers and Neighborhoods*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Inter-American Dialogue. 2004. *All in the Family: Latin America's Most Important International Financial Flow.* Report of the Inter-American Dialogue Task Force on Remittances. Washington, DC: Inter-American Dialogue.

Joint Center for Housing Studies. 2004. *State of the Nation's Housing: 2004*. Cambridge, MA: Harvard University.

Kochhar, Rakesh. 2004. *The Wealth of Hispanic Households, 1996–2002*. Washington, DC: Pew Hispanic Center.

Krivo, Lauren J. 1995. "Immigrant Characteristics and Hispanic-Anglo Housing Inequality," *Demography* 32: 599–615.

———. 1986. "Home Ownership Differences Between Hispanics and Anglos in the United States," *Social Problems* 13: 319–335.

LaCour-Little, Michael. 1999. "Discrimination in Mortgage Lending: A Critical Review of the Literature," *Journal of Real Estate Literature* 7: 15–49.

Lee, Jongho, Louis G. Tornatzky, and Celina Torres. 2004. *El Sueño de Su Casa: The Homeownership Potential of Mexican-Heritage Families.* Los Angeles: University of Southern California, The Tomás Rivera Policy Institute. 27 p.

Masnick, George. 1997. "Citizenship and Homeownership Among Foreign Born Residents in the U.S." Research Note N97-1. Cambridge, MA: Harvard University, Joint Center for Housing Studies.

McArdle, Nancy. 1995. Homeownership Attainment of New Jersey Immigrants. Working Paper W95-2. Cambridge, MA: Harvard University, Joint Center for Housing Studies.

Munnell, Alicia H., Geoffrey M.B. Tootell, Lynn E. Browne, and James McEneaney. 1996. "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review* 86 (1): 25–53.

Myers, Dowel, and Seong Woo Lee. 1998. "Immigrant Trajectories Into Homeownership: A Temporal Analysis of Residential Assimilation," *International Migration Review* 32: 593–625.

Myers, Dowel, Isaac Megbolugbe, and Seong Woo Lee. 1998. "Cohort Estimation of Homeownership Attainment Among Native-Born and Immigrant Populations," *Journal of Housing Research* 9 (2): 237–269.

National Community Reinvestment Coalition. 2003. *The Broken Credit System: Discrimination and Unequal Access to Affordable Loans by Race and Age*. Washington, DC: National Community Reinvestment Coalition.

National Council of La Raza. 2004. *Financial Education in Latino Communities: An Analysis of Programs, Products, and Results/Effects*. Washington, DC: National Council of La Raza

Ondrich, Jan, Alex Stricker, and John Yinger. 1998. "Do Real Estate Brokers Choose to Discriminate? Evidence From the 1989 Housing Discrimination Study," *Southern Economic Journal* 64: 880–901.

Orozco, Manuel. 2004. *The Remittance Marketplace: Prices, Policy, and Financial Institutions*. Report prepared for the Pew Hispanic Center. Washington, DC: Georgetown University, Institute for the Study of International Migration.

Osili, Una O., and Anna Paulason. 2005. *Immigrant-Native Differences in Financial Market Participation*. Chicago, IL: Federal Reserve Bank of Chicago.

Painter, Gary, Stuart Gabriel, and Dowell Myers. 2001. "Race, Immigrant Status, and the Housing Tenure Choice," *Journal of Urban Economics* 49: 150–167.

Paral, Robert. 2004. *The Potential for New Homeownership Among Undocumented Latino Immigrants.* Report prepared for the National Association of Hispanic Real Estate Professionals. Chicago, IL: Paral and Associates.

Passel, Jeffrey S., Randy Capps, and Michael Fix. 2004. *Undocumented Immigrants: Facts and Figures*. Washington, DC: The Urban Institute.

Quercia, Roberto G., George W. McCarthy, and Susan M. Wachter. 2003. "The Impacts of Affordable Lending Efforts on Homeownership Rates," *Journal of Housing Economics* 12 (1): 29–59.

Ratner, Mitchell. 1996. "Many Routes to Homeownership: A Four-Site Ethnographic Study of Minority and Immigrant Experiences," *Housing Policy Debate* 7 (1): 103–145.

Real Estate Center at Texas A&M University. 2004. "Home Buying Among Ethnic Groups." PowerPoint presentation.

Robinson, J. Gregory. 2001. *ESCAP II: Demographic Analysis Results*. Washington, DC: U.S. Census Bureau, U.S. Department of Commerce, Executive Steering Committee for A.C.E. Policy II.

Rosenbaum, Emily. 1996. "Racial/Ethnic Differences in Home Ownership and Housing Quality, 1991," *Social Problems* 43 (4): 403–26.

Rosenthal, Stuart. 2002. "Eliminating Credit Barriers to Increase Homeownership: How Far Can We Go?" In *Low-Income Homeownership: Examining the Unexamined Goal*, edited by Eric Belsky and Nicolas Retsina. Washington DC: Brookings Institution Press: 111–145.

Ross, Stephen L., and John Yinger. 2002. *The Color of Credit: Mortgage Discrimination, Research Methodology, and Fair-Lending Enforcement*. Cambridge, MA: Massachusetts Institute of Technology Press.

Roychoudhury, Canopy, and Allen C. Goodman. 1996. "Evidence of Racial Discrimination in Different Dimensions of Housing Search," *Real Estate Economics* 24: 161–178.

Savage, H. 1999. *Who Could Afford to Buy a House in 1995?* Washington, DC: U.S. Census Bureau.

Schoenholtz, Andrew, and Kristin Stanton. 2001. *Reaching the Immigrant Market: Creating Homeownership Opportunities for New Americans*. Washington, DC: Georgetown University and Fannie Mae Foundation.

Schuetz, Jenny, Eric S. Belsky, and Nicolas P. Retsinas. 2004. *Current Housing Situation in Mexico 2005*. Cambridge, MA: Harvard University, Joint Center for Housing Studies.

Singer, Audrey, and Anna Paulson. 2004. *Financial Access for Immigrants: Learning from Diverse Perspectives*. Policy brief. Washington, DC: The Brookings Institution.

Temkin, Kenneth, George Galster, Roberto Quercia, and Sheila O'Leary. 1999. *A Study of the GSEs' Single-Family Underwriting Guidelines*. Washington, DC: The Urban Institute.

Tong, Zhong Yi. 2004. *Housing Affordability in Urban America: Past and Future*. Washington, DC: Fannie Mae Foundation.

Toussaint-Comeau, Maude, and Sherrie L.W. Rhine. 2000. "Ethnic Immigrant Enclaves and Homeownership: A Case Study of an Urban Hispanic Community." Consumer Issues Research Series. Chicago, IL: Federal Reserve Bank of Chicago, Consumer and Community Affairs Division.

Turner, Margery Austin, et al. 2002a. *All Other Things Being Equal: A Paired Testing Study of Mortgage Lending Institutions*. Washington, DC: U.S. Department of Housing and Urban Development.

———. 2002b. *Discrimination in Metropolitan Housing Markets: National Results From Phase I HDS 2000*. Washington, DC: U.S. Department of Housing and Urban Development.

Turner, Margery Austin, and Felicity Skidmore, eds. 1999. *Mortgage Lending Discrimination: A Review of Existing Evidence*. Washington, DC: The Urban Institute.

U.S. Immigration and Naturalization Service. 2003. *Estimates of the Unauthorized Immigrant Population Residing in the United States*. Washington, DC: U.S. Department of Justice, U.S. Immigration and Naturalization Service.

Wachter, Susan M., and Isaac F. Megbolugbe. 1992. "Racial and Ethnic Disparities in Homeownership," *Housing Policy Debate* 3 (2): 333–370.

Yinger, John. 1998. "Housing Discrimination Is Still Worth Worrying About," *Housing Policy Debate* 9 (4): 893–927.

Mortgage Pricing Differentials Across Hispanic, African-American, and White Households: Evidence From the American Housing Survey

Thomas P. Boehm
University of Tennessee

Alan Schlottmann
University of Nevada, Las Vegas

Abstract

This article uses recent metropolitan area samples of the American Housing Survey (AHS) for 1998, 2002, and 2004 to investigate differences in the terms, conditions, and use of mortgage financing alternatives. It investigates how financing and mortgage rates differ for Hispanics compared with other ethnic groups across a number of different U.S. housing markets. The principal focus of the article is to examine the extent to which differences in the interest rates obtained by homeowners of different race/ethnicity and income levels can be explained by differences in the characteristics of the borrowers, the property, and the loan itself. For example, Hispanic households appear to have a relatively high burden of first mortgage debt. Although limitations in the information available in the AHS do not allow for the determination of whether discrimination exists for minorities in the sample, this data set does identify important differences in the characteristics of these households, which in turn affect mortgage pricing.

Introduction[1]

An important policy emphasis in recent years of the U.S. Department of Housing and Urban Development has been to promote affordable housing homeownership and stronger communities. In developing the details of such programs, Secretary Alphonso Jackson acknowledged the increasing importance of the Hispanic-American population, particularly as a component of low-

income households, whose housing options need improvement.[2] Consistent with the recognition of the housing needs of low-income households and the Hispanic population, however, is the concern of policymakers and housing analysts that differences in access to homeownership financing may be a critical barrier to reducing the homeownership gap between Hispanic households and their White counterparts.

Thus, more needs to be understood about the differences in the terms, conditions, and use of financing alternatives across ethnic groups. The analysis presented in this article employs recent metropolitan statistical area (MSA) samples of the American Housing Survey (AHS) to address these issues and examine how financing factors differ for Hispanics compared with other ethnic groups across a number of different housing markets.

Recently, several researchers have used the AHS to examine loan terms, although their analyses have focused on first mortgages using the national version of the AHS. In this respect, these analyses are more limited in scope than the investigation developed in this article. Our analysis uses a much larger sample of Hispanic homeowners and identifies the markets in which the loans are being originated, which is not true for the national AHS sample.[3] Also, by expanding the analysis to include junior mortgages and home equity loans, a much more complete picture of housing-related finance can be developed. For example, according to the Federal Reserve, as of the second quarter of 2004, American homeowners owed $766.2 billion in home equity loans and lines of credit, more than twice the amount they owed in 1998.[4] Also, one might anticipate that minorities could be more likely to obtain such financing from more costly sources, including "predatory" lenders.

In addition to comparing overall debt levels, interest rates, and other loan characteristics across three major ethnic groups and income categorizations, for both traditional first mortgages and junior and home equity loans this study conducted a basic regression analysis.[5] In particular, for each ethnic subgroup, the current mortgage interest rate is the dependent variable with explanatory variables grouped into three broad categories: (1) the characteristics of the borrower, (2) the characteristics of the property, and (3) the characteristics of the loan itself.[6] Separate regression models are estimated both by purpose (home purchase and refinance) and by market type (conventional and Federal Housing Administration/U.S. Department of Veterans Affairs [FHA/VA]).

There is no "perfect" publicly available data set that allows researchers to investigate the issues and policy concerns related to variations in mortgage terms, conditions, and use across key borrower groups. A limiting factor within the AHS, as in most data, is a lack of information on the households' net-wealth and credit history. Also the AHS does not have information on the institutions that made the loan or the specifics of their underwriting criteria.[7] Consequently, it is not possible to definitively answer the question of whether discrimination exists in mortgage pricing. It is possible, however, to investigate differences in the signs and significance of the independent variables included in the pricing regression, draw inferences about the nature of the mortgage pricing process experienced by Hispanics (as compared with others), and suggest avenues for future research and potential policy concerns. To this end, it is important to note that studies have demonstrated that the financial variables from the AHS generally appear to be quite reliable.[8] Consequently, it is reasonable to assert that any implications for future research and policy development regarding both the pricing of loans and the differences found across other

dimensions of the financing for Hispanic, African-American, and White households in the analysis are based on mortgage information that, although limited in scope, is statistically reliable across a national sample. In addition, due to adequate sample size, the study is able to present new, reliable information for such dimensions as junior mortgages and home equity loans.

This article consists of five sections in addition to the first section, this introduction. The second section presents a brief overview of recent literature on mortgage pricing to provide a frame of reference for the analysis. The third section presents an overview of the data on which the study is based and several data compilations, including the financial variables noted previously. This section presents and discusses various aspects of mortgage loans by type and characteristics and shows these results across the dimensions of income and minority household status. The fourth section presents the basic specification of the regression analysis and the results for first mortgages for both the full sample and, separately, recent movers. Section five presents means and regression analyses for junior mortgage and home equity lending. Conclusions follow the last section.

Literature Review: A Brief Summary

Discussions of public policy about mortgage pricing have been handicapped by the relative lack of studies on the rates charged for mortgages categorized by race and by mortgage market segment. The existing literature on discrimination in mortgage markets has focused largely on discrimination and redlining in the mortgage approval process. Examples of this literature include Yinger (1996), Ross and Yinger (1996), and Ladd (1998). An extensive literature discussion appears in the book by Ross and Yinger (2002). Other studies have examined loan default rates (for example, Berkovec et al., 1996; Cotterman, 2002).

The small but growing literature that analyzes mortgage rates using recent data includes Courchane and Nickerson (1997); Crawford and Rosenblatt (1999); Nothaft and Perry (2002); Black, Boehm, and DeGennaro (2003); and Susin (2003).[9] Courchane and Nickerson report the results from three examinations by the Office of the Comptroller of the Currency. They conclude that differences in rates may be due to discrimination, lenders' market power, or legal restrictions on lenders. Crawford and Rosenblatt 1999 examine lending by a single national mortgage lender for the period 1988–89. They conclude that conventional loan rates are race neutral. Due to data limitations, neither of these studies employs a representative national sample or analyzes refinanced loans in any detail. Nothaft and Perry (2002), using data from the Federal Housing Finance Board's Mortgage Interest Rate Survey for 1992–1995, analyze neighborhood effects. They find that rates are slightly higher in predominantly Hispanic neighborhoods but may be slightly lower in predominantly African-American neighborhoods. Black, Boehm, and DeGennaro (2003) analyze overages for purchase and refinance loans for a single national mortgage lender in 1996.[10] They conclude that the differences in overages are due to market power and differential bargaining skill.

In a pioneering study based on the AHS, Susin (2003) uses data from the national AHS for 2001. He employs a sample of all homeowners who have mortgages (12,524 households) to look at interest rates as a function of several household characteristics (race/ethnicity, house value, education, age, and a wealth proxy [dividend income]), mortgage characteristics, and neighborhood characteristics (the poverty rate and the percentage of African Americans and

Hispanics living in census tracts in which the households reside[11]). In addition, an interest rate index (the 10-year Treasury bond rate) was used to control for differences in interest rates at the time the home was originally purchased. Susin's analysis suggests that African Americans pay an average of 44 basis points more than Whites do, but the differential appears to be smaller for more recent mortgages. Susin's analysis suggests that most of the African-American–White differential is due to the difference in African Americans' refinancing behavior; the rate differential is larger for African Americans who refinance. Susin also finds that Hispanics pay an average of 23 basis points more than Whites do and that most of the differential is due to neighborhood effects.

Because the analysis of Susin (2003) uses the national AHS data to explore mortgage pricing, it is important to delineate clearly the differences between his and our analysis. First, Susin's paper considers all outstanding mortgages for all homeowners in a given year (2001). Although we, too, consider all mortgages at a given point in time, we also consider originations for a sample of homeowners who have moved within a year of their interview. This approach is consistent with the recent study by Lam and Kaul (2003), which suggests that the AHS financial data is more reliable the closer respondents are to the date of loan origination. In addition, borrower characteristics, loan characteristics, and property characteristics are the approximate characteristics that existed when the loans were originated. Thus, our approach should provide a better picture of how those characteristics currently affect market interest rates. Finally, our approach differs from Susin's analysis and represents substantial extension of preliminary work that we have done on this issue using AHS data (see Boehm, Schlottmann, and Thistle [2006]) in several additional ways. First, it employs a pooled set of the AHS MSA samples for the years 1998, 2002, and 2004. This pooled set of samples allows for a substantially larger sample size, which becomes particularly important as one begins to stratify by loan types and minority subgroups. In addition, the markets in which households reside can be identified. Thus, control variables can be included in the interest rate regression for the market in which the loan was made in addition to the year in which it was originated. Also, because of the increased sample size, this analysis separately analyzes first mortgages, junior mortgages (primarily second mortgages), and home equity loans (including lines of credit) individually, while the previous works focus exclusively on first mortgages.

The Data

As already suggested, the data presented and discussed in this article is from recent AHS samples that are specific for MSAs. Information is gathered for samples of approximately 5,000 households in each MSA. Approximately 14 MSAs are selected for each sampling year.[12] The most recently available MSAs are for the sampling years 1998, 2002, and 2004, with information from all 41 of the MSAs covered by these surveys combined for this analysis.[13]

Two primary reasons for using the MSA samples, as opposed to the national version of the data set, are apparent. First, of the almost 50,000 housing units included in the national sample, only about 4,000 are occupied by Hispanic households and slightly less than half of these households are owner occupants. In contrast, pooling the MSA samples for 41 markets yields a total sample size of nearly 200,000 observations, including more than 5,000 Hispanic households with first mortgages.[14] In addition, by using the MSA samples, we can identify the specific market in which housing decisions are being made.

For first mortgages, information is presented across several loan types. Specifically, the markets for home purchase versus refinance loans and conventional versus government (FHA/VA) loans are generally considered to be different enough that they need to be stratified into four separate submarkets for the purpose of analysis. In addition, for each submarket, the home purchase loans of recent movers will be considered separately from the loans of all households. Each sample provides a somewhat different perspective. Recent movers who choose homeownership and finance their home purchase with a first mortgage provide insight into current mortgage conditions across race and income categories for those households that have just negotiated a mortgage in the market. Alternatively, the full sample of current homeowners provides a view of the debt situation of all households whose current circumstances may be viewed as the result of financing decisions made over a substantially longer period of time. As mentioned earlier, in addition to permitting the investigation of first mortgages, the AHS data permits the investigation of other debt secured by home equity (junior mortgages and home equity loans).[15]

Exhibit 1 provides information on the share of homeowners in the sample by race/ethnicity and income who have one of the three types of loans examined in this study (that is, first, junior, and home equity).[16] The percentage of households by race with first mortgages is consistently lower among low-income households, as might be expected. For example, across all low-income households, no racial subgroup has more than 59 percent (Hispanics) of homeowners with first mortgages. In contrast, for high-income homeowners, no fewer than 74 percent (African Americans) of any subgroup have first mortgages. Similarly, low-income households are much less likely to use their homes as sources of financing to secure junior mortgages or home equity loans. Compared with other ethnic groups, White households are much more likely to use their home as a source of a home equity credit, with 4.8 percent of low-income White households using this credit alternative compared with about 2 percent of African-American and Hispanic households.

Exhibit 1

Means
All 1st Mortgagors[a]

	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Percent of owners with first mortgage	58.7	53.9	43.1	80.1	73.7	74.9
Percent of owners with junior mortgage	3.1	4.1	3.1	8.8	6.5	7.4
Percent of owners with home equity credit line	2.2	1.8	4.8	5.9	3.6	10.4

[a] *Data includes both home purchase loans and refinancings.*

First Mortgages

As a starting point for this discussion, information on mortgagors and mean characteristics for first mortgages for both the full and recent mover samples are presented in exhibits 2 and 3. Each of these exhibits will be discussed in turn.[17]

Exhibit 2 provides the financial characteristics of households and their loans. Both home purchase and refinanced loans are included in the data used to construct this exhibit. Perhaps the most striking data shown in exhibit 2 is housing costs relative to income (the ratio "housing cost/income" in the middle section of exhibit 2). As shown, the relative housing burden borne by low-income households to service their mortgage and related costs is quite high. Low-income Hispanic households have the highest ratio of all, with 67 percent of first mortgagors having a ratio that exceeds 32 percent. The ratios are high for other owners as well: 62 percent of African Americans and 61 percent of White low-income households have housing costs that exceed 32 percent of their income.[18] It is also particularly interesting to note that the interest rate differential between Hispanic first mortgagors and low-income White households is higher in exhibit 2 for low-income households than it is for those with higher incomes (a similar differential exists between African-American and White households). In general, White households have the lowest interest rates and African-American households have the highest interest rates within each income group.

Exhibit 3 provides comparable information for households that are recent movers in the AHS surveys. Several interesting differences exist between recent movers and the full sample. As shown in exhibit 3, recent movers have interest rates on first mortgages that are lower compared with those for the full sample of households (in exhibit 2). The differential is greatest for African-American households (for example, the interest rate is 6.78 percent for low-income African-American households that are recent movers compared with 7.39 percent for African Americans in the full sample).[19] In addition, the loan-to-value (LTV) ratios for recent movers are somewhat lower than those for the full sample, particularly for the percentage of households with LTV ratios that exceed 1. For example, across all the recent mover cohorts, 6 percent is the largest proportion of households with an LTV ratio exceeding 1. This finding is in marked contrast to the full sample, where corresponding figures are as high as approximately 13 percent. Although interesting, it is not obvious why this should be the case.

Regression Analysis

As noted previously, a regression model is employed to explore the determinants of interest rates for first mortgages both by purpose (home purchase and refinance) and by market type (conventional and FHA/VA). In addition, we also separate recent movers from the full sample. Exhibit 4 shows the average interest rates for each of the subgroups to be employed in the regression analysis. A number of interesting differences can be observed across these subgroups. First, in all cases except one (Hispanic households in the high-income FHA/VA purchase market for the full sample), White households have lower interest rates than do comparable minority households. As might be expected, FHA/VA loans have higher average rates than do comparable conventional loans. In several instances for lower income homeowners, one minority group has a substantially higher average interest rate than other households do. Specifically, for low-income households that recently moved and purchased a home, Hispanic households pay substantially more than others do, approximately 7.2 percent compared with 6.6 to 6.8 percent for African Americans and Whites. For refinanced loans, in the conventional market African Americans pay more than Hispanics or Whites do, approximately 7.5 percent compared with 6.9 and 6.6 percent, respectively. In contrast, for FHA/VA refinanced loans, interest rates are the highest for Hispanics, at 7.2 percent, and average 6.7 percent for both African Americans and Whites.

Exhibit 2

Means
All 1st Mortgagors[a]

Variable Name	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Interest Rate	7.30%	7.39%	6.99%	6.99%	7.23%	6.88%
Monthly Debt Service	$667	$547	$647	$966	$796	$961
Monthly Housing Cost	$1,071	$925	$1,074	$1,522	$1,264	$1,524
Annual Household Income	$30,301	$27,949	$30,369	$101,999	$90,153	$108,451
Current House Value	$146,560	$107,608	$165,022	$216,758	$155,419	$230,437
LTV > 1	10.1%	12.8%	12.5%	12.7%	10.6%	10.8%
0.9 < LTV <= 1	48.2%	44.9%	30.8%	40.1%	49.9%	30.1%
0.8 < LTV <= 0.9	9.7%	7.9%	10.4%	14.8%	10.5%	14.5%
LTV <= 0.8	32.0%	34.5%	46.2%	32.4%	28.9%	44.7%
Housing Cost/Income > 0.32	66.8%	61.7%	60.7%	10.7%	7.3%	8.3%
0.22 < Housing Cost/Income <= 0.32	23.9%	26.2%	26.2%	28.9%	22.4%	24.0%
0.16 < Housing Cost/Income <= 0.22	6.5%	8.5%	8.8%	28.1%	30.2%	29.2%
Housing Cost/Income <= 0.16	2.7%	3.6%	4.2%	32.3%	40.0%	38.6%
Debt Service/Income > 0.2	59.1%	52.4%	54.6%	14.5%	10.5%	10.5%
0.15 < Debt Service/Income <= 0.2	15.8%	18.0%	17.4%	19.1%	16.2%	16.6%
0.10 < Debt Service/Income <= 0.15	10.1%	14.6%	14.0%	27.8%	28.1%	30.7%
Debt Service/Income < 0.10	15.0%	15.0%	13.9%	38.6%	45.3%	42.2%
Conventional—Purchase	52.7%	45.7%	53.8%	49.1%	45.5%	51.1%
Conventional—Refinance	15.5%	13.2%	22.7%	21.8%	11.9%	28.9%
FHA/VA—Purchase	27.2%	37.6%	19.8%	23.6%	36.7%	15.6%
FHA/VA—Refinance	4.6%	3.5%	3.7%	5.6%	6.0%	4.4%
Number of observations	1,821	2,118	3,191	3,650	2,771	10,210

[a] *Data includes both home purchase loans and refinancings.*

Exhibit 3

Means
Recent Mover 1st Mortgagors

Variable Name	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Interest Rate	7.20%	6.78%	6.65%	6.87%	6.86%	6.72%
Monthly Debt Service	$766	$651	$754	$1,113	$990	$1,133
Monthly Housing Cost	$1,134	$994	$1,167	$1,612	$1,421	$1,665
Annual Household Income	$31,695	$31,309	$32,675	$94,245	$90,048	$106,900
Current House Value	$135,107	$116,648	$162,739	$213,121	$184,143	$242,083
LTV > 1	2.8%	5.9%	1.9%	4.0%	4.3%	1.6%
0.9 < LTV <= 1	56.9%	51.9%	40.8%	47.2%	57.5%	35.4%
0.8 < LTV <= 0.9	11.4%	7.6%	10.0%	16.7%	9.8%	14.3%
LTV <= 0.8	28.9%	34.6%	47.3%	32.0%	28.4%	48.7%
Housing Cost/Income > 0.32	68.3%	59.7%	62.5%	16.3%	10.7%	11.4%
0.22 < Housing Cost/Income <= 0.32	25.6%	30.5%	27.8%	35.5%	30.0%	29.8%
0.16 < Housing Cost/Income <= 0.22	3.6%	7.0%	6.3%	25.7%	30.5%	31.6%
Housing Cost/Income <= 0.16	2.5%	2.7%	3.4%	22.4%	28.8%	27.2%
Debt Service/Income > 0.2	64.0%	58.6%	62.1%	24.3%	18.9%	17.7%
0.15 < Debt Service/Income <= 0.2	17.0%	19.5%	17.8%	22.8%	23.6%	23.4%
0.10 < Debt Service/Income <= 0.15	6.1%	9.2%	8.2%	27.8%	27.5%	31.0%
Debt Service/Income < 0.10	12.9%	12.7%	11.9%	25.1%	30.0%	27.9%
Conventional—Purchase	61.2%	53.5%	70.3%	68.0%	58.8%	77.8%
FHA/VA—Purchase	38.8%	46.5%	29.7%	32.0%	41.3%	22.2%
Number of observations	394	370	522	777	560	1,715

Exhibit 4

First Mortgage Interest Rates by Sample, Loan Type, and Household Type

Sample	Loan		Household Type					
			Low Income			High Income		
	Market	Purpose	Hispanic (%)	African American (%)	White (%)	Hispanic (%)	African American (%)	White (%)
Full	Conventional	Purchase	7.39	7.37	7.09	7.13	7.30	7.04
Full	FHA/VA	Purchase	7.45	7.41	7.20	7.22	7.38	7.27
Mover	Conventional	Purchase	7.20	6.81	6.63	6.89	6.85	6.70
Mover	FHA/VA	Purchase	7.21	6.73	6.70	6.83	6.86	6.80
Full	Conventional	Refinance	6.90	7.49	6.62	6.49	6.79	6.43
Full	FHA/VA	Refinance	7.21	6.73	6.70	6.83	6.86	6.80

Our basic regression specification is consistent with the regression models used by several authors such as Belsky and Duda (2002). In particular, for each ethnic subgroup, the current interest rate is the dependent variable with explanatory variables grouped into three broad categories: (1) the characteristics of the borrower, (2) the characteristics of the property, and (3) the characteristics of the loan itself. The list of included factors available from the AHS is shown in exhibit 5.

An additional aspect of race/ethnicity is identified for this analysis that is normally not available, namely that Hispanic households can be split into White and non-White households. Because the AHS asks questions about race separate from Hispanic ethnicity, it allows for a unique opportunity to compare results for Hispanic households that have different racial characteristics. Consequently, Hispanic households were split into two distinct groups: White and non-White Hispanics.[20] Note that the percentage of White and non-White Hispanics varies depending on whether one considers the refinancing or home purchase subsamples. For home purchases, 35 to 46 percent of Hispanics are classified as non-White. For refinanced loans, only about 25 percent of the Hispanic households are classified as non-White.[21] In addition to including a set of race/ethnicity variables, the AHS includes gender, age, and education as controls. Because women, the elderly, and minorities are protected classes under discrimination laws, some believe these groups may be at a disadvantage in terms of shopping for and negotiating loan rates. It also is hypothesized that more-educated individuals will generally be more able to assess financial market opportunities and might be expected to fare better in finding the lowest cost financing alternatives than less-educated individuals fare. Similarly, we include whether a household is a first-time homeowner, because households purchasing for the first time are likely to have less financial sophistication and generally find themselves in somewhat different financial circumstances than those that have already purchased a house, arranged for its financing, and, by owning, built up equity in that house and demonstrated a willingness and ability to make mortgage payments.

