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## I. Introduction

U.S. homeownership rates moved up substantially over the course of the 1990s to reach a historic high of nearly 67.5 percent in 2001. This increase in homeownership coincided with several important changes in the U.S. economy, including shifts in the demographic composition of the population, innovations in mortgage finance, the economic boom of the 1990s, and declining interest rates. An important goal of this paper is to shed light on the degree to which these and related factors have contributed to the rise in homeownership.

The past decade also has witnessed heightened concern regarding the persistently low levels of homeownership evidenced among minority and underserved populations. In part, the debate has focused on racial disparities in economic status that contribute to large gaps in homeownership between white and non-white households.<sup>1</sup> In addition, prominent newspaper accounts and an influential study by the Federal Reserve Bank of Boston have heightened concerns regarding systematic and unfair denial of mortgage credit to minorities. (Munnell et al (1996))<sup>2,3</sup>. Partly in response to these concerns, a variety of new mortgage products and programs were introduced in the 1990s with the intent of improving access to owner-occupied housing, especially among underserved and minority households.<sup>4</sup> A related goal of this paper is

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<sup>1</sup>See, for example, Wachter and Megbolugbe (1992), Gyourko and Linneman (1996), Coulson (1999), and Gabriel and Painter (2003).

<sup>2</sup>In May 1988, the *Atlanta Constitution* published a four part series, “The Color of Money,” while the *Detroit Free Press* published a similar series in July 1988. Those and like analyses of Home Mortgage Disclosure Act (HMDA) data showed that mortgage application rejection rates for African Americans in 1990 were about 2-1/2 times larger than those for white households with similar income (see Canner and Smith (1991) for details on the HMDA data).

<sup>3</sup>Beginning in 1990, lenders were required by HMDA to report the location of residential loans made along with the income, race, and gender of loan applicants and whether the loan application was withdrawn (by the applicant), approved, or denied. See Rehm (1991a, 1991b) and Munnell et. al. (1996) for further discussion of the HMDA data.

<sup>4</sup>For example, Zero Down<sup>TM</sup> is an affordable mortgage product newly offered by Bank of America that is now available in numerous states. It is a conventional mortgage that requires zero downpayment. In addition, closing costs can come from a gift, the seller, or can be financed (see Bank of America (1998)).

to ascertain the extent to which credit barriers have restricted access to homeownership. Further, we seek to evaluate how the influence of credit barriers has changed over the course of recent decades.

We begin with summary measures. Table 1 displays homeownership rates in the United States for select years over the 1983 to 2001 period based on data from the Survey of Consumer Finances, weighted so as to be representative of the U. S. population. Our sample includes all households except for those that report household income that is negative, above \$500,000 (in 2001 dollars), or missing. Also, both here and throughout the paper, our measure of homeownership treats mobile home residents that own any portion of their home (land or structure) as owner-occupiers.<sup>5</sup>

As evidenced in Table 1, homeownership rates for the sampled population edged up 1 percentage point from 1983 to 1989, and then rose a further 3.5 percentage points over the subsequent twelve years to reach 67.3 percent in 2001.<sup>6</sup> While the increase in homeownership occurred among white, black and Hispanic households, it was especially pronounced for African Americans, rising 5.1 percent points over the 1989 to 2001 period. What these changes do not capture, however, is that the homeownership rate gap between white and minority households largely persisted over this period. To be precise, in 2001, the white-black and white-Hispanic gaps in homeownership rates stood at 26.2 and 29.5 percentage points, respectively. That disparity has gained attention at the highest political levels, including recent statements by

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<sup>5</sup>When the omitted households are included in the sample our estimates of homeownership rates match exactly those reported by Kennickel (1999) in his comparison of homeownership rates in the SCF to the CPS for the years 1989, 1992, 1995, and 1998.

<sup>6</sup>This rise is consistent with widely reported increases in homeownership rates during the 1990s. See estimates based on the Consumer Population Survey (CPS) and the Decennial Census at the Census website, for example: <http://www.census.gov/hhes/www/housing/hvs/q103tab5.html>.

President Bush and his related call for at least 5.5 million additional minority homeowners by 2010:<sup>7</sup>

*“The goal is, everybody who wants to own a home has got a shot at doing so. The problem is we have what we call a homeownership gap in America. Three-quarters of Anglos own their homes, and yet less than 50 percent of African Americans and Hispanics own homes. That ownership gap signals that something might be wrong in the land of plenty. And we need to do something about it.”* President George Bush, June 18, 2002, <http://www.whitehouse.gov/news/releases/2002/06/20020618-1.html>.

The bottom panel of Table 1 reports information pertaining to whether households are currently saving to purchase a home.<sup>8</sup> This information is new to the literature and may indicate recent evolution in factors that might contribute to a rise in minority homeownership and to a related narrowing of racial gaps in homeownership. Findings are plotted in Figure 1 to facilitate review.

As evidenced in Figure 1, the fraction of black and Hispanic renters saving to purchase a home rose sharply over the past few decades to levels equal to or in excess of those recorded for white renters.<sup>9</sup> Those results stand in marked contrast to findings for earlier periods; in 1983, for

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<sup>7</sup>The following White House Press Release announced President Bush’s goal of increasing the number of minority homeowners by at least 5.5 million by 2010:

“Today, President Bush announced a new goal to help increase the number of minority homeowners by at least 5.5 million before the end of the decade. The President's aggressive housing agenda will help dismantle the barriers to homeownership by providing down payment assistance, increasing the supply of affordable homes, increasing support for self-help homeownership programs, and simplifying the home buying process & increasing education. The President also issued "America's Homeownership Challenge" to the real estate and mortgage finance industries to join in his effort to increase the number of minority homeowners by taking concrete steps to tear down the barriers to homeownership that face minority families.” Source: White House Press Release, June 17, 2002 <http://www.whitehouse.gov/news/releases/2002/06/20020617.html>

<sup>8</sup>For each survey year, we characterized a family as saving to purchase a home if either their first or second most important reason for saving was for future home purchase.

<sup>9</sup>Two recent papers yield complementary results that are suggestive of a narrowing of longstanding racial gaps in homeownership rates. The first, by Painter, Gabriel, and Myers (2001), examined Los Angeles data from 1980 and 1990 and found that household attributes fully explain homeownership gaps between white, Asian, and Hispanic households although a large gap between White and African American homeownership rates remains. The second, by Rosenthal (2002), examined 1998 SCF data for the United States and found that renter expectations of buying a home were remarkably similar across race, both in the raw data and even after controlling for household attributes.

instance, only 6.8 percent of blacks and 8.5 percent of Hispanics were saving to purchase a home, compared with some 12.4 percent of white households. Not surprisingly, few homeowners indicate that they are saving to purchase a home.

The increased rate of minority savings behavior is suggestive that something has changed that has affected expectations of future homeownership among minority households. One obvious possibility is the introduction of new mortgage designs and related initiatives in the 1990s that sought to enhance mortgage loan origination among minority and underserved populations. But the early 1990s also marked the beginning of an economic boom that lasted through the remainder of the decade. Enhanced access to high quality jobs and related improvements in minority economic well-being also may have contributed to the increase in minority savings activity.

It is tempting to speculate about the implications of elevated minority home savings rates for future minority homeownership. For example, has the increase in minority savings for home purchase been matched by an increase in minority *demand* for homeownership, suggesting an anticipated narrowing in persistent racial disparities in homeownership? To address this and related questions, as pertain to both minority and non-minority groups, we decompose changes in actual homeownership rates over the 1983 to 2001 period into three broad sets of determinants: changes in the demand for homeownership holding constant household attributes, changes in the demand for homeownership arising from changes in household economic and demographic characteristics, and changes in the influence of credit barriers.<sup>10</sup>

Several findings stand out. First, for the sample overall, credit barriers reduced observed homeownership rates by 11 percentage points in the late 1980s. The influence of credit barriers

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<sup>10</sup>In so doing, we apply decomposition methods similar to those in Gabriel and Rosenthal (1989).

eased back slightly over the 1990s, but moved up again to roughly 11 percentage points in 2001. The heightened influence of credit barriers during the 1998 to 2001 period derived largely from an increase in unrealized demand for homeownership. Moreover, robustness checks suggest that the pattern of changes in the influence of credit barriers are robust to model specification. However, it is also clear that the magnitude of the estimated influence of credit barriers declines with a more complete specification of the model. The 11 percent effect noted for 2001, for example, likely overstates the “true” influence of credit barriers by several percentage points.

Another important pattern that emerges from our work concerns racial gaps in access to homeownership. As noted earlier, racial gaps in homeownership have been the subject of considerable concern both inside and outside of the mortgage lending industry. We show that in each survey year from 1983 to 2001, credit barriers account for no more than 5 percentage points of the roughly 25 percentage point (or higher) racial homeownership differential noted above. This suggests that access to mortgage credit likely accounts for only a limited portion of the gaps in white-black and white-Hispanic homeownership rates.

We also identify the extent to which changes over time in estimates of the demand for homeownership and in the influence of credit barriers are sensitive to: (i) changes in the attributes of the population, and (ii) changes in the way a given set of individuals behave as reflected in the estimated model coefficients. For the sampled population, changes in the characteristics of the population increased demand for homeownership by roughly 3.4 percentage points between 1989 and 2001, accounting for most of the change over this eleven year horizon. These changes reflect shifts in the distribution of income – in part because of the economic boom of the 1990s – as well as changes in the demographic and age composition of the population – as derived, for example, from the continued aging of the baby boomers.



In contrast, changes in home purchase behavior, as reflected in the estimated *model coefficients*, reduced demand for homeownership by roughly 2 percentage points from 1989 to 1998, but then increased the demand for homeownership by roughly that amount from 1998 to 2001. On balance, therefore, changes in home purchase behavior had little net effect on the demand for homeownership over the 1989 to 2001 period. Moreover, it should be emphasized that the patterns generated by changes in the estimated model coefficients arise from multiple influences, including changes in the cost of homeownership, in part because of falling interest rates throughout the 1990s, as well as changes in preferences for homeownership. This is in contrast to increases in demand arising from changes in the characteristics of the population as noted earlier.

The remainder of this paper is organized as follows. Data and empirical methods are discussed in the following section. Section III describes estimation results whereas Section IV discusses the findings of decomposition exercises. Conclusions are presented in Section V.

## **II. Homeownership in the Presence of Credit Barriers: Econometric Model**

### *2.1 Special Features of the Survey of Consumer Finances*

Households choose their housing tenure subject to two sets of constraints: (i) their intertemporal budget constraint and (ii) borrowing constraints imposed by lenders. In this context, borrowing constraints include terms other than the mortgage interest rate that affect the ability of a prospective borrower to obtain a loan, including payment-to-income standards and downpayment requirements. Although the budget constraint is binding for all households provided that savings and bequests are treated as future consumption, borrowing constraints are binding only for a subset of households. If borrowing constraints are binding, then households want to hold more debt than lenders will allow at prevailing interest rates. Throughout this paper, we define all such

households as being credit constrained. A central feature of this paper is to then determine housing tenure preferences and homeownership rates when households are not credit constrained but are subject only to their budget constraints. The model to follow is designed with that goal in mind. The model is also tailored to take advantage of special features of the Survey of Consumer of Finances (SCF), two of which are important to emphasize here.

