

# THE TRANSITION TO HOME OWNERSHIP AND THE BLACK-WHITE WEALTH GAP

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*Abstract*—This paper analyzes differences in the likelihood that black and white families become homeowners. By following a sample of black and white renters over time, we are able to separately study racial differences in the likelihood of applying for a mortgage and in the likelihood that a mortgage application is accepted. Although its effect on the race gap in housing transitions is small, we find strong evidence that black applicants are almost twice as likely as comparable white households to be rejected, even when credit history proxies and measures of household wealth are accounted for. We show that the housing transition gap exists primarily because blacks are less likely to apply for mortgages in the first place. The analysis suggests that differences in income, family structure, and in the ability and willingness of parents to provide down-payment assistance are the primary reasons for this applications gap. We speculate that the portion of the gap that remains unexplained after controlling for income, demographics, and wealth may be the result of blacks anticipating a greater chance of rejection when they apply for mortgages.

## I. Introduction

THE large disparity in wealth between black and white American families has been the subject of much recent discussion and research.<sup>1</sup> Why blacks have so much less wealth than whites remains an unsolved question, but the final answer will undoubtedly come from three sources. Because wealth is a function of the level and the timing of earned income received over the life cycle, a portion of the gap can likely be attributed to racial differences in these streams. Also, because wealth can be transferred from generation to generation, the large current racial wealth gap may be a function of past racial differences in economic conditions and opportunities. Finally, because the efficiency with which savings are converted into wealth depends on the particular savings instrument used, some of the racial wealth gap probably derives from racial differences in the ownership of particular instruments and differences in the returns that the various instruments yield.<sup>2</sup>

Given the strong historical association between home ownership and wealth, it is likely that the racial wealth gap derives, at least partially, from the large observed racial

differences in housing wealth.<sup>3</sup> Because initial wealth levels affect whether individuals become homeowners in the first place, it is difficult to separate the variables' causal roles on each other. But to the extent that home ownership does play a special role in household wealth accumulation, understanding the large gap in wealth between blacks and whites will hinge on the extent and reasons for racial home ownership differences. Moreover, because a home is the single largest purchase that most individuals make, and because owning a home may affect important, nonpecuniary outcomes, understanding the reasons for the racial home ownership gap is a matter of independent interest.<sup>4</sup>

This paper analyzes the transition into home ownership by 1996 for a sample of black and white households who were renters in 1991. Apart from the fact that we examine home ownership in the 1990s, our work extends the small, existing literature on race and home ownership in three distinct ways. First, we use panel data from the Panel Study of Income Dynamics (PSID) to follow the same individuals over time and analyze their transition from renter to homeowner status. The use of longitudinal data allows us to isolate the causal relationship between a rich set of explanatory variables and home ownership much better than can be done with cross-sectional data, for which endogeneity bias is likely to be a major concern. Second, using a new data supplement from the PSID, ours is the first study to decompose and separately study the two constituent parts of race differences in home-owning outcomes: differences between blacks and whites in the propensity to take steps to initiate home ownership, and racial differences in the likelihood that a mortgage application is accepted by a lending institution. Third, we study whether differences in less-formal credit channels, such as reliance on family assistance for down payment, partially explains the observed racial gap in home ownership.

Previewing the results, we find that, for our sample of 1991 renters, whites were much more likely than blacks to become homeowners by 1996, even after controlling for key variables such as the level of income, family demographics,

<sup>3</sup> Hurst et al. (1998) document that more than a third of total household nonpension wealth is in home equity. That housing equity may play a special role in the wealth accumulation process is the subject of some recent research in macroeconomics and finance. The relatively large costs associated with accessing home equity can prevent homeowners from drawing down wealth when faced with consumption, income, or preference shocks. Many authors find that saving in relatively illiquid assets, such as housing, will over time lead to both higher wealth and, if households have time-inconsistent preferences, higher expected discounted lifetime utility (Attanasio, 1994; Laibson, 1996, 1997; Hurst & Stafford, 2000).

<sup>4</sup> Home ownership may be important for reasons such as establishing household credit, building lender relations, increasing financial sophistication, locating in areas with better school systems, and so on.

Received for publication June 6, 2000. Revision accepted for publication March 20, 2001.

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We are grateful for comments from Mark Aguiar, Gary Becker, Eli Berman, Rebecca Blank, John Bound, Charles Brown, Sheldon Danziger, Steve Davis, Ronald Ehrenberg, Gary Engelhardt, Ed Glaeser, Joe Gyourko, Kevin Lang, Helen Levy, Glenn Loury, Chris Mayer, Casey Mulligan, Jacob Vigdor, and two anonymous referees. We also thank seminar participants at NBER's Real Estate Summer Workshop, Boston University, the Inequality Seminar at the Harvard University Kennedy School of Government, the University of Chicago Graduate School of Business Macroeconomics Brown-Bag, the Public Sector Economics Workshop at the University of Chicago, and the 2000 Wealth Conference sponsored by the Levy Institute.

<sup>1</sup> See Blau and Graham (1990), Oliver and Shapiro (1995), Smith (1995), Hurst, Luoh, and Stafford (1998), and Barsky et al. (2000).

<sup>2</sup> Racial differences in wealth held as of a given age can also come from differences in preferences, differences in expected length of life, or differences in probabilities of consumption shocks associated with illness and family dissolution.

and household wealth in the years around 1991. Despite the fact that black mortgage applicants were 73% more likely than whites to be rejected once controlling for credit proxies and demographics, negative treatment by financial institutions was not the main source of the difference in transitions. Instead, blacks became homeowners at a much lower rate than did whites because they were so much less likely to apply for mortgages in the first place. Blacks were almost twenty percentage points less likely than whites to initiate a mortgage application, but this gap accounted for 93% of the gap in transitions. We also find that it is only with respect to whether they get a loan at all that black and white mortgage applicants appear to be treated differently by lenders. We find no evidence of a difference, by race, in the terms of the loan for persons whose applications were successful.

Our data offer little support for the proposition that the rental market is the source of the application differential, as analysis of rental prices reveals only modest difference in rents paid by black and white households. Moreover, direct inclusion of controls for rents paid at the beginning of the sample period in the mortgage application regressions does little to reduce the racial application gap. Nearly two-thirds of the application gap can be explained by income and demographics, particularly variables describing family stability. Own wealth is important in the addition to apply, but it only slightly reduces the racial home ownership gap. We speculate that part of the remaining gap may be due to a greater anticipated probability of mortgage application rejection by blacks. Finally, we document large differences between races in the degree to which successful home buyers relied on their families for help in financing down payments. Consistent with this finding, controlling for the wealth of a household's parents (which proxies for the amount of down-payment help that a household could receive) significantly lowers the racial applications gap.

The remainder of the paper is organized as follows. In the next section, we review the previous literature on the transition into home ownership and racial differences in this decisions. In section III, we outline the basic determinants of households' decision to transition into home ownership. We describe and summarize the data used in the analysis in section IV. Section V presents the results, and then we conclude.

## II. Relationship to Previous Research

This paper uses longitudinal, individual-level data to assess racial differences in housing transitions. Its methods, data, and questions extend the existing literature in many ways. Many authors have documented the large cross-sectional gap in home ownership patterns across races (Gyourko & Linneman, 1996; Collins & Margo, 1999; Long & Caudill, 1992; Gabriel & Painter, 2000). The consensus from this work is that black households are almost thirty percentage points less likely to own a home than white households. Using aggregate cross-sectional data, some au-

thors (Segal & Sullivan, 1998; Collins & Margo, 1999; Long & Caudill, 1992) have studied aggregate changes in home ownership rates by race, and have attempted to relate these changes to aggregate changes in variables such as income. These papers do not isolate the factors that contribute to persistent differences in the propensity to own at the individual level, as we attempt here. Other work has directly studied home ownership differences at the individual level, but explaining racial differences has typically not been the focus.

Important examples of work on individual-level determinants of home ownership include the extensive work done by Rosen (1979), Hendershott (1980), Linneman and Wachter (1989), Engelhardt and Mayer (1994), Engelhardt (1996a, 1996b), Mayer and Engelhardt (1996), Haurin, Hendershott, and Wachter (1997), and Gyourko, Linneman, and Wachter (1999). This work has studied issues like the importance of after-tax user cost of owner-occupied housing, the importance of liquidity constraints generated by lending down-payment rules, and the role that gifts can play in relaxing these liquidity constraints. Mayer and Engelhardt (1996) find that financial constraints are important to the home ownership decision and that gifts are important in relaxing these down-payment constraints. They show that the probability of receiving a gift is negatively related to income and wealth of the new homeowner and positively related to the median house price. Haurin et al. (1997) find that a comparatively larger amount of gifts or inheritances are received during the periods prior to the transition to home ownership. However, they are unable to isolate whether these gifts were used for a down payment. None of these studies document differences in down-payment sources for different racial groups nor do they relate the propensity for gift giving to parental wealth.

When scholars have directly studied racial differences in home ownership, the evidence has usually been cross-sectional. Gyourko et al. (1999), using three different cross-sectional data sources find no racial differences in home ownership rates among households with large enough wealth to meet down-payment and closing-cost requirements. However, they do find large ownership differences between black and white households with low wealth. Although documentation of such results in the cross section is useful, the results are not informative as to the direction of the causality. Additionally, their study does not directly explore the reasons for the race differences in home ownership among those with low wealth.

Instead of focusing on differences in individual characteristics as an explanation of racial differences in home ownership rates, many authors have studied whether blacks experience racial discrimination in the market for mortgage financing.<sup>5</sup> Despite consistent evidence of differential racial

<sup>5</sup> Work on differential racial outcomes in the mortgage application process include Black, Schweitzer, and Mandell (1978), Schafer and Ladd (1981), and Yinger (1986). See Ladd (1998) for a thorough survey of work

outcomes in the mortgage process, the failure of many previous studies to control for applicant credit worthiness makes it difficult to attribute the differences in acceptance rates to discrimination rather than unmeasured differences across races in factors that could affect the profitability of the loan. The influential work of Munnell et al. (1996), which uses data collected by the Boston Federal Reserve on mortgage loan applications made in Boston area banks in 1990, is one of the very few papers with explicit controls for credit worthiness. The paper documents large, statistically significant differences in the probability of having a loan accepted across black and white households even when a full set of credit controls is added.<sup>6</sup>

This paper partially extends all of the results we've just listed and studies other issues related to home ownership that have not been formally addressed. Using individual-level and nationally representative data, and controlling for important demographic and income-related factors, we jointly study the two separate components of the transition into home ownership: the decision to purchase a home and the lenders' decisions to accept the mortgage conditional on the household applying. We find that the overwhelming majority of the racial gap in home ownership transitions is explained by differences in application propensities. We find that differences in income and in family structure stability measures explain more than two-thirds of the application gap. Additionally, we extend previous work discussing the importance of the down-payment requirements by examining racial differences in the role that the borrowers' families plays in providing down-payment relief. The analysis of racial differences in lenders' propensities to accept a mortgage application controls for applicant credit-worthiness, and are drawn from a nationally representative sample of individual applicants. We also study whether there are racial differences in mortgage terms, a subject which has received virtually no previous attention (Ladd, 1998).