In addition, three other household characteristics are included in an attempt to control for a household's ability to make its debt service payments. The ratio of income to household size captures the extent to which household size and related expenditures on the needs of household members could impact default risk. A discrete measure of whether household savings are equal to

Exhibit 5

Variable Names and Definitions

Variable Name	Variable Definition
Loan Characteristics	
Interest Rate	Current interest rate on the loan expressed as a percent
10 Year Loan Term	1 = Loan term is 10 years; 0 = otherwise
15 Year Loan Term	1 = Loan term is 15 years; 0 = otherwise
20 Year Loan Term	1 = Loan term is 20 years; 0 = otherwise
25 Year Loan Term	1 = Loan term is 25 years; 0 = otherwise
30 Year Loan Term	1 = Loan term is 30 years; 0 = otherwise
Loan Term <= 5 years	1 = Loan term is less than or equal to 5 years; 0 = otherwise
5–10 Year Loan Term	1 = Loan term is greater than 5 years and less than or equal to 10 years; 0 = otherwise
10–15 Year Loan Term	1 = Loan term is greater than 10 years and less than or equal to 15 years; 0 = otherwise
15–20 Year Loan Term	1 = Loan term is greater than 15 years and less than or equal to 20 years; 0 = otherwise
20–30 Year Loan Term	1 = Loan term is greater than 20 years and less than or equal to 30 years; 0 = otherwise
Loan Term > 30 years	1 = Loan term is greater than 30 years; 0 = otherwise
Loan to Value (LTV) > 1.0	1 = LTV ratio greater than 100 percent; 0 = otherwise
0.9 < LTV <= 1.0	1 = LTV ratio greater than 90 percent and less than or equal to 100 percent; 0 = otherwise
0.8 < LTV <= 0.9	1 = LTV greater than 80 percent and less than or equal to 90 percent; 0 = otherwise
LTV <= 0.8	1 = LTV ratio less than or equal to 80 percent; 0 = otherwise
Loan Payments Fixed	1 = Loan payments are fixed during the life of the loan; 0 = otherwise
Private Mortgage Insurance	1 = Loan has private mortgage insurance; 0 = otherwise
Year of Origination	Discrete variables indicating the year in which the mortgage was originated
Household Characteristics	
Income/Household Size	Monthly income in 1,000 dollar units of measure relative to household size
Not High School Graduate	1 = Did not graduate from high school; 0 = otherwise
High School Graduate	1 = High school graduate; 0 = otherwise
Post High School	1 = Some education after high school, but not a college graduate; 0 = otherwise
College Graduate	1 = College graduate or more; 0 = otherwise
Married	1 = Married couple or partner present; 0 = otherwise
Single Female	1 = Household head a single female; 0 = otherwise
Single Male	1 = Household head a single male; 0 = otherwise
Household Size	Number of persons in household
Household Income	Household income in $10,000 units

Exhibit 5

Variable Names and Definitions (continued)

Variable Name	Variable Definition
Age 24 or less	1 = Age of household head less than 25 years of age; 0 = otherwise
Age 25–44	1 = Age of household head 25 to 44 years of age; 0 = otherwise
Age 45–61	1 = Age of household head 45 to 61 years of age; 0 = otherwise
Age 62 or more	1 = Age of household head 62 years of age or more; 0 = otherwise
Savings 20k or more	1 = Household has $20,000 in savings or more; 0 = otherwise
White Household[a, b]	1 = Household's race designated to be White; 0 = otherwise
African-American Household[a, b]	1 = Household's race designated to be African American; 0 = otherwise
White Hispanic Household[a, b]	1 = Household identified as Hispanic and White; 0 = otherwise
Non-White Hispanic Household[a, b]	1 = Household identified as Hispanic and non-White; 0 = otherwise
First-time Owner	1 = First home owned by the household; 0 = otherwise
Monthly Housing Cost	Included are the costs of electricity, gas, other heating fuels, water and sewer, real estate taxes, property insurance, condominium fees, mobile home park fees, homeownership association fees, mortgage and home equity loan payments, other mortgage fees paid periodically, and routine maintenance
Housing Cost/Income > 0.33[c, d]	1 = Monthly housing cost relative to monthly income is greater than 33 percent; 0 = otherwise
0.22 < Housing Cost/Income <= 0.33[c, d]	1 = Monthly housing cost relative to monthly income is greater than 22 percent and less than 34 percent; 0 = otherwise
0.16 < Housing Cost/Income <= 0.22[c, d]	1 = Monthly housing cost relative to monthly income is greater than 16 percent and less than 23 percent; 0 = otherwise
Housing Cost/Income <= 0.16[c, d]	1 = Monthly housing cost relative to monthly income is less than or equal to 16 percent; 0 = otherwise
Property Characteristics	
Current House Value	Current house value in 10,000 dollar units
Metropolitan Areas	Households in the sample came from 41 MSAs in three interview periods (1998, 2002, 2004) discrete variables indicating the MSAs in which each housing unit was located were included in regression analyses. For a complete list of the MSAs included in the analysis, see appendix A.

[a] Because the American Housing Survey designates race and Hispanic ethnicity separately, both White and non-White individuals can identify themselves as Hispanic. This split is represented in the categorization of Hispanics in the exhibit.

[b] Race of the spouse (or partner) was considered when identifying the race of the household. For mixed race couples, if either the head or spouse was Hispanic, the household was consider Hispanic, for couples where one partner was African American the household was considered to be African American.

[c] Break points represent the division of the distribution for the full sample into quartiles.

[d] For a definition of what is included in monthly housing cost, see the definition of that variable in the exhibit.

or greater than $20,000 is the only wealth measure available in the AHS. This wealth measure, too, might impact default risk; that is, those households with a substantial amount of savings might be expected to get lower interest rates because they have a greater financial cushion to draw on to avoid default. Finally, the categorical variables representing various levels of housing cost relative to income should be a primary determinant of default risk. Lower values of this ratio should also be correlated with lower interest rates.

In addition to including household characteristics, the AHS includes several loan characteristics to control for differences in the risk associated with these loans. Specifically, loan term, whether the loan payment is fixed, whether the loan has private mortgage insurance (for conventional loans only), and (for recent movers only) whether a set of categorical variables that distinguish between various LTV ratio levels are included in the analysis.[22] Normally, one would expect that the longer the loan term, the higher the interest rate would be based on inflationary risk and the risk associated with any deferral in the repayment of principal. Fixed-payment loans exclude all mortgage instruments where payments may vary (for example, adjustable rate or graduated payment loans). Generally, we might consider fixed-payment, fully-amortized loans to be lower risk than other types of so-called "alternative" mortgage instruments. The effect of private mortgage insurance on the cost of a loan might be expected to differ depending on whether measures of the LTV ratio are included in the analysis. Private mortgage insurance is obtained to reduce the level of default risk on loans with higher LTV ratios. When a measure of the LTV ratio is included in the analysis, mortgage insurance might be expected to have a negative sign. For conventional mortgages, where LTV is not included, however, it might be expected to capture the higher risk associated with low downpayment loans and, therefore, have a positive sign. For recent movers, LTV ratio is defined as a set of categorical variables in which break points occur at meaningful intervals in terms of risk differentiation. In particular, loans with a greater than 80 percent LTV ratio typically are required to have private mortgage insurance, and loans with an LTV ratio of greater than 100 percent represent loans in which the principal balance is greater than the collateral value. Thus, loans in the lower LTV categories might be expected to have lower interest rates.

Beyond the loan and household characteristics, the quality of the neighborhood and structural characteristics of the property (that is, the quality of the collateral) might be expected to influence the risk of the loan. Although numerous subjective measures of housing quality abound in the AHS, the best single measure of the quality of the collateral is property value. It is expected that higher property values will be associated with lower interest rates.[23]

Finally, the AHS enables us to control for the year in which the loan was originated, and, because we are employing the metropolitan statistical area sample, the market in which the loan was originated. Thus, we include a set of categorical variables for the year of origination and the market in which the loan was originated.[24] Although these coefficients and t-statistics are not included in the exhibits, to allow for the results to be presented in a more concise and effective manner, they are highly significant in all the regressions and, as might be expected, account for a substantial amount of the variation in interest rates that are observed.[25] As noted in exhibit 5, the 41 MSAs included in the analysis are listed in appendix A.

As discussed previously, this study recognizes the limitations of the AHS in conducting interest rate analysis—namely, that information on the net-wealth position and credit history of the sample

households is not available and that information on the institutions making the loan (in particular, their underwriting criteria) are not available. Thus, the regression analysis presented can make no definitive statement about whether discrimination exists; however, this investigation's combined regression/means exhibits can shed light on two primary issues:

1. Are there separate racial/ethnic effects, after controlling for factors available in the AHS, that might influence interest rates?

2. What factors, if any, differ across the racial/ethnic/income groups that appear to influence the interest rate a household pays for a given loan? For example, if Hispanics are on average less well educated than Whites, do these differences matter economically and are they statistically significant in the interest rate regressions?

Home Purchase

Exhibits 6 and 7 present results for interest rates on home purchase loans through conventional markets for both the full sample and recent movers. Similarly, exhibits 8 and 9 consider the FHA/VA markets for the same two groups of mortgagors. Both sample means and the regression results are presented in all four exhibits.

The regression coefficients for the different race/ethnicity categories indicate the extent to which these groups pay higher interest rates than Whites do, all else being equal. For the full sample, African-American households appear to pay higher interest rates on first mortgages in both the conventional and FHA/VA markets compared with the interest rates that other households pay. Recent movers who are African American also pay significantly higher rates in the conventional market than other ethnic groups do but not in the government sector. Both non-White and White Hispanics pay significantly higher rates in the conventional market than Whites do (14.6 and 9.2 basis points, respectively), but these rates are not as high as those that African Americans pay (30.6 basis points). For recent movers, only non-White Hispanics pay significantly more than their White counterparts, 14.7 basis points, approximately the same differential we observe for the full sample. In contrast to the conventional market, in the FHA/VA market rates paid by Hispanics are not significantly different from those paid by Whites. Indeed, if one considers these results for minorities as a whole, it appears that, controlling for other factors, they are much more likely to experience significantly higher rates than Whites do in conventional markets than in the government sector.

Turning to the consideration of other factors in these regressions, higher levels of education tend to be associated with lower interest rates across all markets; however, the effects appear to be stronger in the conventional market. Given the correlation between higher levels of education and household wealth and the assumed better understanding of financial markets, this is certainly an anticipated result. This result matters, however, given the lower levels of education of Hispanic households. For example, the proportion of college graduates among low-income Hispanic households is less than half the corresponding figure for White households with conventional mortgages in the full sample—approximately 12.3 percent compared with 28.9 percent, respectively. For FHA/VA loans for the full sample, the difference is more pronounced, as only 7.8 percent of Hispanic household heads are college graduates, whereas 21.2 percent of Whites have earned a

Exhibit 6

Full Sample[a]
First Mortgages—Conventional/Home Purchase

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	7.38568	7.37048	7.08955	7.12884	7.29837	7.03914
Intercept	6.50615*	NA	NA	NA	NA	NA	NA
Household Race							
African-American Household	0.30565*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.14621*	0.35313	0.00000	0.00000	0.27734	0.00000	0.00000
White Hispanic Household	0.09177*	0.64688	0.00000	0.00000	0.72266	0.00000	0.00000
Household Characteristics							
Single Female	– 0.00595	0.21042	0.51810	0.36634	0.08259	0.20777	0.09481
Single Male	0.07736**	0.09688	0.16029	0.18462	0.06696	0.09992	0.10247
Age 24 or Less	– 0.07429	0.03229	0.05067	0.03611	0.01228	0.01665	0.01034
Age 45–61	0.03633	0.28021	0.34333	0.31217	0.34933	0.40285	0.39284
Age 62 or More	– 0.06316	0.14167	0.20476	0.25335	0.04743	0.06899	0.05861
High School Graduate	– 0.06094	0.25417	0.25750	0.27082	0.19364	0.19508	0.16376
Post High School	– 0.10632*	0.22708	0.31127	0.32207	0.30971	0.31800	0.27083
College Graduate	– 0.23344*	0.12292	0.20889	0.28946	0.37835	0.41079	0.52959
Income/Household Size	0.00066	0.84848	1.22576	1.37065	2.91491	3.04984	3.56726
Savings 20k or More	– 0.08740	0.02292	0.01861	0.07338	0.01004	0.00634	0.02624
First-Time Owner	– 0.06815*	0.35104	0.30403	0.56494	0.56975	0.45044	0.68148
0.22 < Housing Cost/Income <= 0.33	– 0.12112*	0.22188	0.25129	0.23646	0.27902	0.22125	0.24631
0.16 < Housing Cost/Income <= 0.22	– 0.17071*	0.07708	0.08583	0.08212	0.27065	0.27042	0.28041
Housing Cost/Income <= 0.16	– 0.21923*	0.03125	0.05274	0.05358	0.32757	0.42982	0.38288

Exhibit 6

Full Sample[a]
First Mortgages—Conventional/Home Purchase (continued)

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Loan Characteristics							
10 Year Loan Term	– 0.26373*	0.02917	0.01965	0.02213	0.01563	0.01190	0.01379
15 Year Loan Term	– 0.08616*	0.10938	0.09721	0.12522	0.09989	0.06503	0.12335
20 Year Loan Term	– 0.12420**	0.01875	0.04033	0.04485	0.02958	0.02538	0.03639
25 Year Loan Term	0.15492	0.00625	0.02172	0.01747	0.00781	0.01665	0.01915
Loan Payments Fixed	– 0.11489*	0.24479	0.35367	0.32091	0.22712	0.27914	0.23903
Private Mortgage Insurance	0.21008*	0.88854	0.77766	0.85149	0.93080	0.86598	0.93354
Property Characteristics							
Current House Value	– 0.00949*	14.59536	10.98829	16.02168	21.47161	17.03789	22.40053
Adjusted R^2	0.2575						
Number of observations	11,918	960	967	1,717	1,792	1,261	5,221

NA = not applicable.

[a] The sample includes all households that have a first mortgage loan.

[b] All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

** Indicates significance at the 1% level.*

*** Indicates significance at the 5% level.*

Exhibit 7

Recent Mover Sample[a]
First Mortgage—Conventional/Home Purchase

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	7.19865	6.81376	6.62636	6.89205	6.85220	6.69537
Intercept	7.29703	NA	NA	NA	NA	NA	NA
Household Race							
African-American Household	0.20625*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.14753**	0.43983	0.00000	0.00000	0.28598	0.00000	0.00000
White Hispanic Household	0.06353	0.56017	0.00000	0.00000	0.71402	0.00000	0.00000
Household Characteristics							
Single Female	– 0.04983	0.17842	0.48485	0.36512	0.08902	0.21277	0.08996
Single Male	0.09302	0.10373	0.22727	0.19074	0.09470	0.09726	0.12444
Age 24 or Less	– 0.14171	0.05809	0.09596	0.07357	0.03030	0.03040	0.01499
Age 45–61	0.04850	0.20747	0.23232	0.23433	0.22727	0.28875	0.25787
Age 62 or More	– 0.06739	0.04979	0.09596	0.09537	0.02083	0.02128	0.02624
High School Graduate	– 0.12846	0.23237	0.18687	0.23978	0.20076	0.21277	0.14168
Post High School	– 0.16904**	0.25726	0.35354	0.28610	0.30492	0.31307	0.26762
College Graduate	– 0.32766*	0.14108	0.30303	0.38147	0.40341	0.41641	0.56822
Income/Household Size	0.00180	0.87207	1.36439	1.47890	2.85650	3.19382	3.85890
Savings 20k or More	0.01119	0.01660	0.02020	0.04087	0.00758	0.00000	0.01799
First-Time Owner	– 0.08608**	0.40664	0.33838	0.58311	0.59659	0.47112	0.73163
0.22 < Housing Cost/Income <= 0.33	– 0.11604**	0.23651	0.27273	0.25341	0.28030	0.24316	0.24363
0.16 < Housing Cost/Income <= 0.22	– 0.20247*	0.07469	0.10101	0.05995	0.29735	0.27964	0.32984
Housing Cost/Income <= 0.16	– 0.24972*	0.03734	0.04545	0.05177	0.28030	0.37994	0.32759

Exhibit 7

Recent Mover Sample[a]
First Mortgage—Conventional/Home Purchase (continued)

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Loan Characteristics							
10 Year Loan Term	0.10420	0.00415	0.02525	0.00817	0.01136	0.00608	0.00600
15 Year Loan Term	– 0.15056**	0.08299	0.08081	0.11989	0.07008	0.04863	0.10120
20 Year Loan Term	0.00316	0.02075	0.04040	0.02997	0.01894	0.02128	0.02699
25 Year Loan Term	– 0.35288	0.00415	0.01515	0.01362	0.00379	0.00304	0.00450
0.9 < Loan to Value <= 1.0	– 0.20040***	0.45228	0.38384	0.27520	0.35795	0.49240	0.26087
0.8 < Loan to Value <= 0.9	– 0.28043**	0.12863	0.08081	0.11989	0.21212	0.12158	0.16567
Loan to Value <= 0.8	– 0.37618*	0.37759	0.47475	0.58311	0.39773	0.35562	0.56147
Loan Payments Fixed	– 0.27142*	0.19917	0.33838	0.28065	0.18939	0.26748	0.21364
Private Mortgage Insurance	– 0.02421	0.90871	0.79798	0.87738	0.95076	0.89970	0.95502
Property Characteristics							
Current House Value	– 0.00686*	14.51983	12.03673	17.14565	23.08435	19.80033	25.28515
Adjusted R^2	0.3963						
Number of observations	2,997	241	198	367	528	329	1,334

NA = not applicable.

[a] The sample includes all households that have a first mortgage loan.

[b] All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

** Indicates significance at the 1% level.*

*** Indicates significance at the 5% level.*

**** Indicates significance at the 10% level.*

Exhibit 8

Full Sample[a]
First Mortgages—FHA/VA—Home Purchases

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	7.45379	7.40982	7.19988	7.22314	7.38361	7.26889
Intercept	6.96243*	NA	NA	NA	NA	NA	NA
Household Race							
African-American Household	0.14791*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.06765	0.40404	0.00000	0.00000	0.35192	0.00000	0.00000
White Hispanic Household	0.06274	0.59596	0.00000	0.00000	0.64808	0.00000	0.00000
Household Characteristics							
Single Female	– 0.00873	0.23030	0.52196	0.31696	0.08246	0.17421	0.09572
Single Male	– 0.04552	0.11313	0.15809	0.22187	0.09175	0.10630	0.12091
Age 24 or Less	0.08823	0.03838	0.01757	0.03328	0.01858	0.00787	0.01259
Age 45–61	0.08786*	0.24444	0.34128	0.27575	0.27875	0.40059	0.31927
Age 62 or More	– 0.07417	0.09091	0.13802	0.11727	0.02787	0.03937	0.03904
High School Graduate	– 0.12947**	0.29293	0.25721	0.30269	0.23926	0.23130	0.23678
Post High School	– 0.11004**	0.26869	0.39147	0.38669	0.38560	0.39469	0.35516
College Graduate	– 0.15405*	0.07879	0.18444	0.21236	0.21719	0.29921	0.36524
Income/Household Size	0.00001	0.86657	1.29547	1.44098	2.22893	2.44053	2.83088
Savings 20k or More	– 0.16708	0.00606	0.01380	0.03645	0.00348	0.00197	0.01511
First-Time Owner	0.01030	0.25253	0.22836	0.38035	0.37631	0.35925	0.50378
0.22 < Housing Cost/Income <= 0.33	– 0.12765*	0.27273	0.28984	0.34390	0.31243	0.22638	0.24937
0.16 < Housing Cost/Income <= 0.22	– 0.16061*	0.07273	0.08908	0.10618	0.31591	0.33858	0.32746
Housing Cost/Income <= 0.16	– 0.20876*	0.02020	0.02133	0.03170	0.28571	0.37402	0.35579

Exhibit 8

Full Sample[a]
First Mortgages—FHA/VA—Home Purchases (continued)

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Loan Characteristics							
10 Year Loan Term	0.54419**	0.00404	0.00125	0.00792	0.00348	0.00098	0.00189
15 Year Loan Term	– 0.13764***	0.03838	0.04391	0.04279	0.03136	0.03839	0.05164
20 Year Loan Term	– 0.17783	0.01818	0.02635	0.01426	0.01626	0.01969	0.01196
25 Year Loan Term	– 0.08999	0.00404	0.01882	0.01109	0.00813	0.00689	0.00819
Loan Payments Fixed	– 0.11800*	0.19192	0.24592	0.28051	0.19744	0.22047	0.22796
Property Characteristics							
Current House Value	– 0.01926*	11.69912	9.72548	11.48391	14.97329	12.26612	14.92562
Adjusted R^2	0.2913						
Number of observations	5,388	495	797	631	861	1,016	1,588

NA = not applicable.

[a] *The sample includes all households that have a first mortgage loan.*

[b] *All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.*

* *Indicates significance at the 1% level.*

** *Indicates significance at the 5% level.*

*** *Indicates significance at the 10% level.*

Exhibit 9

Recent Mover[a]
First Mortgages—FHA/VA—Home Purchases

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	7.21160	6.73110	6.70242	6.82580	6.86255	6.80282
Intercept	7.29264	NA	NA	NA	NA	NA	NA
Household Race							
African-American Household	0.09910	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.12381	0.45752	0.00000	0.00000	0.41365	0.00000	0.00000
White Hispanic Household	0.05543	0.54248	0.00000	0.00000	0.58635	0.00000	0.00000
Household Characteristics							
Single Female	– 0.07690	0.15033	0.54070	0.29677	0.09639	0.15584	0.11549
Single Male	– 0.04041	0.11765	0.15698	0.25161	0.11245	0.14719	0.17323
Age 24 or Less	– 0.00542	0.10458	0.04070	0.07742	0.04016	0.01732	0.03150
Age 45–61	0.00819	0.14379	0.20349	0.16129	0.17269	0.23377	0.20997
Age 62 or More	0.03368	0.04575	0.05233	0.04516	0.01205	0.02597	0.01837
High School Graduate	– 0.16834***	0.30719	0.21512	0.26452	0.22892	0.19481	0.19948
Post High School	– 0.07405	0.30719	0.40116	0.40000	0.41365	0.40693	0.35696
College Graduate	– 0.19007**	0.05882	0.26163	0.26452	0.22892	0.34632	0.40420
Income/Household Size	– 0.00773	0.87220	1.43446	1.53205	2.17557	2.44391	3.05117
Savings 20k or More	– 0.33871	0.00654	0.01163	0.01290	0.00402	0.00000	0.01312

Exhibit 9

Recent Mover[a]
First Mortgages—FHA/VA—Home Purchases (continued)

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Loan Characteristics							
10 Year Loan Term	– 0.11575	0.00654	0.00000	0.02581	0.00000	0.00433	0.00000
15 Year Loan Term	0.00647	0.01961	0.05814	0.03871	0.01205	0.03030	0.02625
20 Year Loan Term	0.00437	0.01307	0.03488	0.00645	0.02410	0.02597	0.01312
25 Year Loan Term	– 0.08973	0.00000	0.00581	0.01290	0.00803	0.00000	0.00000
Current House Value	– 0.01746*	11.92007	10.65694	11.50876	16.19525	14.59677	16.21859
First-time Owner	0.02142	0.23529	0.23256	0.31613	0.40562	0.43290	0.52231
0.22 < Housing Cost/Income <= 0.33	– 0.05458	0.30719	0.30814	0.34839	0.29719	0.23377	0.25459
0.16 < Housing Cost/Income <= 0.22	– 0.09202	0.06536	0.12209	0.20000	0.33735	0.38961	0.37008
Housing Cost/Income <= 0.16	– 0.08656	0.00654	0.02907	0.00645	0.23293	0.29004	0.29921
0.9 < Loan to Value <= 1.0	– 0.08078	0.75163	0.67442	0.72258	0.71486	0.69264	0.67979
0.8 < Loan to Value <= 0.9	– 0.26382**	0.09150	0.06977	0.05161	0.07229	0.06494	0.06562
Loan to Value <= 0.8	– 0.04048	0.15033	0.19767	0.21290	0.15663	0.18182	0.22572
Loan Payments Fixed	– 0.41250*	0.16993	0.20930	0.21935	0.14056	0.18182	0.20472
Adjusted R^2	0.4016						
Number of observations	1,341	153	172	155	249	231	381

NA = not applicable.

[a] The sample includes all households that have a first mortgage loan.

[b] All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

** Indicates significance at the 1% level.*

*** Indicates significance at the 5% level.*

**** Indicates significance at the 10% level.*

bachelor's degree or more. The results are similar for recent movers. Similarly, across ethnic groups, high-income households have significantly higher levels of college graduates than corresponding low-income households do. In general, although African-American households are not as highly educated as White households are, the African-American sample contains higher proportions of households in which the head is in a higher education category than the Hispanic sample does. For example, considering the full sample and focusing on low-income households, in the conventional market 20.9 percent of African-American households are college graduates and 18.4 percent have achieved this level of education in the FHA/VA market. For recent movers, the percentage of African-American college graduates is very close to that of Whites and substantially higher than that of Hispanics.

Other variables that are generally highly significant with the expected sign are the housing-cost-to-income categorical variables, and, for the recent mover sample, the LTV categorical variable. As hypothesized earlier, these variables are included as measures of default risk. The only instance in which the housing-cost-to-income variables are not significantly correlated with interest rate differences (although they do have the expected sign) is in the government sector for recent movers. This difference seems reasonable because lenders are largely insulated against default risk in the FHA/VA market. Although the proportions in each of the housing-cost-to-income categories do not differ substantially across White and minority households, for recent movers in the conventional market, a substantially higher proportion of minority households are in the highest LTV categories. Specifically, for low-income households, 49.4 percent of Hispanic households and 44.4 percent of African-American households have more than a 90 percent LTV ratio at loan origination. For comparable Whites, this figure is only 29.7 percent. For higher income households, the percentage of African Americans with an LTV ratio of greater than 90 percent is substantially higher (53.3 percent) than that of either Hispanics (39.0 percent) or Whites (27.3 percent). These differences suggest that minority groups in our sample are also paying more in interest because of the extent of their mortgage debt with respect to both their ability to pay and the value of the properties acting as collateral for these loans.

One other variable that is statistically significant with the expected sign is house value. Although Hispanics' house values are relatively comparable to those of the White households in the home purchase samples, the current house values for African Americans are consistently lower for both the high- and low-income subsamples. For example, for the low-income group in the conventional market for the full sample, the average house value is $109,883 for African Americans, $145,954 for Hispanics, and $160,217 for Whites.[26] These differences suggest that African Americans in particular may face higher interest rates to a certain degree because of the quality of their owned units.

Refinance Loans

Exhibits 10 and 11 present results for interest rates on refinanced loans in the conventional and government sectors, respectively. Because it is highly unlikely that a recent mover household would be refinancing (after its move but before its interview), this analysis is only done for the full sample of homeowners who have refinanced. In particular, a refinanced loan is identified as any loan that was originated in a more recent year than the year of purchase. The total number of refinanced loans in the FHA/VA market (1,089 loans) is much smaller than the number in the conventional market (5,366 loans). It is not hard to understand why this might be the case. FHA/VA loans are

generally more costly than comparable conventional loans. Refinancing by definition occurs after some time has passed since the home was purchased, the combination of appreciation in house values and some loan amortization increases the borrower's opportunity to choose a conventional loan upon refinancing. Another interesting dimension of the data becomes evident when one considers the proportions of refinanced loans in this sample compared with home purchase loans. Minorities appear less likely to refinance than comparable Whites.[27] This result is more pronounced for low-income households, particularly those that are African American.

For example, in the conventional market for the full sample approximately 29.69 percent of the outstanding first mortgages are refinances (725 out of 2,442 loans); this percentage is 22.77 percent for Hispanics and 22.45 percent for African Americans. In the FHA/VA market, 15.75 percent of White households have refinanced. The proportion of Hispanic FHA/VA borrowers that have refinanced is not substantially different, at 14.4 percent, but only 8.75 percent of African Americans have refinanced. These numbers are consistent with the belief that minority households, especially African Americans, are less likely to refinance than White households are.

A point of particular interest in these exhibits is related to the FHA/VA market. As shown in exhibit 11, this market is the only segment in which no separate impact, or interest rate differential, exists among households by racial/ethnic group. Put another way, on average, neither Hispanic nor African-American households pay significantly higher rates than White households do, controlling for the effects of the other variables that can be held constant. A number of explanations are possible for this result, but the lack of significant differences across racial/ethnic groups does not have to do with the act of refinancing per se. In the conventional refinance market, all else being equal, African Americans and non-White Hispanics (although to a lesser extent) refinance at significantly higher costs than other groups do. In the FHA/VA market, interest rates are 41.2 and 12.8 basis points higher, respectively, for each subgroup.

As is the case for home purchases, the regression coefficients suggest that households in which the head has a college education pay lower interest rates than other households do. Considering the different racial groups, both African-American and Hispanic households have a smaller proportion of college-educated household heads compared with White households. In particular, considering the conventional market, only 13.1 percent of Hispanic households have a college degree or more; this figure is 20.0 percent for African-American households and 31.4 percent for White households. Education generally appears to be less important for refinancing than it is for home purchase, however, because only college graduates are observed to pay interest rates that are significantly different from those paid by individuals who did not finish high school. Because those who refinance loans represent a subset of the population that might be expected to have developed a certain level of expertise from previous experience, we might expect the households that refinance to obtain better interest rates regardless of their education levels. This effect, however, may be offset by the greater prevalence of subprime loans in the refinance market, which have generally higher interest rates. The diminished impact of education levels on interest rates may reflect the fact that poor credit—and hence subprime loans—is generally more common among all owners with less than a college education.

It is interesting to note that in the FHA/VA sample fewer of the risk-related control variables are significant compared with the conventional refinancing market. This trend is to be expected

Exhibit 10

Full Sample[a]
First Mortgages—Conventional/Refinance

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	6.90415	7.49018	6.62328	6.49370	6.78913	6.42712
Intercept	6.77508	NA	NA	NA	NA	NA	NA
Household Race							
African-American Household	0.41196*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.12786***	0.25442	0.00000	0.00000	0.20151	0.00000	0.00000
White Hispanic Household	0.03112	0.74558	0.00000	0.00000	0.79849	0.00000	0.00000
Household Characteristics							
Single Female	0.00325	0.16961	0.51429	0.37103	0.06675	0.22188	0.09002
Single Male	– 0.01350	0.15901	0.13214	0.15172	0.05793	0.10638	0.08799
Age 24 or Less	– 0.39055***	0.01767	0.00714	0.00690	0.00882	0.00000	0.00237
Age 45–61	0.08971*	0.36749	0.40357	0.41793	0.40050	0.50152	0.51743
Age 62 or More	0.04391	0.19788	0.33929	0.24552	0.06297	0.14590	0.07174
High School Graduate	0.01194	0.26148	0.26429	0.23586	0.17884	0.16717	0.15601
Post High School	– 0.06829	0.30389	0.24643	0.36138	0.31864	0.31003	0.28663
College Graduate	– 0.14865**	0.13074	0.20000	0.31448	0.40932	0.43769	0.53029
Income/Household Size	0.00450	1.09417	1.17046	1.52272	3.12867	3.49322	3.78808
Savings 20k or More	– 0.10242	0.02120	0.03929	0.07862	0.00252	0.00000	0.00880
First-Time Owner	– 0.11036*	0.39576	0.32500	0.58207	0.59068	0.51368	0.70491
0.22 < Housing Cost/Income <= 0.33	– 0.14693*	0.21201	0.22857	0.25517	0.28967	0.21884	0.22369
0.16 < Housing Cost/Income <= 0.22	– 0.30723*	0.02473	0.07500	0.08690	0.26574	0.29483	0.29306
Housing Cost/Income <= 0.16	– 0.38467*	0.03180	0.01786	0.02759	0.33879	0.39514	0.40440

Exhibit 10

Full Sample[a]
First Mortgages—Conventional/Refinance (continued)

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Loan Characteristics							
10 Year Loan Term	– 0.38293*	0.02473	0.05714	0.02483	0.01637	0.02736	0.03756
15 Year Loan Term	– 0.39109*	0.28975	0.18571	0.25517	0.28338	0.28571	0.33469
20 Year Loan Term	– 0.12932**	0.03180	0.04643	0.06207	0.05164	0.04255	0.05821
25 Year Loan Term	0.02597	0.01060	0.02500	0.01379	0.01134	0.01824	0.01523
Loan Payments Fixed	– 0.16726*	0.15194	0.21429	0.19448	0.12217	0.18237	0.13232
Private Mortgage Insurance	0.23012	0.96466	0.92500	0.95586	0.99118	0.95441	0.99323
Property Characteristics							
Current House Value	– 0.00857*	19.02732	12.17491	19.57272	26.34839	18.57597	25.46101
Adjusted R^2	0.4086						
Number of observations	5,366	283	280	725	794	329	2,955

NA = not applicable.