First, each year of the SCF is comprised of an independent cross-section of individual households. For that reason, within a given year, all households face the same economy-wide macroeconomic conditions, although access to different mortgage products varies with household demographic and financial characteristics. Second, the SCF permits one to identify *a priori* a group of households for whom borrowing constraints are not binding, taking into account all possible credit constraints both within and outside of the mortgage market. These households are not credit constrained in the sense defined above and are referred to as *unconstrained* for the remainder of this paper. All other households may or may not face binding borrowing constraints for reasons that will be clarified later in the discussion. These households are referred to as *possibly constrained* for the remainder of this paper. The empirical model (below) is estimated for available survey years, including 1983, 1989, 1992, 1995, 1998, and 2001.

## 2.2 Estimating the Demand for Homeownership Controlling for Borrowing Constraints

Define an unobservable index  $I_{\text{own}}$  that represents the difference in utility between owning and renting when families are subject only to their budget constraints,

$$I_{\text{own}} = x a_x + M a_m + \epsilon_{\text{own}} . \tag{2.1}$$

This equation determines a family's preferred tenure status *in the absence of binding borrowing constraints*. Elements of  $x$  include all demographic and financial characteristics of the household

that influence tenure preferences. In addition, elements of  $M$  include characteristics of the preferred mortgage product that the household would choose if it were to own, such as fixed versus variable rate, loan rate, amortization period, loan-to-value ratio, and the like.

The determinants of  $a_m$  include macroeconomic conditions that are identical for all households (given the cross-sectional nature of the data) and household characteristics that influence a family's preferred form of financing. Accordingly,  $M$  is a choice variable that depends on  $x$  and can be expressed as

$$M = h(x) ,$$

where the role of macroeconomic conditions is suppressed to simplify notation.<sup>11</sup> Substituting into (2.1),

$$I_{\text{own}} = xb + e_{\text{own}} . \tag{2.2}$$

Equation (2.2) is a reduced form expression that captures both the direct and indirect effects of household characteristics on housing tenure preferences in the absence of borrowing constraints. However, because  $I_{\text{own}}$  is unobserved, the analysis below focuses on the observable discrete housing tenure decisions (OWN) corresponding to (2.2),

$$I_{\text{own}} > 0 \rightarrow \text{OWN} = 1 , \textit{own home} \tag{2.3}$$

$$I_{\text{own}} < 0 \rightarrow \text{OWN} = 0 , \textit{rent home}$$

where OWN equals 1 if the household owns and 0 if the household rents.

Denote now a second unobservable index that governs whether a household belongs to the *unconstrained* group or the *possibly constrained* group,  $I_{\text{NotCC}}$ ,

$$I_{\text{NotCC}} = xc + e_{\text{NotCC}} . \tag{2.4}$$

The discrete observable realizations corresponding to (2.4) are given by

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<sup>11</sup>Macroeconomic conditions common to all households are captured in the model's constant term.

$$I_{\text{NotCC}} > 0 \rightarrow \text{NotCC} = 1, \text{unconstrained} \quad (2.5)$$

$$I_{\text{NotCC}} < 0 \rightarrow \text{NotCC} = 0, \text{possibly constrained}$$

where  $\text{NotCC}$  equals 1 if the family belongs to the unconstrained group and 0 if the family belongs to the possibly constrained group.

In viewing expressions (2.1–2.5), it is important to recognize that whereas  $\text{NotCC}$  is observed regardless of whether  $\text{OWN}$  takes on a value of 1 or 0, housing tenure preferences *free of borrowing constraints* are observed only for families belonging to the unconstrained group:  $\text{NotCC}$  equal to 1. As is well established in the discrete choice literature (e.g., Maddala 1983), if  $e_{\text{own}}$  and  $e_{\text{NotCC}}$  are uncorrelated, observing  $\text{OWN}$  only for  $\text{NotCC}$  equal to 1 presents few difficulties. Assuming  $e_{\text{own}}$  follows a unit normal distribution, one could obtain unbiased and consistent estimates of  $b$  – the housing tenure preferences in (2.2) – by running a univariate probit model over just that portion of the sample for which  $\text{NotCC} = 1$ . More generally, however, common omitted variables that influence both the likelihood that  $\text{NotCC}$  equals 1 and the likelihood that  $\text{OWN}$  equals 1 would cause estimates of  $b$  to suffer from sample selection bias given the endogenous character of the sample selection procedure. This requires a more general estimation procedure.

### 2.3 The bivariate probit model with three cells

To avoid sample selection bias, it is necessary to control for correlation between the error terms in the two latent indexes,  $e_{\text{NotCC}}$  and  $e_{\text{own}}$ . If (2.2) could be estimated directly, a common approach would be to use well-known Heckman two-step procedures by augmenting (2.2) with a Mills ratio term based on first-stage probit estimates of (2.5). Subject to identification conditions and functional form, in principle including the Mills ratio enables one to obtain consistent estimates of  $b$ . In the present context, however,  $I_{\text{own}}$  is not directly observable. Instead, the

discrete variable OWN is observed. In this case, a nonlinear analogue of the Heckman procedure is to estimate a bivariate probit model over (2.3) and (2.5) with just three cells, where OWN is observed only for NotCC = 1 as noted above.

More formally, assume that  $e_{\text{NotCC}}$  and  $e_{\text{own}}$  follow a bivariate standard normal distribution with mean zero and covariance  $\sigma_{\text{NotCC,own}}$ .<sup>12</sup> Then the log likelihood function ( $L$ ) for this model is given by,

$$L = \sum \{ (1-\text{NotCC}) \cdot \log[F(-xc)] + \text{NotCC} \cdot \text{OWN} \cdot \log[G(xb, xc, \sigma_{\text{NotCC,own}})] + \text{NotCC} \cdot (1-\text{OWN}) \cdot \log[G(-xb, xc, -\sigma_{\text{NotCC,own}})] \}, \quad (2.6)$$

where  $F(\cdot)$  and  $G(\cdot)$  are the standard unit and bivariate normal distributions, respectively, and the log-likelihood function is evaluated separately for all observations in the entire sample,  $i = 1, \dots, I$ .<sup>13</sup> Note, however, that whereas each observation in the sample contributes to the identification of  $c$ , the parameters governing whether a family belongs to the unconstrained group, only those families for which NotCC is equal to 1 contribute to identification of  $b$ , the parameters governing housing tenure preferences. In addition, sample selection effects are controlled for because the covariance between  $e_{\text{NotCC}}$  and  $e_{\text{own}}$  appears in the last two bracketed terms of (2.6) and is estimated simultaneously along with  $b$  and  $c$ . Thus, (2.6) provides unbiased and consistent estimates of  $b$ .<sup>14</sup>

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<sup>12</sup>The variances of  $e_{\text{NotCC}}$  and  $e_{\text{own}}$  are normalized to 1 because the parameters of the bivariate probit model can be estimated only up to a scale factor. See Maddala (1983) for further discussion.

<sup>13</sup>Boyes, Hoffman, and Low (1989) estimate a similar three-celled bivariate probit model for the credit card market.

<sup>14</sup>An issue of identification does remain. Selection models such as the one above provide more reliable results when there are variables included in the selection equation (equation (2.5) in this case) that do not belong in the equation of interest (equation (2.3)). In the work to follow, we include a credit history variable (history of late credit payments) in the credit model but omit that variable in the tenure model to aid in identification. For a more detailed discussion of bivariate probit models with censoring see Maddala (1983) or Tunali (1986).

### III. Homeownership in the Presence of Credit Barriers: Results

As discussed above, we estimate two related but quite different models of homeownership. First, we estimate homeownership over only households that do not perceive themselves to be credit constrained, controlling for sample selection effects in the manner described earlier.<sup>15</sup> Results from this exercise provide estimates of the *demand* for homeownership when households are subject only to their budget constraint. These estimates are presented in Table 2. Second, we estimate homeownership over *all* households as described earlier. Results from this exercise provide estimates of the observed or *actual* likelihood of homeownership in the presence of both household budget and credit constraints. These estimates are presented in Table 3. Differencing estimates from these two exercises enables us to isolate the effects of credit constraints on homeownership attainment. These measures are presented in Table 4.

In reviewing these tables several points regarding sample composition and the format in which the estimates are presented should be emphasized. First, all of our estimates are based on samples that exclude individuals reporting household income that is negative or above \$500,000 (in 2001 dollars).<sup>16</sup> Also, results are provided separately for the survey years 1983, 1989, 1992, 1995, 1998, and 2001. Third, Tables 2 through 4 present partial derivatives for the probit model coefficients. Those partial derivatives are calculated for each observation in the sample and the sample means as derive there from are then reported. As such, the reported coefficients indicate the percentage point influence of a given household attribute on homeownership attainment. The

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<sup>15</sup>As described earlier, the full sample reported in Table 2 is used to estimate the selection equation while the censored observations are omitted when estimating the homeownership equation. Estimates from the selection equation that determines who is not credit constrained are not reported to conserve space.

<sup>16</sup>Especially at the upper end, the SCF includes a small number of extremely high-income households and these individuals are removed from their sample to ensure that they do not unduly influence the results.

numbers in parentheses below the coefficients are t-ratios from the original probit model coefficients. Finally, to facilitate review of the race-related effects, Figures 2a and 2b plot select findings from these tables. Specifically, results for African-Americans from each of the three tables are plotted in Figure 2a. Results for Hispanics are plotted in Figure 2b.

Consider the influence of race and ethnicity. Several patterns stand out in Figures 2a and 2b. Relative to white households, in 1983, *demand* for homeownership among African Americans and Hispanics was roughly 10 and 20 percentage points lower, respectively. Those very large disparities in demand narrowed markedly in the following decade and were roughly 7.1 and 7.8 percentage points for African Americans and Hispanics in 2001, respectively. It is noteworthy that this narrowing of racial differences in demand for homeownership was broadly consistent with changes in the home savings behavior of white and minority households over the survey period, especially changes that occurred in the 1980s: race-related differences in savings behavior were substantial in 1983 but had narrowed considerably by 1989.<sup>17</sup>

Also apparent in Figure 2a, in the early 1980s, the observed or *actual* propensity for homeownership among blacks was roughly 11 percentage points lower than among comparable white households in the early 1980s. That differential narrowed sharply over subsequent years to about 8 percentage points in the latter part of the 1990s. An analogous pattern was evidenced for Hispanics with the white-Hispanic difference in the *actual* propensity for homeownership in Figure 2b narrowing from 25 percentage points in 1983 to just under 12 percentage points in 2001.