In the next section, we present a simple description of home ownership designed to help organize our subsequent empirical work. There is nothing novel in the presentation,

on racial differences in mortgage lending. Berkovec et al. (1998), in an interesting paper on default behavior, are rare in their attempt to distinguish between preference-based and statistical discrimination. Good discussions about the limits of studies that draw this distinction are found in Galster (1996), Ross (1996), and Yinger (1996).

<sup>6</sup> Munnell et al. (1996) control carefully for applicants' financial positions, key information on the proposed loan and the house for which the loan was being pursued, and applicants' credit worthiness, using measures identical to those used by lenders. One criticism of this study has been that the data are drawn from a particular region of the country during an isolated time period. Another criticism, less often noted, is that, because the data used in the Boston Fed study are collected at the level of the application, it is possible that an individual might be responsible for more than one application in the data. Racial differences in the propensity to make multiple applications, if the propensity to apply multiple times is correlated with unobserved credit risk, means that regressions that treat different applications as independent will find, misleadingly, that blacks are more likely than whites to be rejected, controlling for observables.

as the essential features of the home-buying process are well understood.

### III. Buy or Rent: Theoretical Overview and Empirical Specifications

We rely on results from the relevant theoretical literature and on familiar ideas about home buying to motivate our discussion of race differences in home-buying outcomes. (Artle & Varaiya, 1978; Weiss, 1978; Rosen, 1979; Hendershott, 1980; Brueckner, 1986; Poterba, 1991; Henderson & Ioannides, 1993).

#### A. Differences in Housing Valuation Across Races

A key insight of the work on individuals' decisions to purchase housing is that the decision is a relative one. That is, potential homeowners buy a house if, and only if, the net benefits to be derived from owning a home exceed those from renting. Of course, differences in an individual's desire to own their own homes will be affected by differences in these net benefits. As a result, systematic racial differences in the propensity to own a home will derive from systematic racial differences in the net benefits from owning versus renting. We list and briefly discuss several reasons for possible differences in the valuation for home ownership across races.

*User Cost and the Marginal Tax Rate:* In the United States, people who own rather than rent receive a significant tax advantage, the magnitude of which grows with the household's marginal tax rate. In the housing literature, this role of the tax advantages of home ownership has long been emphasized in work that relates home ownership transitions to different user cost measures.<sup>7</sup> Large racial differences in income means that the home ownership incentive provided by the mortgage interest deduction will differ systematically, by race. Importantly, the tax advantage that home ownership brings a household may have an effect on the valuation independent of the effect of the family's income level.

*Variability in Income and Demographics:* Uncertainty about future income streams and the household's future demographic status can lower the valuation for home ownership relative to housing. People typically contract to use and pay for rental property for a short period of time, so the amount (or location) of rental housing demanded can be adjusted relatively easily over time. By contrast, buying a house is a lengthy financial commitment, and adjusting housing demanded is difficult and costly for homeowners. If a household is uncertain about the amount or location of housing it will demand in the future, then renting should be

<sup>7</sup> See Hendershott and Slemrod (1983), Poterba (1984, 1991), Mayer (1993), and Green (1996) for theoretical discussions and empirical tests.

more desired relative to owning, conditional on any user cost benefits. Two sets of variables for which this uncertainty is likely to be important are income and demographic uncertainty. In particular, households that experience great fluctuation in income from year to year, or that see factors like marital status, fertility, or mobility change much over time should be leery about entering into home ownership contracts. We might suppose that there would be differences between black and white households in the extent of this uncertainty.

*Housing Appreciation Rates:* Because housing prices appreciate, a home purchase marks a form of savings. If housing markets are competitive and nonsegmented, a higher appreciation rate in one locality would be capitalized into the price of housing in those localities, thereby equating returns across neighborhoods. But, if housing markets are segmented across either income or racial lines, then the rates of return from home ownership may differ systematically across different locations. Recent work suggests that appreciation rates do appear to positively covary with income (Poterba, 1991; Case & Mayer, 1996; Coate & Vanderhoff, 1993). Differences in income levels between blacks and whites, and in the characteristics of the separate neighborhoods in which black and white families reside, could produce systematic differences in housing appreciation rates across races and a corresponding difference in the valuation for home ownership between the groups.<sup>8</sup>

*Rental Market Outcomes:* Finally, identical families facing different conditions in the rental market would be expected to value home ownership relatively less. In particular, the discrimination against black rental tenants—which has been studied by, among others, Ondrich, Stricker, and Yinger (1999)—suggests that blacks may have a greater desire to own their housing, thereby avoiding discriminatory treatment from landlords.

#### *B. Differences in Constraints to Home Ownership Across Races*

Conditional on the desire to own a home, one might observe differences across individuals in the actual transition into home ownership because of differences among them in the constraints to home ownership that they face. Like the net benefits previously described, these constraints might also differ systematically by race. Also, the constraints may have a feedback effect on the steps that people take to translate their desire for home owning into actual home ownership.

*Down Payment and Endowment Constraints:* The most obvious constraint that households face in translating a

desire for home ownership into actual home ownership has to do with the costs of buying a house—especially, costs of financing the down payment for the mortgage loans that nearly all new homeowners take. These down payments—a lender's collateral on the very large sum of money lent to a home buyer—were historically as high as 20% of the purchase price of a house, but are now often as low as 3%.<sup>9</sup> The 20% figure remains relevant, however, because loans requiring less than this amount in collateral usually require that the borrower take out private mortgage insurance, which is a nontrivial expense.

Households may be “down-payment constrained” in the sense that they are unable to generate this large up-front cost, irrespective of whether their annual incomes would enable them to meet their monthly obligations. This constraint might be expected to apply with particular force to black household for two reasons. First, for any level of current income, blacks have less initial personal wealth than do their white counterparts. Second, blacks may be less able to rely on their friends, parents, and other loved ones than their white counterparts for assistance in generating these down payments.<sup>10</sup> We refer to this second effect as an “endowment” constraint.<sup>11</sup>

*Borrowing Constraint:* Unwillingness on the part of financial institutions to finance a mortgage application when the individual meets the down-payment requirement is obviously another type of constraint. This greater rejection probability, or “borrowing” constraint, would apply to black mortgage applicants if there were systematic discrimination in mortgage lending markets.<sup>12</sup> And, even if mortgage applications rejection probabilities do not differ systematically by race, lending institutions may offer blacks different financing terms for the mortgages they do finance.

Discrimination in rates offered, and in the probability of mortgage application rejection, could make blacks less likely to transition into home ownership both because of a

<sup>9</sup> Even 0% down-payment loans have recently risen in popularity. These remain only a small fraction of the loans taken out by first-time home buyers, probably because the interest rates on these loans are significantly higher than traditional mortgage loans.

<sup>10</sup> Racial differences in parental wealth is well documented. Charles and Hurst (2000) find that, for any given wealth level, black households were more likely to come from parents who had lower levels of net worth than their white counterparts.

<sup>11</sup> Work by Mayer and Engelhardt (1996) find that assistance from loved ones to home buyers often was to enable them to meet the 20% threshold.

<sup>12</sup> Differences in mortgage acceptance probability by race may be the result of statistical discrimination against blacks or discrimination motivated by racial animus. Loosely, statistical discrimination is the process whereby a market agent uses information about a group to form an estimate of the likely value of a characteristic for an individual. If blacks have higher rates of default than whites, on average, then loan applications by a black and a white potential homeowner will not be assessed the same level of “riskiness” by a bank that statistically discriminates. On average, this bank's behavior may make sense on profit-maximizing grounds even though individual blacks are assigned a higher level of riskiness than they should receive. See Aigner and Cain (1977) for a description of statistical discrimination, and see Yinger (1996) for a discussion about the illegality of the use of statistical discrimination by mortgage lenders.

<sup>8</sup> We do not directly study whether housing appreciation rates differ by race in this paper, but we include income and location controls in the empirical analysis.

direct effect that makes black mortgage applications less likely to be accepted and because of an indirect effect whereby blacks may be discouraged, relative to whites, from taking steps to initiate home ownership in the first place. Indeed, this racial discouragement effect can exist if there were systematic racial differences in any of the constraints we have discussed.<sup>13</sup>

### C. Empirical Strategy

The empirical analysis focuses on a sample of persons from the Panel Study of Income Dynamics, (PSID), aged between twenty and sixty in 1991, who were all renters in that year. We study differences among these people, by race, in the probability of becoming a homeowner by 1996.<sup>14</sup> Our work studies differences in both the desire to become a homeowner and in the various constraints to making this transition. We focus on the set of factors discussed in the previous section.

With respect to households' home ownership desires, we estimate a series of regressions in which home ownership desire is proxied for with a binary variable,  $A_i$ , which indicates whether an individual from the sample of 1991 renters applies for a mortgage between 1991 and 1996. We estimate several versions of the linear probability model:

$$\begin{aligned} A_i = & \gamma_1 Black + \alpha_1(\text{Variability in Income and} \\ & \text{Demographic Measures}) + \alpha_2(\text{Permanent} \\ & \text{Income and Marginal Tax Rate}) \quad (1) \\ & + \alpha_3(\text{Characteristics of Location}) + \alpha_4(\text{Rent}) \\ & + \alpha_5(\text{down payment Constraint}) + \epsilon_1 \end{aligned}$$

In equation (1), *Black* is an indicator variable that denotes whether the family head is black. Our goal is to test whether  $\gamma_1 = 0$ .

<sup>13</sup> This discouragement regarding application might also derive from racial differences in households' assessments of their credit worthiness. In a recent study by Freddie Mac, it was found that twice as many black as white households with "good" credit ratings reported that they had a "bad" credit history (22% of blacks and 11% of whites). We might suppose that, even though they would have been deemed credit worthy by a lending institution, these blacks may not have applied for loans if they erroneously anticipated rejection. These greater systematic errors by blacks might be due to the fact that blacks might have observed other putatively "credit worthy" blacks being rejected by lending institutions.

<sup>14</sup> Although our use of individual-level, longitudinal data improves upon much previous work, there is nonetheless the concern that the sample of renters in 1991 may be selected on the basis of unobserved factors. Ideally, we would like data for another sample of renters, chosen in a different year, so that outcomes over time for these two groups could be compared, but data to do this kind of analysis are not available. We go to great lengths to control for all factors relevant to home buying outcomes, so concern about selection bias is somewhat mitigated. Moreover, the basic pattern of our results remains unchanged when we restrict attention to very young household for whom selection is unlikely to be a problem. We discuss our data and the reasons for our sample frame in greater detail in the next section.