[a] *The sample includes all households that have a first mortgage loan.*

[b] *All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.*

* *Indicates significance at the 1% level.*

** *Indicates significance at the 5% level.*

*** *Indicates significance at the 10% level.*

Exhibit 11

Full Sample[a]
First Mortgages—FHA/VA—Refinance

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate		6.83283	7.03378	6.54025	6.63855	6.67197	6.59922
Intercept	7.23833	NA	NA	NA	NA	NA	NA
Household Race							
African-American Household	0.13966	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.16889	0.24096	0.00000	0.00000	0.26601	0.00000	0.00000
White Hispanic Household	0.10371	0.75904	0.00000	0.00000	0.73399	0.00000	0.00000
Household Characteristics							
Single Female	0.17377***	0.28916	0.50000	0.39831	0.06897	0.16970	0.11883
Single Male	– 0.00254	0.09639	0.13514	0.11017	0.09360	0.11515	0.09417
Age 24 or Less	– 1.08716***	0.00000	0.00000	0.00847	0.00493	0.00606	0.00224
Age 45–61	0.02559	0.22892	0.37838	0.33898	0.45320	0.50303	0.45516
Age 62 or More	– 0.03795	0.24096	0.28378	0.21186	0.04433	0.09697	0.07175
High School Graduate	0.00645	0.19277	0.21622	0.27966	0.15764	0.15758	0.24215
Post High School	– 0.20464	0.32530	0.28378	0.37288	0.42857	0.40606	0.37892
College Graduate	– 0.26914***	0.10843	0.31081	0.27119	0.29064	0.37576	0.34978
Income/Household Size	– 0.00876	1.05962	1.19023	1.39742	2.57311	2.87956	3.45887
Savings 20k or More	– 0.45330	0.01205	0.01351	0.05932	0.00000	0.00000	0.00897
First-Time Owner	– 0.09081	0.25301	0.27027	0.57627	0.53202	0.45455	0.59865
0.22 < Housing Cost/Income <= 0.33	– 0.15784	0.32530	0.22973	0.24576	0.27586	0.24848	0.23094
0.16 < Housing Cost/Income <= 0.22	– 0.23200**	0.02410	0.08108	0.08475	0.28571	0.33333	0.30045
Housing Cost/Income <= 0.16	– 0.35448*	0.01205	0.04054	0.02542	0.37438	0.34545	0.39910

Exhibit 11

Full Sample[a]
First Mortgages—FHA/VA—Refinance (continued)

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Loan Characteristics							
10 Year Loan Term	– 0.35254	0.00000	0.01351	0.00000	0.01970	0.01212	0.01570
15 Year Loan Term	– 0.12519	0.15663	0.14865	0.17797	0.24631	0.18182	0.29821
20 Year Loan Term	– 0.00280	0.02410	0.10811	0.06780	0.02463	0.04848	0.04036
25 Year Loan Term	– 0.09150	0.01205	0.00000	0.02542	0.01970	0.02424	0.01345
Loan Payments Fixed	– 0.12616	0.13253	0.18919	0.22034	0.08374	0.14545	0.14350
Property Characteristics							
Current House Value	– 0.00423	15.32506	10.90693	14.95164	18.37806	15.10242	19.33909
Adjusted R^2	0.3261						
Number of observations	1,089	83	74	118	203	165	446

NA = not applicable.

[a] The sample includes all households that have a first mortgage loan.

[b] All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the first mortgage was originated. For a complete list of the MSAs, see appendix A.

** Indicates significance at the 1% level.*

*** Indicates significance at the 5% level.*

**** Indicates significance at the 10% level.*

because FHA and VA insurance and guarantees offer virtually 100-percent protection to lenders against default risk. In any event, in the conventional market for refinancing, higher housing-cost-to-income ratios, longer loan terms, and lower house values each give rise to higher interest charges. As with home purchases, one area where the African-American households in the sample appear to be at a disadvantage relative to Hispanics or Whites has to do with the value of their housing units. In particular, in the conventional market, low-income African Americans who refinance have an average current house value of approximately $121,749, while the average value for both Hispanics and Whites exceeds $190,000.

Junior Mortgages and Home Equity Loans

In general, unlike the American Housing Survey, most publicly available data sets do not allow for an investigation of the types of debt that are not traditional first mortgages but are still secured by home equity. So-called junior mortgages (that is, mortgages that are subordinate to a first mortgage in the event of default and foreclosure) can be identified using the AHS. In addition, information on home equity loans, including lines of credit, is recorded separately from junior and first mortgages in the more recent versions of the AHS. Such loans are becoming an ever more popular way of accessing home equity. These types of loans are explored in exhibits 12 through 15. For this sample, junior mortgages and home equity loans represent a relatively small portion of loans held by homeowners. Comparing the sample sizes for these loans in exhibits 12 and 14 with the sample sizes shown earlier for households that have first mortgages (exhibit 2), the largest percentage of owners with home equity loans, 14.6 percent, is for high-income White households (1,493 out of 10,210 households). Minorities appear to be slightly more likely to use junior mortgages, whereas Whites in both income groups are more likely to have home equity loans. That is, minorities, as compared with Whites, have a much smaller percentage of home equity loans. For example, as a percentage of observations with first mortgages, only 4.1 percent of Hispanics (74 out of 1,821 households) and 3.8 percent of African Americans (80 out of 2,118 households) have home equity loans, but 12.3 percent of Whites do (393 out of 3,191 households). This difference suggests that, for whatever reason, the White households are somewhat more willing and able to make use of this type of financing. For junior mortgages, this difference generally does not appear to exist.

Junior Mortgages

For junior mortgages, all owners who indicated that they had these financial instruments were included in the means analysis reported in exhibit 12. The monthly debt service and total amount of mortgage debt across all junior clients are calculated to give an idea of each group's total indebtedness in this area; however, interest rates are considered only for second mortgages (which is, of course, the predominant loan).[28] Similarly, the regression analysis was conducted for second mortgages only.[29] As in the previous analyses, in the case of the second mortgages, the loans that were included were made by a bank (not, for example, by a relative) and with only residential property acting as collateral for the loan.

Exhibit 12 presents mean values for junior mortgages. White high-income households appear to have lower interest rates on these mortgages than either African-American or Hispanic households do; the latter groups pay rates that are 82 and 64 basis points higher, respectively. Interestingly

Exhibit 12

Full Sample[a]
Means
Junior Mortgages

Variable Name	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Interest Rate[b]	8.13%	8.89%	8.19%	8.37%	8.55%	7.73%
Monthly Debt Service[c]	$436	$304	$393	$442	$397	$451
Total Amount of Debt[c]	$37,591	$21,749	$34,514	$41,944	$34,113	$42,947
Current House Value	$167,419	$106,666	$166,414	$243,689	$172,508	$238,578
Monthly Housing Cost	$1,538	$1,193	$1,481	$1,960	$1,697	$1,953
Annual Household Income	$32,957	$28,154	$32,943	$109,274	$92,340	$110,103
Number of observations	102	174	252	414	259	1,033

[a] *The sample includes all households that have a second mortgage loan.*
[b] *Interest rate on the second mortgage.*
[c] *Total for all junior mortgages—up to four.*

for the low-income subgroup, Hispanic and White households' average interest rates are relatively comparable, at 8.13 and 8.19 percent, respectively; however, African Americans' average interest rate is 70 basis points higher than that of Whites. This difference is almost identical to that in the high-income subsector of this market. Perhaps the most striking observation derived from data presented in exhibit 12 lies in the values for "total amount of debt" (the third line in exhibit 12) for junior mortgages. It certainly does seem that Hispanic and White households in particular have taken on significant levels of junior mortgage debt. For example, among low-income households, Hispanic households have a debt of $37,591 compared with $34,514 for White households and $21,749 for African-American households. Considering these debt levels relative to annual income, low-income Hispanics have a particularly large amount of debt. Specifically, for low-income households, this ratio is 1.14 ($37,591/$32,957); it is 1.04 for Whites and only 0.773 for African Americans. This difference suggests that low-income Hispanics have relatively high monthly debt service on these junior mortgages. Specifically, Hispanics' monthly debt service on junior financing is $436 compared with $304 for African Americans and $393 for Whites. When considered relative to monthly income, these costs represent 15.88 percent for Hispanics ($436/$2,746), 12.96 percent for African Americans ($304/$2,346), and 14.31 percent for Whites ($393/$2,745).

Regression results for second mortgages are shown in exhibit 13. African-American households (but not Hispanic households) pay significantly higher rates on second mortgages than White households do, holding constant the metropolitan area and time period in which the loan was originated and the household, loan, and property characteristics indicated. In particular, the estimated differential between African Americans and Whites is 44.7 basis points. As in the case of first mortgages, education does lower reported interest rates. For example, college graduates are observed to pay an average of 97.1 basis points less on the junior mortgages that they have outstanding at the time of their interview than those who did not graduate high school. In general, White households that have junior mortgages have a higher level of education than minority

households do. This difference is most apparent for low-income individuals. For example, only 13.7 percent of low-income Hispanic household heads have a college degree or more. For African Americans, the rate is about 15.5 percent. In contrast, among White household heads, 24.2 percent fall into this category.

As is the case with the home purchase and refinancing markets, several of our risk measures are significant predictors of interest rates. High housing-cost-to-income ratios and lower house values give rise to higher interest rates. Whereas the proportions of Hispanics, African Americans, and Whites in different housing-cost-to-income categories do not look substantially different for either the high- or low-income subgroups, average house values are substantially lower for African Americans than for either of the other racial/ethnic groups. Specifically, the average house value is $106,666 for African-American households compared with $156,403 for White households and $167,419 for Hispanic households. In addition, as with the first mortgages examined previously, for second mortgages the shortest loan terms generally tend to have significantly lower interest rates. For example, second mortgages with a term in the range of 10 to 20 years have average interest rates more than 105 basis points higher than loans with a term of 5 years or less.

Home Equity Loans

For home equity loans, the AHS contains information on interest rates on all loans of this type held by the owner, so the interest rate that is used in the analysis is the weighted average based on the amount of each loan (although very few households have two home equity loans and none have three). In 2002 and 2004, the AHS began to distinguish between home equity lines of credit and lump-sum loans; however, because this information was not available in 1998 and because of small sample sizes across different race/income categories, we do not disaggregate home equity financing into lines of credit and lump-sum loans with fixed monthly debt service payments.

Mean values for household home equity loans are presented in exhibit 14. Perhaps the most striking figures in exhibit 14 are those for the "total amount of debt" (the third line of exhibit) for all household home equity loans. Among both low- and high-income owners, Hispanic households have the highest amounts in the sample. Specifically, for low-income Hispanic households that have home equity loans, their average level of debt is $4,742 higher than that of African-American households and $3,226 higher than that of White households. For high-income households, these differences are $7,850 and $8,991, respectively. Considering the level of debt relative to income, for high-income households, minorities have a bit more debt per dollar of annual income than Whites do, but the difference is not substantial. When low-income households are considered, however, the ratio of home equity debt to current annual income is about 86.5 percent ($26,142/$30,236) for Hispanics compared with ratios of 75.6 ($21,399/$28,324) and 72.5 ($22,916/$31,587), respectively, for African Americans and Whites. These results are comparable with the circumstances observed for low-income Hispanics with second mortgages. Together, the information presented on junior and home equity loans suggests that Hispanic households that access home equity through these types of loans incur more debt than their African-American or White counterparts do; however, the terms of these loans will impact the magnitude of the debt service. Among low-income owners, interest rates on these loans are more than 100 basis points lower for Hispanics (6.53 percent) than for African Americans (7.74 percent), but this interest rate differential does not exist in comparison with the average rate paid by White households

Exhibit 13

Full Sample[a]
Second Mortgages

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	8.12623	8.88721	8.18948	8.37228	8.54875	7.72955
Intercept	9.18053*	NA	NA	NA	NA	NA	NA
Household Race							
African-American Household	0.44743*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.19985	0.23529	0.00000	0.00000	0.26329	0.00000	0.00000
White Hispanic Household	0.06977	0.76471	0.00000	0.00000	0.73671	0.00000	0.00000
Household Characteristics							
Single Female	– 0.09982	0.18627	0.52874	0.31746	0.04106	0.18533	0.08906
Single Male	– 0.06994	0.09804	0.12644	0.15476	0.04589	0.06950	0.07648
Age 24 or Less	– 0.77507	0.00000	0.01149	0.00794	0.00725	0.00386	0.00387
Age 45–61	– 0.15998	0.32353	0.39080	0.39286	0.35266	0.45560	0.40755
Age 62 or More	– 0.92149*	0.16667	0.24713	0.13492	0.03140	0.06564	0.04743
High School Graduate	– 0.69196*	0.23529	0.20690	0.28175	0.17874	0.19305	0.16651
Post High School	– 0.49440**	0.31373	0.37931	0.36508	0.36473	0.34363	0.33591
College Graduate	– 0.97105*	0.13725	0.15517	0.24206	0.36715	0.40927	0.46467
0.22 < Housing Cost/Income <= 0.33	– 0.44061*	0.19608	0.21839	0.23016	0.28744	0.25869	0.24782
0.16 < Housing Cost/Income <= 0.22	– 0.64024*	0.03922	0.06897	0.06746	0.27778	0.30116	0.31559
Housing Cost/Income <= 0.16	– 0.71181*	0.01961	0.00000	0.01587	0.30918	0.33591	0.33398
Income/Household Size	– 0.01577	0.99824	1.18339	1.39053	2.86406	2.89012	3.41864
Savings 20k or More	– 0.47382	0.02941	0.01149	0.05159	0.00242	0.00386	0.00194

Exhibit 13

Full Sample[a]
Second Mortgages (continued)

Variable Name	Regression Coefficient[b]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Loan Characteristics							
5–10 Year Loan Term	0.52542*	0.19608	0.21839	0.17063	0.16908	0.22394	0.22943
10–15 Year Loan Term	1.05332*	0.25490	0.32759	0.28571	0.40338	0.35521	0.31559
15–20 Year Loan Term	1.05993*	0.04902	0.08621	0.08730	0.07246	0.08494	0.07551
20–30 Year Loan Term	0.33094***	0.36275	0.27011	0.25000	0.23188	0.22394	0.21975
Loan Term > 30 years	– 0.38742	0.00000	0.00575	0.00000	0.00000	0.00386	0.00194
Property Characteristics							
Current House Value	– 0.02612*	16.74190	10.66659	15.64032	22.24207	17.25083	22.46650
Adjusted R^2	0.2219						
Number of observations	2,234	102	174	252	414	259	1,033

NA = not applicable.

[a] *The sample includes all households that have a second mortgage loan.*

[b] *All regressions include discrete variables indicating in which of 41 MSAs the housing units were located and the year in which the second mortgage was originated. For a complete list of the MSAs, see appendix A.*

* *Indicates significance at the 1% level.*

** *Indicates significance at the 5% level.*

*** *Indicates significance at the 10% level.*

Exhibit 14

Full Sample[a]
Means
Home Equity Loans[b]

Variable Name	Low Income			High Income		
	Hispanic	African American	White	Hispanic	African American	White
Interest Rate[c]	6.53%	7.74%	6.68%	6.98%	7.41%	6.72%
Monthly Debt Service[d]	$288	$325	$306	$405	$388	$429
Total Amount of Debt[d]	$26,142	$21,399	$22,916	$35,051	$27,201	$26,060
Current House Value	$223,641	$123,571	$183,102	$294,233	$202,130	$257,307
Monthly Housing Cost	$899	$714	$837	$1,631	$1,273	$1,379
Annual Household Income	$30,236	$28,324	$31,587	$120,662	$98,545	$113,224
Number of observations	74	80	393	283	147	1,493

[a] *The sample includes all households that have a home equity loan.*
[b] *No distinction is made between lump-sum home equity loans and lines of credit.*
[c] *Weighted average of cost of up to two home equity loans.*
[d] *Represents the total for all home equity loans—up to three.*

(6.68 percent). More generally, if one considers monthly debt service relative to monthly income, this ratio is lowest for low-income Hispanic households (11.43 percent) compared with African-American households (13.75 percent) and White households (11.63 percent).

The interest rate regression results are reported in exhibit 15. They suggest that both non-White Hispanic households and African-American households pay higher rates on home equity loans than White households do, controlling for other factors. Note that the only variables that are really significant are the housing-cost-to-income categorical variables and current house value. As in the other interest rate regressions presented previously, the first variable represents a fundamental measure of default risk for the borrowers, and the second represents a basic way of capturing the quality of the property acting as collateral for these loans. For both income groups, Hispanics are observed to have a substantially higher level of housing cost relative to income than other racial/ethnic groups do. In particular, 74.3 percent of low-income Hispanics who have home equity loans are in the highest housing-cost-to-income category (greater than 33 percent). Only 60.0 percent of African Americans and 56.5 percent of Whites have housing-cost-to-income ratios that are in this range. For higher income households, these ratios are generally not as high, but if one considers the top two categories, 50.5 percent of Hispanic households have housing costs greater than 22 percent, whereas 36.1 percent of African-American and 42.3 percent of White households have housing costs greater than 22 percent. This difference suggests that higher levels of debt contribute to the higher rates paid by Hispanics relative to other ethnicities. Analogously, as we have seen in all subsamples, African Americans with home equity loans have relatively higher rates in part because of their lower house values.

Exhibit 15

Full Sample[a]
Home Equity Loans[b]

Variable Name	Regression Coefficient[c, d, e]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Interest Rate	NA	6.52546	7.74440	6.67957	6.97700	7.40986	6.71614
Intercept	6.8023*	NA	NA	NA	NA	NA	NA
Household Race							
African-American Household	0.52322*	0.00000	1.00000	0.00000	0.00000	1.00000	0.00000
Non-White Hispanic Household	0.62674**	0.16216	0.00000	0.00000	0.20495	0.00000	0.00000
White Hispanic Household	0.11176	0.83784	0.00000	0.00000	0.79505	0.00000	0.00000
Household Characteristics							
Single Female	– 0.09450	0.28378	0.43750	0.27735	0.03180	0.18367	0.07971
Single Male	– 0.08529	0.13514	0.16250	0.13995	0.04594	0.08163	0.08104
Age 24 or Less	– 1.07545***	0.01351	0.00000	0.01527	0.01060	0.00000	0.00201
Age 45–61	– 0.14770	0.35135	0.38750	0.37405	0.51237	0.60544	0.50971
Age 62 or More	– 0.20480	0.37838	0.38750	0.38422	0.04947	0.09524	0.10181
High School Graduate	0.26854	0.28378	0.18750	0.34097	0.11307	0.12245	0.15740
Post High School	0.22005	0.39189	0.38750	0.28753	0.33216	0.35374	0.29203
College Graduate	0.00912	0.16216	0.21250	0.27735	0.50177	0.51020	0.51909
Income/Household Size	0.02074	1.12105	1.28883	1.45157	3.21931	3.03552	3.70123
Savings 20k or More	– 0.13541	0.04054	0.07500	0.09669	0.01413	0.01361	0.01340
0.22 < Housing Cost/Income <= 0.33	– 0.20957***	0.09459	0.16250	0.17048	0.30389	0.17687	0.28667
0.16 < Housing Cost/Income <= 0.22	– 0.36253*	0.10811	0.10000	0.15013	0.27915	0.29932	0.27729
Housing Cost/Income <= 0.16	– 0.55485*	0.05405	0.13750	0.11450	0.21555	0.34014	0.29940

Exhibit 15

Full Sample[a]
Home Equity Loans[b] (continued)

Variable Name	Regression Coefficient[c, d, e]	Means					
		Low Income			High Income		
		Hispanic	African American	White	Hispanic	African American	White
Property Characteristics							
Current House Value	– 0.01358*	19.33944	12.35709	18.31017	27.95724	18.83493	24.23831
Adjusted R^2	0.4493						
Number of observations	2,470	74	80	393	283	147	1,493

NA = not applicable.

[a] *The sample includes all households that have a home equity loan.*

[b] *No distinction is made between lump-sum home equity loans and lines of credit.*

[c] *Weighted average of cost of up to two home equity loans.*

[d] *Represents the total for all home equity loans—up to three.*

[e] *All regressions include discrete variables indicating in which of 41 MSAs the housing units were located. For a complete list of MSAs, see appendix A.*

** Indicates significance at the 1% level.*

*** Indicates significance at the 5% level.*

**** Indicates significance at the 10% level.*

Conclusions

Using the American Housing Survey, this article attempted to investigate differences in the terms, conditions, and use of financing alternatives across ethnic groups. The analysis presented used recent metropolitan statistical area samples of the AHS for 1998, 2002, and 2004 to address these issues and examine how financing factors differ for Hispanics as compared with other ethnic groups across a number of different housing markets.

As noted previously, no "perfect" publicly available data set exists to investigate the issues and policy concerns addressed here. Specifically, we do not have information on the credit situation and net-worth position of households in the sample. Nor do we know who the lenders are and what their underwriting criteria are. The characteristics of the AHS, however, do enable researchers to suggest avenues for future investigation and potential policy concerns. To this end, the results presented previously suggest several general conclusions:

1. African-American households in the sample do not appear to be doing quite as well financially as White households and Hispanics households (as evidenced by lower incomes and house values). They also appear to be paying more for their financing.

2. To the extent that Hispanics fare worse in the mortgage markets than other ethnic groups do, the effect seems to be coming from the subgroup of non-White Hispanic households. For home purchases, 35 to 46 percent of Hispanics are classified as non-White. For refinanced loans, only about 25 percent of Hispanic households are classified as non-White. Previously, White and non-White Hispanics have not been considered separately in the mortgage pricing literature.

3. More significant ethnic effects exist for loans originating in the conventional purchase market than in the Federal Housing Administration/U.S. Department of Veterans Affairs market.

4. Household educational levels are an important factor associated with lower interest rates in most markets. This effect contributes to racial/ethnic differences in interest rates due to educational attainment differentials across the groups. In particular, Hispanic and African-American households have lower levels of education on average than their White counterparts do, which tends to increase their mortgage interest rates.

5. Similarly, housing-cost-to-income ratios, loan-to-value ratios (for recent movers), and current house value all are consistent predictors of interest rates. Mean value differences by race/ethnicity suggest that the first two factors contribute to higher interest rates for Hispanics, while the third factor contributes to higher rates for African Americans.

6. For junior mortgages and home equity loans, the specifications are limited by the information that is available on loan characteristics. It is interesting, however, that for second-mortgage interest rates, education appears relatively important, but all else being equal, Hispanic households do not appear to obtain higher rates than White households do (although African-American households do). On the other hand, with home equity loans, both African-American households and non-White Hispanic households have significantly higher rates. In general, low-income Hispanics appear to be taking on a lot of nonprimary mortgage debt compared with other racial/ethnic groups.

This study represents a first step in understanding how the mortgage market experience of minorities, particularly Hispanic households, differs from that of Whites. The analysis suggests areas for further study and, in a few instances, areas in which improvements in the characteristics of minority households and/or their housing situation could help improve their mortgage market outcomes. To better understand these issues, it is imperative that data containing the details of households' credit quality, net worth, and the underwriting criteria of the financial institutions that provide funding to these households be made generally available to researchers working in this area. A clear understanding of these mortgage markets and the reasons for differentials in the terms, conditions, and use of mortgage debt by different racial/ethnic and income groups is crucial if we are to provide equal access to homeownership—and the benefits of homeownership—for all Americans.

Appendix A
List of Metropolitan Statistical Areas in the American Housing Survey for 1998, 2002, and 2004

Exhibit A–1

American Housing Survey MSA Sample Information

Sample Year	MSA Code	MSA Name	MSA Median Income ($)
2004	520	Atlanta, GA	69,000
2004	1680	Cleveland, OH	59,900
2004	2080	Denver, CO	69,500
2004	3280	Hartford, CT	73,900
2004	3480	Indianapolis, IN	63,800
2004	4920	Memphis, TN	54,100
2004	5560	New Orleans, LA	49,900
2004	5880	Oklahoma City, OK	52,100
2004	6280	Pittsburgh, PA	55,100
2004	6920	Sacramento, CA	64,100
2004	7040	St. Louis, MO	65,900
2004	7240	San Antonio, TX	51,500
2004	7600	Seattle-Everett, WA	71,900
2002	360	Anaheim-Santa Ana-Garden Grove, CA	75,600
2002	1280	Buffalo, NY	50,800
2002	1520	Charlotte-Gastonia, NC-SC	64,100
2002	1840	Columbus, OH	63,400
2002	1920	Dallas, TX	66,500
2002	2800	Fort Worth-Arlington, TX	61,300
2002	3760	Kansas City, KS-MO	64,500
2002	5000	Miami-Hialeah, FL	48,200
2002	5080	Milwaukee, WI	67,200
2002	6200	Phoenix, AZ	57,900
2002	6440	Portland, OR-WA	57,200
2002	7280	San Bernardino-Riverside, CA	50,300
2002	7320	San Diego, CA	60,100
1998	720	Baltimore, MD	55,600
1998	1000	Birmingham, AL	44,000
1998	1120	Boston, MA	60,000
1998	1640	Cincinnati, OH-KY-IN	51,500
1998	3360	Houston, TX	50,400
1998	5120	Minneapolis-St. Paul, MN	60,800
1998	5680	Newport News-Hampton, VA	44,600
1998	5775	Oakland, CA	63,300
1998	6480	Providence, RI	46,900
1998	6840	Rochester, NY	48,800
1998	7160	Salt Lake City-Ogden, UT	48,200
1998	7360	San Francisco, CA	68,600
1998	7400	San Jose, CA	77,200
1998	8280	Tampa-St. Petersburg-Clearwater, FL	42,000
1998	8840	Washington, DC-MD-VA	72,300

Acknowledgments

The authors acknowledge financial support from the U.S. Department of Housing and Urban Development (HUD) for this research. The authors thank Chris Herbert, Paul Thistle, and anonymous reviewers from HUD for helpful suggestions in developing the research concept of this article.

Authors

Thomas Boehm is professor of finance and AmSouth Banking Scholar at The University of Tennessee.

Alan Schlottmann is professor of economics at the University of Nevada, Las Vegas (UNLV), a senior research fellow at Claremont Graduate University, director of research for the Lied Institute of Real Estate Studies at UNLV, and associate editor of the *Journal of Regional Science*.

Notes

1. This article was originally part of a series of studies commissioned by U.S. Department of Housing and Urban Development examining Hispanic homeownership. See Cortes et al. (2006) for references to the complete series of reports.
2. This recognition has appeared in numerous U.S. Department of Housing and Urban Development (HUD) statements in recent years. For example, see the discussion of any recent proposed HUD budget, such as that of 2005 (News Release No. 04-0101, 2004).
3. For more details, see Susin (2003) and Boehm, Schlottmann, and Thistle (2006).
4. See LePage (2005).
5. Income levels are defined using U.S. Department of Housing and Urban Development annual estimates of median household income, with low-income defined as being below 80 percent of the median. The three major ethnic classifications are African American, Hispanic, and White.
6. The set of variables that define these categories are shown in exhibit 4.
7. You can identify that a financial institution made the loan to the household in the sample. That is, it was not made by a relative or assumed from the seller.
8. See for example, Lam and Kaul (2003).
9. Earlier studies of mortgage rates include Schaefer and Ladd (1981), Black and Schweitzer (1985), and Benston and Horsky (1991).
10. *Overage,* also referred to as a *yield spread premium,* refers to the difference between the mortgage interest rate charged and the minimum rate the lender would accept as identified by a rate sheet.

11. Census tract information is not normally available with the American Housing Survey data released to researchers; however, because the author was employed by the U.S. Census Bureau at the time of the study, this information was made available to him.

12. Most of these metropolitan statistical areas are also resampled periodically.

13. The metropolitan statistical areas (MSAs) included in the sample for 1998 are Baltimore, MD; Birmingham, AL; Boston, MA; Cincinnati, OH-KY-IN; Houston, TX; Minneapolis-St. Paul, MN; Newport News-Hampton, VA; Oakland, CA; Providence, RI; Rochester, NY; Salt Lake City-Ogden, UT; San Francisco, CA; San Jose, CA; Tampa-St. Petersburg-Clearwater, FL; and Washington, DC-MD-VA. The MSAs included in the sample for 2002 are Anaheim-Santa Ana-Garden Grove, CA; Buffalo, NY; Charlotte-Gastonia, NC-SC; Columbus, OH; Dallas, TX; Fort Worth-Arlington, TX; Kansas City, KS-MO; Miami-Hialeah, FL; Milwaukee, WI; Phoenix, AZ; Portland, OR-WA; San Bernardino-Riverside, CA; San Diego, CA. The MSAs included in the sample for 2004 include Atlanta, GA; Cleveland, OH; Denver, CO; Hartford, CT; Indianapolis, IN; Memphis, TN; New Orleans, LA; Oklahoma City, OK; Pittsburgh, PA; Sacramento, CA; San Antonio, TX; Seattle-Everett, WA; and St. Louis, MO.

14. Because of the large numbers of White households in the sample, a random subsample of these households for first mortgages was selected to make the analysis more tractible.

15. Although the American Housing Survey (AHS) separates loans other than first mortgages into junior mortgages (that is, second and third mortgages; only a few third mortgages exist) and home equity loans, the characteristics that distinguish these loans from one another are not completely clear. In the event of default, junior mortgages are clearly in a subordinate position to more senior liens, which is not necessarily true of home equity loans. Also, home equity loans include lines of credit, which do not require that regular payments be made to amortize the loan and in which the term is indeterminate and may be kept alive as long as the household resides in the dwelling, acting as collateral for the loan. For these reasons and because they are recorded separately in the AHS, these two loan categories are kept separate for purposes of this analysis.

16. Based on the authors' previous research, we used a standard definition of low income as those households below 80 percent of the area median income as defined by the U.S. Department of Housing and Urban Development. Experimentation with this definition (for example, 60 percent and 70 percent) did not lead to any substantive differences in the results for this analysis.