The patterns just discussed reveal an important race-related effect in demand for and actual homeownership propensities even after controlling for a host of household demographic

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<sup>17</sup>Bear in mind of course that the estimates in Figures 2a and 2b reflect the influence of race after controlling for a host of other household attributes, while the patterns in Figure 1 are summary measures across race without controlling for other household attributes.

and financial attributes. To what extent do credit barriers account for these estimated racial differentials? Estimates in Table 4 and in Figures 2a and 2b suggest that credit barriers explain relatively little of the estimated homeownership race effects. In this regard, several points are worth emphasizing. First, much of the increase in demand for homeownership among black and Hispanic households over the 1983 to 2001 period was realized in actual homeownership gains. For that reason, relative to white households, the estimated influence of credit barriers on minority homeownership rates has remained relatively stable throughout the 1990s. Further, in all years from 1983 to 2001, credit barriers account for less than 5 percentage points of the white-minority gap in homeownership rates for both African American and Hispanic households, or about one-fifth of the overall racial gap in homeownership rates. From a policy perspective, this implies that further innovation in mortgage finance is unlikely to substantially affect racial disparities in access to homeownership. Moreover, and arguably more provocative, as abhorrent as discrimination may be, the evidence suggests that mortgage market discrimination has been of only limited importance in the explanation of racial gaps in homeownership.

Finally, in addition to race, it is evident in Tables 2, 3, and 4 that a number of other household economic and demographic factors also affect homeownership and the influence of credit barriers. Consistent with results in the homeownership choice literature, those factors include, for example, age, marital status, and employment status. However, because access to homeownership among minority households has been at the center of recent and sometimes heated policy debates, we have chosen to pay special attention to those effects here.



## IV. Decomposition of Changes in Aggregate Homeownership Rates

### 4.1 Decomposition: Methods

The estimates in Tables 2 through 4 can be used to decompose changes in homeownership rates across years into effects resulting from changes in economic and demographic characteristics of the population versus changes in market conditions. As an illustration, consider the years 1989 and 1998. To further simplify the discussion, define  $X_{1989}$  and  $X_{1998}$  to be the average characteristics of the samples from 1989 and 1998, respectively,  $b_{1989}$  and  $b_{1998}$  are the estimated demand coefficients from equation (2.2), and  $I_{1989}$  and  $I_{1998}$  are the overall sample owner-occupancy rates from the respective years.

Our goal is to explain  $I_{1998} - I_{1989}$ , the change in homeownership rate over the 1989 to 1998 period. Accordingly, we write  $I_{1998}$  and  $I_{1989}$  as

$$I_{1998} = X_{1998}b_{1998} - C_{1998} \quad (3.1a)$$

and

$$I_{1989} = X_{1989}b_{1989} - C_{1989} \quad (3.1b)$$

where  $X_{1998}b_{1998}$  and  $X_{1989}b_{1989}$  are the percentage of the population that would own in the absence of credit barriers – the demand or preference for homeownership – and  $C_{1998}$  and  $C_{1989}$  are the influence of credit barriers on homeownership rates, positive values for which imply that credit barriers reduce homeownership.

Differencing equations (3.1a) and (3.1b) over the two time periods yields

$$I_{1998} - I_{1989} = [X_{1998}b_{1998} - X_{1989}b_{1989}] - [C_{1998} - C_{1989}] \quad (3.2)$$

where the first bracketed term is the change in the demand for homeownership while the second bracketed term reflects the change in the influence of credit barriers on homeownership.

What fraction of the change in the demand for homeownership – the preferred homeownership rate – can be attributed to changes in household demographic/financial attributes

as opposed to factors that affect the coefficients in the model? To address that question, the first term in (3.2) is further decomposed as follows:

$$I_{1998} - I_{1989} = X_{1998}[b_{1998} - b_{1989}] + [X_{1998} - X_{1989}]b_{1989} - [C_{1998} - C_{1989}]. \quad (3.3)$$

Observe that the first two bracketed terms in (3.3) reflect the *demand* for homeownership in the absence of binding credit barriers. The third bracketed term measures the level of unfulfilled demand arising from the influence of credit barriers. We will examine the role of each of these terms in turn.

In equation (3.3), the first bracketed term,  $X_{1998}[b_{1998} - b_{1989}]$ , captures changes in the demand for homeownership arising from changes in cultural norms and the cost of owning. If cultural norms and the cost of owning do not change, then the estimated coefficient vector would not change and the first bracketed term would drop out of the model. In considering that possibility, it is important to remember that  $b_{1998}$  and  $b_{1989}$  each includes a constant term as well as a vector of coefficients for the household attributes. The constant terms reflect macroeconomic conditions common to households in a given year. In that regard,  $b_{1998} - b_{1989}$  captures not only changes in the influence of a given set of demographic traits, but also the effect of changes in mortgage interest rates and innovations in the mortgage market that affect demand for homeownership.

The second bracketed term,  $[X_{1998} - X_{1989}]b_{1989}$ , captures changes in the demand for homeownership arising only from changes in the attributes of the population, such as the distribution of income, race, and marital status. In addition, increases in household income as occurred during the economic boom of the 1990s would be captured here.

Consider now the third bracketed term in equation (3.3a),  $[C_{1998} - C_{1989}]$ . Credit barriers restrict access to homeownership when the level of debt lenders are willing to provide is less than

the amount requested by households. Accordingly, it is desirable to further decompose the influence of credit barriers in (3.3) into changes arising from the characteristics of the population that affect the demand for mortgage debt versus changes arising because of a shift in the propensity of a given type of household to encounter binding credit barriers. This can be accomplished as indicated below.

As displayed in Table 3, we estimate a second homeownership model over all households (including credit constrained families) without controls for the influence of credit barriers. This later model yields an alternative set of coefficients,  $a_t$ , where

$$I_{1998} = X_{1998}a_{1998} \quad , \quad (3.4)$$

and  $I_{1998}$  is the 1998 homeownership rate as before. Now define  $c_{1998} \equiv b_{1998} - a_{1998}$ , where  $b_{1998}$  are the coefficients from equation (3.1a) and  $a_{1998}$  are the coefficients from (3.4). Then from equations (3.1a) and (3.4),  $X_{1998}c_{1998} = C_{1998}$  where  $c_{1998}$  is the marginal effect of  $X_{1998}$  on credit barriers. Hence, the third bracketed term in (3.3) can be written as

$$C_{1998} - C_{1989} = c_{1998}X_{1998} - c_{1989}X_{1989} .$$

Decomposing as in equation (3.2),

$$C_{1998} - C_{1989} = [X_{1998} - X_{1989}]c_{1989} + X_{1998}[c_{1998} - c_{1989}] . \quad (3.5)$$

The first bracketed term in equation (3.5) makes explicit that changes in the characteristics of the population affect the degree to which credit barriers influence homeownership rates holding constant macroeconomic and mortgage market conditions in the initial year. The second bracketed term in equation (3.5) makes explicit that changes in interest rates and mortgage market conditions – as reflected in the constant terms in  $c_{1998}$  and  $c_{1989}$  – as well as changes in the influence of individual household attributes (e.g. white, black, married) also affect the degree to which credit barriers influence homeownership rates.

Substituting equation (3.5) into (3.3) we obtain an expression for the change in homeownership rates decomposed into four bracketed terms.

$$I_{1998} - I_{1989} = X_{1998}[b_{1998} - b_{1989}] + [X_{1998} - X_{1989}]b_{1989} - [X_{1998} - X_{1989}]c_{1989} - X_{1998}[c_{1998} - c_{1989}] . \quad (3.6)$$

Recognizing that the first three bracketed terms above capture demand side effects, the last bracketed term in (3.6) is of particular interest. In particular, a decrease in the influence of the last bracketed term would imply that, holding constant the demand for homeownership, the influence of credit barriers on homeownership rates has diminished. That in turn, would be consistent with a relaxation of credit barriers.<sup>18</sup>

#### *4.2 Decomposition Results*

Table 5 presents results of the decomposition exercise for all SCF survey years from 1983 to 2001. The table is divided into three panels. The top panel utilizes coefficients from Table 3 to estimate “actual” homeownership rates without controlling for the influence of credit constraints. The middle panel utilizes coefficients from Table 2 to estimate “demand” for homeownership in a manner that controls for the influence of credit constraints as described earlier. The bottom panel differences estimates from the first two panels and in so doing identifies the influence of credit barriers.

Observe also that each of the three panels provides a six-by-six matrix of estimates. Each row is based on coefficients from a given survey year as drawn from one of the columns in Tables 2, 3, or 4 depending on the panel in question. For example, the top row in each panel is

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<sup>18</sup>A reduced influence of the last bracketed term could also arise if households seek smaller loans holding constant lender imposed credit standards. However, in the context of the 1990s in which dramatic innovations in low-income and low-downpayment mortgage lending occurred, it seems more likely that a reduction in the last bracketed term would derive from those innovations.

based on 1983 coefficients and the bottom row is based on 2001 coefficients, with the intervening years in sequential order. Looking across the columns, coefficients from a given year are applied to data for each of the different sample years. For example, the left-hand column of each panel combines coefficients from each sample year with the 1983 sample data. Likewise, the right-hand column of each panel combines coefficients from each sample year with the 2001 sample data. It follows that the main diagonal elements of a given panel correspond to coefficients and sample drawn from the same survey year and as such, provide estimates of patterns that truly prevailed in that year. Off-diagonal elements provide estimates of patterns that would have prevailed in a given year had the coefficients or sample differed in the manner specified.

Consider now the top panel of Table 5 and recall that this panel reports estimates of “actual” homeownership rates. In the lower right corner, the estimated homeownership rate in 2001 is 67.2 percent. In contrast, in the upper left corner the estimated homeownership rate in 1983 is 62.6 percent, 4.6 percentage points lower. To what extent does the increase in homeownership over this period reflect changes in household behavior as opposed to changes in the demographic and financial attributes of the population from each of the survey years? To answer that question, consider the following.

Applying 1983 coefficients to the 2001 sample (top row, far right column), the estimated homeownership rate equals 64.5 percent. That value is roughly 2 percentage points higher than the actual homeownership rate in 1983, and roughly 3 percentage points lower than the actual homeownership rate in 2001. Thus, changes in the composition of the population between 1983 and 2001 contributed 2 percentage points to the increase in homeownership rates over that period. Changes in household behavior account for the remaining 3 percentage points. The

former effect includes changes in the distribution of household real income associated with the boom of the 1990s, as well as changes in other household attributes captured in the homeownership model in Table 3. The latter effect includes the influence of changes in market conditions such as interest rates, mortgage financing innovations, and changes in norms and preferences for homeownership, all of which can cause the estimated coefficients of one sample year to differ from those of another sample year.

Focus next on the middle panel of Table 5 and recall that this panel decomposes changes in the demand for homeownership. For 1983 the estimated demand for homeownership was 71.2 percent (upper left corner of the panel). In 2001 the estimated demand for homeownership was 78.4 percent (bottom right corner of the panel). Overall, demand for homeownership appears to have increased by about 7.2 percentage points over the 1983 to 2001 period. But, applying the 1983 coefficients to the 2001 data, the predicted demand for homeownership is 71.5 percent. That value is only 0.3 percentage point higher than the estimated rate in 1983 and 6.9 percentage points lower than the estimated rate in 2001. On balance, these patterns imply that changes in household behavior – not changes in the composition of the population – account for nearly the entire increase in demand for homeownership over the 1983 to 2001 period.

