The Transition to Home Ownership and the Black-White Wealth Gap *

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February 2001

Abstract

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J.E.L.: R210, J150, E210

*We are grateful for comments from Mark Aguiar, Gary Becker, Eli Berman, Rebecca Blank, John Bound, Charles Brown, Sheldon Danziger, Steve Davis, Ronald Ehrengerg, 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.

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1 Introduction

The large disparity in wealth between black and white American families has been the subject of much recent discussion and research.[1] Why blacks have so much less wealth than whites remains an unsolved question, but the final answer will undoubtedly come from three sources. Since wealth is a function of the level and the timing of earned income received over the lifecycle, 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, since 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.[2]

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.[3] Because initial wealth levels affect whether individuals become home owners 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

[1] See Blau and Graham (1990), Oliver and Shapiro (1995), Smith (1995), Hurst, Luoh and Stafford (1998), and Barsky, Bound, Charles, and Lupton (2000).

[2] 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.

[3] Hurst, Luoh and Stafford (1998) document that over a third of total household non-pension 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 macro economics and finance. The relatively large costs associated with accessing home equity can prevent home owners 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 life-time utility. (See, Attanasio (1994), Laibson (1994), Laibson (1997), and Hurst and Stafford (2000)).

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, since a home is the single largest purchase most individuals make, and since owning a home may affect important, non-pecuniary outcomes, understanding the reasons for the racial home ownership gap is a matter of independent interest.[4]

This paper analyzes the transition into home ownership by 1996 for a sample of black and white households who are renters in 1991. Apart from the fact that we examine home ownership in the 1990's, 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 home owners by 1996, even after controlling for key variables such as the level of income, family demographics and household wealth

[4]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, etc.

in the years around 1991. Despite the fact that black mortgage applicants were 73 percent 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 home owners at a much lower rate than whites because they were so much less likely to *apply* for mortgages in the first place. Blacks were almost 20 percentage points less likely than whites to initiate a mortgage application, but this gap accounted for 93 percent 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 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 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 3, 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 4. Section 5 presents the results, and then we conclude.

2 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 and Linneman (1996), Collins and Margo (1999), Long and Caudill (1999)and Gabriel and 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 authors (Segal and Sullivan (1998), Collins and Margo(1999), and Long and Caudill (1999)) 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 paper 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 have typically not been the focus.

Important examples of work on individual level determinants of home owning include the extensive work done by Rosen (1979), Hendershott (1980), Jones(1989), Linneman and Wachter (1989), Engelhardt and Mayer (1994), Engelhardt (1996), 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 gener-

ated 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 home owner and positively related to the median house price. Haurin, Wachter and Hendershott (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, Linneman and Wachter (1999), using three different cross sectional data sources find that there are 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. While 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.[5] Despite

[5]Work on differential racial outcomes in the mortgage application process include Black et al. (1978); Schafer and Ladd (1981); Yinger (1986); and Gabriel and Rosenthal (1991). See Ladd (1998) and Yinger (1999) for thorough surveys of of work 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

consistent evidence of differential racial 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 un-measured differences across races in factors that could affect the profitability of the loan. The influential work of Munnel 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.[6]

This paper partially extends all of the results listed above, and studies other issues related to home ownership which 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 over 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

which draw this distinction are found in Galster (1996), Ross (1996), and Yinger (1996).

[6]Munnel 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 critism, 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 which treat different application as independent will find, misleadingly, that blacks are more likely than whites to be rejected, controlling for observables.

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 (1980)).

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

3 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 and Varaiya (1978), Weiss (1978), Rosen (1979), Hendershott (1980), Brueckner (1986), Poterba (1991), and Henderson and Ioannides (1993)).

3.1 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 home owners 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 U.S., 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 which relates home ownership transitions to different user cost measures.[7] 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 which 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 home owners. If a household is uncertain about the amount or location of housing it will demand in the future, then renting should be 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 which experience great fluctuation in income from year to year, or which 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

[7] See Hendershott and Slemrod (1983), Poterba (1984), Poterba (1991), Mayer (1993) and Green (1996) for theoretical discussions and empirical tests.