Variability in income and demographic variables, respectively, are measured using controls for job instability between 1991 and 1996, and the change in various marital status, mobility, and fertility outcomes over the same interval. Permanent income measure is simply average family labor income over the five years we analyze. Information on households' marginal tax rates is computed directly by the PSID in 1991, from information on state of residence, home ownership status, head and wife labor and asset income, the number of deductions, and whether the household itemized on its last tax return. We use several measures for the characteristics of the household's location in 1991: the mean income in the ZIP code, the percentage of households with income under \$15,000 in the ZIP code, and dummy variables indicating the size and urbanicity of the area. The *Rent* variable measures the rent paid by the family in the 1991. We use the actual level of rent paid, and the residuals from a rent regression in which we control for the household characteristics and characteristics of the rental unit.

A variable measuring whether a household is down-payment constrained is included in these regressions to capture the fact that this constraint may have a discouraging effect on mortgage application propensities. Facing a down-payment constraint is measured by an indicator variable that equals 1 if the household's wealth in 1991 is less than one-tenth of the price of the house they would be predicted to buy. To calculate these predicted housing prices, we create a sample of all PSID homeowners aged twenty to sixty, with a mortgage, between 1989 and 1993, then estimate a regression of house price on race, age, age squared, education dummies, family structure controls, family income, and location controls.<sup>15</sup> With the coefficients from this regression, we can create predicted housing values for all persons in the PSID, including those in our renter sample.

To assess the importance of any difference in what we have termed the *borrowing constraint*, we ask whether black mortgage applicants are more likely to be rejected than their white counterparts. We estimate

$$R_i = \alpha_1 X_{2i} + \gamma_2 Black + \epsilon_2 \quad (2)$$

where  $R_i$  is an indicator variable indicating whether a household's mortgage application is rejected. The vector  $X_{2i}$  contains a full set of controls for a household's credit worthiness. Although we do not have the actual measures of credit risk likely used by banks, the regressions control for variables like unemployment history and financial distress, which are likely very strongly correlated with banks' credit-risk measures. We also estimate a series of regressions of

<sup>15</sup> This procedure is similar in spirit to that used by Haurin et al. (1997). The  $R^2$  for our predicted home value equation was 0.468. Complete results for these regressions are presented in appendix table A1. In our empirical specifications, we tested the robustness of using a 3%, 5%, and a 20% down-payment rule. We discuss the results of these changes in specification in section V.

the same basic form as equation (2) to determine whether there are any difference in the interest rates paid by blacks and whites who successfully apply for loans.

Finally, we assess the role that parental assistance plays in generating home ownership transitions. Specifically, for those 1991 renters who become homeowners by 1996, we examine the incidence of parental assistance in generating a down payment. We note that our answer to this question is, at best, incomplete because we cannot know what assistance people who did not apply for loans (or those whose loan applications were rejected) would have received from their families. Nonetheless, it seems a reasonable assumption that racial differences in family assistance among successful applicants are a conservative estimate of the racial differences in the entire population. Additionally, we control directly for parental wealth in the households' application decision. If endowment effects are important, we predict that households with higher parental wealth will be more likely to apply for a loan, all else equal. We find evidence for this proposition.

#### IV. Data

We use data from the PSID, a large-scale survey started in 1968 that tracks the socioeconomic variables of a given family over time. In each year of the survey, demographic questions such as age, race, family composition, and education levels are asked of all members of the household. Among other information, the survey asks the households about labor market participation, earned labor and asset income, transfer payments received, and a variety of housing information, including rents paid, house value, and outstanding mortgage payments. In 1994 and 1996, the PSID added more-extensive questions about mortgage terms, including information about the rate and when the mortgage was acquired.

The PSID supplements the main data set with special modules from time to time. In 1984, 1989, and 1994, the PSID asked households extensive questions about their wealth position. Aside from pensions (both private and public), the PSID data provides a relatively complete picture of household wealth.<sup>16</sup> Much of the analysis focuses on liquid wealth, defined as the sum of checking account balances, saving account balances, stocks, and bonds. Additionally, in 1988, PSID respondents were asked to describe the nonpension wealth positions of the living parents of both household heads and their spouses. Parental wealth

<sup>16</sup> The PSID wealth data has been shown to match survey of consumer finances data and flow of funds data up to the top 1 percentile. (See Juster, Smith, and Stafford (1999).) Given that the PSID does not oversample the "super-rich," the wealth distributions of the PSID and the SCF do not align for the top 1% of the wealth distributions. However, many authors find that the PSID wealth data accurately depicts household wealth positions for the remainder of the distribution. See Hurst et al. (1998) for a complete description of the wealth data.

was coded as either negative or zero (one category) and as the level if it were positive.<sup>17</sup>

The analysis makes use of two other "new" special supplements: the 1996 Mortgage Shopping Supplement and the 1996 Financial Distress Supplement. The 1996 Mortgage Shopping Supplement asked all households (both homeowners and renters) about their recent experiences with mortgage lenders. All households that initiated a mortgage between 1991 and 1996 were asked about the size and source of the down payment, how they found their lender, and about any previous relationships they had with their lender. Our analysis focuses on first-time home buyers.

Households that did not initiate a mortgage between 1991 and 1996 were asked whether they had considered getting a new mortgage in that time, whether they had applied for a new mortgage during that time, and the outcome of any application they might have made.<sup>18</sup> One drawback of the PSID questions is that they only allow respondents to report their most recent mortgage shopping experience between 1991 and 1996. That means, if the household reported considering taking steps to purchase a house in 1996, we have no information on whether that same household considered taking steps to purchase a home between 1991 and 1995. Additionally, this data limitation forces us to restrict our sample of analysis to households in the survey between 1991 and 1996.

The 1996 Financial Distress Supplement asked households a number of questions about any financial distress the household may have experienced between 1991 and 1996. Households were also asked exactly when the particular problem occurred. Unlike the mortgage shopping data, households could have reported being in financial trouble multiple times between 1991 and 1996. We created a dummy variable indicating financial distress in each year from 1991 to 1996 if the household reported having any financial distress in that year. We also distinguish between mild and severe financial distress, with mild distress indicating a problem with paying bills or having creditors call and severe distress indicating wage garnishment, liens, or

<sup>17</sup> The households were asked "Suppose your parents were to sell off all their major possessions, including their home, turn their investments and all their other assets into cash and pay off all their debts. Would they have money left over, break even or be in debt? If they have money left over, how much would it be?" Because the PSID used a series of bracketed responses for those respondents who did not know the actual total, the number of nonresponses was extremely low. For those households who went through the brackets, parental wealth was assigned to the median of the bracket.

<sup>18</sup> Following are the actual PSID questions used in the study: "Since 1991, did you take steps to buy your own home? If so, what year was that? Did you apply for financing on any of the homes you considered? Why didn't you apply for financing? If you did apply, what happened with your application (was it turned down)?" We treat households that "took steps to buy a home" as being households who considered getting a mortgage, households who "applied for financing" as being households who applied, and households who had their "mortgage application turned down" as being households who were rejected.

TABLE 1.—MEANS FOR SAMPLE OF 1991 PSID “RENTERS”

	All	Black	White	P-value of Difference
Percentage Making Transition to Home Owning	0.271	0.130	0.318	0.000
Percentage with age between 20 and 30 in 1991	0.399	0.359	0.412	0.055
Percentage with age between 30 and 40 in 1991	0.348	0.405	0.329	0.005
Percentage with age between 40 and 50 in 1991	0.157	0.142	0.162	0.356
Percentage with age between 50 and 60 in 1991	0.097	0.094	0.097	0.843
Percentage with less than a high school education	0.168	0.270	0.134	0.000
Percentage with only a high school education	0.367	0.420	0.350	0.011
Percentage with only some college education	0.233	0.226	0.236	0.692
Percentage with college or more education	0.231	0.084	0.280	0.000
Percentage headed by a female in 1991	0.342	0.569	0.267	0.000
Percentage married in 1991	0.318	0.166	0.360	0.000
Change in marital status between 1991 and 1994				
Got married	0.121	0.065	0.145	0.000
Got divorced	0.142	0.304	0.118	0.000
Average number of children in household	0.729	1.05	0.620	0.000
Increase in no. of children, 1991–1996?	0.178	0.159	0.184	0.246
Decrease in no. of children, 1991–1996?	0.144	0.189	0.129	0.003
Average income between 1990 and 1994	28,187	18,184	31,487	0.000
Percent experiencing unemployment 1991–1996	0.350	0.414	0.329	0.002
Average rent paid in 1991	5,009	3,850	5,392	0.000
Percentage experiencing financial distress 1991–1996	0.343	0.364	0.336	0.300
Percentage who owned a bank account in 1989	0.686	0.416	0.778	0.000
Percentage with liquid wealth in 1989 equal to 0	0.305	0.581	0.211	0.000
% w/liquid wealth in 1989 between 0 and \$5,000	0.465	0.342	0.506	0.000
Mean parental net worth in 1988	145,676	41,791	181,210	0.000
Median parental net worth in 1988	66,045	2,641	99,068	0.000

Sample includes all households that were renting in the PSID in 1991 and that remained in the sample through 1996.

Household heads were restricted to being between ages 20 and 60 in 1991 and to paying a positive rent in 1991.

Sample size: 1,475 observations (25.3% of sample household heads are black, weighted average)

All variables reported for 1991 unless otherwise indicated. Income, rent, and wealth data are in 1996 dollars.

Liquid assets is the sum of checking, savings, stocks, and bonds. See text for full description.

All statistical data were weighted by the PSID core sample weights.

repossessions. We also create a variable that indicates whether the household declared bankruptcy.<sup>19</sup>

The sample of renters consists of PSID households who were renters in 1991, are present in every year between 1991 and 1996, and were between the ages of twenty and sixty in 1991. Table 1 presents the summary statistics for the sample of 1991 renters. The means for the time-varying characteristics are as of the 1996 survey year, and use the PSID 1996 weights. Little is noteworthy about the age and education distributions of our sample, except that blacks tend to be concentrated in the lower tail of the education distribution and that they tend to be slightly more middle-aged. If the sample seems slightly young in 1991, this is probably because it consists of people who are all renters in 1991, a group that is, on average younger than the population at large. This also explains the relatively small number of children.