17. The sample was constrained to include only mortgages made by a financial institution (not a relative, seller, or some other unusual source). The mortgage had to be made for a residence only (not in part for a business or other buildings on the property). It was not made on a condominium or a manufactured home (these types of units represented a very small fraction [less than 5 percent] of the total), and the loan was not an assumption or a wraparound loan (that is, it was a newly originated loan when the borrower got it). In addition, for the first mortgage analysis these loans were constrained so that the loan terms were 10, 15, 20, 25, or 30 years. As one might expect, restricting the sample to include only loans with these terms still accounted for 95 percent of all the loans in the sample. The motivation for the loan term

restriction is that it enabled us to include discrete dummy variables for the different loan terms above (a better way generally to capture the fundamental differences in these different loans) and gave us only those loans whose terms were consistent with loan terms that traditional, long-term financing might be expected to have.

18. The breakpoints in the categorization of housing cost were obtained by cutting the distribution of housing cost to income for the full sample into quartiles; however, particularly for pretax income, devoting 30 percent of income to housing expenses would be considered quite high.

19. This differential reflects relatively recent reductions in interest rates compared to previous levels.

20. The designation of race/ethnicity is straightforward for households consisting of a single individual. For married couples, if one individual was White and the other Hispanic or African American, the household was deemed Hispanic or African American, respectively. For cases in which the household head and spouse were both Hispanic, if either the spouse or the head was classified as a non-White Hispanic, the household was designated to be non-White Hispanic. If one was Hispanic and the other African American, the household was classified as African American.

21. The exact percentages for each subsample analyzed in this article are presented in exhibits 10 through 12.

22. To estimate a loan-to-value ratio for the full sample, we would need the house value at the time the loan was originated. It is not possible to obtain house value for refinancing because measures of property value are available only at the point of home purchase and at the point of the interview. For purchases, it is conceptually possible to obtain house value since that (retrospective) variable is on the data set; however, this variable has, unfortunately, many missing values, probably due to the nature of the retrospective question. These issues are not relevant for recent movers who purchase homes.

23. Note that the proposed inverse relationship between property value and interest rates may be mitigated, to some degree, to the extent that higher valued properties have "jumbo" mortgages. Jumbo mortgages are considered nonconforming loans because their values exceed the loan limits set by Fannie Mae and Freddie Mac. As such, they are considered to be higher risk from the lender's perspective, and, therefore, have slightly higher interest rates than would otherwise comparable conforming loans. Experimentation with a dummy variable for jumbo loans did not improve the fit of the model, nor was this variable statistically significant.

24. Note that the earlier a loan was originated, the fewer loans originated in that year are still in existence. Consequently, in earlier years the discrete variables included in the regressions may represent, for example, a 5-year interval (for example, 1965–70). In the case of recent movers, only the metropolitan statistical area (MSA) categorical variables could be included because distinct MSAs were sampled in each year and, therefore, were perfectly correlated with the origination periods.

25. The R^2s in all the regressions presented in the analysis are relatively high for disaggregated microdata samples, ranging from about .22 (exhibit 13, for second mortgages) to .45 (exhibit 15, for home equity loans).

26. Note that this is the only instance in which the average house values for Hispanics and Whites appear markedly different.

27. This result is consistent with the literature. Canner, Dynan, and Passmore (2002) found that minorities are less likely to refinance, and, when they do, the average amount of cash borrowed is lower than the amount Whites borrow. See HUD, Office of Policy Development and Research (2004), which examines refinancing using recent Home Mortgage Disclosure Act data. The report considers mortgage refinance by racial/ethnic group and shows that the percentage of refinanced loans is relatively small in comparison to White households; for example, in 2002, 65.5 percent of all refinanced loans were identified as being held by White households, whereas African Americans and Hispanics accounted for only 3.8 percent and 4.9 percent, respectively.

28. The American Housing Survey provides the monthly debt service and the amount of the debt when borrowed for the second, third, fourth, and subsequent mortgages. The monthly debt service is the payment due for each loan each month. See ICF International (2004).

29. The slightly lower number of observations in the remaining exhibits is due to the possibility of a third mortgage. Only a few third mortgages exist.

References

Belsky, Eric S., and Mark Duda. 2002. "Anatomy of the Low-Income Homeownership Boom in the 1990's." In *Low-Income Homeownership,* edited by N.P. Retsinas and E.S. Belsky. Washington, DC: Brookings Institution Press: 15–63.

Benston, George J., and Daniel Horsky. 1991. "The Relationship Between the Demand and Supply of Home Financing and Neighborhood Characteristics: An Empirical Analysis of Mortgage Redlining," *Journal of Financial Services Research* 5: 235–260.

Berkovec, James A., Glenn B. Canner, Stuart A. Gabriel, and Timothy H. Hannan. 1996. "Race, Redlining and Residential Mortgage Defaults: Evidence From the FHA-Insured Single Family Loan Program." In *Mortgage Lending, Racial Discrimination and Federal Policy*, edited by J. Goering and R. Weink. Washington, DC: Urban Institute Press: 251–288.

Black, H., and R.L. Schweitzer. 1985. "A Canonical Analysis of Mortgage Lending Terms: Testing for Lending Discrimination at a Commercial Bank," *Urban Studies* 22: 13–19.

Black, Harold, Thomas P. Boehm, and Ramon DeGennaro. 2003. "Is There Discrimination in Mortgage Pricing? The Case of Overages," *Journal of Banking and Finance* 27: 1139–1165.

Boehm, Thomas, A. Schlottmann, and P. Thistle. 2006. "Rates and Race: An Analysis of Disparities in Mortgage Rates," *Housing Policy Debate* 17 (1): 109–149.

Canner, Glenn, Karen Dynan, and Wayne Passmore. 2002. "Mortgage Refinancing in 2001 and Early 2002," *Federal Reserve Bulletin* 88 (12): 469–481.

Cortes, Alvaro, Christopher E. Herbert, Erin Wilson, and Elizabeth Clay. 2006. *Improving Homeownership Opportunities for Hispanic Families: A Review of the Literature.* Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research. 127 p.

Cotterman, Robert F. 2002. *New Evidence on the Relationship Between Race and Mortgage Default: The Importance of Credit History Data.* Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research. 40 p.

Courchane, Marsha, and David Nickerson. 1997. "Discrimination Resulting From Overage Practices," *Journal of Financial Services Research* 11: 133–155.

Crawford, Gordon, and Eric Rosenblatt. 1999. "Differences in the Cost of Mortgage Credit: Implication for Discrimination," *Journal of Real Estate Finance and Economics* 19: 147–159.

ICF International. 2004. *Code Book for the American Housing Survey, Public Use File: 1997 and Later*. Version 1.77. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research. 1,104 p.

Ladd, Helen F. 1998. "Evidence of Discrimination in Mortgage Lending," *Journal of Economic Perspectives* 12 (2): 41–62.

Lam, Ken, and Bulbul Kaul. 2003. *Analysis of Housing Finance Issues Using the American Housing Survey.* Report prepared for the U.S. Department of Housing and Urban Development, Office of Policy Development and Research. Cambridge, MA: Abt Associates Inc.

LePage, Andrew. 2005. "Americans Using Home Equity Pile Up Billions in Extra Debt," Scripps Howard News Service, March 10, 2005. http://www.shns.com/shns/g_index2.cfm?action=detail&pk=HOMEEQUITY-03-10-05.

Nothaft, Frank E., and Vanessa G. Perry. 2002. "Do Mortgage Rates Vary By Neighborhood: Implications for Loan Pricing and Redlining," *Journal of Housing Economics* 11: 244–265.

Ross, Stephen L., and John Yinger. 2002. *The Color of Credit*. Cambridge: MIT Press. 459 p.

———. 1999. "Other Evidence of Discrimination: Recent Studies of Redlining and Discrimination in Loan Approval and Loan Terms." In *Mortgage Lending Discrimination: A Review of Existing Evidence*, edited by Margery Turner and Felicity Skidmore. Washington, DC: Urban Institute Press: 85–106.

Schaefer, R., and Helen Ladd. 1981. *Discrimination in Mortgage Lending.* Cambridge: MIT Press. 407 p.

Susin, Scott. 2003. Mortgage Interest Rates and Refinancing: Racial and Ethnic Patterns. Unpublished manuscript. U.S. Census Bureau.

U.S. Department of Housing and Urban Development (HUD), Office of Policy Development and Research. 2004. An Analysis of Mortgage Refinancing, 2001–2003. Unpublished report. U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Yinger, John. 1996. "Discrimination in Mortgage Lending: A Literature Review." In *Mortgage Lending, Racial Discrimination and Federal Policy*, edited by J. Goering and R. Weink. Washington, DC: Urban Institute Press: 29–74.

Additional Reading

Bradford, Calvin. 2002. *Risk or Race: Racial Disparities and the Subprime Refinance Market*. Washington, DC: Center for Community Change. 40 p.

The Importance of Wealth and Income in the Transition to Homeownership

Zhu Xiao Di
Harvard University

Xiaodong Liu
The Ohio State University
Brandeis University

Abstract

Although most studies examining the importance of wealth and income constraints in attaining homeownership employ a simulation methodology, this article uses Panel Study of Income Dynamics data to investigate the actual probability of becoming a homeowner during a 15-year period. The findings confirm that both household wealth and income have significant importance to the transition to homeownership, with wealth as a more important predictor of whether minorities become homeowners. The use of longitudinal data and survival analysis also allow for examining changes over time in the relative importance of wealth and income in predicting homeownership. Although some evidence is found to suggest that the importance of wealth in predicting homeownership has declined over time, we do not find any support for a reduction in the importance of income, despite the fact that mortgage product innovation has increased the allowable ratios of debt to income. It is possible, however, that such mortgage market innovation has had greater impact on the value of homes purchased.

Introduction

Policymakers have supported homeownership because it is believed to have significant financial and social benefits for both individuals and communities (Rohe, Van Zandt, and McCarthy, 2002). Interest in enhancing opportunities to achieve homeownership has fostered a rich body of research on the impact of borrowing and lending constraints on homeownership, with the former well documented by Rosenthal (2002) and the latter comprehensively summarized by Feldman (2001). Although most studies have focused on household wealth and income (for example, Linneman and Wachter, 1989), recent work has devoted more attention to household credit risk (Barakova

et al., 2003; Rosenthal, 2002). A study by Linneman and Wachter (1989) and subsequent studies employing a similar methodology have consistently found that downpayment constraints restrict access to homeownership more frequently than income does. More recent studies employing credit measures, most notably Barakova et al. (2003), have also found that wealth and, to a lesser extent, credit constraints are more important than income constraints in limiting access to homeownership.

The dominant methodology used in this field is simulation, in which a regression model of tenure choice is estimated on a cross-sectional sample of renters and homeowners, using measures of income, wealth, or credit constraints and demographic variables that are positively correlated with tenure choice. The impact of these constraints is then simulated by reestimating these models with the constraints relaxed. So far, few existing studies take advantage of longitudinal data to observe how cohorts of households actually facilitate the transition from renting to owning over time, how the probability of this transition relates to household wealth and income, and how the relationship between wealth and income and the transition to homeownership may change over time for an individual household. Haurin, Hendershott, and Wachter (1997) and Listokin et al. (2001) used longitudinal survey data (the National Longitudinal Survey of Youth and the Survey of Income and Program Participation [SIPP], respectively) to analyze wealth and income constraints on homeownership. Neither study, however, used the longitudinal nature of these data to analyze how these constraints vary over time. In a recent study sponsored by the U.S. Department of Housing and Urban Development (HUD), Herbert and Tsen (2005) applied survival analysis techniques to longitudinal data from the SIPP to examine the probability of renters making the transition to homeownership as a function of income, wealth, and other demographic characteristics and market conditions; however, Herbert and Tsen examined tenure transition over only a 3-year period, compared with the 15-year period that this study examines. In another recent study sponsored by HUD, Boehm and Schlottmann (2005) used Panel Study of Income Dynamics (PSID) data to follow up households for 8 years (1984 to 1992) and model the probability of making the transition from renting to owning and vice versa. The principal focus of this article, however, is on the impact of tenure choice on wealth accumulation over time and not on the factors associated with tenure choice. As a result, it does not address changes in the role of wealth and income in predicting first-time homeownership over time.

As time passes, many factors can influence the probability of moving to homeownership. At a macro level, these factors include mortgage interest rates, underwriting criteria, home price appreciation, appreciation of other household assets, and real rates of income growth relative to house price appreciation. At a micro level, households with different wealth and income can face different obstacles over time due to either changes in the market or changes in the households' personal circumstances. This article is the first to examine the probability of becoming a homeowner over a long period of time—15 years. It therefore helps to answer a set of different questions that have not yet been addressed in the literature. Specifically, this article addresses two questions:

1. What change, if any, in the importance of wealth and income has occurred in predicting the transition to homeownership over time?
2. Do wealth and income have similar effects on Whites and minorities over longer periods of time?

Regarding the first question, there is reason to believe that wealth and income influences would have changed since the 1980s as a result of broader changes in housing and mortgage markets and government policies. Specifically, underwriting requirements regarding the maximum allowable ratios of housing expenses and total debt to income have been relaxed and more low downpayment products are available. Regarding the second question, previous research on racial disparities in homeownership suggests that wealth and income constraints may affect minorities more than Whites.

Basing our analysis on the existing literature and our own understanding of market dynamics, we expected our analysis would show the following:

- Low levels of both household wealth and income constrain the transition to homeownership.
- Wealth is expected to be a more important factor than income in predicting homeownership for minorities because of the lower levels of wealth held by minorities and because minorities tend to have lower credit scores, which may lead lenders to require larger downpayments to compensate for this additional credit risk.[1]
- Wealth should become less important over time as mortgage underwriting requirements regarding loan-to-value ratios have been relaxed.
- Because wealth is more limited among minorities, any reductions over time in the importance of wealth in predicting homeownership should be more pronounced among minorities than among Whites.

Data and Methodology

Our analysis uses PSID data, which are collected by the Survey Research Center at the University of Michigan, and focuses on survey findings from 1984, 1989, 1994, and 1999, because supplemental surveys in these years gathered information on household net wealth, which includes the value of all assets, including homes, minus all liabilities, including mortgages. This information enables researchers to analyze how wealth affects a household's ability to achieve homeownership. Survival analysis is used to analyze the role of wealth and income in household transitions from renting to owning over this 15-year period.

More specifically, the analytic method employed is the method of survival analysis described in Singer and Willett (2003). The event of interest is the transition from renting to owning. Following Singer and Willet (2003), we created a multiperiod longitudinal data set, which follows household heads who were renters in 1984 and remained as heads of households through 1999 and which indicates whether and when their tenure status changed from renter to owner as observed at the end of each 5-year period between 1984 and 1999. Hence, households that dissolved (the head did not remain a head of household) are not included. Given the survival analysis approach used, cases are dropped from the sample after a household makes the transition from renting to owning.

Exhibit 1 summarizes information on the study sample. As shown in the exhibit, 1,014 renter households in 1984 are in our sample, and the same people remained as household heads until 1999, but some of these households became homeowners. This sample comprises the initial "risk

Exhibit 1

Tenure Status of Sample Over Time

Year	Number Renting	Number Becoming Homeowner	Number Censored	Number Used in Analysis
1984	1,014	NA	NA	NA
1989	715	299	0	1,014
1994	530	184	1	714
1999	374	114	42	488
Total	NA	597	43	2,216

set" of households with the possibility of experiencing the event of interest—that is, becoming a homeowner. By 1989, 715 households were still renters and 229 had become homeowners. Of the "surviving" 715 households that were still renters in 1989, 184 achieved homeownership by 1994, while 530 remained renters and 1 was lost to the survey and thus was dropped from the analysis ("censored"). By 1999, of the remaining 530 renter households, 374 continued to be renters, 114 changed their tenure status from renting to owning, and 42 cases were censored. For each case in which the study observes a renter 5 years later, that case then enters the data set as a separate observation. The data set used for analysis consists of a total of 2,216 observations, including 597 cases in which renters succeeded in becoming homeowners.

Based on our survival analysis data set, exhibit 2 displays the share of renter households that became owner households in each 5-year interval. As shown in the exhibit, the conditional probability of achieving homeownership decreased in each succeeding period. In the initial 5-year period, nearly 30 percent of renters purchased a home. Among those still renting in 1989, however, less than 26 percent purchased homes by 1994. For those still renting in 1994, the probability of achieving homeownership by 1999 fell farther to just above 23 percent. Hence, the likelihood of becoming a homeowner contingent on not having become one over the previous 5-year period declined for each period observed. This pattern of declining transition to homeownership is common when tracking a fixed pool of renters over time. Both Haurin and Rosenthal (2005) and Boehm and Schlottmann (2004) found a similar pattern of declining homeownership transition as renters age beyond age 30 as occurs in the timeframe observed with this sample.

Exhibit 3 presents the sample survivor probabilities for the 1,041 households. The survival probability is the share of renters who continue as renters through succeeding 5-year observations. Of those who were not homeowners in 1984, nearly 40 percent remained renters in 1999. Furthermore, exhibit 3 shows that a typical 1984 renter household would achieve homeownership about 10 years later (around 1994); that is, about half the renter households would own their home around 1994, given that the household was a renter in 1984.

The subsequent survival analysis uses logistic regression to model the probability of achieving homeownership. The dependent variable is housing tenure at the end of each 5-year period we observe with a 1, indicating that the household is an owner household, and a 0, indicating that the household is a renter household. Wealth and income are the main independent variables of

Exhibit 2

Percentage of Surviving Rental Households Achieving Homeownership Since 1984

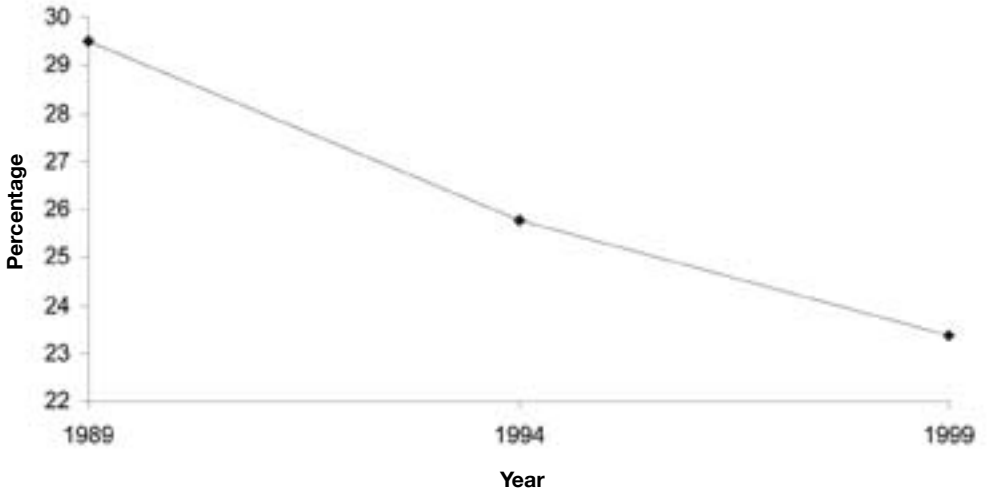
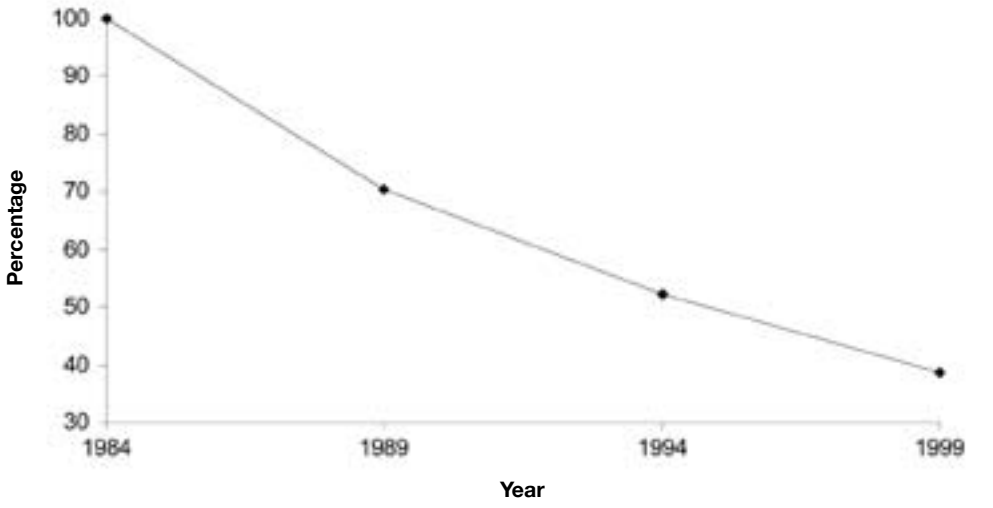


Exhibit 3

Survival Probability of Households Remaining Renters Since 1984



the study because we want to investigate their importance on homeownership over time. In survival models, time-varying covariates generally are measured as of the beginning of the period; that is, wealth and income at the start of a 5-year period would be used to predict the transition to homeownership over the next 5-year period; however, 5 years is an unusually long period between observations. Investigation of alternative measures of wealth and income found that much better

results were obtained by measuring wealth and income as the average over the 5-year period (in constant 2001 dollars) compared with measuring wealth and income at the starting point of the period. This finding is consistent with permanent income theory of consumer behavior; that is, when making decisions about consumer durables, households act on the basis of their expectations of future income streams and not just on current income. To account for the fact that the impact of wealth and income on the probability of homeownership is likely to diminish as the values of these variables increase, the log of these variables is used in the model.[2]

Another important focus of this article is distinguishing between the impact of wealth and income on Whites and the impact on minorities. Unfortunately, with too few observations for specific racial and ethnic groups to model these groups separately, all racial minorities and Hispanics are grouped together in a single minority category. As shown in exhibit 4, among the 1,014 observations in this data set, about 53 percent are non-Hispanic White and 47 percent are minorities.

Exhibit 4

Descriptive Statistics

Variable Name	Description	Share or Means, With Standard Deviation in Parentheses
Age1	Age <30 in 1984	48.82%
Age2	Age in 1984: 30-44	33.14%
Age3	Age >=45 in 1984	18.05%
Minority1	Minority	47.24%
Minority2	White	52.76%
Period1	Period 1984–89	45.8%
Period2	Period 1989–94	32.2%
Period3	Period 1994–99	22.0%
Income	Log of average household income during the period (Average income during the period)	14.75 (1.25) $37,501 ($29,941)
Wealth	Log of average household wealth during the period (Average wealth during the period)	11.01 (6.19) $50,899 ($259,308)
Family size	Number of persons in household	2.99 (1.73)
Marry0	Unmarried	51.73%
Marry1	Married	48.27%
Edu1	Less than high school	25.49%
Edu2	High school	31.06%
Edu3	Some college	22.53%
Edu4	College or above	20.92%
Region1	South	42.15%
Region2	Northeast	15.50%
Region3	North Central	27.02%
Region4	West	15.33%

Other demographic factors controlled for in this study include the share of household heads who are married or living with a partner (48 percent of the sample), the size of the household, and the share of household heads who were distributed among three age categories (under 30, 30 to 44, and 45 or older) as of 1984. Nearly one-half of the household heads were less than 30 years old, about one-third were between 30 and 44 years old, and the others were 45 years old or older in 1984.[3] The study also includes a series of dummy variables indicating the household head's level of education as both a proxy for permanent income and a measure of potential differences in preferences for homeownership related to income level. Finally, the study includes dummy variables for the region of the country where the households lived in 1984. Although, ideally, the researchers would have liked to include more information on the market context in which the tenure choice is made, the public-use PSID does not provide any greater geographic detail.

One point of concern with the estimated model is the long period of time between observations; some households may have achieved homeownership during intervals between observations but failed to maintain this status by the end of the observation period. In this regard, the results are best interpreted as predicting transitions to homeownership that are more lasting because failures to maintain homeownership for less than 5 years may not be observed as transitions to homeownership in this study's data. Another issue is that some renter households observed in 1984 may actually have been homeowners before 1984 and were only temporarily renters in 1984. These situations, however, should not bias the results regarding the importance of wealth and income in predicting the transition to homeownership, because previous homeowners would likely have higher wealth and income than renters who have never been homeowners before. Probably the biggest data limitation is a lack of information on borrowers' credit histories. Although recent work by Barakova et al. (2003) suggests that credit constraints are less important than wealth constraints in predicting homeownership, it is possible that credit constraints are correlated more with wealth than with income since wealth provides a cushion against unexpected events that might damage a household's credit. If so, the wealth effect in this study is biased and is partially reflecting issues related to borrower credit as well. Also, because both credit and wealth requirements have been relaxed by lenders, it is possible that any sign of a reduction in the wealth requirement over time may be reflecting, in whole or in part, a reduction in the credit constraint.

As noted in the introduction, the primary goals of this article are to identify whether the importance of wealth and income has changed over time and whether these changes vary between Whites and minorities. To test these hypotheses, the estimated model includes a series of interaction terms involving wealth and income. Specifically, the study interacts wealth and income, respectively, with variables for minority status and the period of observation. Interactions between household wealth and income and minority status enable us to see if the importance of wealth and income are relatively different to Whites and minorities. The interaction of both wealth and income with the period of observation enables the researchers to determine if the influence of wealth and income has changed over time. Interactions of wealth and income, respectively, with both minority status and the period of observation enable researchers to test whether changes in the market have been more helpful for minorities than Whites in achieving homeownership. Finally, the interactions between wealth and income with age examine whether differences occur in the importance of these variables for different age cohorts.

The general equation for our model can be written as

$$P = 1 / (1 + \exp(-(\beta_0 + \beta_1 * V_1 + \beta_2 * V_2 + \beta_3 * V_3 + \ldots)))$$

in which P is the probability of achieving homeownership; V_1, V_2, V_3… are the independent predictors of homeownership, such as age, income, wealth, education level, or ethnicity; and β_1, β_2, β_3 are the estimated coefficients for each corresponding variable. If the model shows that β_1 is significantly different from 0, we can conclude that variable V_1 has an effect on predicting the likelihood of becoming a homeowner (while controlling for the other variables in the model). The antilog of β_1 (that is, $\exp^{\beta 1}$) is the odds ratio for variable V_1, which tells the ratio of the odds of becoming a homeowner versus remaining a renter for each unit difference in V_1, with all other variables being held constant.

Findings

Exhibit 5 shows the model results. As expected, household wealth and income both are significant predictors of the transition toward homeownership. This observation demonstrates the importance of wealth and income to the transition to homeownership. Minority status and the observation timeframe are, by themselves, not statistically significant, although, as discussed in more detail in the following paragraphs, certain key interactions of these variables are significant.

Regarding the importance of household income, all else being equal, the higher the average annual household income over a 5-year period, the more likely the household will become a homeowner at the end of the period. Using the 1984–89 period as an example, exhibit 6 illustrates the impact of income on the probability of achieving homeownership.[4] Here, the study estimates the probability of becoming a homeowner in 1989, assuming a household with average wealth and of average family size headed by a married person who was between the ages of 30 and 44 in 1984 and had a high school education. The level of household income is then varied and the probability of owning is estimated separately for Whites and minorities, assuming other household characteristics are held constant. Consistent with the log form of the variable, the importance of income on achieving homeownership is nonlinear with larger increases in the probability of homeownership at lower income levels.

In exhibit 6, modeling results also indicate that little difference exists in the impact of income on achieving homeownership by race. Although the lines tracking income and probability of homeownership for Whites and minorities are not exactly the same, the difference is trivial and not statistically significant, as indicated by the insignificance of the interaction term between minority status and income. Thus, these results suggest that minorities do not experience a more binding income constraint than Whites do. All else being equal, minorities with a household income level similar to that of Whites are as likely to become homeowners as Whites are; however, as discussed in the following paragraphs, this observation does not mean that no racial difference exists in the propensity to own. Instead, these differences are related to differences in the importance of wealth between Whites and minorities.