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 non-segmented, 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 and Mayer(1996), and Coate and 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.[8]

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.

[8]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.

3.2 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 they face. Like the net benefits described above, 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 home owners 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 twenty percent of the purchase price of a house, but are now often as low as 3 percent.[9] The 20 percent 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 non-trivial 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 their white counterparts.

[9]Even zero percent 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.

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.[10] We refer to this second effect as an "endowment" constraint.[11]

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 is systematic discrimination in mortgage lending markets.[12] 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 direct effect which 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 are systematic racial differences in any of the

[10] 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.

[11] Work by Mayer and Engelhardt (1996) find that assistance from loved ones to home buyers often was to enable them to meet the 20 percent threshold.

[12] 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 home owner will not be assessed the same level of "riskiness" by a bank which 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.

constraints we have discussed.[13]

3.3 Empirical Strategy

The empirical analysis focuses on a sample of persons from the *Panel Study of Income Dynamics, (PSID)*, aged between 20 and 60 in 1991, who were all renters in that year. We study differences among these people, by race, in the probability of becoming a home owner by 1996.[14] Our work studies differences in both the "desire" to become a home owner, 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

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

[13] 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 percent of blacks and 11 percent 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.

[14] While our use of individual level, longitudinal data improves upon much previous work, there is nonetheless the concern that the sample of renters 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.

In (1), "Black" is an indicator variable which denotes whether the family head is black. Our goal is to test whether γ_1 equals 0.

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. "Rent" 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 which 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* home owners with a mortgage aged 20 to 60 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.[15] With the coefficients from this regression, we

[15]This procedure is similar in spirit to that used by Haurin, Hendershott, and Wachter (1997). The R-squared 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

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,

$$R_i = \alpha_1 X_{2i} + \gamma_2 \text{Black} + \epsilon_2 \tag{2}$$

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 of controls for a households credit-worthiness. Though 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 the same basic form as (2) to determine whether there are any difference in the terms received 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 home owners 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 for we cannot know what down 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

a 3%, 5% and a 20% down payment rule. We discuss the results of these changes in specification in section 5.

parental wealth will be more likely to apply for a loan, all else equal. We find evidence for this proposition.

4 Data

We use data from the *Panel Study of Income Dynamics (PSID)*. The *PSID* is a large scale survey started in 1968 which tracks the socio-economic 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.[16] 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 non-pension wealth positions of the living parents of both household heads and their spouses. Parental wealth was coded as either negative or zero (one category) and as the level if it was positive.[17]

[16]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 over sample the "super-rich", the wealth distributions of the *PSID* and the *SCF* do not align for the top 1 percent 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, Luoh, and Stafford (1998) for a complete description of the wealth data.

[17]The households were asked "Suppose your parents were to sell off all their major possessions,

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 home owners and renters) about their recent experiences with mortgage lenders. All households which initiated a mortgage between 1991 and 1996 were asked about the size and source of the down payment was, how they found their lender, and about any previous relationships they had with their lender. Our analysis focuses on first time home buyers.

Households which 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.[18] 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 houehold may have experienced between 1991 and 1996.

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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 non-responses was extremely low. For those households who went through the brackets, parental wealth was assigned to the median of the bracket.

[18]The 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*.

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 a 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, leins, or repossessions. We also create a variable which indicates whether the household declared bankruptcy.[19]

The sample of renters consists of *PSID* households who: (a) are renters in 1991; (b) who are present in every year between 1991 and 1996 and (c) between the ages of 20 and 60 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 who are, on average, younger than the population at large. This also explains the relative 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,

[19]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 (1999) for a description of the *PSID* Bankruptcy Questions.

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 parent's who had less liquid wealth.[20] Interesting, there is no difference in the incidence of financial distress between black and white households.[21]

In the next section, we present the empirical results.