Racial differences in family structure and stability are evident from table 1. A much larger proportion of black families are female-headed, the incidence of marriage is much smaller for blacks, and the incidence of divorce is almost three times as high. Between 1990 and 1994, annual average family income of the blacks in the sample was almost \$10,000 less than that of their white counterparts. At the start of the time period that we study, blacks also paid

less annual rent than whites. Additionally, black households were much more likely to be unemployed, were less likely to own a bank account, more likely to have low liquid wealth, and had parents who had less liquid wealth.<sup>20</sup> Interesting, there is no difference in the incidence of financial distress between black and white households.<sup>21</sup>

In the next section, we present the empirical results.

## V. Basic Results

### A. Housing and Wealth

We begin with table 2, which documents racial differences in home ownership, house value conditional on home ownership, and wealth. The results in this table are not drawn from the sample of 1991 renters, but rather from the entire PSID sample in 1994 (a year in which the wealth supplement was asked of the PSID respondents). Reassuringly, the results for our sample of 1991 renters are quite similar to the results for the full 1994 PSID sample.

Panel A assesses the magnitude of home ownership differences. In 1994, only about 40% of black household heads

<sup>20</sup> The difference in the incidence of owning checking accounts across races has been well documented. See Hurst et al. (1998).

<sup>21</sup> This counterintuitive result can be explained very simply. To get into credit problems, one must have been offered credit in the first place. To the extent that blacks are less likely to be granted credit cards, for example, then the likelihood that they encounter difficulties paying off their credit card bill is suppressed.

<sup>19</sup> These bankruptcy questions were not restricted to the period between 1991 and 1996, but rather to any time before 1996. See Fay, Hurst, and White (2001) for a description of the PSID bankruptcy questions.

TABLE 2.—BLACK/WHITE COMPARISONS OF NET WORTH, HOME OWNERSHIP RATES, AND HOUSE VALUE FOR 1994

	Mean	Median
A. Wealth (Net Worth)		
Unconditional: Black	43,365	9,435
Unconditional: White/Other	220,428	77,371
Unconditional Difference	-177,063	-67,936
Conditional Race Difference—		
Excluding Housing*	-24,292 (6,004)	-8,112 (3,348)
Including Housing†	-14,580 (5,763)	-310 (2,432)
B. Home Ownership Rates		
Unconditional: Black	0.388	
Unconditional: White/Other	0.663	
Unconditional Difference	-0.275	
Conditional Race Difference*	-0.132 (0.014)	
C. Housing Value (Conditional on Owning)		
Unconditional: Black	65,982	52,702
Unconditional: White/Other	120,248	94,864
Unconditional Difference	-54,266	-42,162
Conditional Race Difference*	-20,893 (4,286)	-13,959 (3,232)

Sample: All PSID households in 1994. Regression-weighted using core weights. The top/bottom 1% of the wealth distribution was truncated.

\* Controls used in the OLS/median regression include Age, Age Squared, Less than High School Education dummy, Some College dummy, and College or More dummy, Female Head dummy, Marriage dummy, Number of Children, and Five-Year Average Income Between 1990 and 1994.

† Includes controls shown above in addition to whether the household owns home.

For conditional regressions: The first column presents the results from an OLS regression. The second column (where applicable) presents the results from a quantile regression at the median. Standard errors are shown in parentheses.

owned their own home, compared to a home ownership rate of 66% for whites. This difference was not due to differences in observables between the races. In a linear probability model regression with a standard set of controls, the racial difference falls but is still substantial at thirteen percentage points.<sup>22</sup> Panel B looks at the value of homes, conditional on being a homeowner. Not only are blacks less likely to own homes than are whites, but, when they do own, the value of their homes is smaller at the means, at the medians, and with and without controls.

Panel C depicts the size of the unconditional wealth gap between blacks and whites. On average, black households in the PSID in 1994 have only \$43,000 of wealth, compared to \$220,000 for white household heads. The raw racial wealth gap evaluated at the medians is smaller than at the means, but it too is quite large. The median wealth of black household heads is just a bit more than \$9,000 but is \$77,000 for whites. The difference in the mean and median wealth gap is obviously the result of greater concentration among whites at the very high end of the overall wealth distribution.

The wealth gap falls considerably once we control for standard demographic measures and average household income over the five preceding years, but it remains substantial.<sup>23</sup> The conditional black shortfall is just over \$24,000 at

<sup>22</sup> We include as controls: age of the household head, age squared of the household head, education dummies, family structure controls, and five-year average family labor income. The results were nearly identical when a probit was used to estimate home ownership probabilities.

<sup>23</sup> We include as controls: age of the household head, age squared of the household head, education dummies, family structure controls, and five-year average family labor income.

the mean and is approximately \$8,000 at the median. When we add an indicator variable for whether the head is a homeowner to the set of controls, the wealth gap at the means falls to only \$14,580 (a decrease of 40%) and disappears completely at the medians. As we've emphasized, no direct causal inference can be drawn from this summary, as initial wealth also determines housing. Rather, it merely illustrates the strong link between racial differences in home ownership and racial differences in wealth.

Table 3 summarizes the transition into home ownership between 1991 and 1996 for the sample of renters. Over the five-year period, not only did the black and white 1991 renters differ in the rates at which they became homeowners, but they also differed in each of the antecedent steps. Whereas 32% of the white renters in 1991 had become homeowners five years later, less than 13% of blacks had. When asked whether they had "taken any steps to acquire a mortgage (considered getting a mortgage)," 37.2% of whites answered in the affirmative, but only 18% of blacks reported considering getting a mortgage. There was an equally dramatic difference in application rates: white renters were more than twice as likely than black renters to apply for a mortgage. Similarly, there are racial differences in applying conditional on having considered buying a home. Finally, among those who applied for loans over the five years, blacks were much more likely to be rejected than were whites, although it is important to note that the overall rejection incidence was not particularly large for either blacks or whites. A simple decomposition shows that more than 93% of the raw gap in transitions is due to differences in application probability, with only the remaining 7% due to differences in rejection rates.

### B. Transitions into Home Ownership: The Mortgage Applications Gap

Understanding the differences in racial transition into home ownership requires the examination of both the mortgage application and rejection differences outlined in table 3. We focus on the applications decision first. Table 4

TABLE 3.—HOME OWNERSHIP TRANSITION FOR 1991 RENTERS AND SOURCE OF DIFFERENCE IN TRANSITION BY RACE

	Black	White	Race Gap
Became homeowner between 1991 and 1996	0.126	0.320	-0.194
"Considered": took steps to acquire a mortgage between 1991 and 1996	0.180	0.372	-0.192
Applied for a home loan, not conditional on considering	0.153	0.350	-0.197
Applied for a home loan, conditional on considering	0.851	0.940	-0.089
Mortgage application rejected, not conditional on applying	0.028	0.030	-0.002
Mortgage application rejected, conditional on applying	0.175	0.086	0.089
Sample size (unweighted)	774	701	

The data in this table are from multiple waves of the PSID. See text for explanations. All means weighted by the PSID core sample weights.

TABLE 4.—MEANS OF SELECTED VARIABLES BY RACE AND WHETHER APPLIED FOR A MORTGAGE

	Black Applicants	Black Nonapplicants	<i>p</i> -value of Mean Differences	White Applicants	White Nonapplicants	<i>p</i> -value of Mean Differences
Age of head in 1991 (median/mean)	33/34.5	33/35	1.00/0.610	32/34	33/35	0.391/0.098
Percentage with education in 1991 < 12	0.098	0.302	0.000	0.092	0.157	0.011
Percentage with education in 1991 = 12	0.434	0.418	0.733	0.325	0.364	0.268
Percentage with education between 12 and 16 in 1991	0.320	0.208	0.004	0.246	0.230	0.596
Percentage with education 16 years and above in 1991	0.147	0.072	0.004	0.336	0.250	0.009
Percentage headed by a female in 1991	0.501	0.582	0.086	0.131	0.339	0.000
Married in 1991	0.253	0.150	0.003	0.529	0.270	0.000
Married 1991–1996 (conditional on not married in 1991)	0.181	0.046	0.000	0.349	0.075	0.000
Divorced 1991–1996 (conditional on married in 1991)	0.146	0.354	0.000	0.048	0.191	0.000
Average number of children in household in 1991	1.02	1.07	0.716	0.641	0.610	0.687
Did number of children increase 1991–1996?	0.306	0.131	0.000	0.305	0.119	0.000
Did number of children fall 1991–1996?	0.096	0.206	0.003	0.110	0.140	0.227
Head and wife's marginal tax rate in 1991	0.161	0.089	0.000	0.199	0.152	0.000
Family income 1990–1994	27,991	16,349	0.000	40,897	26,470	0.000
Average rent paid in 1991	4,642	3,702	0.000	6,256	4,932	0.000
Unemployed anytime between 1991–1996	0.211	0.452	0.000	0.253	0.369	0.001
Household experience financial distress: 1991–1996	0.283	0.379	0.036	0.309	0.350	0.242
Net worth in 1989 (median)	1,887	0	0.000	10,068	2,893	0.000
Net worth in 1989 (mean)	12,820	6,194	0.003	35,286	18,873	0.005
Liquid assets in 1989 (median)	629	0	0.000	2,007	691	0.000
Liquid assets in 1989 (mean)	4,868	2,228	0.015	12,124	6,051	0.002
Percentage with zero liquid assets in 1989	0.341	0.624	0.000	0.144	0.253	0.002
% w/liquid assets in 1989 < 10% of predicted house value*	0.844	0.959	0.000	0.782	0.880	0.000
Parent wealth in 1988 (median)	25,757	0	0.000	132,091	66,046	0.000
Parent wealth in 1988 (mean)	53,865	39,534	0.063	185,520	135,233	0.001
Sample size	157	617		289	412	

All variables are reported as of 1991, unless otherwise specified. Data weighted using PSID core sample weights.

The *p*-values report the significance of a *t*-test that the means of the variables of the black households that applied are equal to the means of the variables for black households that did not apply. The same test was applied to the means of white households that did and did not apply for a mortgage.

\* See text for discussion of method used to predict the expected size of the house that the renters would purchase.

presents the means of demographic, income, and wealth variables for the households in the renter sample by race and by whether the household applied for a mortgage between 1991 and 1996. Within both races, households that were more educated, less likely to be female headed, more likely to be married, less likely to have gotten divorced, and that were more likely to have experienced an increase in family size were more likely to apply for a mortgage. Also, renters who attempted to transition into home ownership had both higher and more-stable income streams over the 1991–1996 time period.