The results shown in exhibit 5 also suggest that the importance of income does not differ by the age of the household head or the observed time period, because none of the interactions between income and these variables are statistically significant. The insignificant interactions between

Exhibit 5

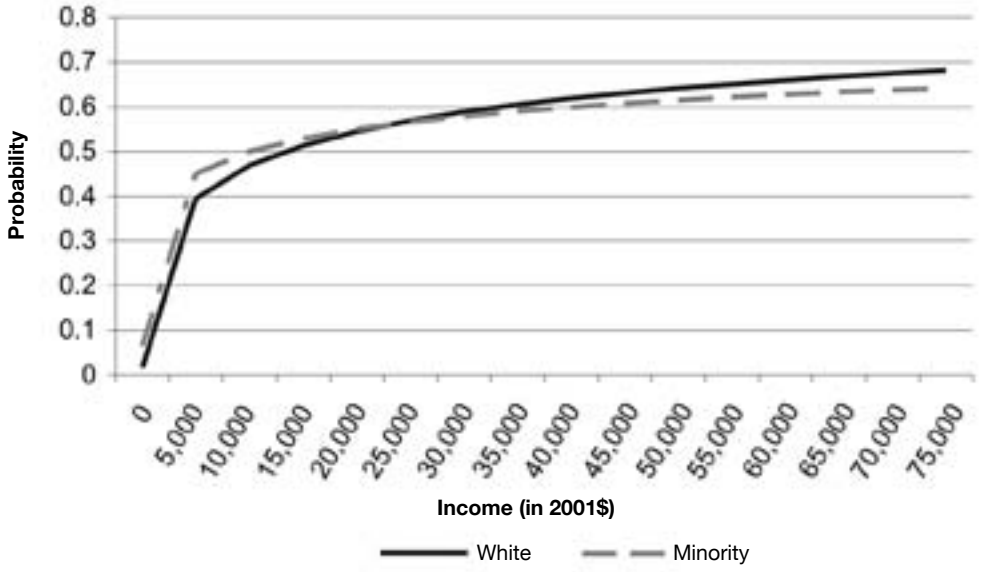
Model Results

Variable Name	Description	Coefficient
Intercept		– 8.531(1.18***)
Age1	<30 in 1984; Reference group	
Age2	30–44 in 1984	1.544(1.36^{ns})
Age3	45 or over in 1984	1.552(1.55^{ns})
Minority1	Whites; reference group	
Minority2	Minorities	– 0.507(0.99^{ns})
Period1	Period 1984–89; reference group	
Period2	Period 1989–94	0.510(1.36^{ns})
Period3	Period 1994–99	– 0.242(1.51^{ns})
Income	Log of average household income during the period	0.280(0.08***)
Wealth	Log of average household wealth during the period	0.204(0.02***)
Income*Age2	Interaction	– 0.078(0.09^{ns})
Income*Age3	Interaction	– 0.157(0.11^{ns})
Income*Minority2	Interaction	0.102(0.06^{ns})
Income*Period2	Interaction	– 0.031(0.09^{ns})
Income*Period3	Interaction	0.064(0.10^{ns})
Income*Period2*Minority2	Interaction	– 0.028(0.02^{ns})
Income*Period3*Minority2	Interaction	– 0.034(0.02^{ns})
Wealth*Age2	Interaction	– 0.025(0.02^{ns})
Wealth*Age3	Interaction	0.034(0.03^{ns})
Wealth*Minority2	Interaction	– 0.063(0.01***)
Wealth*Period2	Interaction	– 0.005(0.02^{ns})
Wealth*Period3	Interaction	– 0.053(0.02*)
Wealth*Period2*Minority2	Interaction	0.033(0.02^{ns})
Wealth*Period3*Minority2	Interaction	0.030(0.02^{ns})
Family size	The number of people in the households	0.217(0.04***)
Marry0	Types of households other than married couples or partners living together; reference group	
Marry1	Married couples or partners living together	0.151(0.07*)
Edu1	High school dropouts; Reference group	
Edu2	High school graduates	– 0.153(0.09^{ns})
Edu3	With some college education	0.114(0.10^{ns})
Edu4	College graduates or with higher education	0.275(0.11*)
Region1	South; reference group	
Region2	Northeast	– 0.319(0.11**)
Region3	North Central	0.081(0.10^{ns})
Region4	West	– 0.102(0.11^{ns})
-2LL	1872.74	
AIC	1932.74	
SC	2103.37	
Max-r R-Square	0.3824	
R-Square	0.2630	
DF	29	

*Note: *** p<0.001; ** p<0.01; * p<0.05; ns: nonsignificant; and standard errors are in parentheses.*

Exhibit 6

The Probability of 1984 Renters To Achieve Homeownership by 1989, as a Function of Income and Minority Status*



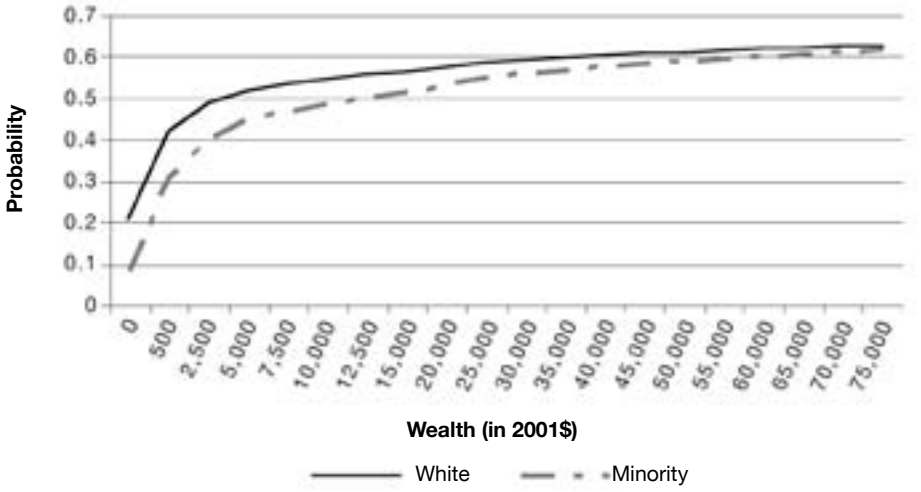
Assuming average wealth and family size, married, with high school education, under 30 years old in 1984, and living in South.

income and time period suggest that changes in the mortgage market during the 1990s did not reduce the influence of income on achieving homeownership.

Exhibit 7 illustrates the impact of household wealth on the probability of achieving homeownership assuming the same household characteristics as those described for exhibit 6. Again, consistent with the log form, the importance of wealth on achieving homeownership is also nonlinear—larger increases exist in the probability of homeownership corresponding to increases in wealth at the lower end than that at the higher end. For White households, the average probability of achieving homeownership by 1989, given that the household was renting in 1984, is 42 percent, assuming an average wealth of $500 during this period; average probability increases to 51.6 percent if the average wealth is $5,000. If the average wealth increases by $5,000 to $10,000, the probability increases to 54.5 percent; this increase amounts to merely a 2.9-percentage-point increase for every $5,000 increase in wealth. Although higher wealth levels continue to increase the probability of achieving homeownership, the effect is smaller than at lower levels of wealth. For example, a $5,000 increase in wealth from $20,000 to $25,000 only increases the probability of homeownership by 0.9 percentage points, from 57.3 to 58.2 percent. This result is consistent with the finding by Herbert and Tsen (2005) that small amounts of wealth are associated with large increases in the probability of homeownership and that increases in wealth above these low levels increase the probability of homeownership by relatively small amounts.

Exhibit 7

The Probability of 1984 Renters To Achieve Homeownership by 1989, as a Function of Wealth and Minority Status



The significant negative coefficient on the interaction term between minority status and wealth indicates that minorities require higher levels of wealth than Whites do to achieve the same probability of homeownership. As shown in exhibit 7, all else being equal, at all levels of wealth, minorities are less likely to achieve homeownership than Whites are. For example, assuming the household characteristics described previously, with $5,000 in wealth, the probability of achieving homeownership is 44.6 percent for minorities and 51.6 for Whites, a 7-percentage-point difference. To put it in another way, a minority renter in 1984 would have had to have more than $12,500 in average wealth during the 1984–89 period to have a similar probability of homeownership as a White renter with $5,000 in wealth. As also illustrated by exhibit 7, however, racial differences in the impact of wealth on the probability of homeownership decline as wealth increases.

We can only speculate about why minorities, which, as defined in our analysis, include African Americans, Hispanics, Asians, and other racial groups, require more wealth than Whites do to become homeowners. One hypothesis is that lenders require greater equity contributions from minorities than from Whites to accommodate higher levels of credit risk—either perceived or actual—for minority borrowers. To the extent that wealth is needed to compensate for credit, borrowers are credit constrained, not wealth constrained. Because our data set does not include measures of borrower credit history, however, we cannot control for this factor. The disparity in wealth requirements for homeownership could also be attributed to the fact that minorities prefer to purchase homes with larger equity investments to lower their reliance on debt. Another possible reason is that minorities are disproportionately concentrated in higher cost areas, where required dollar downpayments are larger by virtue of higher cost homes. Unfortunately, the lack of

geographic identifiers in the PSID data used for this analysis precluded the use of any controls for variations in market conditions across borrowers.

The modeling results also suggest that the influence of wealth decreased in the late 1990s as indicated by the significant negative interaction term between wealth and the 1999-period variable.[5] This observation is in keeping with expectations because, in the late 1990s, lending practices became more relaxed regarding downpayment requirements and mortgage products appeared that allowed downpayments as low as 3 percent of the purchase price. Not only are these products widely available, homebuyers used them increasingly over the time period studied. According to data provided by the Federal Housing Finance Board, the share of home purchase loans with downpayments of 10 percent or less increased from 10 percent in the 1989–91 period to 25 percent in the 1994–97 period.[6] This finding of a reduction in how binding the wealth influence has been, however, is not robust. Other variations of the model tested, but not reported here, which contained different interaction terms, resulted in insignificant coefficients on this variable.

The three-way interactions of wealth with minority status and time period were not statistically significant. Thus, even though the study found significant differences between Whites and minorities in the importance of wealth in predicting homeownership, it did not find any evidence that a differential change has occurred in the importance of wealth over time between Whites and minorities. This observation suggests that changes in wealth over time benefited minorities and Whites equally.

Although household age is usually strongly associated with homeownership, this model does not produce statistically significant coefficients for the age variables or their interactions with household wealth and income. To some extent, this finding is plausible, given the longitudinal nature of the data structure. Over such a long period of time, the impact of age would be diminished.

Other statistically significant variables include family size, marital status, and the possession of a college education, which were positively associated with the probability of homeownership, and residence in the Northeast region, which was negatively associated with the probability of homeownership. These results are all in keeping with reasonable expectations. Married couples, households with children, or those with higher levels of education generally have higher homeownership rates than do other types of families, households without children, or those with lower levels of education. The Northeast has relatively high home prices and has less single-family housing than other regions do, which may make homeownership more difficult to achieve in the Northeast compared with other regions (Herbert, 1997).

Conclusion

The results of the survival analysis of the transition from renting to owning based on the linked longitudinal data of PSID data from 1984, 1989, 1994, and 1999 found that both household income and net wealth are positively related to the likelihood of achieving homeownership, while controlling for other demographic factors. Although modeling results generally did not find any difference between minorities' and Whites' propensity to own, they did suggest that the required wealth level for transition to homeownership is higher for minorities than it is for Whites.

Several explanations for this finding are possible. Lenders may require higher downpayments by minorities to mitigate other credit risks not captured by these data. Another explanation might be that minority borrowers may have greater aversion to debt and so voluntarily choose larger downpayments. Finally, minorities may be disproportionately concentrated in higher cost markets, which could not be controlled for in the estimated model due to a lack of geographic identifiers in the data. The model results also support the view that the proliferation of mortgage products allowing for low downpayments in the late 1990s may have contributed to a reduction in the importance of wealth for achieving homeownership during the 1994-to-99 period. These results are somewhat fragile, however, so further research is needed to support this conclusion.

We also did not find any support for a reduction in the importance of income on homeownership, despite the fact that mortgage product innovation has increased the allowable ratios of debt to income. Most existing research, however, has found that wealth constraints have been more important than income constraints in limiting homeownership. Thus, the results of this article may be taken to mean that the relaxation of downpayment requirements has been more important in increasing homeownership opportunities than changes in allowable debt ratios have been. It is possible, however, that relaxed debt-to-income ratios had less impact on the ability to purchase a home and a greater impact on the value of the home that purchasers could afford—an impact that was not evaluated in this study.

One contribution of this study is the use of a longitudinal data set to investigate the change over time in the importance of wealth and income on homeownership. The model results of the study are based on data of actual observations following more than 1,000 household heads from 1984 to 1999. In contrast, the existing literature largely employs a simulation methodology on a cross-section of data from one point in time. Our results both reinforce the existing literature and strengthen the current understanding of the role of wealth and income in the transition toward homeownership.

Acknowledgments

The authors thank Christopher Herbert and Eric Belsky for helpful advice and editing.

Authors

Zhu Xiao Di is a senior research analyst at Harvard University's Joint Center for Housing Studies.

Xiaodong Liu is an assistant professor at The Ohio State University and Brandeis University.

Notes

1. See Bostic, Calem, and Wachter (2004) for an analysis of trends in credit score by tenure and race and ethnicity.
2. Because logs are not defined for 0 or negative values, cases of 0 or negative wealth were recoded as $1 so the log value is 0.

3. Ideally, we would like to include more narrowly defined age categories (such as 5-year age brackets), but the relatively small sample size required these broader categories.
4. Only this time period is shown because little difference exists in the graphs for other time periods.
5. The interaction term between wealth and the period 1989 to 1994 (period 2) is very small and not significant, indicating that the baseline coefficient on wealth of 0.204 is unchanged in this period; however, the coefficient on the interaction term for 1994 to 1999 (period 3) is significant and negative. This observation indicates that the effect of wealth was reduced by 0.053 in this later period, yielding a coefficient of 0.151 in the late 1990s.
6. Figures cited appear in Federal Register (2004).

References

Barakova, Irina, Raphael W. Bostic, Paul S. Calem, and Susan M. Wachter. 2003. "Does Credit Quality Matter for Homeownership?" *Journal of Housing Economics* 12: 318–336.

Boehm, Thomas P., and Alan M. Schlottmann. 2005. *Wealth Accumulation and Homeownership: Evidence for Low-Income Households*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

———. 2004. "The Dynamics of Race, Income, and Homeownership," *Journal of Urban Economics* 55: 113–130.

Bostic, Raphael W., Paul S. Calem, and Susan M. Wachter. 2004. Hitting the Wall: Credit as an Impediment to Homeownership. Working Paper Series: BABC 04-5. Harvard University, Joint Center for Housing Studies.

Federal Register. 2004. "U.S. Department of Housing and Urban Development's Proposed Housing Goals for Fannie Mae and Freddie Mac," May 3.

Feldman, Ron J. 2001. "Mortgage Rates, Homeownership Rates, and Government-Sponsored Enterprises," *The Region* (Annual Report): 5–23.

Haurin, Donald R., Patric H. Hendershott, and Susan M. Wachter. 1997. "Borrowing Constraints and the Tenure Choice of Young Households," *Journal of Housing Research* 8 (2): 137–154.

Haurin, Donald R., and Stuart S. Rosenthal. 2005. *The Growth of Earnings of Low-Income Households and the Sensitivity of Their Homeownership Choices to Economic and Socio-Demographic Shocks*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Herbert, Christopher E. 1997. "Limited Choices: The Effect of Residential Segregation on Homeownership Among Blacks." Ph.D. diss., Harvard University.

Herbert, Christopher E., and Winnie Tsen. 2005. *The Potential of Downpayment Assistance for Increasing Homeownership Among Minority and Low-Income Households*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Linneman, P., and S. Wachter. 1989. "The Impacts of Borrowing Constraints on Homeownership," *AREUEA* 17: 389–402.

Listokin, David, Elvin K. Wyly, Brian Schmitt, and Ioan Voicu. 2001. "The Potential and Limitations of Mortgage Innovation," *Housing Policy Debate* 12 (3): 465–513.

Rohe, W.M., S. Van Zandt, and G. McCarthy. 2002. "Social Benefits and Costs of Homeownership." In *Low-Income Homeownership*, edited by N.P. Retsinas and E.S. Belsky. Cambridge, MA: Joint Center for Housing Studies; Washington DC: Brookings Institution Press: 381–406.

Rosenthal, S.S. 2002. "Eliminating Credit Barriers: How Far Can We Go?" In *Low-Income Homeownership*, *Low-Income Homeownership*, edited by N.P. Retsinas and E.S. Belsky. Cambridge, MA: Joint Center for Housing Studies; Washington DC: Brookings Institution Press: 111–145.

Singer, Judith D., and John B. Willett. 2003. *Applied Longitudinal Data Analysis.* Oxford: Oxford University Press.

The Potential of Downpayment Assistance for Increasing Homeownership Among Minority and Low-Income Households

Christopher E. Herbert
Abt Associates Inc.

Winnie Tsen
U.S. Government Accountability Office

Abstract

The purpose of this study is to investigate the potential for downpayment assistance efforts to increase homeownership. The study analyzes data from the 1996 panel of the Survey of Income and Program Participation, which tracks some 11,000 renter households over a 3-year period. The analysis has two stages. In the first stage, a parametric proportional hazard model is estimated of the transition to homeownership based on a variety of demographic and financial characteristics of each household and on economic conditions in the markets in which those households reside. In the second stage, the results of the hazard model are used to simulate the impact of cash grants to households on the probability of their becoming homeowners over time. The simulations are run for all renter households and for subgroups of low-income, African-American, and Hispanic households. Results confirm that liquid financial assets are statistically significant predictors of homeownership. Although the importance of wealth in predicting homeownership is in keeping with the findings of previous research, a somewhat surprising finding is that the largest impact on the probability of homeownership is associated with savings of between $0 and $1,000; although savings of between $1,000 and $5,000 have a lower marginal impact on this probability, savings of between $5,000 and $20,000 add only slightly to the likelihood of buying, and savings above $20,000 have no statistically significant impact. These results suggest that downpayment assistance programs that provide even modest amounts of assistance can have a significant impact on the number of low-income and minority households that buy homes.

Introduction

Research has consistently found that a lack of wealth is among the most important factors limiting households from becoming homeowners (Barakova et al., 2003; Linneman and Wachter, 1989; Listokin et al., 2002; Quercia, McCarthy, and Wachter, 2003). Wealth is needed both to meet mortgage requirements for a downpayment and to pay for closing costs. These referenced studies have found that a lack of wealth is more important in limiting homeownership than either having low income relative to area house prices or poor credit. In recognition of the importance of the wealth constraint in limiting homeownership, the American Dream Downpayment Act was enacted in 2003 to provide downpayment assistance of up to $10,000 through the HOME Investments Partnerships Program to up to 40,000 households a year.

The purpose of this study is to investigate the potential for downpayment assistance efforts, such as that provided through the American Dream Downpayment Act, to increase homeownership, both overall and among the low-income and minority households that are of special concern to policymakers. This study will add to existing research in several ways.

First, much has changed in the mortgage market since the early 1990s, when policymakers at all levels of government began focusing on the goal of increasing homeownership among low-income and minority households. Both in response to pressure from the federal government and out of recognition of the market potential of low-income households, mortgage lenders began offering products that loosened traditional underwriting guidelines to expand the pool of households that could qualify for a mortgage. In particular, significant growth has occurred in the number of mortgage products available that require downpayment levels of 5 percent or less of the mortgage balance. Many of the studies cited previously relied on data from 1995 or earlier and so may not reflect changes in the importance of the wealth constraint due to changes in the mortgage market. This study makes use of panel data covering a period from 1997 through 2000, a period when many of these low-downpayment products were becoming more widely available.

Second, most existing research has analyzed the tenure choice of a cross-section of households at a point in time and associated the level of wealth at that point in time with the probability of being a homeowner. Several studies, however, have found that household wealth can change rapidly in anticipation of a move to homeownership, either due to increased savings or from gifts (Engelhardt and Mayer, 1998; Haurin, Hendershott, and Wachter, 1996). In addition, examination of panel study data has previously found that some households are able to purchase homes that would have appeared to be out of reach financially (Listokin et al., 2002). Studies that examine a cross-section of households may not adequately capture this dynamic nature of household wealth and movements to homeownership in general. By using a panel of renter households over time, this study is able to track changes in wealth and relate these changes to the likelihood of becoming a homeowner.

Finally, existing studies have examined the potential impact of changes in downpayment requirements on the propensity to own. In contrast, the approach used in this study is intended to model the effects of a downpayment assistance program by simulating the impact of cash grants on a household's propensity to own. This approach will shed more light on the potential for downpayment assistance of different amounts to stimulate homeownership.

The next section presents a brief review of the literature on this topic. The third section describes the data used in this study and presents the methodology for modeling the transition to homeownership. The fourth section presents the modeling results and the fifth section uses these results to simulate the impact of downpayment assistance programs on the propensity of households to become homeowners. The article concludes with a summary of findings and policy implications from the research.

Literature Review

Over the past 15 years, a series of articles has evaluated the relative importance of various barriers to homeownership and the potential increases in homeownership that might result from relaxing these constraints. Among the earliest of these studies are Linneman and Wachter (1989) and Zorn (1989). Using the 1977 Survey of Consumer Credit and the 1983 Survey of Consumer Finances (SCF), Linneman and Wachter (1989) first estimated a desired house value for each household based on the choices of homeowners deemed to be unconstrained by financial considerations.[1] Next, they calculated the house value that each household could afford to purchase by applying traditional underwriting criteria to the household's income and wealth. Specifically, they assumed that housing payments could not exceed 28 percent of income and that sufficient wealth should be available to support a downpayment of 20 percent of the house value. The desired house value was then compared with the house values that were feasible, given the household income level and, separately, its wealth level. If the ideal house value was more than 10 percent above the value supported by income or wealth, the household was deemed to be highly income constrained and/or wealth constrained. If the ideal house value exceeded the affordable house value by less than 10 percent, the household was considered moderately income and/or wealth constrained. Dummy variables corresponding to the degree of income and wealth constraints were then incorporated into a logit model of tenure choice for recent movers (those who moved within 3 years of the survey date). The study then examined the impact of these financial constraint measures on the probability of homeownership. The findings indicate that income and wealth constraints are important determinants of homeownership, with binding constraints greatly lowering the overall probability of homeownership.

Zorn's (1989) approach is similar, although, rather than estimating separate income and wealth constraints, he used a single measure of the difference between the desired house value and the value derived from the more binding of the two constraints. Based on analysis of a sample of households from 1986, Zorn's (1989) findings are consistent with those of Linneman and Wachter (1989): moving to homeownership is less likely when financial constraints are binding.

Using data from the National Longitudinal Survey of Youth (NLSY), conducted from 1985 through 1990, Haurin, Hendershott, and Wachter (1997) employed a similar methodology as Linneman and Wachter (1989) but improved on their specification in a number of ways, including creating instrumental variables for wealth and allowing for households to choose a loan-to-value ratio higher than 80 percent to avoid this constraint if their income would support larger mortgage payments. Similar to Zorn (1989), however, Haurin, Hendershott, and Wachter (1997) combined income and wealth constraints into a single variable measuring the financial constraint imposed by standard underwriting guidelines, so the results do not shed light on the relative importance

of income and wealth constraints. Their results are also highly consistent with the findings from Linneman and Wachter (1989): these financial constraints are important factors in predicting the probability of homeownership.

Although these studies made an important contribution to the literature by examining the role of financial constraints on tenure choice, none of these studies examined the magnitude of the impact of these constraints on homeownership rates. Several recent studies, however, have adapted this general approach to examine how a reduction in financial and other constraints might contribute to homeownership levels. Using the 1995 American Housing Survey (AHS), Quercia, McCarthy, and Wachter (2003) employed Linneman and Wachter's (1989) approach to identify households that are wealth or income constrained and then incorporate these measures into a general tenure choice model. As in Linneman and Wachter (1989), dummy variables were used to identify households facing income or wealth constraints, assuming a loan requiring a 20-percent downpayment and a 28-percent front-end ratio at then-current market interest rates of 8 percent. These variables were then included in a logit model that predicted the probability of homeownership based on household characteristics (age, race/ethnicity, gender, and marital status) and the relative costs of owning and renting in each household's market area. A principal goal of this analysis was to examine the impact of loosening the constraints on the probability of homeownership for key subgroups of the population. The impact of loosened underwriting criteria was simulated by applying the estimated coefficients of the logit model to household characteristics and by varying the value of the dummy variables for the income and wealth constraints to reflect different underwriting assumptions regarding the maximum percentage of income that is needed for housing costs, the size of the downpayment required as a percentage of the house value, and the mortgage interest rate.

Quercia, McCarthy, and Wachter (2003) presented results for all households and for African-American households, low- and moderate-income households, central-city households, and young households (ages 24 to 29). They examined the potential impact of hypothetical mortgage products with varying loan-to-value ratios, front-end ratios, and mortgage interest rates. They found that the largest impacts on predicted homeownership rates were from reductions in the amount of downpayment required. Specifically, they found that relaxing downpayment requirements to between 3 and 5 percent of the house value is associated with a rise in homeownership rates of between 3 and 6 percentage points across the subgroups examined. The largest impact is associated with a loan product allowing for 0 percent down—essentially eliminating the downpayment constraint. Under this scenario, homeownership rates are estimated to rise by between 7 and 9 percentage points. Quercia, McCarthy, and Wachter (2003) also estimated that the increase in homeownership rates from loosening underwriting requirements would generally be larger for African-American households, low- and moderate-income households, and young households, compared with all households.

One limitation of using the AHS for the purpose of evaluating the impact of wealth constraints on homeownership is that the AHS does not include very good information on household wealth. As a result, Quercia, McCarthy, and Wachter (2003) were forced to construct wealth estimates based by basing them on estimates of housing equity and by applying a capitalization rate to income from sources other than wages. One concern of this approach is that homeowners will accumulate

wealth in the form of housing equity. In this regard, Barakova et al. (2003) improved on the analysis by Quercia, McCarthy, and Wachter (2003) by using the SCF, which includes detailed information on household assets and liabilities. These authors further improved on previous research by including estimates of credit constraints in addition to income and wealth constraints.

Barakova et al. (2003) analyzed the tenure choice of recent movers between the ages of 21 and 50. Reflecting more recent underwriting standards, households are deemed to be wealth constrained if they cannot afford to fund a 10-percent downpayment for their ideal house value and are deemed to be income constrained if 38 percent of their income is not sufficient to meet the costs of a mortgage for 90 percent of the ideal house value. Using data from the 1989, 1995, and 1998 SCFs, the researchers were also able to simulate a credit score for each household, using a model estimated on proprietary credit scores from a national consumer credit reporting agency. Credit-constrained households are those estimated to have a credit score of 620 or lower. The researchers found that income constraints were only marginally important during the period studied while wealth and credit constraints were consistently significant factors in limiting homeownership. This study found that wealth constraint was much more important than credit constraint in limiting homeownership. In 1989, twice as many recent mover households were predicted to own if the wealth constraint were removed; 60 percent of recent movers were predicted to own in the absence of wealth constraints compared with 30 percent of recent movers predicted by the baseline model where households were allowed to be wealth constrained. In comparison, removing the credit constraint increased the baseline homeownership rate by only 2 percentage points; however, over time, the impact of the wealth constraint was found to decline. By 1998, removing the wealth constraint was found to increase the homeownership rate among movers by only 19 percentage points compared with 30 percentage points in 1989. The 1998 impact of the credit constraint was about the same as it was in 1989; removal of this constraint was associated with an increase of 3 percentage points in the predicted homeownership rate.[2]

In short, the literature has consistently found that wealth constraint is a significant factor in limiting homeownership. Recent analysis by Barakova et al. (2003) suggests that wealth constraints may have eased between the late 1980s and the late 1990s, perhaps due to the availability of more generous underwriting from affordable mortgage products. At the same time, however, the researchers also found that, despite this improvement, wealth constraints remain the most important financial constraint on homeownership.

Several observations explain why the existing literature does not shed much light on the issue of how effective it would be in fostering homeownership if different levels of downpayment assistance were available. First of all, almost all the work in this area employs the methodology developed by Linneman and Wachter (1989) that identifies households without sufficient current wealth to meet mortgage underwriting requirements. Although this approach may be appropriate for evaluating the impact of loosening underwriting guidelines on homeownership propensities, it is not appropriate for evaluating the potential impact of cash grants of different amounts as generally provided by downpayment assistance programs, because these cash grants may also ease constraints due to outstanding debts or a lack of cash for closing costs.

Another shortcoming of most existing literature is that these studies in general rely on a cross-sectional analysis of the tenure choice of households at a particular point in time, including

both owner and renter households.[3] There is reason to believe that this approach could overstate the importance of wealth in achieving homeownership. Almost by definition, a large majority of homeowners will have some amount of wealth, both because these households have managed to meet underwriting guidelines for a downpayment and cash reserves and because nominal appreciation in house values will add to their wealth over time. Given the correlation between wealth and homeownership, these models may overstate the amount of wealth that is a prerequisite for achieving homeownership. In fact, a variety of research has found that renters can accumulate wealth rapidly through savings efforts or from gifts. In an analysis of renters tracked by the NLSY over a 6-year period, from 1985 to 1990, Haurin, Hendershott, and Wachter (1996) found that the level of savings among renter households rises rapidly in the year before home purchase. In addition, using survey data collected by the Chicago Title and Trust Company, Mayer and Engelhardt (1996) examined the source of funds used for downpayments and found that, from 1988 through 1993, about one in five first-time buyers received gifts to help fund home purchase; on average, the gifts accounted for about half the downpayments. Listokin et al. (2002) also found that among renters in the 1993 Survey of Income and Program Participation (SIPP) panel who purchased homes by the end of the panel in 1995, 93 percent purchased homes that had values that exceeded the amount that appeared to be affordable to those households in 1993. Furthermore, a large majority of these households purchased housing that was valued at least 50 percent higher than the estimate of what they could afford. In short, there is good reason to believe that the wealth constraint may not be as binding on renters as a cross-sectional assessment of tenure choice would make it appear.

This study is intended to improve on existing research in several ways. First, it will evaluate the potential of downpayment assistance programs to stimulate homeownership by measuring the impact of cash grants on the propensity to own. Second, it will avoid the endogeneity of wealth and homeownership by focusing exclusively on a sample of renter households. Finally, by tracking renter households over time, it will capture the ability of households to accumulate savings, reduce expenses, and/or increase income to achieve homeownership, dynamic aspects of the tenure transition process that are not captured by cross-sectional analysis.

Data and Methodology

Data Source

The 1996 panel of the SIPP is the source of data used for this study.[4] The SIPP is a nationally representative, longitudinal survey of households that gathers detailed information about their income and wealth and about other household characteristics. The longitudinal nature of the SIPP provides researchers with an opportunity to observe dynamic aspects of household circumstances over several years. The 1996 panel tracked a sample of some 37,000 households over a 4-year period between December 1995 and February 2000. As with earlier SIPP panels, the 1996 panel oversampled the low-income population to ensure a large sample of households that are eligible for government assistance.

Each household is surveyed every 4 months (or three times a year) over the life of the panel, with each interview referred to as a "wave" of the survey. The 1996 SIPP panel includes 12 waves. In

each wave, a core set of information concerning household composition, labor force participation, income, and participation in government programs is collected. Each wave also includes a topical module that asks detailed questions about a rotating set of topics, such as marital history, education and training, childcare needs, disabilities, medical expenses, use of health care, and so on. Of particular interest for this study, the 1996 SIPP included detailed questions about household assets and liabilities once each year—during the 3rd, 6th, 9th, and 12th waves.

The 1996 SIPP is particularly well suited for investigating the potential for downpayment assistance to increase homeownership. First, by tracking a panel of households over time, it captures the dynamic nature of household financial circumstances that is an important part of the process of making the transition from renting to owning. Second, the time period covered is also of interest because the late 1990s was a time when more liberal mortgage products were becoming more widely available. Third, it provides detailed information on household assets and liabilities on an annual basis. Finally, it has a sufficiently large sample size to provide reliable estimates of the experience of low-income and minority renter households.

Questions about the accuracy of the SIPP's estimates of wealth, however, are important to note. A recent review by Czajka, Jacobson, and Cody (2004) has shown that the SIPP provides consistently lower estimates of wealth than do either the SCF or the Panel Study of Income Dynamics (PSID), two other national surveys that gather detailed information on household wealth. Specifically, the researchers found that the SIPP's estimate of median net wealth is only two-thirds of the median derived from the SCF and 74 percent of the PSID median; however, they attributed most (72 percent) of the underreporting of wealth in the SIPP to underestimates of the assets of wealthy households. Of the remaining portion of underreporting, they attributed 13 percent to assets not captured by the SIPP, including pension plans other than 401(k) and thrift accounts; the cash value of life insurance, annuities, and trusts; and vehicles owned beyond the three captured by the SIPP. Again, much of this missing wealth is concentrated among the wealthy. Business equity, however, is also underreported among the nonwealthy, which accounts for 5 percent of the lower wealth estimates in the SIPP. Other than the underreporting of business equity, underreporting of other assets by the nonwealthy accounts for 10 percent of the shortfall in wealth captured by the SIPP. Perhaps more importantly, Czajka, Jacobson, and Cody (2004) reported that SIPP families underreport the ownership of checking and savings accounts and individual retirement accounts (IRAs) and Keogh accounts.