5 Results

5.1 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 percent of black household heads owned their own home, compared to a home ownership rate of 66 percent 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 13 percentage points.[22] Panel B looks at the value of homes, conditional on being a home owner. Not only are blacks less likely to own homes than whites, but when they do own, the

[20] The difference in the incidence of owning checking accounts across races has been well document. See Hurst, Luoh and Stafford (1998).

[21] This counter-intuitive 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.

[22] 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.

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.[23] The conditional black shortfall is just over $24,000 at the mean, and is about $8,000 at the median. When we add an indicator variable for whether the head is a home owner to the set of controls, the wealth gap at the means falls to only $14,580, (a decrease of 40 per cent) and disappears completely at the medians. As we emphasize above, 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 5 years period, not only did the black and white 1991 renters differ in the rates at which they became home owners, but they also differed in each of the antecedent steps. Thirty two percent of the white renters in 1991 had become home owners 5 years later, while less than thirteen percent of blacks had. When asked whether they had 'taken any steps to acquire a mortgage (considered getting a

[23] 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.

mortgage)', 37.2 percent of whites answered in the affirmative. Only 18.0 percent of blacks reported considering getting a mortgage. There was an equally dramatic difference in application rates. White renters were over 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 5 years, blacks were much more likely to be rejected than whites, though it is important to note that the overall rejection incidence was not particularly large for either blacks or whites. A simple decomposition shows that over 93 percent of the raw gap in transitions is due to differences in application probability, with only the remaining 7 percent due to differences in rejection rates.

5.2 Transitions Into Home Ownership - The Mortgage Applications Gap

Understanding the differences in racial transition into home ownership requires examination of both the mortgage application and rejection differences outlined in Table 3. We focus on the applications decision first. Table 4 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 who 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 to 1996 time period.

Table 4 also examines both own household and parental wealth. Households who applied for a mortgage during our sample had higher levels of net worth, higher levels of liquid assets and had higher parental wealth. We report the percentage of renter

households whose wealth in 1989 was less than 10 percent of their predicted house value for both those who did and did not apply, by race. The means of the predicted house values described above 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.[24]

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 noted above, is likely to predict a household's desire to own a home. Households who were initially married in 1991 or who became married between 1991 and 1996 were over 30 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 under 30 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

[24]The large number of households which applied for a mortgage with liquid wealth in 1991 less than 10 percent of the their predicted home value is consistent with the evidence that many new home owners receive gifts to help with their down payments (Mayer and 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, Hendershott, and Wachter (1997)).

decline of 50 percent. Over 58 percent of the initial race gap in the decision to become a home owner can be explained by simple demographics. Adding the controls for the community characteristics described in the previous section, had essentially no effect on the race coefficient.[25]

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 percent to 28 percent 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 percent (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=0.000). A $10,000 increase in permanent income increases the household's probability of applying for a mortgage by 8.3 percentage points.[26] Adding income to the model causes the coefficient of the marginal tax rate variable to fall by 86 percent, 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, 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.

[25]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.

[26]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 which should affect households' desires for home ownership. Whether the households 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 and 1996 period are all associated with a lower probability of applying for a mortgage, though 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 their down payment as of 1989. Households with wealth lower than 10 percent of their predicted home value in 1989 were 10.9 percentage points less likely to apply for a home, all else equal. This result is consistent with the existing literature on down payment constraints.[27] Interestingly, controlling for this down payment constraint effect does little to the estimated race coefficient. Again, this may be because of colinearity 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. While 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 6.3 percentage point gap still remains. This gap is statistically different from zero at close to the 1% confidence level. In the next section, we attempt to explore the role of parental wealth on this gap.

[27]The results are both quantatatively and qualatatively 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.