Table 4 also examines own household and parental wealth. Households that applied for a mortgage during our sample had higher levels of net worth, higher levels of liquid assets, and higher parental wealth. We report the percentage of renter households whose wealth in 1989 was less than 10% of their predicted house value for both those who did and did not apply, by race. The means of these predicted house values were \$50,942 and \$86,842 for black and white households, respectively. The results show that a large fraction of both black and white households were down-payment constrained in 1989, and people who applied for loans were much less likely to be drawn from this group.<sup>24</sup>

<sup>24</sup> The large number of households that applied for a mortgage with liquid wealth in 1991 less than 10% of its predicted home value is consistent with the evidence that many new homeowners receive gifts to help with their down payments (Mayer & Engelhardt, 1996) or with the fact that households do a majority of their saving for the down payment in the year prior to home ownership (Haurin et al., 1997).

Table 5 analyzes the racial gap in application rates outlined in table 3. The regressions in this and all subsequent tables were weighted using the appropriate sample weights. The first column of the table shows that there is a raw racial applications differential of 19.7 percentage points. The second column adds controls for the household's age and level of educational attainment. Older, less-educated renters were less likely to apply for a mortgage on a home during the 1991–1994 period. However, neither of these controls significantly reduced the estimated racial gap in applications.

In the third column of table 5, we include a series of demographic characteristics measuring household stability which, as previously noted, is likely to predict a household's desire to own a home. Households that were initially married in 1991 or who became married between 1991 and 1996 were more than thirty percentage points more likely to buy a home during our sample frame. Likewise, a renter who was initially married in 1991 but was divorced by 1996 was just less than thirty percentage points less likely to transition into home ownership. Having a child during the time period also increased the probability of applying for a home mortgage loan. None of these coefficients are surprising. Adding these controls for household family structure stability causes the coefficient on race in the apply equation to fall from  $-0.166$  (column II) to  $-0.082$  (column III), an additional decline of 50%. More than 58% of the initial race gap in the decision to become a homeowner can be explained by simple demographics. Adding the controls for

TABLE 5.—LINEAR PROBABILITY REGRESSION OF MORTGAGE APPLICATION DECISION (1,475 OBSERVATIONS)

	I	II	III	IV
Black	-0.197 (0.029)	-0.166 (0.028)	-0.082 (0.027)	-0.083 (0.030)
Age in 1991 between 20 and 30		0.078 (0.041)	0.050 (0.041)	0.049 (0.042)
Age in 1991 between 30 and 40		0.098 (0.041)	0.101 (0.041)	0.101 (0.041)
Age in 1991 between 40 and 50		0.051 (0.046)	0.055 (0.044)	0.048 (0.044)
Education < high school		-0.182 (0.039)	-0.145 (0.037)	-0.155 (0.039)
Education = only high school		-0.101 (0.032)	-0.099 (0.030)	-0.108 (0.031)
Education = only some college		-0.065 (0.034)	-0.034 (0.032)	-0.042 (0.033)
Female household head in 1991			-0.006 (0.029)	-0.007 (0.030)
Married in 1991			0.312 (0.034)	0.308 (0.034)
Became married, 1991–1996			0.313 (0.046)	0.312 (0.047)
Became divorced, 1991–1996			-0.276 (0.058)	-0.276 (0.058)
Number of children in 1991			-0.015 (0.013)	-0.016 (0.013)
Did number of children in household increase between 1991 and 1996?			0.121 (0.033)	0.122 (0.034)
Did number of children in household decrease between 1991 and 1996?			-0.036 (0.037)	-0.037 (0.037)
Location controls*	No	No	No	Yes
Constant	0.350 (0.014)	0.352 (0.043)	0.211 (0.046)	0.272 (0.077)
Adjusted R <sup>2</sup>	0.034	0.052	0.178	0.178

Standard errors are in parenthesis.

All regressions in table 5 are weighted using 1996 PSID core weights.

Sample restricted to renters in 1991 who remained in sample through 1996 and who were between the ages of 20 and 60.

\* Location controls include region and urbanicity dummies, mean income of the ZIP code in which the household rented in 1991, and the percentage of households with income under \$15,000 in the ZIP code in which the household rented in 1991. See text for details.

the community characteristics described in the previous section had essentially no effect on the race coefficient.<sup>25</sup>

In column V of table 5, we add the husband and wife's marginal tax rates to the model in column IV. The results indicate that an increase in the marginal tax rate from 15% to 28% increases a household's probability of applying for a mortgage by 9.5 percentage points. Given the large marginal tax rate differences between black and white families, adding this variable to the model causes the race coefficient to fall by an additional 24% (from  $-0.083$  to  $-0.063$ ). Even though the race coefficient falls, the gap still remains statistically different from zero.

Column VI of table 5 adds permanent income. Household income enters with the predicted positive sign and is highly statistically significant from zero ( $p$ -value = 0). A \$10,000 increase in permanent income increases the household's probability of applying for a mortgage by 8.3 percentage points.<sup>26</sup> Adding income to the model causes the coefficient of the marginal tax rate variable to fall by 86% and to no longer be statistically different from zero. But adding income causes only a slight additional reduction in the race coefficient (from  $-0.063$  to  $-0.058$ ). That adding income so dramatically lowers the effect of marginal tax rate is not surprising given the high degree of collinearity between these two variables. Furthermore, the collinearity between income and education, and between family instability and the marginal tax rate, may also explain why adding income to the model produces only a slight further reduction in the race coefficient. Later, we attempt to isolate the separate effects of these variables.

<sup>25</sup> Additionally, controls for rent paid do not change the unexplained race coefficient in the application regressions at all. This is true whether we use actual rents paid or residuals from a rent equation.

<sup>26</sup> Both income and income squared were included in our model. The marginal effect of the \$10,000 reported was computed around the mean income for our sample.

We next add several additional variables that should affect households' desires for home ownership. Whether the household was unemployed between 1991 and 1996, whether the household was a frequent mover during the 1984–1991 period, and whether the household experienced some sort of financial distress during the 1991–1996 period are all associated with a lower probability of applying for a mortgage, although only unemployment experience and severe financial distress have statistically significant effects. Interestingly, adding these controls actually caused the race coefficient to increase slightly from  $-0.058$  to  $-0.065$ .

Column VIII of table 5 controls for whether the household was liquidity constrained in making its down payment as of 1989. Households with wealth lower than 10% of its predicted home value in 1989 were 10.9 percentage points less likely to apply for a home, all else being equal. This result is consistent with the existing literature on down-payment constraints.<sup>27</sup> Interestingly, controlling for this down-payment constraint effect does little to the estimated race coefficient. Again, this may be because of collinearity between wealth and income, education, family, and job instability.

In the full specification in column VIII, a large and statistically significant race gap remains in the decision to apply for a mortgage. Although the race coefficient fell by 68% from its initial level (from  $-0.197$  to  $-0.056$ ) once controlling fully for household wealth, income, marginal tax rates, demographics, and income and marital instability, a gap of 6.3 percentage points still remains. This gap is statistically different from zero at close to the 1% confi-

<sup>27</sup> The results are both quantitatively and qualitatively similar using down-payment cutoffs of 3%, 5%, and 20%. With a large percentage of households holding essentially zero liquid wealth, the robustness of this result to different down-payment constraints is not surprising.

	V*	VI*	VII*	VIII*
Black	-0.063 (0.029)	-0.058 (0.029)	-0.065 (0.029)	-0.063 (0.029)
Include age, education, family structure and location controls?	Yes	Yes	Yes	Yes
Marginal tax rate	0.731 (0.133)	0.103 (0.172)	0.082 (0.171)	0.070 (0.170)
Mean family income, 1990-1994 * 10 <sup>5</sup>		0.847 (0.191)	0.750 (0.195)	0.689 (0.195)
Mean family income, 1990-1994 squared * 10 <sup>10</sup>		-0.367 (0.160)	-0.306 (0.162)	-0.275 (0.162)
Unemployed 1991-1996			-0.056 (0.024)	-0.053 (0.024)
Mild financial distress 1991-1996			-0.034 (0.024)	-0.031 (0.025)
Severe financial distress 1991-1996			-0.168 (0.095)	-0.168 (0.095)
Proportion of years changed residence between 1984-1991			-0.050 (0.043)	-0.038 (0.044)
Liquid wealth in 1989 less than 10% of predicted 1991 house value				-0.109 (0.033)
Constant	0.163 (0.079)	0.100 (0.080)	0.151 (0.083)	0.216 (0.084)
Adjusted R <sup>2</sup>	0.192	0.210	0.215	0.234

\* All regressions in table 5 columns V-VIII included all the controls reported in column IV of table 5. The coefficients, except for the race dummy, were suppressed to save space. A full model is presented in appendix table A2.

dence level. In the next section, we attempt to explore the role of parental wealth on this gap.

**VI. Transition into Home Ownership: The Differing Role of Families**

For people who bought houses between 1991 and 1996, the PSID inquired about the source of the down payment. Respondents were presented with several categories and were asked to check all that applied. The main categories were assistance from family, own savings, and “other.” The first row of table 6a reveals the large role that family assistance played in helping whites finance their down payments. Only 54% of whites paid for their down payments entirely with their own savings. Fully 15% got their down payments entirely from their families, and more than a quarter of all white home buyers (27%) got some help from their families in coming up with the down payment. Including the “other” category, 45% of white households had resources other than their own saving to purchase a home.

The picture was much different for blacks who purchased homes. Almost 90% came up with their down payments entirely from their own savings, only 6% relied entirely on help from family, and virtually none of those who used savings got any family help as well. Thus, whites were, on average, four times more likely than blacks to receive some help from their parents in coming up with their down payment. This is suggestive of a very large role indeed for endowments. If blacks anticipate that they will be on their own when they try to get a house, they will be less likely to apply for mortgages. And, because it takes time to save for a down payment, young blacks will be loathe to apply for mortgages and blacks will enter home ownership status later in life.

In table 6b, we more formally study family assistance differences. These regressions are linear probability estimates of whether the household received any help from their family when financing its down payment. As seen in table 6a, the unconditional gap is quite large. Adding controls for the child’s age and their level of income causes the race gap to fall slightly, but the gap is still large and statistically different from zero. Blacks are less likely to receive help from their families in financing their mortgage down payment even when the own income and simple demographics are controlled for.

These results provide suggestive evidence regarding the role that family assistance might play in the relatively lower transition of blacks into home ownership. If a mortgage applicant cannot demonstrate that she has a down payment, the application is very unlikely to be accepted. Because all potential applicants know this, and because blacks appear to be much less likely to get help from their parents than are whites, black renters with given levels of personal wealth and income should be less likely to apply for mortgages in the first place relative to whites to whom they appear identical.

The evidence that black and white renters would receive different levels of family assistance is suggestive only because the statistics in tables 6a and 6b are restricted to the sample of blacks and whites who actually bought houses. These people applied for mortgages and had their applications accepted, and they may differ fundamentally from persons who did not even bother to apply. But, under the assumption that the people most likely to pass through these two steps are those whose anticipation of family assistance is the highest, then the race gaps that we have estimated might well be underestimates of the degree to which blacks and whites can rely on assistance from others.