Nonetheless, Czajka, Jacobson, and Cody (2004) noted that the SIPP provides much larger sample sizes than the apparently more reliable SCF for low-income households. For this population, when the assets not captured by the SIPP are excluded from the SCF estimates, the two surveys provide fairly comparable estimates of wealth. Thus, although concerns arise about underreporting of wealth in the SIPP, these concerns are less important for the low-income population, which is the focus of this study, than they are for the wealthy.

The sample used for this study consists of all renter households from the 3rd wave of the 1996 SIPP. This wave is the first one for which information on assets and liabilities was collected. The heads of these households are then tracked through the final wave to observe changes in their tenure status and financial circumstances.[5] Thus, the tenure choices of renter households from wave 3 are observed for up to 9 periods, corresponding to waves 4 through 12. The time period

covered by these waves is November 1996 through February 2000. Exhibit 1 provides information on this sample. The initial sample consists of 11,357 renter households. The sample includes fairly large numbers of low-income and minority households.[6] Of the renter sample, 8,438 are low income, 2,065 are African American, and 1,493 are Hispanic.[7] Exhibit 1 also shows the transition rates to homeownership of the overall sample and key subgroups. Of the total sample of 11,357 renters, 2,062, or 18.2 percent, become homeowners by wave 12. The key subgroups of interest for this study have a lower rate of transition, with 13.7 percent of low-income households, 10.5 percent of African-American households, and 13.6 percent of Hispanic households becoming owners over the period.

Finally, exhibit 1 also shows the rate of censoring over the period from wave 3 through wave 12. A household is considered censored if it is dropped from the survey before wave 12 and before it is observed to have become a homeowner. A fairly high rate of censoring occurs among the sample, with 27 percent of the initial sample of renter households becoming censored before wave 12. The censoring rates are slightly higher for the subgroups of interest, with 28.8 percent of low-income households, 31.7 percent of African-American households, and 30.9 percent of Hispanic households becoming censored.

Exhibit 1

Sample Sizes, Tenure Transition, and Censoring

	Wave 3 Renter Household	Households Becoming Homeowners by Wave 12	Share Becoming Homeowners (%)	Households Censored[a] by Wave 12	Share Censored (%)
All households	11,357	2,062	18.2	3,089	27.2
Household income[b]					
Low	8,438	1,160	13.7	2,432	28.8
Low-moderate	1,088	275	25.3	267	24.5
Upper-moderate	650	216	33.2	139	21.4
High	1,181	411	34.8	251	21.3
Race/ethnicity[c]					
White	7,268	1,550	21.3	1,817	25.0
African American	2,065	216	10.5	654	31.7
Hispanic	1,493	203	13.6	461	30.9
Other	531	93	17.5	157	29.6

[a] *"Censored" households are those that are dropped from the survey before wave 12 and before a transition to homeownership was observed.*

[b] *Income categories are defined as follows: Low is less than 80 percent of area median income; Low Moderate is between 80 and 100 percent of area median income; Upper Moderate is between 100 and 120 percent of area median income; and High is above 120 percent of area median income.*

[c] *The categories White, African American, and Other exclude households of Hispanic origin, while Hispanics may be of any race.*

Source: Authors' tabulations of 1996 SIPP panel, waves 3 through 12

Methodology

The analysis has two stages. In the first stage, a parametric proportional hazard model is estimated of the transition to homeownership.[8] In the second stage, the results of the hazard model are used to simulate the impact of cash grants to households on the probability of becoming a homeowner over time.

In modeling the transition to homeownership, we have assumed that the baseline risk of becoming a homeowner can be described by a Weibull distribution.[9] Using maximum likelihood techniques, the following equation is estimated as follows:

$$h(t \mid x_{jt}) = pt^{p-1} \exp(B_0 + x_{jt}\beta_x)$$

where $h(t|x_{jt})$ is the hazard that subject j will become a homeowner at time t given subject j's characteristics at time t described by the vector x. The baseline hazard is given by pt^{p-1}, with the parameter p indicating the shape of the distribution. This baseline hazard is shifted for each subject by the term $x_{jt}\beta_x$, with β_x being the vector of coefficients corresponding to the independent variables x. The hazard is the instantaneous rate of failure, with failure in this case defined as a change in housing tenure from renting to homeownership. The hazard indicates the number of failures that would be expected in a given interval of time, conditional on the subject having not failed before the beginning of that interval, divided by the width of the interval. The hazard rate can range from 0 to infinity.

In our analysis of the SIPP data, the period used is the time interval between interviews. This interval is generally a period of 4 months, although in some cases the interval is as short as 2 months or as long as 9 months.[10] The data are organized so that a household's characteristics at the beginning of an interval are used to predict the probability of becoming a homeowner by the end of the period. Thus, wave 3 household characteristics are used to predict the probability of that household becoming a homeowner by the time of the wave 4 interview, wave 4 characteristics are used to predict tenure in wave 5, and so on. As a result, although tenure status in wave 12 is used, household characteristics as of wave 12 are never used as explanatory variables. In the estimated model, time is measured as the period in months from the wave 3 interviews to capture the fact that the sampled households are at risk of becoming homeowners in our analysis from the time we begin tracking them. The analysis is designed to estimate the time until each renter household becomes a homeowner. Once homeownership is achieved, the household is dropped from the data set.[11]

The impact of downpayment assistance on the propensity to purchase a home is simulated by increasing the amount of liquid financial assets held by each household in the sample by the amount of the hypothesized downpayment assistance. The estimated model is then used to predict the probability of moving to homeownership given this higher level of liquid financial assets. The impact of the downpayment assistance is given by the difference between the predicted average cumulative homeownership attainment rate with and without the downpayment assistance. The simulations are run for all renter households and for subgroups of low-income, African-American, and Hispanic households.

Explanatory Variables

The explanatory variables used in the model are intended to capture the household demographic characteristics, income, wealth, and market conditions associated with the desire and ability to purchase a home. Exhibit 2 presents summary statistics for the independent variables.

Exhibit 2

Summary Statistics

Independent Variables	Mean	Median	Standard Deviation	Minimum	Maximum
Demographic Variable					
Race/Ethnicity:					
White	0.63	1.00	0.48	0	1
African American	0.19	0.00	0.39	0	1
Hispanic	0.13	0.00	0.34	0	1
Other	0.05	0.00	0.21	0	1
Age	44.4	40.0	17.3	15	87
Marital Status:					
Married	0.33	0.00	0.47	0	1
Divorced	0.39	0.00	0.49	0	1
Single	0.29	0.00	0.45	0	1
Presence of Children	0.41	0.00	0.49	0	1
Education Level:					
Less Than High School	0.26	0.00	0.44	0	1
High School	0.29	0.00	0.45	0	1
Some College	0.27	0.00	0.45	0	1
College	0.18	0.00	0.39	0	1
Economic Variable					
Household Income (000s)	30.3	23.0	30.1	– 23.7	795.9
Log of Household Income	9.8	10.0	1.6	0.0	13.6
Interest Rate (Percent)	7.40	7.46	0.33	6.86	7.94
Interest Rate Change	– 0.02	– 0.05	0.26	– 1.03	1.11
Area Median House Value (000s)	121.0	109.9	42.2	47.7	329.5
Area Annual House Price Appreciation	0.04	0.04	0.03	– 0.09	0.15
Area Ratio of Gross Rent to Owner Costs	0.54	0.54	0.05	0.44	0.71
Area Ratio of Gross Rent to Median House Value	0.09	0.09	0.02	0.04	0.17
Financial Asset Variable					
Liquid Financial Assets	14,590	232	346,534	– 478,000	50,100,000
Share With Nonzero Liquid Financial Assets	0.62	1	0.49	0	1
Net Business Equity	3,146	0	53,797	– 400,000	3,700,000
Share With Nonzero Net Business Equity	0.06	0.00	0.24	0.00	1.00
Net Real Estate Equity	2,332	0	25,182	–36,000	1,860,000
Share With Nonzero Net Real Estate Equity	0.03	0.00	0.18	0.00	1.00
Net Vehicle Equity	3,113	1,000	5,429	–33,930	63,900
Share With Nonzero Net Vehicle Equity	0.71	1.00	0.18	0.00	1.00
Unsecured Debt	4,417	0	17,831	0	1,212,100
Share With Nonzero unsecured debt	1.00	1.00	0.02	0.00	1.00

Source: Authors' tabulations of 1996 SIPP panel, waves 3 through 11

The specific variables included and their expected associations with the probability of becoming a homeowner are discussed in turn in the following paragraphs.

Demographic Characteristics

Race/Ethnicity. The race/ethnicity of the household head is included in the model to account for racial/ethnic differences in the propensity to become a homeowner. The SIPP includes four categories of race (White; African American; American Indian, Aleut, or Eskimo; and Asian or Pacific Islander) and more than 30 country of origin categories. Combining these two SIPP variables, we created indicator variables for the mutually exclusive groups of White, African American, Hispanic, and Other (which includes the categories American Indian, Aleut or Eskimo and Asian or Pacific Islander).[12] Household heads that indicated an origin of Mexican, Mexican-American, Chicano, Puerto Rican, Cuban, Central American, South American, Dominican Republican, or Other Hispanic are categorized as "Hispanic," regardless of the racial category indicated. Extensive literature has found that African Americans and Hispanics are less likely than Whites, all else being equal, to become homeowners (Herbert et al., 2005). As a result, it is expected that these households will have a lower probability of becoming homeowners.

Age. The age of the household head in years is included as an explanatory variable to capture the strong association between age and the likelihood of becoming a homeowner. Homeownership rates rise rapidly as household heads age through their 20s and into their 30s. Homeownership rates continue to rise, although at a slower rate, well into old age before declining slightly. Reflecting this general tendency, we would expect a positive coefficient on the age variable initially to reflect the growing rate of transition into homeownership, followed by a negative coefficient as the probability of moving into homeownership declines for older households. We attempted specifications with age and its square to capture this nonlinear relationship but found that in these specifications age squared was significant but age was not. As a result, we thought that a model including age without its square was more appropriate.

Marital Status. Homeownership rates are generally highest for married households. Mutually exclusive indicator variables are created to identify households that are headed by married couples (used as the reference group in the estimated model); previously married people (that is, divorced, separated, or widowed); and single people. The expectation is that those who are married will have a higher likelihood of making the transition to homeownership compared with those who are single or divorced.

Presence of Children. Households with children tend to have higher homeownership rates than those without children, perhaps reflecting greater demand for housing services or greater desire for residential stability. To capture this effect, an indicator variable is included to identify households with children under age 18. This variable is expected to be positively associated with the probability of becoming a homeowner.

Education Level. Dummy variables are also used to measure the highest education level attained by the household head. A more detailed SIPP education variable is collapsed into four categories: less than a high school graduate, a high school graduate, some college, and a college graduate or more (which is used as the reference category in the estimated model). Households with heads

who have higher levels of education are expected to have higher long-run income and asset levels and, therefore, a higher likelihood of becoming homeowners.

Household Income

Household income has a strong association with the likelihood of becoming a homeowner. The income measure used is the total household annual income for the current wave, which includes earned income, property income, means-tested cash transfers, and "other" household income. The total household income for each wave is multiplied by 3 to estimate the annual income for that household as of that wave. Because the impact of higher levels of income on the probability of homeownership would be expected to diminish at higher levels of income, income is measured as the log of income.[13]

Financial Assets and Liabilities

Waves 3, 6, and 9 of the SIPP topical modules include a series of detailed questions on household financial assets and liabilities.[14] One shortcoming of the SIPP for estimating the impact of household financial net wealth on the probability of becoming a homeowner is that the information on financial assets and liabilities is collected only once a year while all other information on the household is available every 4 months. One option for addressing this shortcoming would be to estimate a hazard model based solely on these once-a-year observations on the sampled households. This approach, however, would not take advantage of the additional information on changes in household and market circumstances and tenure choice that is available from the two intervening waves of sample data from each year. Another option would be to include all waves in the model but employ some assumption about the level of financial assets and liabilities in the waves for which this information is not collected. One approach considered was to interpolate values for these variables between the 3rd, 6th, and 9th waves. Due to censoring, however, we do not always observe households in these subsequent waves, so this approach could not be consistently applied to all households. In the end, to preserve as much information on the timing of tenure transitions as possible, we chose to include all waves in the model with the value of the financial asset variables taken from the most recent wave available.[15] Thus, wave 3 wealth measures are also used in waves 4 and 5, wave 6 wealth measures are also used in waves 7 and 8, and wave 9 wealth measures are also used in waves 10 and 11.[16]

To evaluate whether the impact of financial assets may vary by type of asset, separate measures were created for liquid financial assets, which are most commonly tapped to purchase a home, and other asset classes. Each of the asset classes and the measures used to capture them are discussed, in turn, in the following paragraphs.

Liquid Financial Assets. The components of the liquid financial assets variable include the following:

- Equity owned in other financial investments.
- The face value of U.S. savings bonds.
- The amount in a joint, noninterest-earning checking account.
- The amount in an individual, noninterest-earning checking account.

- Interest-earning assets held in banking institutions.
- Interest-earning assets held at other institutions.
- Equity in stocks and mutual fund shares.
- Equity in IRAs and Keogh accounts.[17]

These liquid financial assets are expected to be the primary source of wealth used to fund home purchase. Although the financial asset variable itself is continuous, splines are used to account for the possibility that different ranges of financial assets may have different effects on the probability of home purchase.[18] The knots used for the splines are at $1, $1,000, $5,000, and $20,000; this approach means that slope coefficients are estimated separately for the ranges of liquid financial assets of less than $1, from $1 to $999, from $1,000 to $4,999, from $5,000 to $19,999, and $20,000 or greater.[19] Our expectation is that lower levels of wealth will have a greater impact on the probability of buying a home, with less marginal impact from the highest wealth categories.

Vehicle Wealth. Vehicle wealth is the total value of all vehicles owned minus the debt on these vehicles. Because it seems unlikely that households would tap vehicle wealth (at least that of primary vehicles) to purchase a home, this subcategory of wealth was separated from financial assets. Various forms of this variable were tried, including a continuous variable and splines; however, these approaches produced generally insignificant coefficients. In the final specification, a series of categorical dummy variables were used to indicate households with negative vehicle wealth, $0 of vehicle wealth, low levels of vehicle wealth (less than $20,000), and high levels of vehicle wealth ($20,000 or more). Although lower levels of vehicle wealth are not expected to be used for homeownership, given the household's need for transportation, it would be expected that higher levels of vehicle wealth would have a positive association with the transition to homeownership because this excess wealth could be channeled into buying a home while leaving sufficient wealth for vehicle ownership.

Real Estate Wealth. The SIPP also collects information on the value of real estate owned by other than primary residences and the debts associated with these properties. The SIPP asks separate questions about owner-occupied properties, but, because our sample includes only renter households, no owner-occupied properties are present. Ownership of real estate would be expected to be positively associated with the transition to homeownership, both because of the potential ability to tap this wealth to finance a home purchase and because the household has been shown to be willing to take on the risk associated with investments in real property. This form of wealth, however, may be fairly illiquid and so may be less likely to be tapped to purchase a home. We tried various specifications to capture the impact of real estate wealth on the probability of becoming a homeowner, including a continuous variable, splines, and categorical dummy variables. Most of these specifications were insignificant, perhaps due to the relative rare occurrence (3 percent) of the ownership of real estate. A dummy variable indicating the presence of positive other real estate wealth is included in the model.

Business Equity. Business wealth, like real estate wealth, may provide a source of funds for purchasing a home, but the illiquid nature of these funds may also mean they are less likely to be used to fund a home purchase. In addition, households owning a business may choose to invest available funds in the business rather than in home purchase. As with the ownership of other real

estate, very few households in the sample had business equity. Variations of business equity measures were tried in the model, including a continuous variable with splines and dummy variables indicating the presence of positive or negative business wealth; but, because none of the coefficients of alternative specifications proved statistically significant, they were dropped from the final model.

Unsecured Debt. The final category of assets and liabilities included in the model is unsecured debt. Unsecured debt includes debts on credit cards, debts for medical expenses, personal loan debts, and student loan debts. It would be expected that higher levels of unsecured debt would lower the likelihood of purchasing a home by making it more difficult for the household to meet mortgage underwriting requirements concerning debt-to-income ratios; however, it is also likely that those who purchase homes will have some amount of unsecured debt. Unsecured debt is included in the model in spline form, with knots at $2,000, $5,000, and $10,000.

Market Characteristics

Mortgage Interest Rate. Interest rates for the relevant time period are taken from the Monthly Interest Rate Survey conducted by the Federal Housing Finance Board.[20] The effective interest rate (including points and fees) for a 30-year, fixed-rate mortgage was used to measure fluctuations in interest rates over time. At the beginning of the 4-year period of this SIPP panel, the effective interest rate was 7.8 percent, having fluctuated between 7.2 and 8.2 percent over the previous 2 years. The rate then dropped fairly steadily through late 1998 to about 6.8 percent before rising again fairly steadily to about 8 percent by the beginning of 2000. In short, the study period was one of relatively favorable interest rates. It is expected that lower interest rates would make homeownership more affordable, so a negative association between interest rate levels and the probability of becoming a homeowner. Another possibility is that the move to homeownership may be more closely related with short-run fluctuations in interest rates than in the level of interest rates. That is, households may time their home purchase to take advantage of short-run declines in interest rates, even if the overall level of interest rates is higher than in previous years. Again, declines in interest rates would be expected to be associated with higher rates of homeownership, so the coefficient on this variable should be negative.

To test these different potential impacts of interest rates, three alternative measures were included in the estimated model: (1) the interest rate level at the beginning of the period of observation, (2) the interest rate at the end of the period, and (3) the change in the interest rate during the period. In survival modeling, explanatory variables are generally measured as of the beginning of the period of observation while the outcome is measured as of the end of the period of observation. For example, if the household is observed first in January of a given year and then again 4 months later in May, the household and market characteristics in January would be used to predict the outcome observed in May. Because interest rates do not remain stable during the 4-month period, however, and because fluctuations in interest rates are hypothesized to be an important factor in the specific timing of a home purchase decision, we experimented with different measures of interest rates to capture the hypothesized role of changing interest rates on the timing of the purchase decision. The interest rate levels from both the beginning and end of the period were found to have a positive association with the transition to homeownership—a result that was not consistent with our expectation—while the change in interest rate had the expected negative association. As a result, the interest rate change was used in the final versions of the model.

Median House Value. The ability of households to afford to purchase a home varies with the level of housing prices across markets. Higher house prices would be expected to lower the propensity to purchase a home. To capture this factor, the median house value in the market area where the household resided was included as an explanatory variable. The median value is derived from the 2000 Decennial Census but is indexed over time using the house price index from the Office of Federal Housing Enterprise Oversight (OFHEO).[21] The SIPP identifies the specific metropolitan area where the household resides for some 98 metropolitan areas and the state of residence. In cases in which the metropolitan area is identified, we use data for this area. In other cases, we use estimates of the median house value for the state.[22]

Annual House Price Appreciation Rate. The decision to purchase a home may be related to trends in house price appreciation. In general, it would be expected that higher levels of appreciation would provide a greater incentive to purchase a home because the rate of return on the investment is high. In addition, renters may be motivated to purchase sooner than they might otherwise be because of concern that it may become more difficult to buy if prices continue to rise. On the other hand, rapidly rising home prices may also make it more difficult for renters to purchase a home. In short, the impact of rising home prices on the propensity to purchase is indeterminate. If the coefficient is positive, it indicates that the increased return on homeownership is motivating individuals to purchase sooner. If the coefficient is negative, it indicates that rising home prices are making attainment of homeownership more difficult for renters. Under the assumption that households derive assumptions about future house price appreciation from recent trends, we measure house price appreciation as the percentage of change in the OFHEO house price index for the relevant market area over the year prior to the interview date.

Ratio of Renter and Owner Costs. A common factor included in tenure choice models is some relative measure of the costs of renting and owning. A higher cost of renting relative to owning would be expected to increase the propensity to own. Two approaches were explored to capture the relative costs of renting and owning, both using data from the 2000 Decennial Census. The first measure was the ratio of median gross rent on an annual basis to the median house value. The second measure was the ratio of median monthly gross rent to the median monthly owner-occupied housing cost. This latter measure has the advantage of factoring in differences in property tax and insurance rates across markets but has the drawback of having owner costs determined, in part, by the average amount of equity owners have in their homes and variations in interest rates over time. In practice, we found that the ratio of gross monthly rent to the median house value was generally insignificant, in part, due to a strong correlation with the median house value, which was highly significant. As a result, the ratio of median rent to median owner cost was used in the final model.

Modeling Results

Exhibit 3 presents modeling results. Overall, the model fits the data well as indicated by the chi-square statistic for the likelihood ratio. The Weibull distribution shape parameter p is 1.37 and highly significant. A p value slightly above 1 indicates that the baseline risk of becoming a homeowner rises gradually over time. Given the importance to this study of the subgroups consisting of African Americans, Hispanics, and low-income households, stratified models were also estimated that allowed the baseline hazard to vary across these groups. These tests found that

Exhibit 3

Modeling Results

Independent Variables	Hazard Ratio	Coefficient	Standard Error	Z Score
Demographic Variable				
Race/Ethnicity:				
African American	0.7436	– 0.2190	0.056	– 3.91
Hispanic	0.8542	– 0.1331	0.067	– 1.98
Age	0.9785	– 0.0212	0.002	– 11.11
Marital Status				
Divorced	0.7498	– 0.2135	0.044	– 4.89
Single	0.4230	– 0.3637	0.029	– 12.72
Presence of Children	1.1115	0.1215	0.057	2.12
Education Level:				
Less Than High School	0.8009	– 0.1718	0.072	– 2.40
High School	0.9513	– 0.0398	0.063	– 0.63
Some College	0.9211	– 0.0722	0.057	– 1.26
Economic Variable				
Log of Household Income	1.3475	0.3989	0.048	8.31
Interest Rate Difference	0.6950	– 0.2535	0.060	– 4.24
Median House Price	0.9970	– 0.0031	0.001	– 4.24
House Price Appreciation	0.0025	– 0.0155	0.003	– 5.40
Ratio of Renter to Owner Costs	11.2656	27.0370	6.627	4.08
Financial Assets Variable				
Liquid Financial Assets $0 or Less	1.0451	0.0453	0.076	0.60
Liquid Financial Assets $1 to $999	1.4054	0.4682	0.110	4.25
Liquid Financial Assets $1,000 or $4,999	1.0495	0.0513	0.025	2.04
Liquid Financial Assets $5,000 to 19,999	1.0136	0.0138	0.006	2.19
Liquid Financial Assets $20,000 or More	0.9989	– 0.0001	0.000	– 0.71
Has Real Estate Wealth	1.4257	0.4918	0.129	3.82
Has Negative Vehicle Wealth	1.2899	0.3199	0.132	2.43
Has Vehicle Wealth $1 to $19,999	1.4625	0.5532	0.112	4.93
Has Vehicle Wealth $20,000 or more	1.8320	1.1085	0.263	4.22
Unsecured Debt $0 to 1,999	1.0908	0.5208	0.243	2.14
Unsecured Debt $2,000 to $4,999	0.9825	– 0.2605	0.543	– 0.48
Unsecured Debt $5,000 to $19,999	0.9782	– 0.2522	0.219	– 1.15
Unsecured Debt $20,000 or More	1.0000	0.0000	0.000	0.00
Weibull Shape Parameter p	1.3723	0.4336	0.029	15.04
Number of Observations	75,512			
Number of Subjects	11,352			
Log Likelihood	– 6133.0167			
Likelihood Ratio Chi Squared	1390.52			
Prob > Chi Squared	0.0000			

the baseline hazard does not vary for African Americans or low-income households but it does for Hispanic households; however, it was found that a model that allowed the baseline hazard to vary for Hispanics did a much poorer job of predicting the actual rate of homeownership among the Hispanic sample. As a result, the estimated model did not include a different baseline hazard for Hispanics.[23]

Both the estimated hazard ratio and coefficients are shown in exhibit 3. The hazard ratio is the ratio of the hazard rate with a one-unit change in the variable of interest to the hazard rate before this one-unit change. Hazard ratios of less than 1 indicate that increases in the variable lower the hazard rate, while hazard ratios greater than 1 indicate that an increase in the variable raises the hazard rate. For example, the hazard ratio of 0.7436 on the African-American dummy variable indicates that the probability that a African-American household will become a homeowner is 74.36 percent of the probability that a White household will become a homeowner, all else being equal. (In the case of a dummy variable, a one-unit change in the variable is equivalent to comparing the hazard rate for the dummy category to the base case category.) Because the sample includes multiple observations for individual households over time, a possibility of correlation across these observations exists. To allow for this possibility, robust standard errors are estimated, accounting for the correlation of outcomes across individuals.[24]

In general, the independent variables are highly significant and of the expected sign. Among the demographic characteristics, African Americans and Hispanics are found to have a lower propensity to become owners, all else being equal. Relative to households headed by married couples, both divorced and single-person households are much less likely to purchase a home. The presence of children in the household also increases the likelihood of purchasing a home. Higher levels of education are associated with a higher probability of home purchase, although the only education categorical variable that is statistically significant is for those with less than a high school education. The coefficient on the age variable is negative, indicating that as households age they become less likely to purchase a home. As discussed previously, we had expected the coefficient on age to be positive for younger age groups and negative for older age groups. Given that the baseline hazard is rising over time (as discussed previously, this trend is evidenced by the Weibull distribution shape parameter being greater than 1), the negative coefficient of age counters this effect and produces the expected initial rising and then falling hazard rate as households age. Finally, the coefficient on household income is positive and highly significant.

In terms of market characteristics, the coefficient on the interest rate change is negative, indicating that households are less likely to purchase when interest rates rise. The coefficient on the median house price is also negative, indicating that borrowers are less likely to purchase in higher priced markets. The hazard ratio for the renter-to-owner cost measure is positive, indicating that if rents are high relative to owner costs, households are more likely to purchase a home. Finally, the coefficient on the appreciation rate in home prices is negative, indicating that rising prices decrease the probability of renters purchasing a home.

The wealth measure of most interest for this study is liquid financial assets. This variable was included in the model in a series of splines designed to allow the slope to vary for different ranges of this variable. The first and last splines are not statistically significant, indicating that little association exists between the probability of becoming a homeowner and either negative liquid

wealth or levels of wealth above $20,000. The middle three splines are all statistically significant. The hazard ratio of the second spline, measuring liquid wealth between $1 and $999, is the largest in magnitude, at 1.41. Because liquid wealth is measured in thousands of dollars, this hazard ratio indicates that households with $1,000 in liquid wealth are 41 percent more likely than households with no liquid wealth to purchase a home. The hazard ratio for the next spline is also greater than 1 but, at 1.05, is much smaller. This hazard ratio indicates that for every $1,000 in liquid financial assets between $1,000 and $5,000, the probability of homeownership increases by 5 percent. Finally, the spline for liquid wealth between $5,000 and $19,999 is also positive but is just slightly larger than 1. Thus, for every $1,000 in liquid assets between $5,000 and $20,000, the probability of buying a home increases by a little more than 1 percent. The insignificance of the coefficient on wealth above $20,000 suggests that, at this level of wealth, households are generally unconstrained by wealth in choosing whether to purchase a home. As a result, additional wealth above $20,000 has no impact on this decision.

These results suggest that the biggest impact on the probability of becoming a homeowner is from having some initial positive liquid assets.[25] The impact of additional liquid assets, although still positive, is much smaller. One concern with this result, however, is that it may be that the most common reason for a household to begin accumulating savings is because it has decided to pursue homeownership. In that case, households that have decided to purchase a home would be identified by the accumulation of savings. That is, the presence of savings is a flag for a *desire* to be a homeowner as much as it is an indication of an *ability* to overcome a wealth barrier to homeownership.[26] This situation would be problematic for the purpose of simulating the impact of downpayment assistance on the probability of becoming a homeowner because the mere availability of financial assistance would not be expected to create the desire to become a homeowner. Yet, that may be what the addition of liquid assets is in part simulating. Unfortunately, we cannot distinguish these effects in our results.

None of the other classes of financial wealth were found to have as strong a relationship with homeownership as liquid financial wealth. Initial estimates, which included splines for all the other financial wealth variables, resulted in generally insignificant coefficients. As previously described, the measures of business wealth were consistently insignificant and so were dropped from the model. The magnitude of real estate wealth was also not significant, although the presence of this type of wealth (as captured by a dummy variable indicating some positive real estate wealth) was found to have a positive association with homeownership. Households with some real estate wealth were 43 percent more likely to buy than other households were, all else being equal. It may be that the ownership of other real estate indicates individuals who are willing to take on this investment risk and are familiar with real estate transactions and so are more likely to be attracted to owning their own home. Given that the level of real estate wealth was not significant, this indication of willingness to buy property appears to be more important than the amount of wealth in other properties. Similarly, the amount of wealth in vehicles was not statistically significantly associated with the probability of homeownership, but having some nonzero vehicle wealth is significant and positively associated with homeownership. The largest association is with high levels of positive vehicle wealth and the smallest with negative vehicle wealth. It may be that the presence of vehicle wealth is an indication of an ability to accrue savings as needed. Finally, unsecured liabilities are found to have a generally weak association with homeownership. The main result is that low

levels of unsecured liabilities are associated with a greater likelihood of home purchase, perhaps indicating that these households are active but reasonable users of credit and so represent good credit risks. Levels of unsecured debt above $2,000 begin to lower the probability of ownership, but the magnitude is small and the coefficients are not statistically significant.

Given the importance of the financial variables for this study and to shed some light on the role of liquid financial assets and wealth generally in the transition to homeownership, exhibit 4 presents summary information on these variables at the time of wave 3 for households that subsequently purchased a home and those that were not observed to buy. A fairly substantial difference is present in the average liquid assets as of wave 3 between buyers and nonbuyers, with buyers having 40 percent more liquid assets on average; however, the average masks the fact that a large share of both buyers and nonbuyers has limited amounts of liquid assets. The median level of liquid assets is only $928 for buyers and $160 for nonbuyers. In fact, 71 percent of buyers had less than $5,000 in liquid assets as of wave 3. The largest difference between the two groups in terms of the distribution of liquid assets is the share with no positive liquid assets, which amounts to 43 percent of nonbuyers and 23 percent of buyers. Given the generally low level of liquid financial assets among buyers and the large difference in the share with some financial assets, it is not surprising that the statistical model finds that low levels of liquid assets are the most critical factor in predicting which households will become owners.