6 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 reveals the large role that family assistance played in helping whites who purchased homes finance their down payments. Only fifty-four percent of whites paid for their down payments entirely with their own savings. Fully fifteen percent got their down payments *entirely* from their families, and more than a quarter of all white home buyers - twenty-seven percent - got *some* help from their families in coming up with the down payment. Including the "other" category, forty-five percent of white households had resources other than their own saving to purchase a home.

The picture was much different for black who purchased homes. Almost 9 in 10 came up with their down payments entirely from their own savings. Only six percent 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, since 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 their 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 family in financing their mortgage down payment even when the own income and simple demographics are controlled for.

These results provide suggestive evidence about 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, then the application is very unlikely to be accepted. Since all potential applicants know this, and since blacks appear to be a lot less likely to get help from their parents than 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 only suggestive because the statistics in 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 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 under-estimates of the degree to which blacks and whites can rely on assistance from others.

While 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, 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 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.[28] 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, while 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 per cent decline. The inclusion of this variable explains approximately an additional 7 percent 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.

7 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

[28] We present the full model with all controls, including parental wealth, in Appendix Table A2.

the strong collinearity among the variables. We use two approaches. Table 7a shows the estimated race coefficient and R-squared 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 percent. When only age and education controls are added, the estimated race gap falls by 3.1 percentage points (or 15.7 percent). 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 percent, 46.7 percent and, 44.2 percent, respectively, from regressions which control only for race and one of these variables. Likewise, as shown above, 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 percent. None of the other factors lowers the race gap by more than 13 percent 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?" This table 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 percent). The percentage point increase for income and user costs are are similarly non-trivial (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 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 Tables 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 4.9 percentage point gap 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, possibly accounting for the remaining small unexplained applications gap.

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

The third column in the table adds a set of variables which are likely to be strongly associated with credit worthiness and which 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.[29] The effect of owning a checking account is what one would expect. Households with checking account 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, though 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 co-

[29]We included three dummy variables to capture net worth differences in applicants. First, we included a dummy variable indicating whether the household negative net worth. In this case, our net worth measure is the same used by Hurst, Luoh and Stafford (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.

efficient 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. (*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 whites, while the *Boston Fed Study* reports an 80 per cent 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, since 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 which only affects the application probability through its effect on anticipated rejection. While 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 we estimate test for racial differences in the terms of the mortgage contract. In 1996, the *PSID* asked households the current mortgage rate they are 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 mortgage did not pay a significantly higher interest rate, on average, than white households. The results remain robust when additional controls are added. Controlling for the type of loan, whether the loan is government subsidized, standard income and demographic measures, measures of credit history and year dummies, black households who were able to secure a mortgage paid similar interest rates as their white counterparts. Not surprisingly, less educated households, households with a fixed mortgage rate, households who became divorced, and households who 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.

9 Conclusion

This paper studies the difference in the transition into home ownership by 1996 for a sample of blacks and whites who are 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's mortgage applications. Overall, thirty-two percent of white renter households acquired a home by 1996, while only thirteen percent of black households did. Thirty-five percent of white renters had applied for mortgage financing as of 1996, of which 8.6 percent were rejected. Only just over fifteen percent 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* which are likely strongly correlated with banks' estimates of an applicant's credit-risk, we are able to explain only about thirty percent 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 percent 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 discouraged 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 who purchased a home had help with their down payment from their family. By contrast, only seven percent 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. While 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.

Bibliography

Aigner, Dennis J., and Glen Cain "Statistical Theories of Discrimination in Labor Markets," *Industrial and Labor Relations Review*, 30(2), Jan. 1977, 175-87.

Artle, Roland and Pravin Varaiya, "Life Cycle Consumption and Home Ownership," *Journal of Economic Theory*, June 1978, 18(1), 38-58.

Attanasio, Orazio, "The Intertemporal Allocation of Consumption: Theory and Evidence," *NBER Working Paper* #4811, 1994.

Barsky, Robert, John Bound, Kerwin K. Charles and Joseph Lupton "Understanding the Black-White Wealth Gap", unpublished manuscript, 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," *Review of Economics and Statistics*, 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*, May 1978, v68(2), 25-53.