TABLE 6A.—SOURCES OF HOUSEHOLD MORTGAGE DOWN PAYMENTS

	Percentage Solely From Savings	Percentage Solely From Family	Percentage Solely From Other	Percentage From Both Saving and Family
White	0.55	0.14	0.18	0.13
Black	0.88	0.06	0.05	0.01

TABLE 6B.—LINEAR PROBABILITY ESTIMATES OF WHETHER HOUSEHOLD RECEIVED ANY DOWN PAYMENT HELP FROM FAMILY

	I	II	III
Household head black	-0.195 (0.083)	-0.210 (0.084)	-0.145 (0.080)
Age in 1991 between 20 and 30		0.183 (0.135)	0.243 (0.137)
Age in 1991 between 30 and 40		0.276 (0.137)	0.298 (0.136)
Age in 1991 between 40 and 50		0.294 (0.149)	0.344 (0.150)
Mean family income, 1991–1996 * 10 <sup>5</sup>			0.965 (0.565)
Mean family income, 1990–1994 squared * 10 <sup>10</sup>			-0.660 (0.521)
Constant	0.264 (0.029)	0.043 (0.129)	-0.269 (0.200)
Adjusted R <sup>2</sup>	0.018	0.032	0.069

The entries in table 6a and 6b are for 1991 renters who bought homes by 1996. See text for discussion. Data are from the PSID. Twenty-five percent of new homeowners did not respond as to where they got their down payment.

We do not and cannot observe what type of down-payment help people who did not apply would have received from their families if they had applied, but we can determine whether the parents of the blacks and whites renters that we study were in a similar position to help their children. Not surprisingly, there was a large difference in these parental wealth levels by race. From table 1, for our sample of renters, the average parental net worth of black households was about \$42,000 and the average parental net worth for white households was \$181,000. When we add these parental wealth measures to a set of regressions like those in table 6b, the racial gap in the likelihood of receiving down-payment assistance falls by one-quarter and the parental wealth numbers were highly statistically significant.

In table 6c, we include the parental wealth numbers directly into the mortgage application regression we ran in column VIII of table 5.<sup>28</sup> One can think of the parental wealth measure as capturing the capacity of parents to assist with a down payment. If family assistance plays a large role in explaining the home ownership transitions gap, the parental wealth measures should cause the race gap in applications to fall. Table 6c reveals that this is indeed what occurs. The parental wealth variable was strongly significant in the application equation, whereas the race coefficient was much smaller and no longer significant at any standard significance level. As predicted, the addition of the parental wealth variable causes the point estimate of the remaining race gap to fall from -0.063 to -0.049, an additional 29% decline. The inclusion of this variable explains approximately an additional 7% of the original racial gap in applications.

The results in these three tables argue for a strong explanatory role for family assistance in analysis of the different home ownership transitions of blacks and whites.

## VII. Summarizing Roles of Alternative Factors on Applications Gap

Tables 7a and 7b represent two attempts to summarize the effect of the different factors we have studied on the racial gap in the probability of mortgage application. As evidenced from table 5, one problem we face in summarizing the various effects is the strong collinearity among the vari-

ables. We use two approaches. Table 7a shows the estimated race coefficient and  $R^2$  from a series of application regressions in which the regressors are only the race dummy variable and the variables associated with one particular factor. The first row of the table shows that the raw race gap is 19.7%. When only age and education controls are added, the estimated race gap falls by 3.1 percentage points (or 15.7%). This reduction in the race gap pales in comparison to what is observed when income, family structure controls, or user cost measures are controlled for separately. The reductions in the gap are 63.5%, 46.7%, and 44.2%, respectively, from regressions that control only for race and one of these variables. Likewise, as shown previously, parental wealth has strong predictive power on the racial gap in applications. The addition of only parental wealth causes the racial gap in applications to fall by more than 25%. None of the other factors lowers the race gap by more than 13% in the simple regressions.

Table 7b answers a different thought experiment from that presented in table 7a. Specifically, we ask “How much would the race coefficient rise if variables associated with a particular factor were removed from the full model presented in table 6c?” Table 7b shows results qualitatively very similar to those in table 7a: separately removing controls for family structure, income, user costs, and parental wealth have the largest effect on the estimated race coefficient. If variables summarizing family structure are removed from the full regression, the unexplained race gap rises by 4.3 percentage points (an increase of almost 88%). The percentage point increases for income and user costs are similarly nontrivial (0.8 and 1.0, respectively). The results for parental wealth are particularly noteworthy: removing parental wealth from the full model (as seen from tables 5 and 6c) causes the racial gap in applications to increase by 1.4 percentage points. This suggests two things: that there is a large difference between blacks and whites in their ability to depend on their families for down-payment

TABLE 6C.—LINEAR PROBABILITY ESTIMATE OF APPLICATION DECISION CONTROLLING FOR PARENTAL WEALTH

Variable	Coefficient
Black	-0.049 (0.034)
Parental wealth in 1988 * 10 <sup>7</sup>	0.758 (0.406)
R <sup>2</sup>	0.245

Regression includes all controls in column VIII of table 5. Full model reported in appendix table A2. See text for discussion.

<sup>28</sup> We present the full model with all controls, including parental wealth, in appendix table A2.

TABLE 7A.—SUMMARY I: ESTIMATED RACE COEFFICIENT FOR ALTERNATIVE MORTGAGE APPLICATION REGRESSIONS

Regression Controls	Race Coefficient	Percentage Change in Absolute Value of Race Coefficient From Regression I	Adjusted $R^2$ from Regression
I: Race only	-0.197 (0.027)	NA	0.034
II: Race plus age/education controls	-0.166 (0.028)	-15.7%	0.052
III: Race plus family structure controls	-0.105 (0.027)	-46.7%	0.162
IV: Race plus location controls	-0.171 (0.030)	-13.2%	0.041
V: Race plus user cost controls	-0.110 (0.028)	-44.2%	0.085
VI: Race plus income controls	-0.072 (0.027)	-63.5%	0.138
VII: Race plus variability of earnings controls	-0.184 (0.027)	-6.6%	0.052
VIII: Race plus own-wealth controls	-0.176 (0.027)	-10.7%	0.054
IX: Race plus parental wealth controls	-0.144 (0.029)	-26.9%	0.058

All regressions were estimated using linear probability models. (Sample size: 1,475.) Standard errors are in parenthesis. Sample composition: All renters in the PSID in 1991 between the ages of 20 and 60 who were in the PSID in all years between 1991 and 1996. All data weighted using PSID core sample weights.

- *Age and education controls* includes three dummies, respectively, for whether the household head was in his/her twenties, thirties, or forties, and includes three additional dummies for whether the head's education was less than high school, exactly high school, or some college.
- *Family structure controls* include dummies for whether the household head is currently married, is female, became married over the sample period, and became divorced over the sample period and a measure of children in the household in 1991.
- *Location controls* include mean income of the ZIP code in which the household rented in 1991, the percentage of households with income under \$15,000 in the ZIP code in which the household rented in 1991, and dummies for whether or not the household was in a large urban area, a small urban area, or a large rural area (small rural area omitted).
- *User cost controls* include the head and wife's marginal tax rate in 1991.
- *Income controls* include average family labor income between 1991 and 1996 and average family income squared.
- *Additional variability of earnings controls* include whether the household experienced an unemployment spell between 1991 and 1996, whether its experienced severe or mild financial distress between 1991 and 1996, and its own ex post probability of moving in a given year.
- *Down-payment constraint* is a dummy for whether the household had liquid wealth less than 10% of predicted house value.
- *Parental wealth controls* include the combined wealth of the head and wife's parents in 1988.

assistance, and that this help significantly makes mortgage application more likely.

Why then, do both tables show that own wealth, as measured by whether a household has enough wealth to finance a down payment by itself, does not have a large effect on the applications gap? The regression results from table 5 indicate that being down-payment constrained negatively effects application probability. Thus, the only explanation for the results in table 7 is that there is not a large racial difference in whether own wealth, as measured as liquid assets in 1989, makes a household down-payment constrained.

In summary, differences between blacks and whites in their income streams, in family instability, and in the capacity to rely on assistance from their families in generating down payments are the largest reason for the race gap in mortgage application. There is still an unexplained gap of 4.9 percentage points in applications probability (although the gap is not statistically different from zero). In the next section, we examine whether blacks are treated differently by mortgage lenders. Any such difference can cause discouragement among blacks, thus possibly accounting for the remaining small unexplained applications gap.

### VIII. Transitions into Home Ownership: The Rejections Gap

Differential treatment from lending institutions for those who do apply for loans obviously has a direct effect on home ownership transition probability. Because of what we have called the *discouragement effect*, there may also be an indirect feedback effect in that anticipating being rejected makes one less likely to apply in the first place. Although it is impossible to obtain direct individual estimates of a discouragement effect, this possible consequence of differential treatment by lending institutions should be kept in mind in what follows.

Table 8 presents the results of a series of linear probability estimates of the probability of having the mortgage application for a first home be rejected. The first column presents the raw race differential: blacks are 8.9 percentage points more likely than whites to have the applications rejected. When we add controls available in most household surveys, the race gap falls somewhat, but remains large at 7.8 percentage points. The main question raised by results such as those in the first two columns is whether the race gap reflects unequal and possibly unfair treatment or

TABLE 7B.—SUMMARY II: ESTIMATED RACE COEFFICIENT FOR ALTERNATIVE MORTGAGE APPLICATION REGRESSIONS

Regression Controls	Race Coefficient	Percentage Change in Absolute Value of Race Coefficient From Regression I	Adjusted $R^2$ from Regression
I: Full Model from Table 6c	-0.049 (0.034)	NA	0.245
II: Full model less age/education controls	-0.051 (0.032)	4.1%	0.234
III: Full model less family structure controls	-0.092 (0.031)	87.8%	0.186
IV: Full model less location controls	-0.048 (0.034)	-2.0%	0.244
V: Full model less user cost controls	-0.057 (0.030)	16.3%	0.230
VI: Full model less income controls	-0.059 (0.031)	20.4%	0.219
VII: Full model less earnings variability controls	-0.046 (0.034)	-6.1%	0.239
VIII: Full model less own-wealth controls	-0.055 (0.032)	12.2%	0.228
IX: Full model less parental wealth controls	-0.063 (0.029)	28.6%	0.235

TABLE 8.—LINEAR PROBABILITY ESTIMATE OF BEING REJECTED FOR A MORTGAGE LOAN: (498 OBSERVATIONS)