The patterns just described are mirrored in the bottom panel of Table 5. That table examines the influence of credit barriers on homeownership rates. In 1983 and 2001 credit barriers are estimated to have depressed homeownership rates by 8.6 and 11.1 percentage points, respectively. Decomposing this change as above, it is clear that the increase in the influence of credit barriers over this period is being driven predominantly by changes in the model coefficients as opposed to changes in the attributes of the population.

Summarizing the discussion above, demand for homeownership rose by over 7 percentage points from 1983 to 2001. However, only 4.6 percentage points of that increase in demand was realized. The remainder is reflected in an increase in the influence of credit barriers as can be seen in the bottom panel of Table 5.

The discussion thus far has focused just on the beginning and end of our sample horizon, 1983 and 2001. Although informative, that comparison does not do justice to the changes in the intervening years. Accordingly, Figure 3a plots the last row from each of the three panels in Table 5. Recall that this row is based on year 2001 coefficients and that these coefficients are then applied to the samples from each of the different survey years. Also, it should be emphasized that the patterns in Figure 3a are very similar to those for the other survey year rows in Table 5.

In Figure 3a, observe that the “actual” homeownership rate is predicted to fall from 63.8 percent in 1983 to 61.6 percent in 1989, but then is predicted to rise continuously to its peak of 67.2 in 2001. This implies that an increase in actual homeownership rates of 5.6 percentage points over the decade of the 1990s can be attributed to changes in the financial and demographic attributes of the population. A similar but more muted pattern is evident for the demand for homeownership. Demand is initially forecast to be 77.3 percent in 1983, falls to 75.0 in 1989, and then rises monotonically to 78.4 in 2001. This implies an increase in demand for homeownership of 3.4 percentage points over the decade of the 1990s that can be attributed to changes in the attributes of the population. Together, these patterns imply that changes in the attributes of the population had little impact on the influence of credit barriers in the 1980s, but contributed to a 2.3 percentage point decline in the influence of credit barriers from 1989 to 2001. More generally, from Figure 3a it is clear that shifts in the financial and demographic

attributes of the population in the 1990s boosted demand for homeownership and reduced the influence of credit barriers.

Figure 3b considers the influence of changes in the intrinsic behavior of individuals, as reflected in the model coefficients. Specifically, the figure plots the last column from each of the three panels in Table 5.<sup>19</sup> Recall that this column is based on the year 2001 sample and that this sample is then applied to the coefficients from each of the different survey years. This figure displays a different pattern. Changes in the behavior of individuals imply a sharp increase in demand for homeownership from 1983 to 1989, only a portion of which was realized in an “actual” increase in homeownership. That disparity leads to a sharp uptick in the influence of credit barriers on homeownership rates, from 7 percentage points in 1983 to 10 percentage points in 1989.

Following 1989, estimates of the “actual” homeownership rate decline slightly throughout the 1990s, as does the demand for homeownership. The primary exception is a market increase in demand from 1998 to 2001, with an accompanying increase in the influence of credit barriers.

Comparing the patterns in Figure 3b with those in Figure 3a, it is clear that during the decade of the 1990s two important factors influenced homeownership. On the one hand, changes in the financial and demographic attributes of the population served to boost demand for homeownership and to reduce the influence of credit barriers throughout the decade. Changes in the behavior of individual households however – as reflected in the model coefficients – reduced

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<sup>19</sup>We choose the column corresponding to the year 2001 coefficients to facilitate comparison to the patterns just noted. Note, however, that the patterns revealed in Figure 3b are nearly identical for the other survey year columns in Table 5 but are not presented to conserve space.



both demand and the influence of credit barriers until 1998 and then subsequently pushed both higher.

#### 4.3 *Robustness Checks*

As a robustness check, we repeated the entire exercise above using a richer set of control variables in the underlying probit models that are available in just four of the sample years, 1983, 1992, 1995, and 1998. These additional variables include controls for the four census regions in the United States and also for the density of development in the local neighborhood.

Decomposition results based on this specification appear in Table 6, while the underlying Probit model coefficients are reported in the Appendix.

Two points become apparent when comparing findings in Table 6 to those in Table 5. First, the qualitative pattern of the changes in the influence of credit barriers over time is similar in Table 6 as compared to Table 5. Specifically, observe that the influence of credit barriers in Table 6 peaks in 1992 (at 11.1 percentage points), and then declines continuously to 8.9 percentage points in 1998, the same qualitative pattern as in Table 5.

Second, the magnitude of the influence of credit barriers is reduced when additional control variables are added to the model. For example, in 1998, the estimated influence of credit barriers in Table 6 (lower right corner) is 8.9 percentage points versus 9.6 percentage points in Table 5.

Because of idiosyncratic differences in the data files for different years, the set of variables available for 1998 is more complete than for any other survey year. For that reason, we further augment the 1998 regression by including controls for several additional variables. Specifically, we begin by retaining all variables included in the model reported in the appendix

and used to produce Table 6. In addition, both the housing tenure and credit constraint models were further augmented by including controls for (i) whether household total income rose faster than the rate of inflation in the last five years, (ii) whether total household income is expected to rise faster than inflation in the coming year, and (iii) whether the household expects to receive an inheritance or future transfer of assets at some point in the future. The credit model was further expanded by including a measure of whether the household head or spouse had filed for bankruptcy in the past five years. Results from this specification indicate that credit barriers reduced homeownership rates in 1998 by 6.5 percentage points, a further decline relative to Tables 5 and 6.<sup>20</sup>

Summarizing, the qualitative patterns with regard to changes in the influence of credit barriers appear largely robust to inclusion of additional covariates in the models, at least to the extent that the data allow us to investigate this issue. However, it is apparent that including additional control variables tends to work in the direction of reducing the estimated influence of credit barriers. With that in mind, we feel it is prudent to view the estimated impacts of credit barriers in Tables 5 and 6 as upper bounds.

## **V. Conclusions**

U.S. homeownership rates rose by roughly 3-1/2 percentage points during the 1990s to 67.2 percent in 2001, a historically high level. The upward movement in homeownership coincided with shifts in the composition of the population, innovations in mortgage finance, the

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<sup>20</sup>In Rosenthal (2002), the estimated influence of credit barriers in 1998 was lower still, 4.05 percentage points. However, in that paper, farm households were omitted while all other families were retained (including those with income above \$500,000). In addition, the set of covariates in the prior paper did not include the regional controls but included some additional measures pertaining to education and the value of past and anticipated future inheritances and settlements. These differences account for the difference in estimates between the two papers and further underscore that the magnitude of the estimated influence of credit barriers is somewhat sensitive to model specification.

economic boom of the 1990s, and declining interest rates. Using six waves of the Federal Reserve Board's Survey of Consumer Finances, this paper analyzes the determinants of changes in homeownership rates in the 1980s and 1990s, with particular attention to racial gaps in homeownership. The analysis is unique to the literature in applying the same model specification to different years of the Survey of Consumer Finances: 1983, 1985, 1989, 1992, 1995, 1998, and 2001. This ensures that changes in the estimated patterns over time are not driven by changes in the quality of the data or in model specification.

Results indicate that changes in population demographic and financial attributes account for most of the increase in demand for homeownership (and actual homeownership rates) between 1989 and 2001. This implies that innovations in mortgage finance and declining interest rates, while clearly important for a host of reasons, likely were not the primary drivers of the rise in homeownership during the 1990s.

New to the literature, we also demonstrate that minority renters were substantially less likely to save for homeownership in the early 1980s relative to white households. However, those differences in savings behavior have narrowed continuously over the past two decades and disappeared in 2001. Nevertheless, white-minority gaps in homeownership rates remained at or above 25 percentage points throughout the 1980s and 1990s. Further, by the end of the 1990s, demographic and financial attributes were estimated to account for all but 8 percentage points of the racial disparities in homeownership. Of that residual, credit barriers account for no more than 5 percentage points. Policy makers, therefore, will have to look beyond mortgage market innovation if their goal is to substantially reduce racial disparities in homeownership.

Finally, we also examine the overall influence of credit barriers on U.S. homeownership rates as well as the sensitivity of our results to the inclusion of additional control variables for

those survey years in which a richer set of covariates is available. Results suggest that the qualitative patterns regarding changes over time in the influence of credit barriers are robust. However, it is also clear that the estimated influence of credit barriers on aggregate U.S. homeownership rates tends to decline with a more complete model specification. Our most reliable estimate of the influence of credit barriers on homeownership rates is based on an expanded model specification for 1998. Results from that model suggest that credit barriers depressed homeownership rates in 1998 by roughly 6.6 percentage points, but that estimate should be viewed as an upper bound for reasons just noted.

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## Appendix: Data

Data for the analysis are taken from the Survey of Consumer Finances (SCF) for the years 1983, 1989, 1992, 1995, 1998, and 2001. These surveys are independent cross-sections with the exception of the 1983 and 1989 surveys for which a portion of the 1983 families appear again in 1989. The SCF is uniquely suited for addressing the research questions because it provides substantial detail on individual household financial and demographic characteristics, along with a number of unique questions on expectations of future behavior and access to credit.

Each year of the SCF provides data on roughly 4,500 households. Sampling weights provided with the data permit one to weight the data such that results are representative of the United States population.<sup>21</sup> In addition, beginning in 1989, a sophisticated procedure is used to impute missing values. In part, this includes the creation of five “implicates” of the data, where each is an alternate version of the entire dataset but with slightly different imputations. Kennickell (1998) provides details on how to interpret and work with the implicates.<sup>22</sup>

The Survey of Consumer Finances (SCF) provides unusually rich information on the financial characteristics of households. Of the SCF sample of about 4500 households, roughly 2,800 are selected so as to be representative of the entire United States while the remaining households over-represent wealthy families and are drawn from tax files. To protect confidentiality, the public use version of the 1998 SCF does not allow the analyst to separately identify the representative and tax-based samples. However, sampling weights provided with the

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<sup>21</sup>Kennickell (1999) provides a careful discussion of the SCF sampling weights and shows that the sample moments of the weighted SCF data match the Consumer Population Survey (CPS). See also Rosenthal (2002) for further discussion of the SCF.

<sup>22</sup>The SCF data are imputed five times to control for missing values and also to protect the confidentiality of some respondents with especially unusual and highly visible characteristics (such as very high wealth). When estimating the bivariate probit models, all five implicates totaling over 21,000 records were used and the standard errors were divided by the square root of 5 to adjust for the “true” sample size. See the 1998 SCF manual and Kennickell (1998) for details.

data permit one to weight the data such that results are representative of the entire United States. The bivariate probit model was estimated using unweighted data to obtain the parameter estimates on the assumption that all the covariates in the model are exogenous. The simulations, in contrast, were calculated using the sampling weights to ensure that the simulation results are representative of the United States.<sup>23</sup>

A final point concerns sample composition. All of the analysis in this paper is conducted using non-farm households with household heads between ages 18 through 65 and annual income between \$10,000 and \$200,000 in 2001 dollars. These restrictions were imposed in order to focus on the set of households most subject to policy attention with respect to opportunities for homeownership.

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<sup>23</sup>See Kennickell (1999) for a careful discussion of the SCF sampling weights.