Brueckner, Jan K, "The Down Payment Constraint and Housing Tenure Choice: A Simplified Exposition," *Regional-Science-and-Urban-Economics*, November 1986, 16(4), 519-25.

Case, Karl, and Christopher Mayer, "Housing Price Dynamics Within A Metropolitan Area", *Regional Science and Urban Economics*, June, 1996, pp 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*, November 1993, v7(3), 205-12.

Collins, William J. and Robert A. Margo, "Race and Home Ownership," *NBER Working Paper*, # 7277.

Engelhardt, Gary, "House Prices and Home Owner Saving Behavior," *Regional Science and Urban Economics*, 26, 1996, 313-336.

Engelhardt, Gary, "Consumption, Down Payments, and Liquidity Constraints," *Journal of Money, Credit and Banking*, May, 1996, 255-271.

Engelhardt, Gary and Christopher Mayer, "Gifts for Home Purchase and Housing Market Behavior," *New England Economic Review*, May/June, 1994, pp 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/cceipoll.htm.*

Gabriel, Stuart and Gary Painter, "Paths to Homeownership: An Analysis of the Residential Location and Homeownership Choices of Black Households in Los Angeles," Working Paper, 2000.

Galster, George, "Comparing Loan Performance Between Races as a Test for Discrimination," *Cityscape: A Journal of Policy Development and Research,*" February 1996, v2(1), 33-40.

Green, Richard, "Should the Stagnant Homeownership Rate Be a Source of Concern", *Regional Science and Urban Economics*, June, 1996, 337-68.

Gyourko, Joseph, and Peter Linneman, "Analysis of the Changing Influences on Traditional Households' Ownership Patterns," *Journal of Urban Economics*, May 1996, v39(3), 318-41.

Gyourko, Joseph, and Peter Linneman, "The Changing Influences of Education, Income, Family Structure and Race on Home Ownership by Age Over Time," *Journal of Housing Research*, 1997, v8(1), 1-25.

Gyourko, Joseph, Peter Linneman, and Susan Wachter, "Analyzing the Relationship Among Race, Wealth and Home Ownership in America," *Journal of Housing Economics*, 1999, v(8), 63-89.

Haurin, Donald R., Susan M. Wachter, and Patric H. Hendershott, "Wealth Accumulation and Housing Choices of Young Households: An Exploratory Investigation", *Journal of Housing Research*, 1997.

Hendershott, Patric, "Real User Costs and the Demand for Single Family Housing", *Brookings Papers on Economic Activity*, 1980:2.

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, 375-93.
Henderson, Vernon and Yannis Ioannides, "A Model of Housing Tenure Choice" *American-Economic-Review*, March 1983, 73(1), 98-113.

Hurst, Erik, Ming Ching Luoh, and Frank P. Stafford, "The Wealth Dynamics of American Families, 1984-1994," *Brookings Papers on Economic Activity*, 1998:1, 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*, 1999.

Ladd, Helen F. "Evidence on Discrimination in Credit Markets," *Journal of Economic Perspectives*, Spring 1998, Vol 1, 223-234.

Laibson, David "Self-Control and Saving," Ph.D. dissertation. Massachusettes Institute of Technology, May, 1996.

Laibson, David "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics*, 112(2), 1997, 443-77.

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.

.

Munnell, Alicia, Geoffrey M.B. Tootell, Lynn E. Browne, and James McEneaey, "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review*, March, 1996, 25-53.

Oliver, Melvin L. and Thomas M. Shapiro, *Black Wealth/White Welath: A New Perspective on Racial Inequality*, 1995, London: Routledge.

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*, 1999, v(8), 185-204.

Poterba, James "House Price Dynamics: The Role of Tax Policy and Demography," *Brookings Papers on Economic Activity*, 1991:2, 143-199.