Exhibit 4 also presents information on the average and distribution of net wealth for buyers and nonbuyers. Net wealth is a comprehensive measure of each household's financial holdings, including the value of all financial, real estate, business, and vehicle wealth less all debt. This

Exhibit 4

Comparison of Liquid Financial Assets and Net Worth of Buyers and Nonbuyers

Liquid Financial Assets	Nonbuyers	Buyers
Average	$10,884	$15,270
Median	$160	$928
Distribution of households by liquid financial assets		
$0 or less	43%	23%
$1 to $999	27%	28%
$1,000 to $4,999	13%	20%
$5,000 to $19,999	9%	15%
$20,000 and higher	8%	14%
Net Wealth	**Nonbuyers**	**Buyers**
Average	$14,500	$25,454
Median	$750	$4,104
Distribution of households by net wealth		
$0 or less	40%	30%
$1 to $999	11%	6%
$1,000 to $4,999	17%	17%
$5,000 to $19,999	20%	25%
$20,000 and higher	12%	22%

Source: Authors' tabulations of 1996 SIPP panel, wave 3

information is meant to shed light on whether there might be more substantial differences in the ownership of other assets between buyers and nonbuyers, suggesting that liquid financial assets may be too restrictive a category of wealth for predicting ownership. In general, however, the differences in net wealth between buyers and nonbuyers are similar to those observed for liquid financial assets. A somewhat larger disparity is present in net wealth between buyers and nonbuyers; the average net wealth of buyers is 75 percent higher than the average net wealth of nonbuyers. The disparity in the medians for net wealth is also larger than the disparity in the medians for liquid financial assets; the median net wealth of buyers is $4,104 and the median net wealth of nonbuyers is $750. Yet, many buyers are still found to have little or no wealth; 30 percent have zero or negative net wealth and 6 percent have net wealth of only $1 to $999. Furthermore, for many households, much of their net wealth is based on their net equity in vehicles. When vehicle net wealth is excluded from total net wealth, the median net wealth of both buyers and nonbuyers is $0. In fact, 61 percent of buyers have net wealth of less than $1,000 (excluding vehicle wealth). In short, although a greater difference is present in buyers and nonbuyers in terms of net wealth, much of this difference is due to net vehicle wealth, which seems unlikely to be a source of savings for homeownership.

As a final test of the goodness of fit of the estimated model, exhibits 5a through 5d compare the actual and estimate cumulative probability of homeownership for the entire sample of renter households and for low-income, African-American, and Hispanic households.[27] The estimated cumulative probability is the weighted average of the cumulative probability for each individual household.[28] In general, the predicted level of homeownership attainment comes fairly close to the actual share by the end of the 3-year period over which households are tracked. In all cases, however, the actual attainment of homeownership is more rapid than predicted and a decline

Exhibit 5a

Comparison of Actual and Estimated Cumulative Purchase Rates for All Renter Households

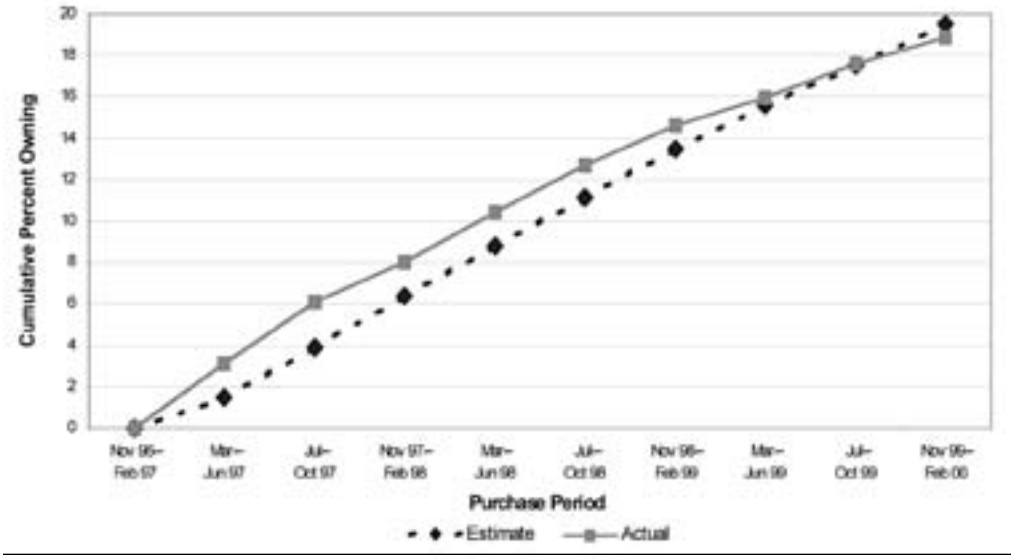


Exhibit 5b

Comparison of Actual and Estimated Cumulative Purchase Rates for Low-Income Renter Households

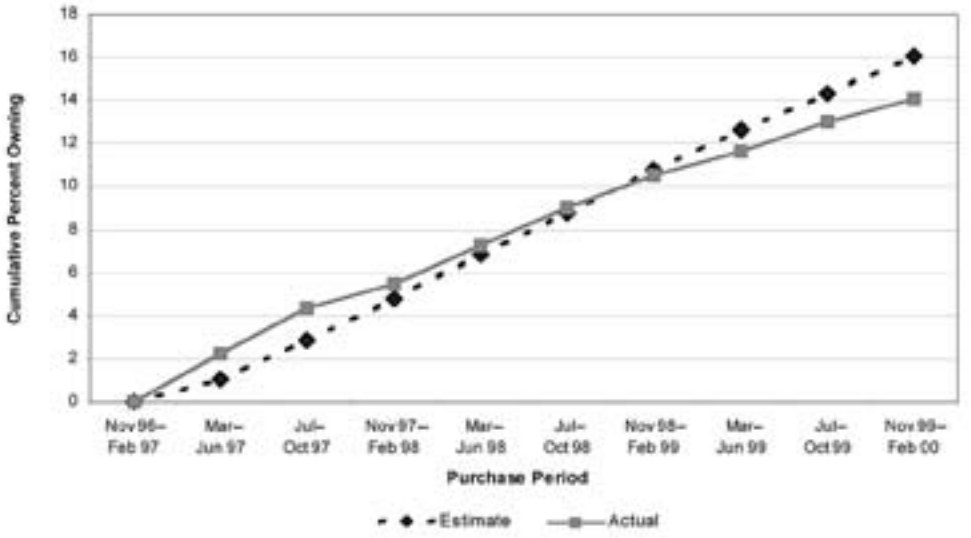


Exhibit 5c

Comparison of Actual and Estimated Cumulative Purchase Rates for African-American Renter Households

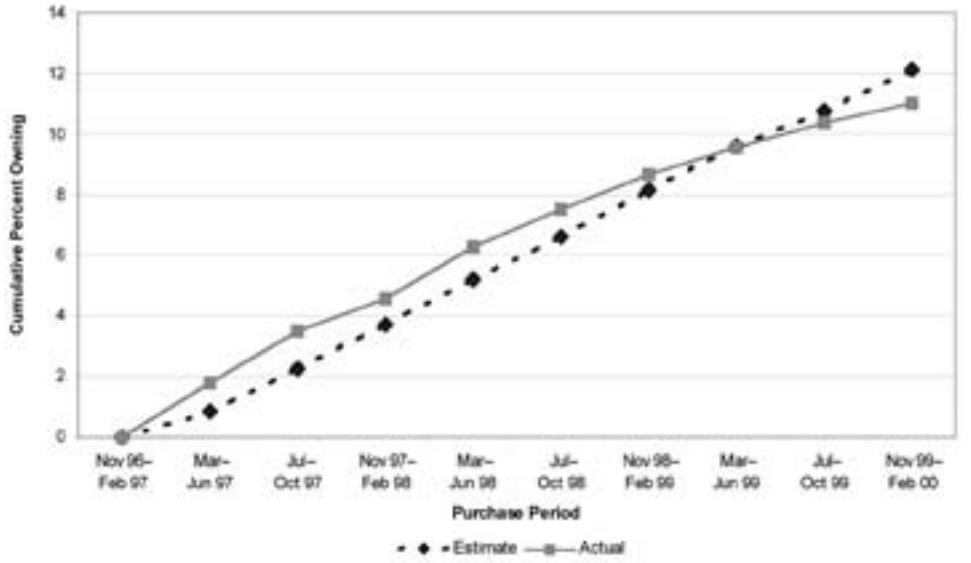
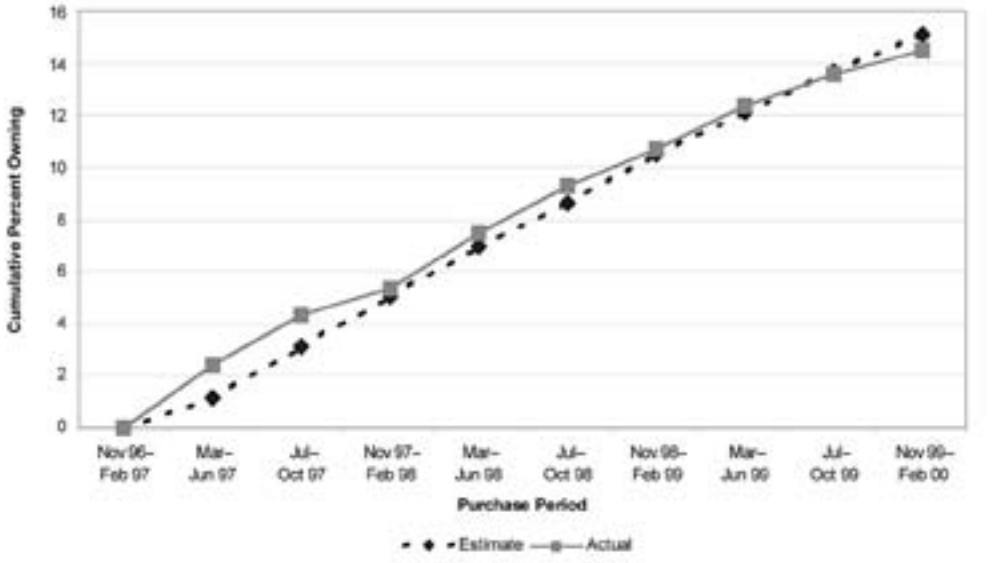


Exhibit 5d

Comparison of Actual and Estimated Cumulative Purchase Rates for Hispanic Renter Households



in the actual transition to homeownership over time is greater than predicted. The result is that the predicted level of homeownership lags the actual level over most of the initial waves but, by the end of the period, the predicted level of homeownership slightly exceeds the actual level. Given the difficulties in predicting the exact timing of homeownership over the 3-year period, the simulations will focus on the share of households estimated to attain homeownership by the end of the 3-year period rather than the exact timing of homeownership attainment. Also, given the slight variation between the actual level of homeownership attainment and the level estimated by the model, the impact of downpayment assistance will be derived by comparing the baseline estimate of homeownership attainment with an estimate derived by increasing each household's level of liquid financial assets. The simulation approach and results are discussed in detail in the next section.

Simulating Downpayment Assistance

Exhibit 6 summarizes the results of simulations in which households are provided grants of $1,000, $5,000, and $10,000.[29] The baseline estimates indicate that over the 3-year tracking period, 6.3 million renter households would become homeowners, including 3.8 million low-income renters, 0.7 million African-American renters, and 0.6 million Hispanic renters. When renters' liquid assets are increased by $1,000, simulating the provision of this amount of downpayment assistance, the number of homebuyers is estimated to increase by 943,000 overall, including 708,000 low-income buyers, 152,000 African-American buyers, and 143,000 Hispanic buyers. This expansion of the number of homebuyers represents increases of 15 to 22

Exhibit 6

Simulated Impact of Downpayment Assistance on the Number of Homeowners and Estimated Program Costs

	All Households	Low Income	African American	Hispanic
Initial renter households	32,037,380	23,533,749	5,651,290	4,283,615
Baseline estimate of homeowners	6,248,337	3,784,410	684,857	647,008
Simulated homeowners under alternative levels of downpayment assistance				
$1,000	7,191,107	4,492,016	837,106	789,734
$5,000	8,021,048	5,089,272	963,534	906,714
$10,000	8,393,399	5,348,779	1,018,647	956,280
Percent increase in homeowners from downpayment assistance				
$1,000	15%	19%	22%	22%
$5,000	28%	34%	41%	40%
$10,000	34%	41%	49%	48%
Net gain in homebuyers from downpayment assistance				
$1,000	942,770	707,606	152,249	142,727
$5,000	1,772,712	1,304,862	278,677	259,706
$10,000	2,145,063	1,564,368	333,791	309,272
Estimated program cost if only net new homebuyers are subsidized ($ millions)				
$1,000	$943	$708	$152	$143
$5,000	$8,864	$6,524	$1,393	$1,299
$10,000	$21,451	$15,644	$3,338	$3,093
Estimated program cost if all homebuyers are subsidized ($ millions)				
$1,000	$7,191	$4,492	$837	$790
$5,000	$40,105	$25,446	$4,818	$4,534
$10,000	$83,934	$53,488	$10,186	$9,563

Note: Estimates are of number of renter households that become homeowners during the 3-year period of observation.

percent above the baseline estimates of the number of homebuyers. The provision of $5,000 in downpayment assistance is simulated to produce an increase of 1.8 million additional homebuyers over the period, including 1.3 million low-income buyers, 279,000 African-American buyers, and 260,000 Hispanic buyers. Finally, given simulated downpayment assistance of $10,000, the number of homebuyers is estimated to increase by 2.1 million, including 1.6 million low-income homebuyers, 334,000 African-American homebuyers, and 309,000 Hispanic buyers.

In comparing the impact of $1,000 in downpayment assistance with $5,000 in assistance, note that despite the fact that the level of downpayment assistance was increased fivefold, the estimated number of additional homebuyers increases by less than a factor of 2. This result can be traced back to the magnitude of the coefficients on the liquid financial asset splines. As previously noted, the largest impact is associated with financial assets of between $1 and $999. Increases in liquid financial assets of between $1,000 and $5,000 have a much smaller impact on the probability of

homeownership, and the impact of increases beyond $5,000 are smaller still. Thus, when $10,000 in downpayment assistance is simulated, the number of renter households estimated to achieve homeownership over the 3-year period is only a little more than twice the increase associated with downpayment assistance of $1,000—or one-tenth the level of assistance. These results suggest that a small amount of financial assistance can go a long way toward enabling homeownership.[30]

One downside of the effectiveness of even modest amounts of downpayment assistance is that if this assistance were universally available, the cost of such a program would be quite high. As shown in exhibit 6, assuming that only low-income households would be eligible for assistance, the simulation results indicate that under the assumption of $1,000 in downpayment assistance, 4.5 million renter households would become homeowners over the 3-year period. If all these households took advantage of available assistance, the cost of the program would be $4.5 billion; however, because a large majority of these households would be expected to become owners even without the availability of downpayment assistance, many households would be unnecessarily subsidized. If it were somehow possible to identify only those households that would purchase only with assistance, the cost of the program over 3 years would be $708 million, an amount close to the maximum of $200 million a year allowed under the American Dream Downpayment Initiative.[31] If the $5,000-grant program (the average amount assumed by the American Dream Downpayment Initiative) were implemented, the total number of low-income homebuyers is estimated at 5.1 million, including 1.3 million more than would be expected without this level of assistance. The cost of this program would $25.4 billion if all buyers receive assistance and $6.5 billion if only those who need assistance to purchase could be identified.

Summary of Findings and Policy Implications

This study has focused on evaluating the importance of liquid financial wealth for enabling homeownership. Survival analysis of data from the 1996 Survey of Income and Program Participation panel found that liquid financial assets are statistically significant predictors of homeownership. Although the importance of wealth in predicting homeownership is in keeping with the findings of previous research, a somewhat surprising finding of this analysis was that initial savings are most strongly associated with the probability of becoming a homeowner. Specifically, savings in the neighborhood of $1,000 were found to provide the strongest indication of the likelihood of a transition from renting to owning, while savings of between $1,000 and $5,000 only moderately increased this probability and savings of between $5,000 and $20,000 added only slightly to the likelihood.

The pattern is somewhat surprising because $1,000 would appear to be a trivial amount of money compared with the cost of buying a home. With a median house value of about $120,000 in the markets studied, it would be expected that several thousand dollars in savings would be the minimum amount needed to purchase a home, yet about half of the homebuyers observed over the 3-year period had less than $1,000 in liquid assets at the start of the period. What might account for this pattern? One possibility is that, given the growing availability of low-downpayment mortgages, relatively little wealth is, in fact, needed to purchase a home. Another possibility is that the act of savings signals the desire on the part of a household to become a homeowner. Although the level of liquid financial assets is low when we observe it, households may be able to accumulate savings fairly rapidly in the months leading up to home purchase, a runup that may not be captured by

the once-a-year wealth estimates provided by the SIPP. It is also possible that households rely on gifts from family members, which is a source of funds that is not captured by the survey. Finally, it is also possible that the SIPP does not provide an accurate estimate of household wealth. Although recent analysis of the SIPP does find shortcomings in this area, most of the undercounting is among wealthy households and so should not affect the wealth estimates of the low-income and low-wealth households of interest for this study.

Given the importance of low levels of liquid financial assets on the probability of homeownership in the estimated model, the simulations suggest that small amounts of downpayment assistance can be very effective at stimulating fairly large numbers of renter households to become homeowners. Downpayment assistance of as little as $1,000 is simulated to entice 700,000 additional low-income households to purchase a home, a 19-percent increase from the baseline estimate of the number of homebuyers absent any assistance. Reflecting the finding from the survival model that there is a diminishing impact of higher levels of savings on the probability of buying a home, higher levels of assistance do not have as large a marginal impact on the number of homebuyers. Assistance of $5,000 per household is simulated to increase the number of low-income homeowners by an additional 15 percent beyond the gain from $1,000 in assistance, while assistance of $10,000 is simulated to increase the number of buyers by an additional 7 percentage points beyond the gain associated with $5,000 in assistance.

Although the simulation results are encouraging about the efficacy of downpayment assistance, if $1,000 in downpayment assistance were made available to all low-income households, the cost of such a program could be quite high. If all low-income households were eligible for assistance, the cost would be as high as $4.5 billion over 3 years. But, if assistance could be limited to only those households that could purchase only with assistance, the cost would be a more reasonable $700 million over 3 years, a level that is in keeping with the American Dream Downpayment Initiative that authorizes expenditures of up to $200 million a year.

In interpreting the findings from these simulations it is important to bear in mind two important caveats. First, these results are based on analysis of a sample of households from a 3-year period between 1997 and 2000. It is not known whether the same homeownership propensities will be evident in future periods. Second, it may well be that the existence of a small amount of savings is commonly associated with a decision by a renter household to pursue homeownership. That is, households may choose to not accumulate any savings until they have made a decision to pursue some goal requiring savings, such as starting a business, returning to school, or purchasing a home. Because the pursuit of homeownership may be the most common motivation for beginning to save, the presence of savings may be an indication that the household has decided to attempt to buy a home. If that is the case, the model may be overstating the importance of the savings itself as a predictor of homeownership. It may well be that the availability of downpayment assistance will not stimulate the desire to become a homeowner that is evident in these renter households in the SIPP.

This interpretation suggests an alternative policy approach for stimulating homeownership. Initial savings activity may predict homeownership in part because it indicates that households have enough control over their financial circumstances to begin accumulating savings. In addition, the household may well be motivated to begin saving in the belief that homeownership, or some other financial goal, is attainable. Based on this scenario, another policy approach, aside from downpayment

assistance, that might spur homeownership is to support savings efforts by households to accumulate the funds needed to buy a home, such as through individual development accounts. Such savings incentives could also be coupled with support for financial management training to help households develop the skills needed to manage their finances to the point where they can accumulate savings. The findings from this analysis suggest that a little savings can go a long way toward enabling homeownership.

Acknowledgments

The authors gratefully acknowledge financial support from the Office of Policy Development and Research, U.S. Department of Housing and Urban Development (HUD). The authors also thank Harold L. Bunce and William J. Reeder of HUD and David Rodda of Abt Associates Inc., for their careful and thoughtful review of the article.

Authors

Christopher E. Herbert is a senior associate in the Social and Economic Policy Division of Abt Associates Inc.

Winnie Tsen is an analyst with the U.S. Government Accountability Office.

Notes

1. A two-step process identifies unconstrained households. First, for each household, two estimates are made for the house value that it could possibly afford: one assuming that the household is constrained by its income level and another assuming that the household is constrained by its wealth level. For the income constraint, the maximum affordable house value is derived by assuming that the household can only spend 28 percent of its income on a mortgage covering 80 percent of the house value at an assumed market interest rate. For the wealth constraint, it is assumed that the household can afford a house with a value that is five times the household's wealth (that is, wealth is used to provide a 20-percent downpayment). Unconstrained households are those whose observed house value is 85 percent or less of both of these maximum house values. In the second step, a model is estimated to predict the chosen house values of these unconstrained households based on household characteristics. This model is then applied to all households to estimate the ideal house value for each household.

2. Another recent study that focuses on the role of credit constraints on homeownership attainment is Rosenthal (2002). Using data from the 1998 Survey of Consumer Finances, Rosenthal identified credit-constrained households using survey questions that identified whether, at any time in the past 5 years, the household had a loan request denied, had a loan request only partially granted, or considered applying for credit but then chose not to apply because of an expectation of being rejected; however, he did not include any direct measures of wealth because this is expected to be an aspect of the presence of borrowing constraints.

3. An exception is a study by Galster, Laudan, and Reeder (1999), which modeled the probability that renter households in the 1990 Survey of Income and Program Participation panel would become owner households by the end of that panel 18 months later. This study did not evaluate the impact of wealth constraints on the probability of homeownership, however; instead, it focused on the combined importance of discrimination, informational barriers, and housing market conditions on homeownership propensities of households other than White suburbanites.

4. See U.S. Department of Commerce (2001) for a detailed description of the Survey of Income and Program Participation.

5. The head continues to be tracked even if he or she joins another household as a nonhead (for example, moves in with his or her parents). Thus, the tracked individuals can have three tenure statuses over time: renter, owner, or nonhead. The Survey of Income and Program Participation follows all members of the originally sampled households, but we do not track nonheads from the original sample who split off either to form their own household or to join another household.

6. Low-income households are those with incomes of 80 percent or less of area median income (AMI). AMI is based on estimates by the U.S. Department of Housing and Urban Development (HUD) for each federal fiscal year for metropolitan areas, nonmetropolitan counties, and metropolitan and nonmetropolitan portions of states. (See http://www.huduser.org/datasets/il.html for detailed information on these estimates.) HUD's estimates are linked to the Survey of Income and Program Participation (SIPP), using information from the SIPP on the metropolitan area, state, and metropolitan status of each observation.

7. Throughout this study, the terms "White" and "African American" are used to refer to non-Hispanic households in these racial groups, while Hispanics may be of any race.

8. A parametric model is used rather than the more flexible approach of using a semiparametric model such as the Cox proportional model because parametric models can more readily be used to simulate the probability of transition to homeownership. See Kalbfleisch and Prentice (2002) for a detailed discussion of approaches for estimating of hazard models.

9. Other functional forms were investigated in developing the model. The Weibull model was found to provide the best fit of the data.

10. Intervals of more than 4 months are possible because households may miss a wave of interviews and not be dropped from the survey but households missing more than one wave are no longer tracked.

11. It should be noted that we are not modeling time until *first* homeownership because we do not know whether the subjects previously owned a home. Rather, we are modeling the time until next homeownership, which, for many households, may be their first experience with homeownership.

12. The "Other" race category is not a focus of analysis due to both the relatively small sample size and the diverse nature of this grouping.

13. Negative and $0 in income are recoded as 1 so that the log of income is defined as 0.

14. The financial asset and liability questions are also gathered in the 12th wave, but, because we do not observe the household's tenure subsequent to wave 12, this information is not used in the model.

15. It is not clear how this lag in the availability of information on financial assets would affect the estimated coefficients for these variables. On the one hand, household wealth is known to increase rapidly in the period immediately prior to purchasing a home (Haurin, Hendershott, and Wachter, 1996). In this case, it might be expected that small amounts of savings would be estimated to have a large impact on the probability of owning because the savings level of future buyers represents only a portion of the amount ultimately accumulated prior to purchase. Thus, for example, every $1,000 saved may be representative of some larger amount of money ultimately saved before purchase. On the other hand, the lag between the collection of information on assets and liabilities and switches in tenure may weaken the association between wealth levels and this decision.

16. As described previously, the survival model uses information from wave 3 to predict tenure choice in wave 4, information from wave 4 to predict tenure choice in wave 5, and so on. Because we do not observe tenure choice after wave 12, information on wealth collected in this wave is not used in the analysis.

17. IRA and Keogh accounts are less liquid than other forms of savings due to the limitations on the ability to withdraw these funds; however, owners of these assets can tap them, either by paying penalties and taxes or by borrowing against these funds.

18. See Greene (1993) for a discussion of the use of spline functions in regression analysis.

19. The knots were chosen based on a comparison of results from alternative locations for the knots. The chosen knots were found to provide higher levels of statistical significance on the estimated coefficients.

20. See the Federal Housing Finance website for a description of these data: http://www.fhfb.gov/MIRS/MIRS.htm.

21. For information on the derivation of this price index, see the Office of Federal Housing Enterprise Oversight website: http://www.ofheo.gov/HPI.asp.

22. Due to the small sample size in some areas, the Survey of Income and Program Participation combines Maine and Vermont into one state grouping and North Dakota, South Dakota, and Wyoming into another grouping. In these cases, we created a weighted average of the median house values for the individual states using the number of owner-occupied housing units as the weights.

23. The models do, however, include dummy variables for African Americans and Hispanics. The dummy variables will shift the baseline hazard but will not alter its shape.

24. A further test of the correlation of outcomes for an individual is to allow for shared frailty, which is the survival-data equivalent of a random-effects model. The Stata® software package

provides tests for the evidence of shared frailty in the data. The results suggested that shared frailty was evident but only when a Weibull distribution was assumed. For other forms for the baseline hazard, shared frailty was not evident. A comparison of results using a Weibull model with and without shared frailty showed that the model without shared frailty did a better job of recreating the actual rates of homeownership attainment. As a result, the preferred model did not incorporate estimates for shared frailty.

25. A large share of the sample (39 percent) did not have any positive financial assets as of wave 3.

26. Households that are beginning to accumulate savings may also benefit from assistance from family in purchasing a home. Mayer and Engelhardt (1996) showed that about 1 in 10 first-time buyers benefit from gifts when purchasing a home. Because these gifts are likely to be received at the time of closing on the purchase, they are not captured in our wealth measures at the beginning of the period when homeownership occurs.

27. Low-income households are defined as those with incomes of 80 percent or less of area median income (AMI) at the time of wave 3. See note 4 for more details on how AMI is defined.

28. Wave 3 sample weights are used to create these weighted averages. Weights are used in these exhibits because the simulations will employ weights to provide estimates of the number of households that could be induced to purchase a home through downpayment assistance. Previous exhibits have not employed weights because the estimated model did not use weights and these exhibits were intended to shed light on the observations used to estimate the model.

29. Simulations were also run with grants of 1, 5, and 10 percent of the area median house price. The results were very similar to those using fixed dollar amounts because the average median house price is $115,500 and thus these percentage grants are on average quite similar to $1,000, $5,000, and $10,000 grants. Although there may well be differences in the geographic impact of these two approaches to downpayment assistance, given the small sample sizes in specific market areas it is not possible to evaluate these differences. As a result, the results presented here are exclusively for the fixed dollar amount grants.

30. It is also important to consider that the levels of wealth needed to achieve homeownership are understated by the data available in the Survey of Income and Program Participation (SIPP). Those seeking to purchase a home may accumulate savings rapidly in the months prior to buying. Because the data on wealth is captured by the SIPP only every 12 months, some amount of wealth accumulation may not be captured by the data. In addition, households may benefit from gifts from family members at the time of purchase, which would also not be captured here. For these reasons, the analysis may understate the importance of wealth.

31. One way to try to ensure that assistance is targeted to those who truly need help to become a homeowner would be to impose some costs on the use of government assistance. But, because these buyers will be facing financial hurdles in qualifying to buy a home, the payment of these costs would probably have to be deferred until some years after the initial purchase. Among the approaches that could be used would be some form of equity sharing at the time of resale of the property in proportion to the percentage of the original price that was financed with government assistance or a loan that did not begin to require payments until 5 or 10 years after purchase.

References

Barakova, Irina, Raphael W. Bostic, Paul S. Calem, and Susan M. Wachter. 2003. "Does Credit Quality Matter for Homeownership?" *Journal of Housing Economics* 12: 318–336.

Czajka, John L., Jonathan E. Jacobson, and Scott Cody. 2004. "Survey Estimates of Wealth: A Comparative Analysis and Review of the Survey of Income and Program Participation," *Social Security Bulletin* 65 (1): 63–69.

Engelhardt, Gary, and Christopher Mayer. 1998. "Intergenerational Transfers, Borrowing Constraints, and Saving Behavior: Evidence from the Housing Market," *Journal of Urban Economics* 44 (1): 135–57.

Galster, George, Aron Laudan, and William Reeder. 1999. "Encouraging Mortgage Lending in 'Underserved' Areas: The Potential for Expanding Home Ownership in the US," *Housing Studies* 14 (6): 777–801.

Greene, William H. 1993. *Econometric Analysis*, 2nd ed. New York: Macmillan Publishing Company.

Haurin, Donald R., Patric H. Hendershott, and Susan M. Wachter. 1997. "Borrowing Constraints and the Tenure Choice of Young Households," *Journal of Housing Research* 8 (2): 137–154.

———. 1996. "Wealth Accumulation and Housing Choices of Young Households: An Exploratory Investigation," *Journal of Housing Research* 7 (1): 33–57.

Herbert, Christopher E., Donald R. Haurin, Stuart S. Rosenthal, and Mark Duda. 2005. *Homeownership Gaps Among Low-Income and Minority Borrowers and Neighborhoods.* Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Kalbfleisch, John D., and Ross L. Prentice. 2002. *The Statistical Analysis of Failure Time Data.* New York: John Wiley & Sons.

Linneman, Peter, and Susan Wachter. 1989. "The Impact of Borrowing Constraints on Homeownership," *AREUEA Journal* 17 (4): 389–402.

Listokin, David, Elvin K. Wyly, Brian Schmitt, and Ioan Voicu. 2002. *The Potential and Limitations of Mortgage Innovation in Fostering Homeownership in the United States.* Washington, DC: Fannie Mae Foundation.