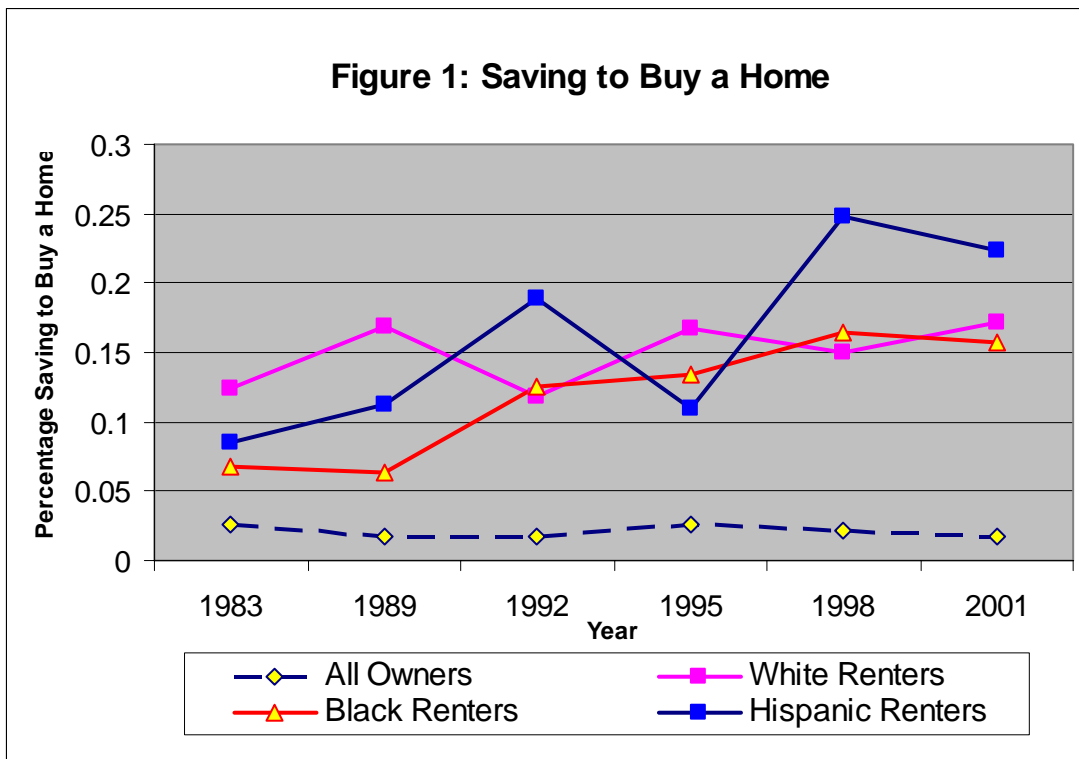


**Table 1: Homeownership Rates and the Percent of Households Saving to Buy a Home**

**Sample Composition: Household Heads Aged 18 Through 65<sup>a</sup>**

	1983	1989	1992	1995	1998	2001
Homeownership Rate						
<i>All Households</i>	0.628	0.638	0.639	0.645	0.660	0.673
<i>White Households</i>	0.673	0.704	0.703	0.704	0.716	0.737
<i>Black Households</i>	0.440	0.424	0.436	0.427	0.461	0.475
<i>Hispanic Households</i>	0.314	0.419	0.399	0.429	0.441	0.442
Saving to Buy a Home						
<i>All Households</i>	0.058	0.063	0.057	0.071	0.070	0.069
<i>All Owners</i>	0.026	0.018	0.017	0.026	0.022	0.017
<i>All Renters</i>	0.111	0.141	0.127	0.152	0.162	0.176
<i>White Renters</i>	0.124	0.169	0.118	0.167	0.150	0.171
<i>Black Renters</i>	0.068	0.063	0.125	0.134	0.165	0.157
<i>Hispanic Renters</i>	0.085	0.113	0.189	0.110	0.248	0.224

<sup>a</sup>All estimates are based on data from different years of the Survey of Consumer Finances and are weighted to be representative of the United States. Excludes families with total family income (in \$2001) below zero, above \$500,000, or missing.



**Table 2: Demand for Homeownership Controlling for Borrowing Constraints<sup>a</sup>**

	1983	1989	1992	1995	1998	2001
<i>Some college</i>	-0.0074 (-0.14)	0.0166 (0.60)	0.0239 (1.08)	0.0290 (1.30)	-0.0022 (-0.11)	-0.0395 (-2.07)
<i>College degree</i>	-0.0392 (-0.80)	-0.0451 (-1.61)	-0.0287 (-1.28)	-0.0453 (-2.05)	-0.0214 (-1.01)	-0.0344 (-1.74)
<i>Married</i>	0.1036 (1.79)	0.1353 (3.97)	0.1637 (5.04)	0.1005 (3.63)	0.1636 (6.38)	0.0932 (4.28)
<i>Divorced</i>	-0.0156 (-0.27)	0.0819 (2.63)	0.0524 (1.87)	0.0364 (1.35)	0.0598 (2.45)	0.0745 (3.36)
<i>Age for Individuals Under 35</i>	0.0029 (0.63)	0.0014 (0.56)	0.0018 (0.80)	-0.0001 (-0.04)	0.0010 (0.49)	0.0003 (0.17)
<i>Age for Individuals Between 35 and 55</i>	0.0050 (1.44)	0.0031 (1.72)	0.0046 (2.89)	0.0020 (1.26)	0.0031 (2.13)	0.0024 (1.84)
<i>Age for Individuals Over 55</i>	0.0047 (1.80)	0.0036 (2.94)	0.0038 (3.48)	0.0034 (3.02)	0.0034 (3.25)	0.0024 (2.61)
<i>Household size</i>	0.0318 (1.93)	0.0308 (3.58)	0.0172 (2.27)	0.0287 (3.82)	0.0251 (3.35)	0.0221 (3.26)
<i>Male</i>	-0.0102 (-0.29)	-0.0019 (-0.06)	-0.0332 (-1.32)	0.0019 (0.08)	-0.0147 (-0.65)	0.0107 (0.54)
<i>African American<sup>b</sup></i>	-0.0984 (-1.52)	-0.0372 (-1.15)	-0.0637 (-2.12)	-0.0622 (-2.13)	-0.0315 (-1.15)	-0.0712 (-3.09)
<i>Hispanic<sup>b</sup></i>	-0.2131 (-2.16)	-0.0718 (-1.62)	-0.1194 (-3.10)	-0.1448 (-3.77)	-0.1035 (-3.27)	-0.0778 (-2.97)
<i>Other Race (including Asian)<sup>b</sup></i>	-0.1444 (-0.91)	-0.0093 (-0.17)	-0.0880 (-2.38)	-0.0781 (-1.65)	-0.1408 (-3.35)	-0.0751 (-1.70)
<i>Head in bad health</i>	-0.0170 (-0.25)	-0.0058 (-0.16)	-0.0214 (-0.66)	-0.0712 (-2.03)	-0.0399 (-1.18)	-0.0771 (-2.69)
<i>Spouse in bad health</i>	-0.0884 (-0.93)	-0.0943 (-1.63)	-0.0894 (-1.61)	-0.0836 (-1.48)	-0.0908 (-1.74)	0.0315 (0.64)
<i>Total family income (in \$2001)</i>	0.0043 (3.44)	0.0048 (6.23)	0.0038 (6.55)	0.0035 (5.76)	0.0036 (7.07)	0.0032 (7.75)
<i>Total family income squared (in \$2001)</i>	-9.19E-06 (-2.85)	-1.04E-05 (6.20)	-8.37E-06 (-6.66)	-7.65E-06 (-5.96)	-7.47E-06 (-6.95)	-6.50E-06 (-7.17)
<i>Family has received an inheritance</i>	-0.0084 (-0.13)	0.0550 (2.22)	0.0815 (3.68)	0.0455 (2.04)	0.1008 (4.59)	0.0949 (4.55)
<i>Head works full-time</i>	0.0107 (0.21)	0.0441 (1.23)	0.0582 (2.07)	0.0754 (2.77)	0.0632 (2.28)	-0.0124 (-0.54)
<i>Spouse works full-time</i>	0.0118 (0.23)	0.0062 (0.21)	-0.0014 (-0.05)	0.0399 (1.58)	0.0072 (0.32)	0.0417 (1.98)
<i>Spouse works part-time</i>	0.0676 (0.85)	0.0710 (1.66)	-0.0086 (-0.25)	0.0081 (0.23)	0.0429 (1.14)	0.0710 (2.17)
<i>Head's # full-time jobs lasting &gt; 1 year</i>	-0.0041 (-0.48)	-0.0059 (-1.20)	-0.0074 (-1.68)	-0.0031 (-0.76)	-0.0077 (-1.81)	0.0014 (0.51)
<i>Constant</i>	-0.2773 (-1.45)	-0.2499 (-2.79)	-0.2016 (-2.56)	-0.1811 (-2.21)	-0.2269 (-2.82)	-0.1194 (-1.72)
<i>Rho</i>	-0.5988 (-1.63)	-0.8774 (-10.07)	-0.6644 (-5.25)	-0.6662 (-6.40)	-0.5610 (-3.93)	-0.6939 (-6.90)
<i>Uncensored obs (not credit constrained)</i>	2,925	2,321	2,639	2,914	2,830	2,851
<i>Censored obs (possibly constrained)</i>	727	571	908	980	1,007	970
<i>Log likelihood</i>	-0.7872	-0.7905	-0.8198	-0.8084	-0.7834	-0.7760

<sup>a</sup>Reported coefficients were obtained by calculating the partial derivative of a given variable for each observation in the sample and then averaging over the sample. The t-ratios in parentheses are those for the untransformed model coefficients. Data for each year were weighted to be representative of the United States (see the text and data appendix for details). Observations with annual income below zero, above \$500,000 (in year 2001 dollars), or missing were excluded from each sample.

<sup>b</sup>Omitted category is White.