Poterba, James "Tax Subsidies to Owner-Occupied Housing: An Asset-Market Approach", *Quarterly Journal of Economics*, November, 1984, 729-752.

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

Ross, Stephen, "Flaws in the Use of Loan Defaults To Test for Mortgage Lending Discrimination," *Cityscape: A Journal of Policy Development and Research*," February 1996, v2(1), 41-48.

Segal, Lewis and Daniel Sullivan, "Trends in home ownership: Race, Demographics and Income," *Federal Reserve Bank of Chicago Economic Perspectives*, 2nd Quarter 1998, v22(2), 53-72.

Shafer, Robert and Helen F. Ladd, *Discrimination in Mortgage Lending*, MIT-Harvard Joint Center for Urban Studies, Cambridge, MA, MIT Press, 1981.

Smith, James P., "Racial and Ethnic Differences in Wealth," *Journal of Human Resources*, 1995, v30(s), s158-83.

Weiss, Yoram, "Capital Gains, Discriminatory Taxes, and the Choice between Renting and Owning a House Author," *Journal-of-Public-Economics*, Aug. 1978, 10(1), 45-55.

Yezer, Anthony M. J., Robert F. Phillips, and Robert P. Trost, "Bias in Estimates of Discrimination and Mortgage Lending: The Effects of Simultaneity and Self-Selection," *Journal of Real Estate Finance and Economics*, November 1994, v9(4), 197-215.

Yinger, John, "Measuring Racial Discrimination with Fair Housing Audits: Caught in the Act," *American Economic Review*, March 1986, v76(5), 881-93.

Yinger, John, "Why Default Rates Cannot Shed Light on Mortgage Discrimination," *Cityscape: A Journal of Policy Development and Research*, February 1996, v2(1), 25-32.

Table 1: Means for Sample of 1991 PSID "Renters"

	All	Black	White	*P-value* of Difference
Percent Making Transition to Home Owning	**0.271**	**0.130**	**0.318**	**0.000**
Percent with age between 20 - 30 in 1991	0.399	0.359	0.412	0.055
Percent with age between 30 - 40 in 1991	0.348	0.405	0.329	0.005
Percent with age between 40 - 50 in 1991	0.157	0.142	0.162	0.356
Percent with age between 50 - 60 in 1991	0.097	0.094	0.097	0.843
Percent with less than a high school education	0.168	0.270	0.134	0.000
Percent with only a high school education	0.367	0.420	0.350	0.011
Percent with only some college education	0.233	0.226	0.236	0.692
Percent with college or more education	0.231	0.084	0.280	0.000
Percent headed by a female in 1991	0.342	0.569	0.267	0.000
Percent 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 # of children, 1991-1996?	0.178	0.159	0.184	0.246
Decrease in # 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 91-96	0.350	0.414	0.329	0.002
Average rent paid in 1991	5,009	3,850	5,392	0.000
Percent experiencing financial distress 91-96	0.343	0.364	0.336	0.300
Percent who owned a bank account in 1989	0.686	0.416	0.778	0.000
Percent with liquid wealth in 1989 equal zero	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 who were renting in the *PSID* in 1991 and who 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.

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	-8,112
	(6,004)	(3,348)
Conditional Race Difference - Including Housing+	-14,580	-310
	(5,763)	(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	-13,959
	(4,286)	(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 5 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.

Table 3. Home Ownership Transition for 1991 Renters, and Source of Difference in Transition, by Race

	Black	White	Race Gap
Became Home-Owner Between 1991 and 1996	0.126	0.320	-0.194
"Considered": Took Steps 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 *Panel Study of Income Dynamics.* 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 Non-Applicants*	*p-value of Mean Differences*	*White Applicants*	*White Non-Applicants*	*p-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
Percent with education in 1991 < 12	0.098	0.302	0.000	0.092	0.157	0.011
Percent with education in 1991 = 12	0.434	0.418	0.733	0.325	0.364	0.268
Percent with education between 12 and 16 in 1991	0.320	0.208	0.004	0.246	0.230	0.596
Percent with education 16 years and above in 1991	0.147	0.072	0.004	0.336	0.250	0.009
Percent headed by a female in 1991	0.501	0582	0.086	0.131	0.339	0.000
Married in 1991	0.253	0.150	0.003	0.529	0.270	0.000
Married '91-'96 (conditional on not married in '91)	0.181	0.046	0.000	0.349	0.075	0.000
Divorced '91-'96 (conditional on married in '91)	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
Percent 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 who did not apply. The same test was applied to the means of white households who 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.