	I	II	III
Black	0.089 (0.039)	0.078 (0.041)	0.063 (0.037)
Age in 1991 between 20 and 30		0.153 (0.057)	0.116 (0.056)
Age in 1991 between 30 and 40		0.101 (0.058)	0.061 (0.057)
Age in 1991 between 40 and 50		0.039 (0.063)	0.001 (0.062)
Education in 1991 < high school		-0.030 (0.049)	-0.049 (0.054)
Education in 1991 = only high school		0.072 (0.032)	0.073 (0.034)
Education in 1991 = only some college		0.024 (0.035)	0.046 (0.035)
Female head in 1991		-0.058 (0.046)	-0.006 (0.046)
Married in 1991		-0.096 (0.037)	-0.071 (0.038)
Became married, 1991–1996		0.002 (0.045)	0.028 (0.045)
Became divorced, 1991–1996		0.156 (0.084)	0.129 (0.091)
Mean family income, 1990–1994 * 10 <sup>5</sup>			0.365 (0.205)
Mean family income, 1990–1994 squared * 10 <sup>10</sup>			-0.268 (0.161)
Unemployed any time between 1991 and 1996?			0.087 (0.031)
Experienced mild financial distress 1991–1996?			0.030 (0.033)
Experienced extreme financial distress 1991–1996?			0.155 (0.145)
Declared bankruptcy between 1985 and 1995?			-0.034 (0.052)
Owned a bank account in 1989?			-0.134 (0.039)
Net worth less than zero in 1989?			0.076 (0.048)
Net worth equal to zero in 1989?			-0.137 (0.152)
Down-payment constrained: liquid assets greater than zero and less than predicted house value			0.064 (0.042)
Constant	0.086 (0.014)	0.006 (0.065)	-0.002 (0.085)
R <sup>2</sup>	0.008	0.055	0.107

Sample: Households in rental sample that applied for a mortgage between 1991 and 1996 and that were between the ages of 20 and 60.  
Regressions weighted using 1996 PSID core sample weights. Standard errors in parenthesis.  
See text for description of our measures of financial distress and our net worth measure.

whether they reflect differences, by race, in credit worthiness that financial institutions but not the analyst are able to observe.

The third column in the table adds a set of variables that are likely to be strongly associated with credit worthiness and that are typically not available in most household surveys. Having experienced a bout of unemployment and having experienced self-assessed “financial distress” both raise the likelihood that a mortgage application will be rejected, as does the absence of significant net worth.<sup>29</sup> The effect of owning a checking account is what one would expect. Households with checking accounts are more likely to establish credit histories with lending institutions and are more likely to be financially sophisticated. Oddly, having declared bankruptcy has no statistically significant effect on the probability of rejection, although this effect is compromised by the tiny number of people in the sample who both had this experience and applied for a mortgage. Even with all these additional controls for credit worthiness, the race coefficient remains large (0.063 percentage points) and is still statistically different from zero.

The main point in column III is that the large, unexplained racial gap in rejection rates remains after all of these controls are added. This result reproduces the results from Munnell et al. (the 1996 Boston Fed study) on a sample of

different design and with different controls for credit worthiness. We find that blacks are 73% more likely to be rejected than are whites, whereas the Boston Fed study reports an 80% greater rejection probability for blacks. It is clear that part of the racial gap in home ownership transitions derives from the fact that black mortgage applicants are more likely to be rejected. But, because rejection rates for both blacks and whites are very small, this effect accounts for a relatively small amount of the racial gap in the home ownership transitions.

Differential treatment from mortgage lenders may also account for some of the applications gap. We can only speculate about this, because we do not directly observe the rejection experience of people who did not apply for loans. In principle, we could use the results from the rejection equation to predict how every person would have fared had they applied. The problem is that we would need a convincing instrumental variable that affects only the application probability through its effect on anticipated rejection. Although we do not have such a variable, the very different rejection experiences of blacks and whites suggests that we cannot reject the notion that there is a type of discouragement feedback effect on applications.

The last set of regressions that we estimate test for racial differences in the terms of the mortgage contract. In 1996, the PSID asked households the current mortgage rate they were paying on their mortgage. Table 9 summarizes the results from an OLS regression predicting mortgage rate for our sample of renters in 1991 who acquired a home by 1996. The first column of table 9 provides the raw racial gap. Without any controls, black households who received a

<sup>29</sup> We included three dummy variables to capture net worth differences in applicants. First, we included a dummy variable indicating whether the household had negative net worth. In this case, our net worth measure is the same used by Hurst et al. (1998). Second, we included a control for whether the household had zero net worth in 1989. Finally, we included a dummy indicating whether the household had enough wealth between zero and the standard 10% down payment on a typical home in 1989.

TABLE 9.—OLS REGRESSION OF INTEREST RATES PAID FOR NEW HOMEBUYERS (328 OBSERVATIONS)

	I	II
Black	-0.272 (0.260)	-0.280 (0.258)
Age in 1991 between 20 and 30		1.11 (0.44)
Age in 1991 between 30 and 40		1.26 (0.44)
Age in 1991 between 40 and 50		1.48 (0.47)
Education in 1991 < high school		0.863 (0.375)
Education in 1991 = only high school		0.280 (0.204)
Education in 1991 = only some college		0.001 (0.207)
Married in 1991		0.368 (0.197)
Became married, 1991–1996		0.416 (0.249)
Became divorced, 1991–1996		0.400 (0.649)
Mean family income, 1990–1994 * 10 <sup>5</sup>		0.680 (1.30)
Mean family income, 1990–1994 squared * 10 <sup>11</sup>		-0.371 (10.2)
Unemployed any time between 1991 and 1996		0.058 (0.200)
Experienced mild financial distress 1991–1996?		0.486 (0.205)
Experienced extreme financial distress 1991–1996?		-1.46 (1.00)
Declared bankruptcy between 1985 and 1995?		0.645 (0.348)
Household secure a variable rate mortgage?		-0.932 (0.208)
Household secure an FHA mortgage?		-0.390 (0.183)
Household secure another government subsidized mortgage?		-0.829 (0.433)
Time dummies included?	No	Yes
Constant	7.91 (0.26)	7.25 (0.61)
R <sup>2</sup>	0.003	0.201

Sample: Households in rental sample that applied for a mortgage between 1991 and 1996 and that were between the ages of 20 and 60.

Regressions weighted using 1996 PSID core sample weights. Standard errors in parenthesis. See text for description of our measures of financial distress and our net worth measure.

mortgage did not pay a significantly higher interest rate, on average, than did white households. The results remain robust when additional controls are added. Controlling for the type of loan, standard income and demographic measures, measures of credit history and year dummies, and whether the loan is government subsidized, black households who were able to secure a mortgage paid similar interest rates as did their white counterparts. Not surprisingly, less-educated households, households with a fixed mortgage rate, households that became divorced, and households that experienced financial distress were more likely to pay higher mortgage rates. Even though we find evidence that blacks were less likely to apply and more likely to be rejected, we find no evidence that blacks face different mortgage terms conditional on securing a mortgage.

## IX. Conclusion

This paper studies the difference in the transition into home ownership by 1996 for a sample of blacks and whites who were all initially renters in 1991. New data from the

Panel Study of Income Dynamics allows us to decompose home ownership transitions into two parts: renters' decisions to attempt to buy homes and lenders' decisions whether to accept the households' mortgage applications. Overall, 32% of white renter households acquired a home by 1996, whereas only 13% of black households did. Whereas 35% of white renters had applied for mortgage financing as of 1996 (of which 8.6% were rejected), only just over 15% of blacks renters applied for a mortgage, of which 17.5 percent were rejected.

After controlling for income, income volatility, demographic factors, and a set of variables from the 1996 PSID Financial Distress Supplement that are likely strongly correlated with banks' estimates of an applicant's credit risk, we are able to explain only about 30% of the raw racial difference in the probability of mortgage application rejection. However, we find no racial difference in the terms of the mortgage offered to households who had their mortgage application approved. A 73% greater marginal likelihood of having a mortgage application declined for blacks would seem to suggest that differential treatment from lenders is a major reason for the race gap in home ownership transitions, but tiny difference between blacks and whites in overall rejection rates implies that this is not the case.

The racial gap in mortgage applications was the primary reason for the racial difference in home ownership transitions. Theory predicts that racial differences in marginal tax rates and income, in rental market outcomes, in the demand for a constant housing stock over time, and in the expected return on housing should explain the racial application gap. We find that these factors—particularly income and variables summarizing family stability—do indeed explain approximately two-thirds of the racial gap in applications.

We believe that there might be two sources of discouragement in the applications process for which we are not able to directly control, but for which we offer some suggestive evidence. First, if households are forward-looking and the application process is costly, anticipated differential treatment in the lending market may discourage some black families from applying. Second, it appears that assistance from parents and other family members play a large role in whether or not a household acquires a mortgage. Twenty-seven percent of white households that purchased a home had help with their down payments from their families. By contrast, only 7% of black households received help from their families. These differences are particularly salient in view of another result indicating that blacks are less likely than whites to have enough liquid wealth to finance down payments. When we control for the level of parental wealth among the renters, the race gap in applications falls significantly, with the parental wealth level being positive and statistically significant. These results suggest that differences in wealth between previous generations of blacks and whites might have persistent effects, in the sense that the wealth levels of blacks and whites today may be heavily affected by them.

Our results raise an important policy question about the best way to generate higher home ownership rates among blacks. Historically, those concerned about the racial difference in home ownership rates have emphasized the treatment that blacks receive from banks when they apply for loans. Although we do find some evidence that blacks seem to be treated differently in lending markets, our results show that a majority of the racial difference in home ownership rates is due to racial differences in the propensity to apply. The strong results we find that blacks have difficulty generating a down payment, either from drawing upon their own or their parents' wealth, suggests that developing policies aimed at helping to relax these constraints may help close both the black-white home ownership gap and, to the extent that home ownership is important in generating or maintaining savings, the black-white wealth gap.