Mayer, Christopher J., and Gary V. Engelhardt. 1996. "Gifts, Down Payments, and Housing Affordability," *Journal of Housing Research* 7 (1): 59–77.

Quercia, Roberto G., George W. McCarthy, and Susan M. Wachter. 2003. "The Impacts of Affordable Lending Efforts on Homeownership Rates," *Journal of Housing Economics* 12: 29–59.

Rosenthal, Stuart S. 2002. "Eliminating Credit Barriers: How Far Can We Go?" In *Low-Income Homeownership: Examining the Unexamined Goal*, edited by Nicolas P. Retsinas and Eric S. Belsky. Washington, DC: The Brookings Institution: 111–145.

U.S. Department of Commerce. 2001. *Survey of Income and Program Participation Users' Guide*, 3rd ed. Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau.

Zorn, Peter. 1989. "Mobility-Tenure Decisions and Financial Credit: Do Mortgage Qualification Requirements Constrain Homeownership?" *AREUEA Journal* 17 (4): 1–16.

Additional Reading

Cleves, Mario A., William W. Gould, and Roberto G. Gutierrez. 2004. *An Introduction to Survival Analysis Using Stata®*. College Station, TX: Stata Press.

Policy Briefs

The Policy Briefs department summarizes a change or trend in national policy that may have escaped the attention of researchers. The purpose is to stimulate the analysis of policy in the field while the policy is being implemented and thereafter.

The Transition to Asset Management in Public Housing

Meena S. Bavan
Shomon R. Shamsuddin
U.S. Department of Housing and Urban Development

Opinions expressed in this article are those of the authors and do not necessarily reflect the views and policies of the U.S. Department of Housing and Urban Development or the U.S. Government.

Abstract

The U.S. Department of Housing and Urban Development is requiring public housing agencies (PHAs) to adopt an asset management model of operations. This article describes the conditions existing prior to the new requirement and the reasons for implementing asset management. After reviewing specific elements of the Department's asset management regulations, the article outlines potential advantages and disadvantages from the PHA perspective.

Introduction

In September 2005, the U.S. Department of Housing and Urban Development (HUD) issued a new rule[1] requiring public housing agencies (PHAs) that own 250 units or more to convert their operations to a system of asset management. Under asset management, PHAs must monitor and report on the financial, physical, and management performance of individual housing projects. Asset management is intended to improve public housing as a whole by holding PHAs accountable for the success of each separate property they own. Asset management is also meant to facilitate

future private investment in public housing. Critics argue, however, that asset management poses excessive administrative burdens, results in funding imbalances, and requires major operational changes. As PHAs change operations to conform to the new rules, researchers will have an opportunity to evaluate the impact of asset management on public housing.

Background

The conversion to asset management involves applying private, for-profit real estate management principles to public housing. Asset management can be differentiated from other approaches to housing management by its focus on the long-term financial and physical viability of properties. It includes assessing the condition of projects through a physical needs assessment, projecting income and expenses, planning for the best future use of the asset, and reallocating resources to achieve that use. Asset management is intended to facilitate investment decisions by providing measurable performance information that can be compared across projects. The conversion to asset management signals a major shift in the way HUD monitors public housing.

Until the new Public Housing Operating Fund rule was issued, HUD funded the approximately 3,100 PHAs that operate public housing on the basis of their aggregate housing portfolio and evaluated agency performance as a whole as opposed to evaluating individual activity at each project. Since its inception in 1975, the Performance Funding System (PFS) has allocated funds to PHAs based on actual costs in that year, with subsequent annual distributions adjusted for inflation and other factors. Several studies[2] have noted problems with the PFS, such as inadequate base-year funding and subsequent operational costs that exceed the adjustments.

In 1998, the Quality Housing and Work Responsibility Act replaced the PFS by establishing an Operating Fund to make assistance available to PHAs for operating and managing public housing. The amount of assistance to be made available through the Operating Fund was to be determined by a formula developed through negotiated rulemaking. Although HUD completed its negotiated rulemaking in 2000 regarding the Operating Fund, the rulemaking committee determined that further study of the basic underlying costs of operating public housing was needed. During the negotiations, Congress mandated a study[3] to determine the cost of operating well-run public housing in order to establish how funds would be distributed. The study recommended that HUD replace the distribution of operating funds at the agency level with a system of individual allocations based on the characteristics of each housing project. The study further suggested that housing authorities conduct property-based accounting and property-based management, as is common in private industry. After several months of negotiated rulemaking with PHAs, industry groups, and other interested parties, HUD published the Operating Fund final rule. Concurrent with this new rule, PHAs will be required to manage, budget, and maintain accounting information on an individual project level.

Specific Elements of Asset Management

Five major program reforms are associated with the conversion to asset management. These reforms affect funding, budgeting, accounting, management, and performance assessment.

Funding

HUD will allocate funding based on individual project characteristics. In contrast, the current system funds PHAs at the entity level. A major component of a project's subsidy calculation is its project expense level, an estimate of the cost to operate the project, exclusive of utilities and taxes, based on the costs of operating other federally assisted housing with similar project characteristics.

Budgeting

The PHA's governing body must approve project-based budgets before the start of each fiscal year. A project-based budget is a measure of the individual property's financial health. It serves as a guide for operations, decisionmaking, and future income and expense projections. Except in the case of nonperforming projects, such budgets will not be subject to HUD approval and are primarily for internal PHA planning purposes.

Accounting

PHAs must now submit year-end financial statements on each project to HUD. These statements of assets and liabilities will include revenues, expenses, and other balance sheet items. In accounting for project costs, PHAs will be able to charge projects only for services actually received.

Management

PHAs must manage each project in that project's best interests. For example, a project must receive the same level of service from a central landscaping crew as it would obtain through the market or by executing the work with onsite staff. PHAs must assign to each project site-level management personnel with primary authority and responsibility for day-to-day operations.

Performance Assessment

HUD will revise the Public Housing Assessment System (PHAS) to facilitate project-based performance assessment and to emphasize project-based performance monitoring and evaluation. Currently, the PHAS examines PHA-wide, not project-specific, activities. Each project will be evaluated, not just on its physical condition, but also on its financial and management performance. A central part of this new performance measurement structure will be a system of onsite management reviews of each project.

Benefits and Goals of Asset Management

The intention of asset management is to improve the short- and long-term management of public housing through more accurate information and better decisionmaking. Asset management offers three main advantages to housing operators: increased efficiency, improved accountability, and better planning for the future.

Efficiency

By providing appropriate mechanisms for monitoring performance at the property level, HUD anticipates that PHAs will be better equipped to accurately assess individual projects. Property-level reporting should help agencies identify unusually high operating expenses so they can reduce waste. Similarly, a PHA might discover maintenance practices that reduce costs at one project and, as a result, benefit the agency's entire housing portfolio. Furthermore, excess funds resulting from cost-saving measures stay with the PHA.

Maintaining property-level data should also help PHAs better understand and respond to larger project needs. Accurate financial information regarding rent collection rates and vacancy loss can be used to project income. Property-specific physical inspections can help predict system-replacement expenses. PHAs that can better anticipate income and expenses will be well positioned to address annual needs before they exceed available resources.

Accountability

Under asset management, the assignment of dedicated personnel to each project should improve accountability to residents. For example, each project might have its own property manager and maintenance personnel. This staff could address onsite issues more quickly and efficiently than a centralized office searching for available staff and dispatching a different person each time. Residents are likely to see a faster, more personal response to their issues.

Planning

Asset management will help PHAs plan for the future of their housing portfolios. By envisioning properties as assets that require strategic investment, agencies will be encouraged to analyze the long-term physical and financial viability of these assets. Portfolio analyses and market comparability studies will enable PHAs to understand their current position relative to the private housing market. Capital planning needs may lead some agencies to consider a variety of asset-repositioning strategies, including acquisition and voluntary disposition. In general, project-level information should help agencies make better management decisions to preserve and protect each individual asset.

The transition to asset management further represents an effort to align public housing with accepted practice in the private housing market. The multifamily housing industry has long considered asset management to be an essential component of a successful real estate operation. Physical needs assessments, income and expense statements, and debt service coverage ratios represent the language of the for-profit housing industry. If public housing is able to speak in the same terms and provide comparable measures of performance, investors may feel more comfortable putting their money in this asset. PHAs could use public funds to leverage additional private investment to meet their capital needs. By aligning operations with accepted practice, it is believed that the transition to asset management will facilitate future investment and reinvestment in public housing by public- and private-sector entities.

Concerns and Drawbacks of Asset Management

Despite the prevalence of asset management in the multifamily industry, some observers have questioned its value and suitability for public housing. Although funding is a primary concern, the changes to operations necessitated by asset management could also pose problems.

Funding

First and foremost, accumulated funding cuts have left many PHAs and their projects in difficult financial positions. The modernization backlog for public housing is $18 billion, with an annual accrual of $2 billion.[4] No management reform by itself could alleviate this massive shortfall. Asset management might be viewed as simply a new way to distribute smaller pieces of an ever-shrinking pie.

The new Operating Fund rule will change the funding level for all PHAs. Slightly more than one-fifth of all housing authorities (667 out of 3,141) are eligible to receive less funding than they did last year due to the revised formula. Of those agencies with 250 units or more, approximately 150 will see reductions in absolute operating subsidy amounts.[5] In an era of budget cuts and a growing backlog of funding needs, housing authorities are worried that the new Operating Fund rule will worsen the financial position of their agencies.

Some PHAs are concerned that uneven project-level funding could lead to long-term inequities. They fear that HUD's funding methodology might not reflect the regional variations, local circumstances, and special needs inherent to a PHA project's particular situation. A deteriorating building faced with reduced funding may not be able to afford physical improvements. Instead of rehabilitating this project, the PHA may be forced to dispose of the property and lose vital affordable units along with it.

The elimination of centralized funding under asset management could also have a negative impact on resident services, such as supportive services for the elderly and disabled, job training programs for unemployed residents, and recreational programs for children. Social services typically benefit from the economies of scale associated with a unified budget. Because services are often considered incidental to the agency's mission of providing housing, they tend to be the first programs to be eliminated during budget cuts. A shift to property-level staffing could force PHAs to choose between services such as building maintenance and resident service programs. PHAs might reduce or eliminate services due to increased personnel and overhead costs.

Operations

The transition to asset management and accompanying financial limits on centralized services that can be charged to projects will force housing authorities to change many policies and procedures. Staff skills may need to be reassessed and personnel may need to be reassigned from the central office to individual projects. In addition to hiring new employees, PHAs may need to negotiate union titles and job responsibilities.

Another major change involves the financial reporting on asset management projects. Instead of providing one accounting report for the entire agency, PHAs must now produce accounting

statements for every project. The additional recordkeeping requirements will likely require more staff hours, improved data-tracking procedures, and updated computer systems.

PHAs currently maintain one centralized waiting list for all their projects. Under asset management, the implementation of multiple site-based waiting lists has the potential to reinforce preexisting segregation patterns within communities. For example, a household of a particular race or ethnicity might apply for the waiting list of only the project closest to their current neighborhood, which happens to be segregated. Furthermore, fair housing laws would come into play when an individual who is disabled cannot enter a project across town to apply for an accessible unit in that project. Housing authorities must bear additional oversight responsibility to ensure that public housing applicants are treated fairly under the Fair Housing Act.

Finally, asset management may reduce savings from the economies of scale associated with centralized purchasing and warehousing. Some PHAs have reaped the benefits of bulk purchases of items such as light bulbs. Large-scale purchase contracts for one item often result in reduced prices for others. The smaller purchase sizes associated with project-based budgeting and accounting may reduce cost savings. Maintaining separate project storage facilities instead of one warehouse could increase overhead expenses. Although private-sector companies use these project-based activities to their advantage, PHA purchases are governed by potentially restrictive procurement rules.

Expected Effects of Asset Management

The first PHAs required to convert to project-based budgeting and accounting must start compliance on July 1, 2007. All PHAs will have implemented at least 1 year of project-based budgeting and accounting by March 31, 2009. Complete transition to asset management operations for all PHAs is expected by 2011.

HUD believes that housing authorities will benefit from asset management by using project-level information to improve decisionmaking. In the short term, PHAs will be expected to reduce maintenance costs, improve vacant unit turnaround times, and streamline operations. Over the long term, PHAs will be expected to leverage funds, access investment capital, and position their assets for modernization or redevelopment.

By more closely aligning public housing practice with that of the private sector, HUD hopes to promote third-party investment. Because public housing will now adhere to multifamily housing reporting standards, project-level income and expenses will be easier to evaluate. In turn, potential investors should feel more confident about their involvement with public housing.

Conclusion

Concurrent with the new Public Housing Operating Fund rule, HUD is requiring all PHAs with 250 or more units to convert operations to asset management. As the accepted standard in private industry, asset management is believed to lead to improved housing management and oversight through project-level reporting. In addition, asset management is expected to help housing authorities plan for the future viability of their housing portfolios and encourage third-

party investment. Asset management, however, is not without its critics. PHAs in particular have expressed concerns about increased administrative burdens, the potential for federal micromanagement, and inadequate funding levels. As PHAs begin their transition to asset management, researchers will have the opportunity to evaluate the effects of these new systems on a program that provides housing for many of America's poorest households.

Acknowledgments

The authors gratefully acknowledge comments from Greg Byrne, Joan DeWitt, Marge Martin, and Mark Shroder at the U.S. Department of Housing and Urban Development.

Authors

Meena S. Bavan is a social science analyst in the Policy Development Division in the Office of Policy Development and Research, U.S. Department of Housing and Urban Development.

Shomon R. Shamsuddin is a program analyst in the Office of Policy, Program and Legislative Initiatives in the Office of Public and Indian Housing, U.S. Department of Housing and Urban Development.

Notes

1. Revisions to the Public Housing Operating Fund Program; Final Rule, 24 CFR Part 990. *Federal Register* 79 (180) September 19, 2005.
2. For example, see U.S. Government Accountability Office. (1998).
3. See Stockard et al. (2003).
4. See Finkel et al. (2000), U.S. Department of Housing and Urban Development (2003), and *Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Bill, 2003,* 107th Cong. 2nd Sess., S. Rep 107-222.
5. Twenty of these PHAs represent more than three-fourths of the total operating subsidy reduction.

References

Finkel, Meryl, et al. 2000. *Capital Needs of the Public Housing Stock in 1998*. Report prepared for the U.S. Department of Housing and Urban Development. Cambridge, MA: Abt Associates Inc. 146 p.

Stockard, James, et al. 2003. *Public Housing Operating Cost Study: Final Report*. Report prepared for the U.S. Department of Housing and Urban Development. Cambridge, MA: Harvard University, Graduate School of Design. 101 p. http://www.gsd.harvard.edu/research/research_centers/phocs/documents/Final%206.11.pdf.

U.S. Department of Housing and Urban Development. 2003. *Congressional Budget Justification, Public and Indian Housing: Public Housing Capital Fund*. Washington, DC: U.S. Department of Housing and Urban Development. 4 p.

U.S. Government Accountability Office. 1998. *Public Housing Subsidies: Revisions to HUD's Performance Funding System Could Improve Adequacy of Funding.* Report to the U.S. Senate, Committee on Appropriations, Subcommittee on VA, HUD, and Independent Agencies. Washington, DC: U.S. Government Printing Office. 101 p.

Additional Reading

Preparing for Asset Management Under the New Public Housing Operating Fund Rule (24 CFR 990): A Planning Document. 2006. U.S. Department of Housing and Urban Development.

Further Information

HUD's asset management website: http://www.hud.gov/offices/pih/programs/ph/am/.

Data Shop

Data Shop, a department of Cityscape*, presents short papers or notes on the uses of data in housing and urban research. Through this department, PD&R will introduce readers to new and overlooked data sources and to improved techniques in using well-known data. The emphasis will be on sources and methods that analysts can use in their own work. Researchers often run into knotty data problems involving data interpretation or manipulation that must be solved before a project can proceed, but they seldom get to focus in detail on the solutions to such problems. If you have an idea for an applied, data-centric note of no more than 3,000 words, please send a one-paragraph abstract to David.A.Vandenbroucke@hud.gov for consideration.*

Weighting and the American Housing Survey

Gregory J. Watson
The Moran Company

All the views expressed in this article are the author's own and do not necessarily reflect those of the U.S. Department of Housing or the author's present and past employers.

Abstract

The American Housing Survey (AHS) is the preeminent source of housing characteristic information for the U.S. housing stock. To produce accurate universe-level estimates or other statistics, however, researchers must properly weight the sample observations. This article describes the general strategy used for weighting and then adds notes for researchers who use the AHS.

Introduction

How many housing units are in the Northeast? What percentage of housing units are owner occupied? How many units lack plumbing facilities?

Researchers can answer these questions and many more by using the American Housing Survey (AHS). Answering the questions appropriately requires researchers to understand more than just

the housing data collected in the AHS; they must also understand some of the subtleties of how sampling works in the AHS. An understanding of sampling is necessary to understand how the weights are created. These weights enable researchers to produce research with such information as national-level estimates of the number of housing units or the percentage of housing units with particular characteristics.

The goal of this article is to inform researchers about weighting topics in the AHS, including the following:

- The background of the AHS.
- How weights are created.
- Different weight variables.
- Cross-sectional analysis (practical discussion).
- Time-series analysis (practical discussion).
- Special circumstances.

Although the topic of weights is not of the highest importance to housing researchers, it is an essential topic.

Because this article provides an overview about weighting and the AHS, researchers are strongly encouraged to closely read the technical appendixes in the resources listed in the Additional Reading section.

Background on the AHS

The AHS is funded by the U.S. Department of Housing and Urban Development (HUD) and conducted by the Census Bureau. The AHS collects very detailed information on housing units and their occupants; the data originally was collected via paper surveys and now is collected via telephone interviews. The national sample, consisting of about 50,000 housing units, is conducted every 2 years, and the metropolitan sample is conducted on a rotating basis across different metropolitan areas. Although this article focuses on the national sample, the weighting issues addressed herein are mostly the same as those that pertain to the metropolitan samples.

The current national sample was drawn in 1984 and first implemented in 1985. As a matter of design, the original sampling strategy was one of stratified random sampling, with oversampling (sampling a greater proportion) conducted inside certain strata to get better representation. The same housing units (structures) are surveyed in each survey, which enables the tracking of units over time as a large panel data set. The sample is adjusted over time to account for units being removed from and added to the housing stock.

The original sampling strategy, combined with adjustments over time, led to a requirement to use sample weights to produce accurate universe-level estimates or sample proportions. Failure to use the weights will lead to erroneous estimates of counts or proportions, which can lead researchers to erroneous conclusions. The weight assigned to each sample case in the AHS is the number of housing units represented by that particular sample case. Depending on the year, the average weight assigned to each case is in the range of 2,000 to 2,200, representing that number of housing units.

Researchers must also remember that the sampling strategy is set up to produce estimates of the number of housing units, not estimates of population or the number of households. Estimates of population created using the AHS weight should be treated with extreme caution. They may be reasonably accurate, but, because it is hard to know for sure, benchmarking with other data sets is appropriate and highly recommended.

Other data sets to compare against for estimates of both population and housing units include the Current Population Survey (CPS), American Community Survey (ACS), and decennial census. When doing very quick benchmarking, researchers should remember that it is not always necessary to download the microdata and create summary tables. The Census Bureau provides a very useful tool in American FactFinder (http://factfinder.census.gov) that allows for quick access to published statistics from its reports. Fannie Mae Foundation's DataPlace (http://www.dataplace.org) similarly allows for very easy access to summary statistics that are useful for benchmarking.

Weights in the AHS

Depending on the year of the AHS, two or three weights are present in the data files, but researchers commonly use only one.

The first weight is the "pure weight"—the "PWT" variable in the AHS data—which is used as the initial basis for the adjusted household weight. The pure weight is the inverse of the probability of selection based on the original sampling. If the AHS had been implemented with a pure random sample, this value would be the same for every case; however, because stratified random sampling occurs, the values are different depending on the strata. A higher weight means the sample observation represents more units, which means the housing unit had a lower chance of being selected in the first place. This stratified random sampling is the reason why sample proportions should be computed on weighted data instead of on unweighted data. Merely calculating proportions without weighting data may result in computing incorrect proportions.

Generally, the pure weight should not vary over time; however, by design, certain circumstances will occur in which the pure weight does vary. The pure weight will vary when the sample changes. In certain years, the AHS was designed to oversample inside certain groupings. This oversampling provides more sample cases in certain strata that allow for a higher level of statistical confidence in the estimates produced. This oversampling, however, leads to changes in the pure weights for those strata.

In select national surveys conducted from 1985 to 1993, the AHS oversampled in rural areas. In 1995, the AHS started oversampling in the six largest metropolitan areas: Chicago, Detroit, Los Angeles, New York, Northern New Jersey, and Philadelphia. The oversampling has occurred in every other national survey of the AHS since 1995 but is scheduled to be discontinued starting in 2007.

The pure weight is generally not interesting in and of itself but is useful in certain circumstances. The pure weight is used as the basis for the adjusted weight, which is why it is of interest now.

In certain cases, the pure weight inexplicably changes due to historical errors in the data processing. These cases are few and not material.

The household adjusted weight—the "WEIGHT" variable in the AHS data—is where nearly all the researcher's interest should be. This variable originally was based on the pure weight variable discussed previously but then is adjusted by the Census Bureau. This weight is adjusted to control for changes in the sample, such as losses in the housing stock or other adjustments. These adjustments are based on benchmarking with other data sets, such as the CPS and the decennial census.

The adjusted weights should nearly always be used in analysis because they provide the most accurate estimates of the housing stock. These weights do change from year to year, however, so, although the weights are extremely useful for cross-sectional analysis, adjustments need to be made if researchers try to link multiple years of data. These weights change from year to year both because of changes in the sample (just as the pure weight changes because of oversampling) and because of smaller adjustments due to changes in the sample, such as the addition of new construction. These changes are necessary because the sample originally was drawn in 1984 and many changes have occurred since then. When it sets the adjusted weights, the Census Bureau also corrects for the problem of nonresponse from the housing unit occupants.

With the 2001 data, a second adjusted weight variable started being released with the AHS. This variable—WGT90GEO—is based on the 1990 geography definitions, not the 1980 geography definitions that were used when the samples were created. As reported in the AHS codebook for 1997 and successive survey years, "HUD and Census recommend that WGT90GEO, the 1990 geography-based weight, be used only to match numbers from the public use file (PUF) with numbers in the publication at the U.S. and Census region level. For historical comparisons and other analyses, use the 1980 geography-based weights (WEIGHT), as these are comparable to previous publications."

Zero Weights

In a few circumstances, a sample observation will have a zero weight assigned to it. This assignment occurs when the unit is *permanently* removed from the housing stock, which is known as a Type C removal from the housing stock. These units will have a weight of 0 for both the adjusted weight and the pure weight for the last year they are present; other possible reasons for a zero weight include an interview conducted in error or certain other interviews not conducted in housing units. After the last record of the unit's change in status, the case is removed from the sample. In contrast, Type A and B noninterviews will still have a nonzero pure weight. These Type A and B observations remain in the data so researchers can examine the characteristics of units being permanently removed from the housing stock.

Changes in Weights

As discussed previously, both the pure weight and adjusted household weight will change due to changes in the sample, but only the household adjusted weight will be modified from year to year to take into account issues other than oversampling.

Practical Discussion—Cross-Sectional Analysis

From a practical perspective, researchers do not need to remember much to be able to properly apply weights to the AHS; however, they do need to keep the following important items in mind:

1. Use the household adjusted weight variable (WEIGHT).
2. Use the correct values when reading the weight in and then using it. The weights should have two decimal places and have an average of a little more than 2,000, depending on the year of the survey. When reading the data in, be certain about whether the raw data has the weight variable with the decimal places explicitly or implicitly defined. The data in the ASCII versions of the files generally have the implied decimal places, so researchers must divide the weight by 100 to put in the decimal places.

   If analyzing data using SAS, use the WEIGHT option, not the FREQ option, to weight the sample cases. The FREQ option truncates the integer value and removes the decimal places.
3. If you get a warning about a zero weight, check the data but do not be overly concerned about the zero weight.
4. It is possible that a valid housing unit is vacant, which occurs when a unit has been sold or new construction has been completed but the unit has not been occupied yet or when a unit simply was not occupied when the interview occurred. Vacant units still have a valid weight assigned to them. As a result, any analysis of occupied units must be run on a restricted sample. Restrict the analysis to occupied housing units by restricting the analysis to observations in which the status indicator equals 1.

Practical Discussion—Time-Series Analysis

One of the elegant design elements of the AHS is that different years of data can be linked together to perform time-series analysis of the housing units. Comparing the characteristics of a particular unit from one year to the next is a relatively easy analysis, but estimating the number of units this case represents is difficult.

Housing units in different years of the AHS can be linked together using the CONTROL variable. The CONTROL variable, the unique identifier for the housing unit, stays constant from year to year. By comparing a unit's characteristics from year to year, researchers can identify changes in characteristics of the housing unit or its occupants. Given the changes in weight from year to year, researchers face the question of what weight to use.

This section provides an extremely brief and general discussion about how to create a weight for time-series analysis. Researchers are strongly encouraged to refer to the documentation for the Components of Inventory Change (CINCH) reports at http://www.huduser.org/datasets/cinch.html for more detail. A warning to researchers: computing these new weights for your purposes is not a simple or easy task. In addition, you should use caution when viewing these weights.

A problem with linking data across years is that the estimated number of units represented by the observation will vary from year to year. That estimate does also not change consistently from one unit to another, so it is not simply a case of "inflation." The weight will vary simply because of the adjustments made by the Census Bureau; the Census Bureau is controlling for other changes it has measured in the housing stock. In addition, much larger adjustments will occur due to changes in the oversampling.

Researchers need to limit the sample from both years to just those sample cases that appear in both years. In other words, researchers need to exclude the cases that are in the AHS due to oversampling, precisely because they do not appear in both years. Then, after the sample is limited to those cases that appear in both years, the weights need to be adjusted to take those excluded cases into account. As part of this step, however, researchers must be careful not to improperly exclude known added units (for example, new construction) or known removed units (for example, those lost to a disaster) because these units appropriately should be in only 1 year of the data.

As a general rule, the weight then can be set to the maximum of the individual weights. Using the maximum gets very close to the new weight that needs to be used, but some refinements still need to be done. The next refinement is to account for cases that legitimately appear in only one year, such as units that were added or removed from the housing stock. For the weights for these special cases, use the weight that is present in the single year that the unit exists as an occupied unit.

After the weights are approximately set, then "ratio adjustment" should be performed to more precisely set the weights to match to published control totals. The ratio adjustment process is only performed on those cases present in both years. Excluded are the weights of cases that are present in only 1 year, namely the known additions and known removals.

The process of ratio adjustment roughly consists of summing up all the current weights, computing the ratio of that total to the published control total, and then applying that ratio to all the individual weights to create a new, "ratio-adjusted" weight for each case. Other analyses can then be computed using these new computed weights.

Special Cases of Weights Changing Dramatically

In certain situations, the sample weight assigned to a housing unit can change dramatically. Some possibilities include Type C interview losses, conversions/mergers, and other corrections made by the Census Bureau. These situations generally represent a very small proportion of the cases and are generally not issues when working with a sufficiently large sample size. A Type C loss has a weight of 0, and the case generally is removed from the sample in the following year because no possibility exists of the unit returning to the housing stock. In comparison, Type A and B noninterviews maintain their weights.

Small Sample Size Caveats

This article has thus far presented reasons for weighting the data and notes about weighting the data. Even with weights, however, estimates derived from the data may not be perfect because the

AHS is a survey and although the weights are intended to allow estimates, there is still the potential for measurement error. Therefore, researchers must be careful, especially when using small sample sizes, to recognize that potentially erroneous estimates exist due to sampling error.

Researchers are strongly encouraged to read "Sampling Errors for Small Groups," available at http://www.huduser.org/datasets/ahs/ahsprev.html, for a more detailed discussion about issues related to small sample sizes and the AHS. Researchers are also encouraged to read appendix D in any AHS report; this appendix is also available on line at http://www.census.gov/hhes/www/housing/ahs/errors.pdf.

Generally, the smaller the number of sample cases used to create the total estimates, the wider the confidence intervals surrounding the measurement. Researchers should pay particular attention to this issue when comparing different estimates. Because each case has a sample weight of approximately 2,000 housing units, it is highly unlikely that researchers would be able to obtain reliable estimates of anything less than several thousand units.

Conclusion

It is hoped that this brief discussion of AHS weights will encourage the appropriate use of weights. Using appropriate weights will lead to more accurate estimates of the characteristics of the U.S. housing stock.

Acknowledgments

The author thanks all the staff at the U.S. Department of Housing and Urban Development and the Census Bureau that he and his colleagues at ICF Consulting (now ICF International) had the pleasure to work with on American Housing Survey issues in the past. These individuals include, but are not limited to, Tom Blatt, Fred Eggers, Paul Harple, Jane Kneessi, Dennis Schwanz, Ron Sepanik, David Vandenbroucke, and Barbara Williams.

Author

Gregory J. Watson is a partner at The Moran Company, a healthcare consulting firm.

Additional Readings

For additional details, researchers are strongly encouraged to refer to the following documents:

Hadden, Louise, and Mireille Leger. 1995. *Codebook for the American Housing Survey, Volume 1.* Report prepared by Abt Associates, Inc. Washington, DC: U.S. Department of Housing and Urban Development. http://www.huduser.org/datasets/ahs/ahs_codebook.html.

ICF Consulting. 2001. *Documentation of Changes in the 1997 American Housing Survey.* Report prepared for U.S. Department of Housing and Urban Development, Office of Policy Development and Research. http://www.huduser.org/intercept.asp?loc=/Datasets/ahs/docchg1997.pdf.

ICF International. 2006. *Codebook for the American Housing Survey, Public Use File: 1997 and Later.* Report prepared for U.S. Department of Housing and Urban Development, Office of Policy Development and Research. http://www.huduser.org/intercept.asp?loc=/Datasets/ahs/AHS_Codebook.pdf

U.S. Department of Housing and Urban Development. 1998. *Sampling Errors for Small Groups.* http://www.huduser.org/datasets/ahs/binom.exe.

U.S. Department of Housing and Urban Development, contracting with various firms. Multiple years. *Components of Inventory Change (CINCH)* reports. http://www.huduser.org/datasets/cinch.html.

U.S. Department of Housing and Urban Development
Office of Policy Development and Research
Washington, DC 20410-6000

First-Class Mail
U.S.Postage Paid
HUD
Permit No. G-795

Contents

Cityscape
Volume 9, Number 2 • 2007