Table 5: Linear Probability Regression of Mortgage Application Decision
(1,475 observations)

	I	*II*	*III*	*IV*
Black	**-0.197**	**-0.166**	**-0.082**	**-0.083**
	(0.029)	(0.028)	(0.027)	(0.030)
Age in 1991 between 20 and 30		**0.078**	**0.050**	**0.049**
		(0.041)	(0.041)	(0.042)
Age in 1991 between 30 and 40		**0.098**	**0.101**	**0.101**
		(0.041)	(0.041)	(0.041)
Age in 1991 between 40 and 50		**0.051**	**0.055**	**0.048**
		(0.046)	(0.044)	(0.044)
Education < high school		**-0.182**	**-0.145**	**-0.155**
		(0.039)	(0.037)	(0.039)
Education = only high school		**-0.101**	**-0.099**	**-0.108**
		(0.032)	(0.030)	(0.031)
Education = only some college		**-0.065**	**-0.034**	**-0.042**
		(0.034)	(0.032)	(0.033)
Female Household Head in 1991			**-0.006**	**-0.007**
			(0.029)	(0.030)
Married in 1991			**0.312**	**0.308**
			(0.034)	(0.034)
Became Married, 1991-1996			**0.313**	**0.312**
			(0.046)	(0.047)
Became Divorced, 1991-1996			**-0.276**	**-0.276**
			(0.058)	(0.058)
# Children in 1991			**-0.015**	**-0.016**
			(0.013)	(0.013)
Did number of children in household increase between 1991 and 1996			**0.121**	**0.122**
			(0.033)	(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**	**0.352**	**0.211**	**0.272**
	(0.014)	(0.043)	(0.046)	(0.077)
Adjusted R-Squared	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 where the household rented in 1991 and the percentage of households with income under $15,000 in the zip code where the household rented in 1991. See text for details.

Table 5 (continued): Linear Probability Regression of Mortgage Application Decision (1,475 observations)

	*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 * 10^5*		**0.847** (0.191)	**0.750** (0.195)	**0.689** (0.195)
*Mean Family Income, 1990-1994 Squared * 10^{10}*		**-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-Squared	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.*

Table 6a: Sources of Household Mortgage Down Payments

	Percent Solely From Savings	***Percent Solely From Family***	***Percent Solely From Other***	***Percent 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**	**-0.210**	**-0.145**
	(0.083)	(0.084)	(0.080)
Age in 1991 between 20 and 30		**0.183**	**0.243**
		(0.135)	(0.137)
Age in 1991 between 30 and 40		**0.276**	**0.298**
		(0.137)	(0.136)
Age in 1991 between 40 and 50		**0.294**	**0.344**
		(0.149)	(0.150)
*Mean Family Income, 1991-1996 *10^{5}*			**0.965**
			(0.565)
*Mean Family Income, 1990-1994 Squared * 10^{10}*			**-0.660**
			(0.521)
Constant	**0.264**	**0.043**	**-0.269**
	(0.029)	(0.129)	(0.200)
Adjusted R-squared	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.