**Table 3: Actual Propensity for Homeownership Without Controlling for Borrowing Constraints<sup>a</sup>**

	1983	1989	1992	1995	1998	2001
<i>Some college</i>	-0.0240 (-0.54)	0.0243 (0.98)	0.0284 (1.40)	0.0028 (0.14)	0.0014 (0.08)	-0.0460 (-2.61)
<i>College degree</i>	-0.0403 (-0.88)	-0.0220 (-0.85)	-0.0191 (-0.91)	-0.0330 (-1.60)	-0.0279 (-1.42)	-0.0258 (-1.33)
<i>Married</i>	0.1181 (2.40)	0.1767 (5.71)	0.1962 (7.47)	0.1432 (6.24)	0.1770 (8.33)	0.0984 (4.86)
<i>Divorced</i>	-0.0042 (-0.08)	0.1033 (3.62)	0.0201 (0.80)	0.0392 (1.59)	0.0504 (2.28)	0.0631 (2.98)
<i>Age for Individuals Under 35</i>	0.0092 (2.23)	0.0056 (2.40)	0.0064 (3.04)	0.0031 (1.48)	0.0038 (2.04)	0.0073 (3.94)
<i>Age for Individuals Between 35 and 55</i>	0.0102 (3.60)	0.0071 (4.41)	0.0088 (5.96)	0.0057 (3.97)	0.0060 (4.79)	0.0083 (6.65)
<i>Age for Individuals Over 55</i>	0.0092 (4.85)	0.0079 (7.33)	0.0080 (8.16)	0.0068 (6.92)	0.0064 (7.50)	0.0077 (8.81)
<i>Household size</i>	0.0300 (2.14)	0.0322 (4.70)	0.0089 (1.31)	0.0244 (3.79)	0.0193 (3.06)	0.0228 (3.85)
<i>Male</i>	-0.0019 (-0.06)	0.0110 (0.41)	-0.0468 (-2.04)	-0.0346 (-1.55)	-0.0109 (-0.52)	0.0074 (0.38)
<i>African American<sup>b</sup></i>	-0.1122 (-2.35)	-0.0739 (-2.78)	-0.0999 (-4.19)	-0.1075 (-4.81)	-0.0751 (-3.37)	-0.0844 (-4.14)
<i>Hispanic<sup>b</sup></i>	-0.2536 (-2.89)	-0.1298 (-3.67)	-0.1470 (-4.80)	-0.1597 (-4.78)	-0.1239 (-4.48)	-0.1187 (-4.74)
<i>Other Race (including Asian)<sup>b</sup></i>	-0.0914 (-0.65)	-0.0440 (-1.01)	-0.0831 (-2.32)	-0.1362 (-3.37)	-0.1401 (-3.57)	-0.1129 (-2.68)
<i>Head in bad health</i>	0.0228 (0.35)	-0.0379 (-1.09)	-0.0038 (-0.12)	-0.0667 (-1.99)	-0.0760 (-2.25)	-0.0652 (-2.24)
<i>Spouse in bad health</i>	-0.1042 (-1.17)	-0.0559 (-0.96)	-0.0758 (-1.40)	-0.0519 (-0.97)	-0.0953 (-2.09)	-0.0078 (-0.17)
<i>Total family income (in \$2001)</i>	0.0052 (4.73)	0.0052 (7.61)	0.0044 (8.81)	0.0045 (8.09)	0.0047 (10.71)	0.0045 (11.22)
<i>Total family income squared (in \$2001)</i>	-1.12E-05 (-3.39)	-1.18E-05 (-7.37)	-9.90E-06 (-8.29)	-1.03E-05 (-8.33)	-9.33E-06 (-9.78)	-8.73E-06 (-9.64)
<i>Family has received an inheritance</i>	-0.0103 (-0.18)	0.0779 (3.26)	0.0950 (4.38)	0.0747 (3.51)	0.1013 (4.90)	0.1057 (5.08)
<i>Head works full-time</i>	0.0570 (1.34)	0.0708 (2.24)	0.1067 (4.28)	0.1164 (4.87)	0.0463 (2.02)	0.0323 (1.44)
<i>Spouse works full-time</i>	-0.0019 (-0.04)	0.0278 (0.99)	0.0112 (0.48)	0.0557 (2.56)	0.0200 (0.99)	0.0555 (2.83)
<i>Spouse works part-time</i>	0.0719 (1.00)	0.0838 (2.11)	0.0145 (0.46)	0.0257 (0.81)	0.0283 (0.84)	0.0693 (2.26)
<i>Head's # full-time jobs lasting &gt; 1 year</i>	-0.0087 (-1.18)	-0.0076 (-1.66)	-0.0163 (-4.34)	-0.0118 (-3.39)	-0.0074 (-2.65)	-0.0056 (-1.93)
<i>Constant</i>	-0.6382 (4.86)	-0.6106 (-7.92)	-0.5139 (-7.58)	-0.4530 (-6.63)	-0.4545 (-7.38)	-0.5403 (-8.59)
<i>Number of obs</i>	3,652	2,892	3,547	3,894	3,837	3,821
<i>Log likelihood</i>	-1,812.3	-6,652.4	-8,676.3	-9,571.6	-8,878.2	-8,816.1

<sup>a</sup> Reported coefficients were obtained by calculating the partial derivative of a given variable for each observation in the sample and then averaging over the sample. The t-ratios in parentheses are those for the untransformed model coefficients. Data for each year were weighted to be representative of the United States (see the text and data appendix for details). Observations with annual income below zero, above \$500,000 (in year 2001 dollars), or missing were excluded from each sample.

<sup>b</sup>Omitted category is White.

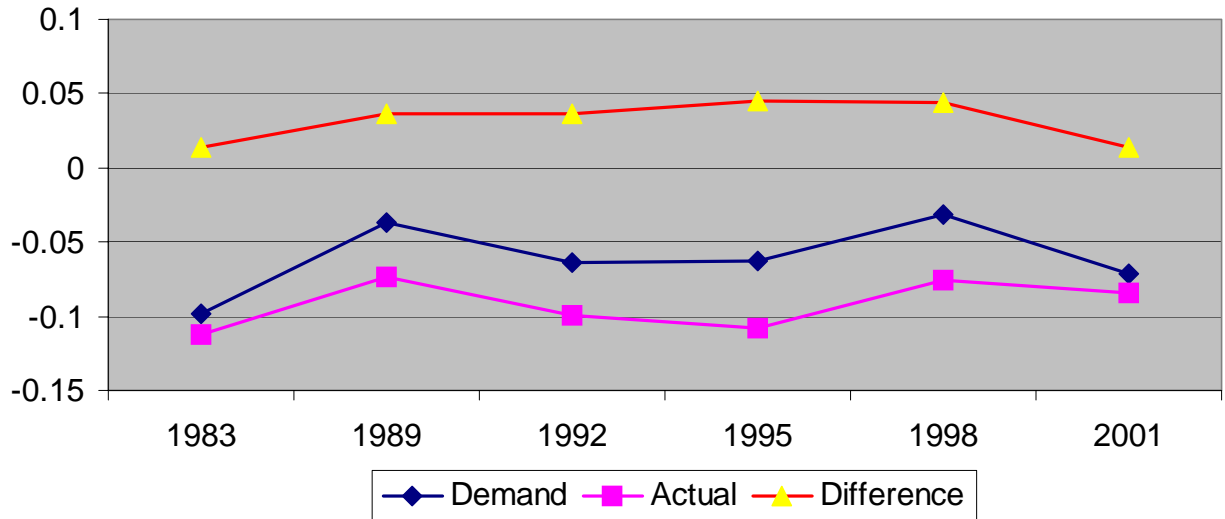
**Table 4: The Influence of Credit Barriers on Homeownership: Demand Minus Actual<sup>a</sup>**

	1983	1989	1992	1995	1998	2001
<i>Some college</i>	0.0166	-0.0077	-0.0045	0.0262	-0.0037	0.0065
<i>College degree</i>	0.0011	-0.0231	-0.0095	-0.0123	0.0066	-0.0086
<i>Married</i>	-0.0146	-0.0414	-0.0326	-0.0427	-0.0134	-0.0052
<i>Divorced</i>	-0.0114	-0.0214	0.0322	-0.0028	0.0094	0.0114
<i>Age for Individuals Under 35</i>	-0.0063	-0.0042	-0.0046	-0.0032	-0.0028	-0.0070
<i>Age for Individuals Between 35 and 55</i>	-0.0052	-0.0040	-0.0042	-0.0037	-0.0029	-0.0059
<i>Age for Individuals Over 55</i>	-0.0045	-0.0043	-0.0042	-0.0034	-0.0030	-0.0053
<i>Household size</i>	0.0018	-0.0014	0.0083	0.0043	0.0057	-0.0006
<i>Male</i>	-0.0083	-0.0129	0.0136	0.0366	-0.0038	0.0033
<i>African American<sup>b</sup></i>	0.0138	0.0367	0.0361	0.0453	0.0436	0.0133
<i>Hispanic<sup>b</sup></i>	0.0405	0.0579	0.0276	0.0149	0.0205	0.0409
<i>Other Race (including Asian)<sup>b</sup></i>	-0.0531	0.0348	-0.0049	0.0580	-0.0007	0.0378
<i>Head in bad health</i>	-0.0398	0.0321	-0.0175	-0.0045	0.0361	-0.0119
<i>Spouse in bad health</i>	0.0159	-0.0384	-0.0136	-0.0317	0.0045	0.0393
<i>Total family income (in \$2001)</i>	-0.0010	-0.0004	-0.0007	-0.0010	-0.0010	-0.0013
<i>Total family income squared (in \$2001)</i>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<i>Family has received an inheritance</i>	0.0019	-0.0230	-0.0135	-0.0292	-0.0005	-0.0108
<i>Head works full-time</i>	-0.0463	-0.0267	-0.0485	-0.0410	0.0169	-0.0448
<i>Spouse works full-time</i>	0.0137	-0.0217	-0.0127	-0.0158	-0.0128	-0.0138
<i>Spouse works part-time</i>	-0.0043	-0.0128	-0.0232	-0.0176	0.0146	0.0017
<i>Head's # full-time jobs lasting &gt; 1 years</i>	0.0045	0.0016	0.0089	0.0088	-0.0002	0.0070
<i>Constant</i>	0.3609	0.3607	0.3122	0.2719	0.2276	0.4210

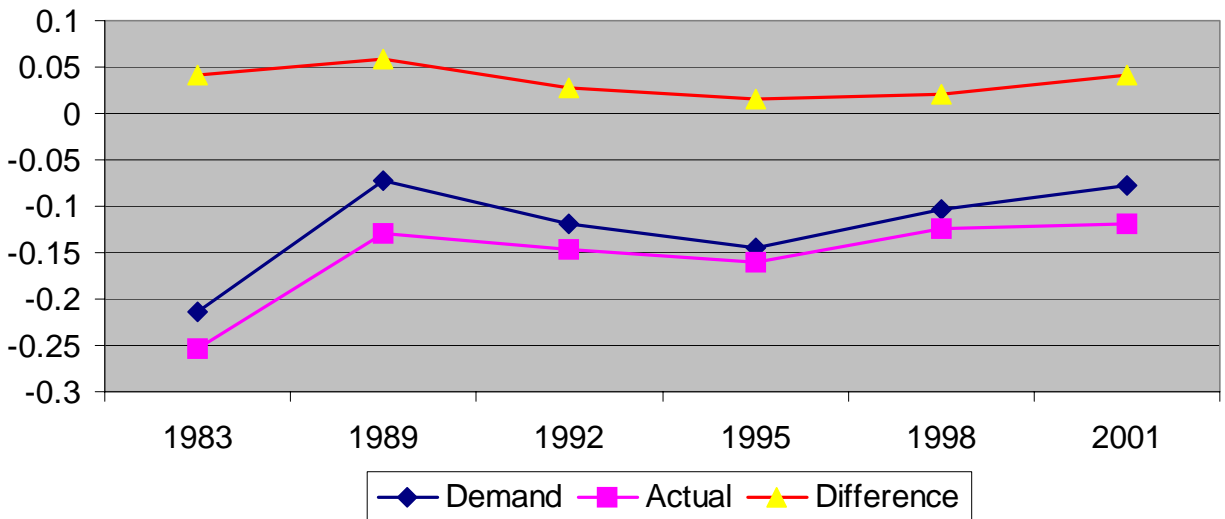
<sup>a</sup>Reported coefficients were obtained by calculating the partial derivative of a given variable for each observation in the sample and then averaging over the sample. The t-ratios in parentheses are those for the untransformed model coefficients. Data for each year were weighted to be representative of the United States (see the text and data appendix for details). Observations with annual income below zero, above \$500,000 (in year 2001 dollars), or missing were excluded from each sample.

