

Homeownership Gaps Among Low-Income and Minority Households

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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

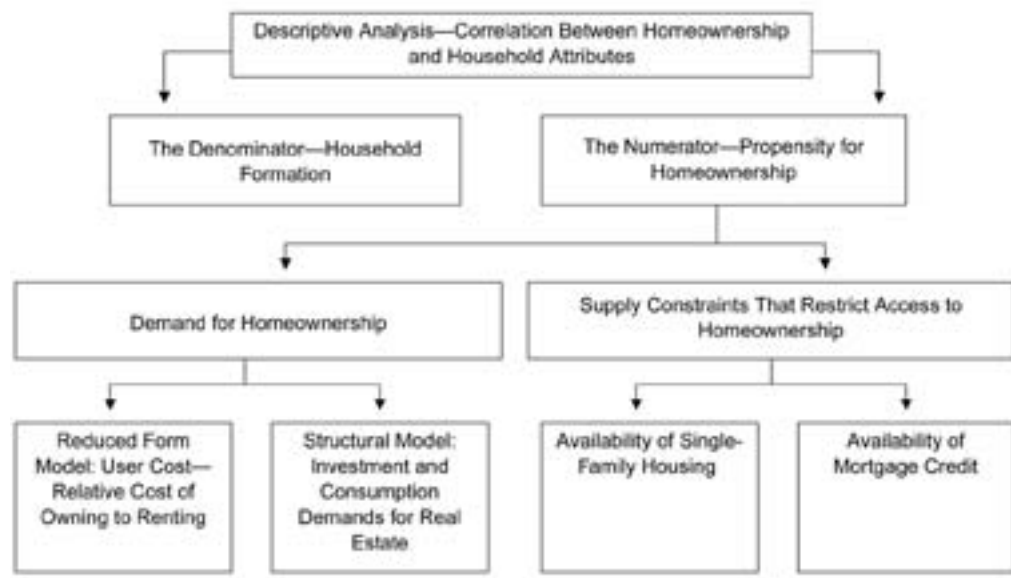
The primary goal of this study is to synthesize what is known about the determinants of gaps in homeownership rates by income status and racial and ethnic status. Our focus is on comparing non-Hispanic White (hereafter, White) homeownership rates with those of African Americans, Hispanics, and Asians. 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 rent⁶ 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 homeownership 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 indicator 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.

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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 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).

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