Table 6c: Linear Probability Estimate of Application Decision Controlling for Parental Wealth

Variable	*Coefficient*
Black	**-0.049**
	(0.034)
*Parental Wealth in 1988 * 10^7*	**0.758**
	(0.406)
R-Squared	0.245

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

Table 7a: Summary I - Estimated Race Coefficient for Alternative Mortgage Application Regressions

Regression Controls	*Race Coefficient*	*Percent Change in Absolute Value of Race Coefficient From Regression I*	*Adjusted R-squared 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 20s, 30s, or 40s and includes three additional dummies for whether the head's education was less had 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 where the household rented in 1991, the percentage of households with income under $15,000 in the zip code where the household rented in 1991 and dummies for whether or not the household lived 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 they experienced severe or mild financial distress between 1991 and 1996 and their 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 ten percent of predicted house value.
- Parental Wealth Controls include the combined wealth of the head and wife's parents in 1988.

Table 7b: Summary II - Estimated Race Coefficient for Alternative Mortgage Application Regressions

Regression Controls	*Race Coefficient*	*Percent Change in Absolute Value of Race Coefficient From Regression I*	*Adjusted R-squared 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**

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 20s, 30s, or 40s and includes three additional dummies for whether the head's education was less had 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 where the household rented in 1991, the percentage of households with income under $15,000 in the zip code where the household rented in 1991 and dummies for whether or not the household lived 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 they experienced severe or mild financial distress between 1991 and 1996 and their 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 ten percent of predicted house value.
- Parental Wealth Controls include the combined wealth of the head and wife's parents in 1988.

Table 8: Linear Probability Estimate of Being Rejected for a Mortgage Loan: (498 observations)

	I	*II*	*III*
Black	**0.089**	**0.078**	**0.063**
	(0.039)	(0.041)	(0.037)
Age in 1991 between 20 and 30		**0.153**	**0.116**
		(0.057)	(0.056)
Age in 1991 between 30 and 40		**0.101**	**0.061**
		(0.058)	(0.057)
Age in 1991 between 40 and 50		**0.039**	**0.001**
		(0.063)	(0.062)
Education in 1991 < high school		**-0.030**	**-0.049**
		(0.049)	(0.054)
Education in 1991= only high school		**0.072**	**0.073**
		(0.032)	(0.034)
Education in 1991= only some college		**0.024**	**0.046**
		(0.035)	(0.035)
Female Head in 1991		**-0.058**	**-0.006**
		(0.046)	(0.046)
Married in 1991		**-0.096**	**-0.071**
		(0.037)	(0.038)
Became Married, 1991-1996		**0.002**	**0.028**
		(0.045)	(0.045)
Became Divorced, 1991-1996		**0.156**	**0.129**
		(0.084)	(0.091)
*Mean Family Income, 1990-1994 * 10^5*			**0.365**
			(0.205)
*Mean Fam. Income, 1990-1994 Squared * 10^{10}*			**-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**	**0.006**	**-0.002**
	(0.014)	(0.065)	(0.085)
R-Squared	0.008	0.055	0.107

Sample: Households in rental sample who applied for a mortgage between 1991 and 1996 and who 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.

Table 9: OLS Regression of Interest Rates Paid for New Homebuyers (328 observations)

	I	*II*
Black	**-0.272**	**-0.280**
	(0.260)	(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 * 10^5*		**0.680**
		(1.30)
*Mean Fam. Income, 1990-1994 Squared * 10^{11}*		**-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**	**7.25**
	(0.26)	(0.61)
R-Squared	0.003	0.201

Sample: Households in rental sample who applied for a mortgage between 1991 and 1996 and who 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.

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 * 10^6*	**-2.34**
	(0.31)
Time Dummies Included?	**Yes**
Urbanicity Dummies Included?	**Yes**
Region Dummies Included?	**Yes**
Constant	**73,220**
	(14,303)
Adjusted R-squared	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 reside.

Appendix 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 * 10^5	0.634	0.227
Mean Family Income, 1990-1994 Squared * 10^{11}	-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 * 10^7	0.758	0.406
Location controls included?	Yes	
Constant	0.147	0.098
R-Squared	0.245	

Sample: Households in rental sample who applied for a mortgage between 1991 and 1996 and who 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.