<sup>c</sup>Omitted category is White.

**Figure 2a**  
**Influence of Credit Barriers on Homeownership Rates of African Americans Relative to Whites**



**Figure 2b**  
**Influence of Credit Barriers on Homeownership Rates of Hispanics Relative to Whites**



**Table 5**  
**Decomposition of the Propensity for Homeownership**  
**and the Influence of Borrowing Constraints By Year**

<b>Predicted Actual Homeownership Rates</b>						
Sample Year Used to Estimate the Coefficients <sup>b</sup>	Sample Year Applied to the Coefficient Estimates					
	1983	1989	1992	1995	1998	2001
1983	0.626	0.584	0.593	0.606	0.623	0.645
1989	0.661	0.635	0.640	0.651	0.669	0.688
1992	0.656	0.629	0.637	0.649	0.663	0.680
1995	0.658	0.626	0.630	0.644	0.662	0.679
1998	0.655	0.623	0.628	0.640	0.659	0.677
2001	0.638	0.616	0.622	0.633	0.653	0.672

<b>Predicted Demand for Homeownership Rates</b>						
Sample Year Used to Estimate the Coefficients <sup>c</sup>	Sample Year Applied to the Coefficient Estimates					
	1983	1989	1992	1995	1998	2001
1983	0.712	0.667	0.673	0.686	0.699	0.715
1989	0.774	0.747	0.749	0.758	0.771	0.787
1992	0.772	0.743	0.746	0.757	0.767	0.780
1995	0.763	0.735	0.737	0.748	0.761	0.773
1998	0.759	0.732	0.733	0.742	0.755	0.767
2001	0.773	0.750	0.751	0.759	0.772	0.784

<b>Influence of Credit Constraints on Homeownership Rates</b>						
Sample Year Used to Estimate the Coefficients <sup>d</sup>	Sample Year Applied to the Coefficient Estimates					
	1983	1989	1992	1995	1998	2001
1983	0.086	0.083	0.080	0.080	0.076	0.070
1989	0.114	0.111	0.109	0.107	0.102	0.100
1992	0.116	0.113	0.109	0.108	0.104	0.100
1995	0.104	0.109	0.106	0.104	0.099	0.094
1998	0.104	0.109	0.105	0.102	0.096	0.091
2001	0.135	0.134	0.130	0.126	0.120	0.111

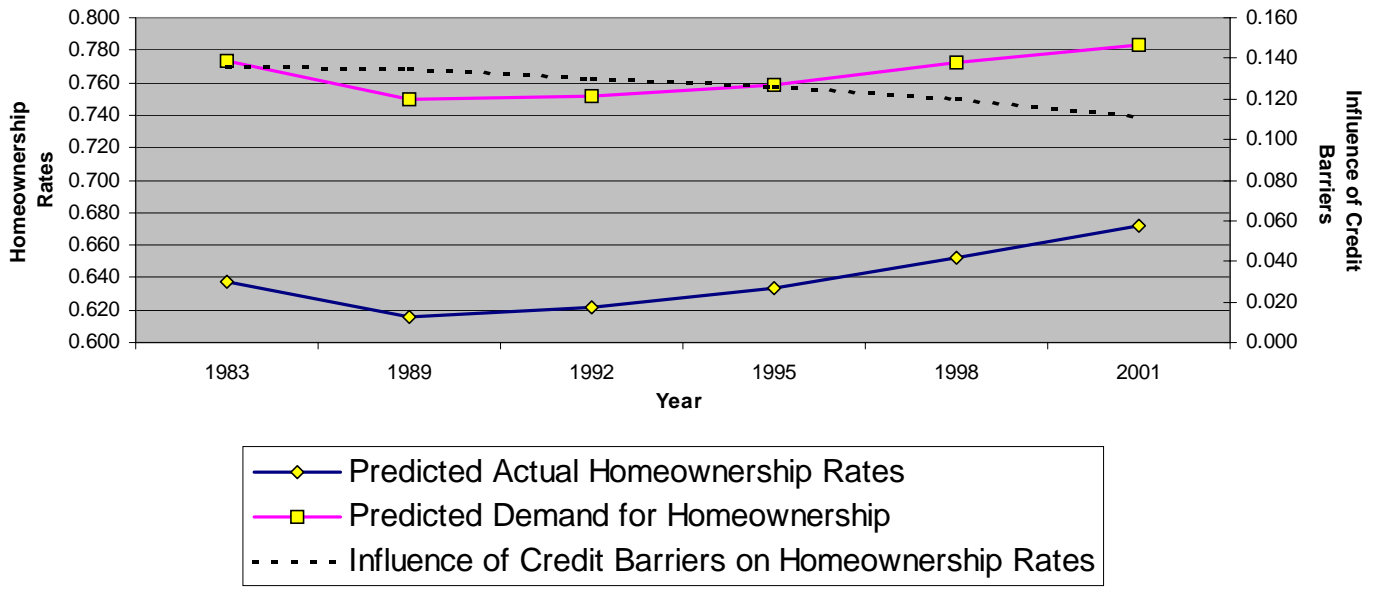
<sup>a</sup>All estimates are based on data from different years of the Survey of Consumer Finances and are weighted to be representative of the United States. Observations with annual income below zero, above \$500,000 (in year 2001 dollars), or missing were excluded from each sample.

<sup>b</sup>Coefficient estimates used to calculate the actual homeownership rates ignoring the influence of credit constraints were drawn from the columns of Table 3 for the respective years.

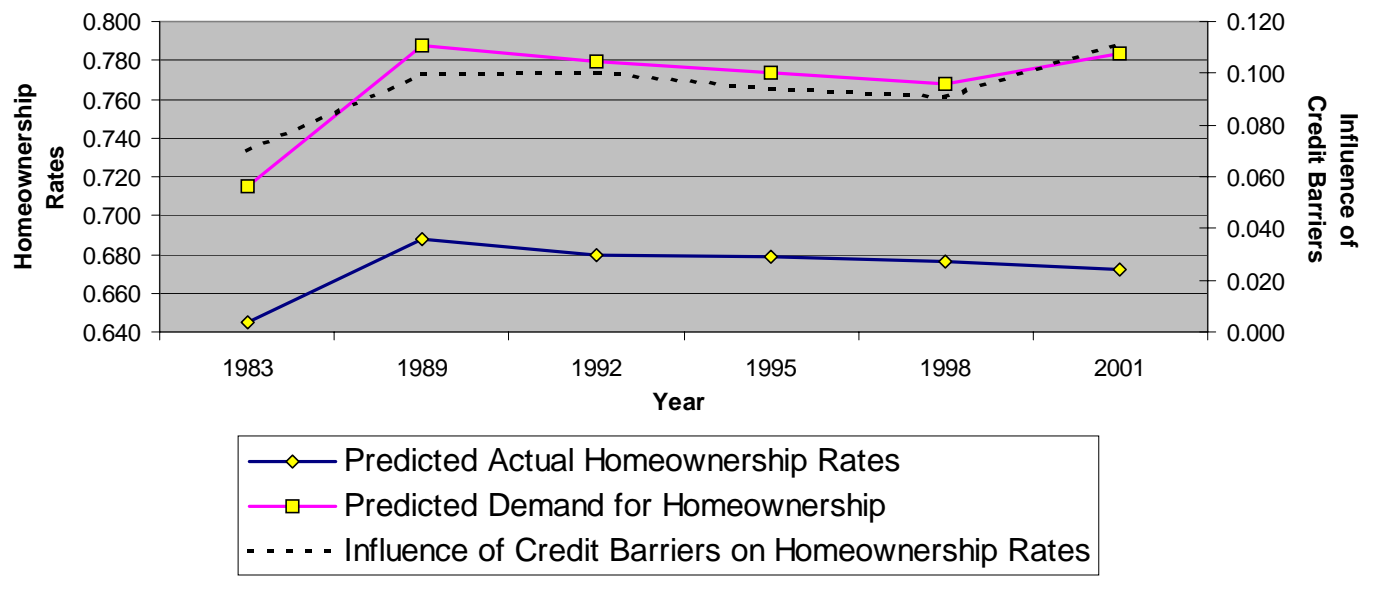
<sup>c</sup>Coefficient estimates used to calculate the demand for homeownership controlling for credit constraints were drawn from the columns of Table 2 for the respective years.

<sup>d</sup>Coefficient estimates used to calculate the influence of credit constraints were drawn from the columns of Table 4 for the respective years.

**Figure 3a**  
**Decomposition of Homeownership: Changes in the Characteristics of the Population**  
**Holding Constant the 2001 Coefficients**



**Figure 3b**  
**Decomposition of Homeownership: Changes in the Model Coefficients**  
**Holding Constant the Attributes of the 2001 Population**



**Table 6**  
**Decomposition of the Propensity for Homeownership**  
**and the Influence of Borrowing Constraints By Year:**  
**Controls for Census Region and Neighborhood Density<sup>a</sup>**

<b>Predicted Actual Homeownership Rates</b>						
Sample Year Used to Estimate the Coefficients <sup>b</sup>	Sample Year Applied to the Coefficient Estimates					
	1983	1989	1992	1995	1998	2001
1983	0.627	-	0.578	0.590	0.612	-
1992	0.684	-	0.637	0.648	0.664	-
1995	0.689	-	0.632	0.644	0.663	-
1998	0.663	-	0.628	0.637	0.659	-

<b>Predicted Demand for Homeownership Rates</b>						
Sample Year Used to Estimate the Coefficients <sup>c</sup>	Sample Year Applied to the Coefficient Estimates					
	1983	1989	1992	1995	1998	2001
1983	0.674	-	0.624	0.636	0.656	-
1992	0.802	-	0.748	0.758	0.770	-
1995	0.779	-	0.736	0.747	0.761	-
1998	0.747	-	0.726	0.733	0.748	-

<b>Influence of Credit Constraints on Homeownership Rates</b>						
Sample Year Used to Estimate the Coefficients <sup>d</sup>	Sample Year Applied to the Coefficient Estimates					
	1983	1989	1992	1995	1998	2001
1983	0.047	-	0.046	0.045	0.044	-
1992	0.118	-	0.111	0.110	0.106	-
1995	0.090	-	0.105	0.103	0.098	-
1998	0.084	-	0.098	0.096	0.089	-

<sup>a</sup>All estimates are based on data from different years of the Survey of Consumer Finances and are weighted to be representative of the United States. Observations with annual income below zero, above \$500,000 (in year 2001 dollars), or missing were excluded from each sample.

<sup>b</sup>Coefficient estimates used to calculate the actual homeownership rates ignoring the influence of credit constraints were drawn from the columns of Appendix Table 2 for the respective years.