## REFERENCES

- Aigner, Dennis J., and Glen Cain, "Statistical Theories of Discrimination in Labor Markets," *Industrial and Labor Relations Review* 30:2 (1977), 175–187.
- Artle, Roland, and Pravin Varaiya, "Life Cycle Consumption and Home Ownership," *Journal of Economic Theory* 18:1 (1978), 38–58.
- Attanasio, Orazio, "The Intertemporal Allocation of Consumption: Theory and Evidence," NBER working paper no. 4811 (1994).
- Barsky, Robert, John Bound, Kerwin K. Charles, and Joseph Lupton, "Understanding the Black-White Wealth Gap," University of Michigan working paper (2000).
- Berkovec, James A., Glenn B. Canner, Stuart A. Gabriel, and Timothy H. Hannan, "Discrimination, Competition, and Loan Performance in FHA Mortgage Lending," this REVIEW 80:12 (1998), 241–250.
- Blau, Francine D., and John W. Graham, "Black-White Differences in Wealth and Asset Composition," *Quarterly Journal of Economics* 30 (May 1990), 321–339.
- Black, Harold, Robert L. Schweitzer, and Lewis Mandell, "Discrimination in Mortgage Lending," *American Economic Review* 68:2 (1978), 25–53.
- Brueckner, Jan K., "The Down Payment Constraint and Housing Tenure Choice: A Simplified Exposition," *Regional-Science-and-Urban-Economics* 16:4 (1986), 519–525.
- Case, Karl, and Christopher Mayer, "Housing Price Dynamics Within A Metropolitan Area," *Regional Science and Urban Economics* (June 1996), 387–407.
- Charles, Kerwin, and Erik Hurst, "Intergenerational Correlations in Wealth," University of Chicago working paper (November 2000).
- Coate, Douglas, and James Vanderhoff, "Race of the Homeowner and Appreciation of Single-Family Homes in the United States," *Journal of Real Estate Finance and Economics* 7:3 (1993), 205–212.
- Collins, William J., and Robert A. Margo, "Race and Homeownership: 1900–1990," NBER working paper no. 7277 (1990).
- Engelhardt, Gary, "House Prices and Home Owner Saving Behavior," *Regional Science and Urban Economics* 26 (1996a), 313–336.
- "Consumption, Down Payments, and Liquidity Constraints," *Journal of Money, Credit and Banking* (May 1996b), 255–271.
- Engelhardt, Gary, and Christopher Mayer, "Gifts for Home Purchase and Housing Market Behavior," *New England Economic Review* (May/June 1994), 47–58.
- Fay, Scott, Erik Hurst, and Michelle White, "The Consumer Bankruptcy Decision," *American Economic Review*, forthcoming, 2001.
- Freddie Mac Special Report, "Freddie Mac National Consumer Credit Survey," 2000, <http://www.freddiemac.com/corporate/reports/ccceipoll.htm>.
- Gabriel, Stuart, and Gary Painter, "Paths to Homeownership: An Analysis of the Residential Location and Homeownership Choices of Black Households in Los Angeles," Lusk Center for Real Estate, University of Southern California working paper, 2000.
- Galster, George, "Comparing Loan Performance Between Races as a Test for Discrimination," *Cityscape: A Journal of Policy Development and Research* 2:1 (1996), 33–40.
- Green, Richard, "Should the Stagnant Homeownership Rate Be a Source of Concern," *Regional Science and Urban Economics* (June 1996), 337–368.
- Gyourko, Joseph, and Peter Linneman, "Analysis of the Changing Influences on Traditional Households' Ownership Patterns," *Journal of Urban Economics* 39:3 (1996), 318–341.
- "The Changing Influences of Education, Income, Family Structure and Race on Home Ownership by Age Over Time," *Journal of Housing Research* 8:1 (1997), 1–25.
- Gyourko, Joseph, Peter Linneman, and Susan Wachter, "Analyzing the Relationship Among Race, Wealth and Home Ownership in America," *Journal of Housing Economics* 8:2 (1999), 63–89.
- Haurin, Donald R., Patric H. Hendershott, and Susan M. Wachter, "Borrowing Constraints and the Tenure Choice of Young Households," *Journal of Housing Research* 8:2 (1997), 137–154.
- Hendershott, Patric, "Real User Costs and the Demand for Single Family Housing," *Brookings Papers on Economic Activity* 2 (1980), 401–444.
- Hendershott, Patric, and Joel Slemrod, "Taxes and the User Cost of Capital for Owner-Occupied Housing," *American Real Estate and Urban Economics Association Journal* (Winter 1983), 375–393.
- Henderson, Vernon, and Yannis Ioannides, "A Model of Housing Tenure Choice," *American Economic Review* 73:1 (1983), 98–113.
- Hurst, Erik, Ming Ching Luoh, and Frank P. Stafford, "The Wealth Dynamics of American Families, 1984–1994," *Brookings Papers on Economic Activity* 1 (1998), 267–337.
- Hurst, Erik, and Frank P. Stafford, "Home is Where the Equity Is: Liquidity Constraints, Refinancing and Consumption," University of Chicago working paper (2000).
- Juster, Thomas, Jim Smith, and Frank Stafford, "The Measurement and Structure of Household Wealth," *Labour Economics* 6:2 (1999) 253–275.
- Ladd, Helen F., "Evidence on Discrimination in Credit Markets," *Journal of Economic Perspectives* (Spring 1998), 223–234.
- Laibson, David, "Self-Control and Saving," unpublished doctoral dissertation, Massachusetts Institute of Technology (May 1996).
- "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics* 112:2 (1997), 443–477.
- Linneman, Peter, and Susan Wachter, "The Impacts of Borrowing Constraints on Homeownership," *American Real Estate and Urban Economics Association Journal* (Winter 1989), 389–402.
- Long, James E., and Steven Caudill, "Racial Differences in Home Ownership and Housing Wealth, 1970–1986," *Economic Inquiry* (January 1992), 83–100.
- Mayer, Christopher, "Taxes, Income Distribution, and the Real Estate Cycle: Why all Houses Do Not Appreciate at the Same Rate," *New England Economic Review* (May/June 1993), 39–50.
- Mayer, Christopher, and Gary Engelhardt, "Gift, Down Payments, and Housing Affordability," *Journal of Housing Research* 7:1 (1996), 59–77.
- Munnell, Alicia, Geoffrey M. B. Tootell, Lynn E. Browne, and James McEneaney, "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review* (March 1996), 25–53.
- Oliver, Melvin L., and Thomas M. Shapiro, *Black Wealth/White Wealth: A New Perspective on Racial Inequality* (London: Routledge, 1995).
- Ondrich, Jan, Alex Stricker, and John Yinger, "Do Landlords Discriminate? The Incidence and Causes of Racial Discrimination in Rental Housing Markets," *Journal of Housing Economics* 8 (1999), 185–204.
- Poterba, James, "Tax Subsidies to Owner-Occupied Housing: An Asset-Market Approach," *Quarterly Journal of Economics* (November 1984), 729–752.
- "House Price Dynamics: The Role of Tax Policy and Demography," *Brookings Papers on Economic Activity* 2 (1991), 143–199.
- Rosen, Harvey, "Housing Decisions and the U.S. Income Tax: An Econometric Analysis," *Journal of Public Economics* 11:2 (February 1979), 1–23.
- Ross, Stephen, "Flaws in the Use of Loan Defaults To Test for Mortgage Lending Discrimination," *Cityscape: A Journal of Policy Development and Research* 2:1 (1996), 41–48.
- Segal, Lewis, and Daniel Sullivan, "Trends in Home Ownership: Race, Demographics and Income," *Federal Reserve Bank of Chicago Economic Perspectives* 22:2 (1998), 53–72.

- Shafer, Robert, and Helen F. Ladd, *Discrimination in Mortgage Lending* (Cambridge, MA: The MIT Press, 1981).
- Smith, James P., "Racial and Ethnic Differences in Wealth," *Journal of Human Resources* 30:5 (1995), S158–S183.
- Weiss, Yoram, "Capital Gains, Discriminatory Taxes, and the Choice between Renting and Owning a House," *Journal-of-Public-Economics* 10:1 (1978), 45–55.
- Yinger, John, "Measuring Racial Discrimination with Fair Housing Audits: Caught in the Act," *American Economic Review* 76:5 (1986), 881–893.
- , "Why Default Rates Cannot Shed Light on Mortgage Discrimination," *Cityscape: A Journal of Policy Development and Research* 2:1 (1996), 25–32.

## APPENDIX

TABLE A1.—OLS REGRESSION OF HOUSE PRICES FOR ALL PSID HOMEOWNERS WITH A MORTGAGE OVER THE 1989–1993 WAVES (10,622 OBSERVATIONS)

Variable	Coefficient
Is household head black?	–15,611 (2,371)
Age of household head	–653 (711)
Age squared	13.7 (8.7)
Household head has only a high school degree?	9,367 (2,745)
Household head has only some college education?	16,722 (3,082)
Household head has a college degree or more?	27,051 (3,057)
Is household head married?	292 (2,132)
Is household head female?	–1,419 (2,762)
Number of children in household	1,241 (718)
Total family income	1.10 (0.06)
Total family income squared * 10 <sup>6</sup>	–2.34 (0.31)
Time dummies included?	Yes
Urbanicity dummies included?	Yes
Region dummies included?	Yes
Constant	73,220 (14,303)
Adjusted R <sup>2</sup>	0.468

Sample restricted to household heads aged 20–60.

Standard errors in parenthesis.

Regressions run on weighted PSID data using PSID core sample weights.

Urbanicity dummies represent Beale's urbanicity measure reported in the PSID, which categorize the size of the county in which the household resides.

TABLE A2.—LINEAR PROBABILITY REGRESSION OF MORTGAGE APPLICATION DECISION (FULL MODEL) (1,475 OBSERVATIONS)

	Coefficient	Standard Error
Black	–0.049	0.032
Dummy: age in 1991 between 20 and 30	0.056	0.047
Dummy: age in 1991 between 30 and 40	0.112	0.043
Dummy: age in 1991 between 40 and 50	0.031	0.045
Education in 1991 < high school	–0.071	0.043
Education in 1991 = only high school	–0.044	0.035
Education in 1991 = only some college	–0.022	0.036
Female head in 1991?	0.032	0.032
Married in 1991	0.221	0.040
Became married, 1991–1996	0.218	0.054
Became divorced, 1991–1996	–0.168	0.062
Number of children in household in 1991	–0.006	0.014
Did number of children in household increase between 1991 and 1996.	0.123	0.037
Did number of children in household fall between 1991 and 1996.	–0.096	0.038
Husband and wife's 1991 marginal tax rate	0.046	0.002
Mean family income, 1990–1994 * 10 <sup>5</sup>	0.634	0.227
Mean family income, 1990–1994 squared * 10 <sup>11</sup>	–0.218	0.183
Unemployed any time between 1991 and 1996	–0.055	0.026
Experienced mild financial distress 1991–1996?	–0.044	0.027
Dummy: experienced extreme financial distress 1991–1996?	–0.146	0.108
Proportion of years changed residence between 1984–1991	0.091	0.052
Liquid wealth in 1989 < 10% of predicted 1991 house value	–0.099	0.034
Parental wealth in 1988 * 10 <sup>7</sup>	0.758	0.406
Location controls included?	Yes	
Constant	0.147	0.098
R <sup>2</sup>	0.245	

Sample: Households in rental sample that applied for a mortgage between 1991 and 1996 and that were between the ages of 20 and 60.

Variables in bold indicate that they are statistically significant at the 5% level.

Regressions weighted using 1996 PSID core sample weights.

See text for description of our measures of financial distress and our net worth measure.