<sup>c</sup>Coefficient estimates used to calculate the demand for homeownership controlling for credit constraints were drawn from the columns of Appendix Table 1 for the respective years.

<sup>d</sup>Coefficient estimates used to calculate the influence of credit constraints were obtained by differencing the coefficients in Appendix Tables 1 and 2.



**Appendix Table 1: Demand for Homeownership Controlling for Borrowing Constraints  
With Controls for Census Region and Neighborhood Density<sup>a</sup>**

	1983	1992	1995	1998
<i>Some college</i>	-0.0022 (-0.09)	0.0287 (1.30)	0.0292 (1.30)	0.0140 (0.68)
<i>College degree</i>	-0.0315 (-1.38)	-0.0225 (-1.02)	-0.0365 (-1.66)	-0.0067 (-0.32)
<i>Married</i>	0.1078 (3.92)	0.1538 (4.71)	0.0909 (3.37)	0.1527 (6.04)
<i>Divorced</i>	-0.0141 (-0.53)	0.0607 (2.20)	0.0306 (1.14)	0.0597 (2.47)
<i>Age for Individuals Under 35</i>	0.0041 (1.81)	0.0017 (0.77)	-0.0003 (-0.13)	0.0013 (0.65)
<i>Age for Individuals Between 35 and 55</i>	0.0065 (3.43)	0.0044 (2.74)	0.0019 (1.16)	0.0034 (2.36)
<i>Age for Individuals Over 55</i>	0.0061 (3.85)	0.0036 (3.28)	0.0032 (2.85)	0.0036 (3.50)
<i>Household size</i>	0.0274 (3.71)	0.0165 (2.21)	0.0289 (3.84)	0.0243 (3.23)
<i>Male</i>	-0.0127 (-0.79)	-0.0348 (-1.41)	0.0023 (0.09)	-0.0104 (-0.47)
<i>African American<sup>b</sup></i>	-0.1063 (-3.28)	-0.0429 (-1.44)	-0.0598 (-2.09)	-0.0224 (-0.82)
<i>Hispanic<sup>b</sup></i>	-0.1511 (-3.32)	-0.0943 (-2.53)	-0.1225 (-3.28)	-0.0568 (-1.740)
<i>Other Race (including Asian)<sup>b</sup></i>	-0.1042 (-1.41)	-0.0918 (-2.52)	-0.0669 (-1.39)	-0.1062 (-2.57)
<i>Head in bad health</i>	-0.0283 (-0.97)	-0.0196 (-0.64)	-0.0854 (-2.47)	-0.0423 (-1.31)
<i>Spouse in bad health</i>	-0.1066 (-2.49)	-0.0972 (-1.77)	-0.0921 (-1.68)	-0.0729 (-1.39)
<i>Total family income (in \$2001)</i>	0.0049 (7.00)	0.0039 (6.68)	0.0037 (5.77)	0.0037 (7.28)
<i>Total family income squared (in \$2001)</i>	-1.06E-05 (-6.09)	-8.57E-06 (-6.73)	-8.13E-06 (-6.25)	-7.69E-06 (-7.23)
<i>Family has received an inheritance</i>	-0.0202 (-0.68)	0.0762 (3.45)	0.0347 (1.58)	0.0942 (4.29)
<i>Head works full-time</i>	0.0197 (0.83)	0.0496 (1.77)	0.0576 (2.12)	0.0701 (2.63)
<i>Spouse works full-time</i>	0.0013 (0.06)	-0.0141 (-0.54)	0.0284 (1.13)	-0.0035 (-0.16)
<i>Spouse works part-time</i>	0.0715 (1.95)	-0.0155 (-0.46)	0.0060 (0.17)	0.0356 (0.94)
<i>Head's # full-time jobs lasting &gt; 1 year</i>	-0.0046 (-1.08)	-0.0063 (-1.46)	-0.0019 (-0.49)	-0.0086 (-2.23)
<i>Homes on block 20 to 100 feet apart</i>	0.1010 (3.06)	0.0819 (4.49)	0.0716 (3.94)	0.1124 (6.27)
<i>Homes on block &gt; 100 feet apart</i>	0.0936 (4.46)	0.1292 (4.42)	0.0884 (3.28)	0.0726 (2.87)

Continued on next page

**Appendix Table 1 cont.: Demand for Homeownership Controlling for Borrowing Constraints With Controls for Census Region and Neighborhood Density<sup>a</sup>**

	1983	1992	1995	1998
<i>NorthEast</i>	-0.0125 (-0.48)	-0.0372 (-3.2)	-0.0520 (-4.51)	-0.0075 (-0.31)
<i>Northcentral</i>	0.0992 (3.55)	-0.0219 (-1.87)	0.0141 (1.28)	0.0500 (2.09)
<i>South</i>	0.0725 (2.82)	-0.0059 (-0.53)	0.0518 (4.76)	0.0550 (2.48)
<i>Constant</i>	-0.4985 (-3.65)	-0.2179 (-5.94)	-0.2112 (-5.6)	-0.3328 (-4.00)
<i>Rho</i>	-0.2645 (-0.32)	-0.6857 (-5.45)	-0.6690 (-6.66)	-0.5467 (-3.95)
<i>Uncensored obs (not credit constrained)</i>	2,925	2,639	2,914	2,830
<i>Censored obs (possibly constrained)</i>	727	908	980	1,007
<i>Log likelihood</i>	-0.7701	-0.8115	-0.8001	-0.7682

<sup>a</sup>Reported coefficients were obtained by calculating the partial derivative of a given variable for each observation in the sample and then averaging over the sample. The t-ratios in parentheses are those for the untransformed model coefficients. Data for each year were weighted to be representative of the United States (see the text and data appendix for details). Observations with annual income below zero, above \$500,000 (in year 2001 dollars), or missing were excluded from each sample.

<sup>b</sup>Omitted categories are White, homes on block 0 to 20 feet apart, West Region.

**Appendix Table 2: Actual Propensity for Homeownership Without Controlling for Borrowing Constraints With Controls for Census Region and Neighborhood Density<sup>a,b</sup>**

	1983	1992	1995	1998
<i>Some college</i>	-0.0071 (-0.36)	0.0363 (1.79)	0.0106 (0.55)	0.0150 (0.83)
<i>College degree</i>	-0.0284 (-1.39)	-0.0087 (-0.42)	-0.0160 (-0.78)	-0.0087 (-0.44)
<i>Married</i>	0.1009 (4.66)	0.1833 (7.00)	0.1326 (5.85)	0.1575 (7.52)
<i>Divorced</i>	-0.0075 (-0.32)	0.0240 (0.96)	0.0337 (1.39)	0.0461 (2.13)
<i>Age for Individuals Under 35</i>	0.0087 (4.79)	0.0061 (2.94)	0.0024 (1.17)	0.0034 (1.89)
<i>Age for Individuals Between 35 and 55</i>	0.0100 (7.95)	0.0085 (5.80)	0.0053 (3.66)	0.0056 (4.55)
<i>Age for Individuals Over 55</i>	0.0089 (10.72)	0.0077 (7.97)	0.0064 (6.47)	0.0060 (7.21)
<i>Household size</i>	0.0272 (4.43)	0.0097 (1.44)	0.0255 (3.94)	0.0178 (2.84)
<i>Male</i>	-0.0035 (-0.24)	-0.0489 (-2.16)	-0.0354 (-1.61)	-0.0081 (-0.40)
<i>African American<sup>b</sup></i>	-0.0960 (-4.47)	-0.0857 (-3.56)	-0.0940 (-4.21)	-0.0592 (-2.67)
<i>Hispanic<sup>b</sup></i>	-0.1801 (-4.51)	-0.1166 (-3.85)	-0.1213 (-3.66)	-0.0604 (-2.14)
<i>Other Race (including Asian)<sup>b</sup></i>	-0.0327 (-0.51)	-0.0747 (-2.11)	-0.1197 (-2.92)	-0.0954 (-2.49)
<i>Head in bad health</i>	0.0119 (0.43)	-0.0041 (-0.13)	-0.0777 (-2.35)	-0.0724 (-2.25)
<i>Spouse in bad health</i>	-0.1124 (-2.92)	-0.0908 (-1.72)	-0.0558 (-1.06)	-0.0727 (-1.59)
<i>Total family income (in \$2001)</i>	0.0054 (10.93)	0.0045 (8.93)	0.0045 (7.99)	0.0047 (10.98)
<i>Total family income squared (in \$2001)</i>	-1.16E-05 (-7.65)	-9.97E-06 (-8.19)	-1.05E-05 (-8.48)	-9.95E-06 (-10.16)
<i>Family has received an inheritance</i>	-0.0110 (-0.44)	0.0910 (4.25)	0.0647 (3.06)	0.0976 (4.75)
<i>Head works full-time</i>	0.0497 (2.65)	0.0966 (3.87)	0.0977 (4.10)	0.0434 (1.91)
<i>Spouse works full-time</i>	-0.0065 (-0.32)	0.0013 (0.05)	0.0425 (1.97)	0.0123 (0.61)
<i>Spouse works part-time</i>	0.0725 (2.27)	0.0120 (0.38)	0.0184 (0.58)	0.0302 (0.90)
<i>Head's # full-time jobs lasting &gt; 1 year</i>	-0.0062 (-1.88)	-0.0151 (-4.07)	-0.0107 (-3.01)	-0.0068 (-2.44)

Continued on next page.

**Appendix Table 2: Actual Propensity for Homeownership Without Controlling for Borrowing Constraints With Controls for Census Region and Neighborhood Density<sup>a,b</sup>**

	1983	1992	1995	1998
<i>Homes on block 20 to 100 feet apart</i>	0.0716 (2.56)	0.0920 (5.53)	0.0957 (5.84)	0.1170 (7.59)
<i>Homes on block &gt; 100 feet apart</i>	0.0878 (5.55)	0.1277 (4.84)	0.1359 (5.40)	0.1036 (4.25)
<i>NorthEast</i>	-0.0082 (-0.36)	0.0265 (1.10)	-0.0402 (-1.69)	0.0251 (1.11)
<i>NorthCentral</i>	0.1133 (5.27)	0.0177 (0.74)	0.0482 (2.12)	0.0867 (3.96)
<i>South</i>	0.0820 (3.85)	0.0436 (1.95)	0.0441 (2.07)	0.0576 (2.86)
<i>Constant</i>	-0.7339 (-12.14)	-0.5732 (-8.29)	-0.4909 (-6.99)	-0.5423 (-8.71)
<i>Number of obs</i>	3652	3547	3894	3837
<i>Log likelihood</i>	-1763.3	-8519.2	-9314.0	-8594.4

<sup>a</sup>Reported coefficients were obtained by calculating the partial derivative of a given variable for each observation in the sample and then averaging over the sample. The t-ratios in parentheses are those for the untransformed model coefficients. Data for each year were weighted to be representative of the United States (see the text and data appendix for details). Observations with annual income below zero, above \$500,000 (in year 2001 dollars), or missing were excluded from each sample.

<sup>b</sup>Omitted variables are White, homes on block 0 to 20 feet apart, West Region.