Trends in homeownership: Race, demographics, and income

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Introduction and summary

For most Americans, a home is more than shelter. It is also their most valuable asset and an important savings vehicle.[1] Moreover, a high rate of homeownership is often thought to create better citizens, enhance the stability of communities, increase the value of other property, and even improve the performance of children in school.[2] Perhaps for these reasons, a wide array of public policies have been undertaken to encourage homeownership. These include favorable treatment of homeownership under the tax code, the creation of the thrift industry, the establishment of the Federal Housing Administration's (FHA) lending programs, and the chartering of government-sponsored enterprises to facilitate mortgage securitization.

The U.S. homeownership rate, as shown in figure 1, has recently reached new highs. However, the increase during the last two years follows two decades of stagnant or falling homeownership rates, which were in sharp contrast to the previous 30 years during which the U.S. homeownership rate increased by over 20 percentage points. The lack of growth in homeownership after the mid-1970s was taken by some analysts and policymakers to imply the need for down payment assistance programs, lower down payments for FHA mortgages, and looser underwriting standards for the secondary mortgage market, among other policies.[3] Similarly, the recent jump in homeownership rates might be taken as evidence that certain housing policies are beginning to have a positive effect.

Public policy concern has been especially great over the large and, until recently, growing gap between white and black homeownership rates. As shown in table 1, while the overall homeownership rate declined by only 0.8 percentage points between 1977 and 1995, the black homeownership rate fell by 2.6 percentage points to 40.7 percent.[4] In contrast, the white homeownership rate actually increased by 0.4 percentage points to 67.9 percent, implying a 1995 gap of 27.2 percentage points. Although that gap shrunk by nearly 3 percentage points from 1995 to 1997 as black homeownership grew a significant 3.5 points, the homeownership rate for blacks remains more than 23 percentage points below that for whites.

Policymakers are concerned that some or all of the gap between white and black homeownership rates may be due to discriminatory "steering" by real estate agents or to discriminatory lending practices.[5] Concern over possible discrimination has motivated the passage of legislation such as the Fair Housing Act, the Equal Credit Opportunity Act, the Community Reinvestment Act (CRA), and the Home Mortgage Disclosure Act. Though these laws have been in place in some form for many years, one might argue that recent amendments and stepped-up enforcement efforts might have increased their impact in the last few years.[6] Thus, one might argue that the increased effectiveness of CRA and fair lending laws is behind the recent homeownership gains of black households and the drop in the white–black homeownership gap.

However, it is dangerous to draw conclusions on the effectiveness of policy from trends in raw homeownership rates. Many major demographic and economic trends unrelated to narrowly focused housing policies significantly affect the homeownership rate. In particular, forces such as the aging of the baby boom generation, the decline in marriage rates, and the growth and distribution of real incomes can cause

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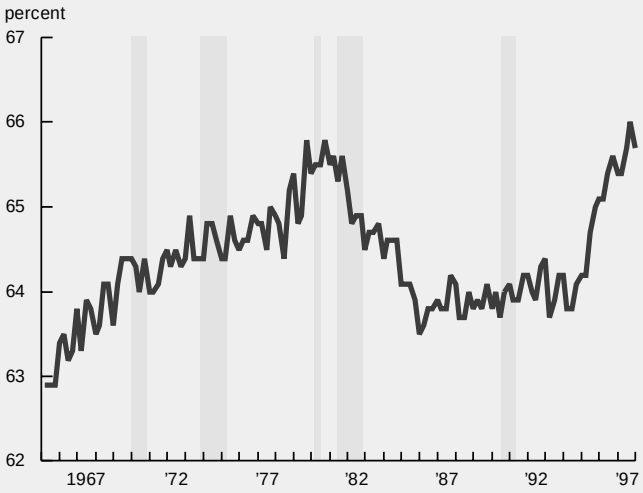
FIGURE 1

U.S. homeownership rate



Note: Shaded areas indicate recessions.
Source: U.S. Department of Commerce, Bureau of the Census.

the homeownership rate to rise or fall independently of policymakers' actions. Thus, trends in overall homeownership rates or the white–black homeownership gap that are due to major economic and demographic trends may be mistakenly interpreted as reflecting the consequences of narrow housing policy choices.

In this article, we use the Census Bureau's *March Current Population Survey* (CPS) data from 1977 to 1997 to look at homeownership trends within more narrowly defined groups that may be free of compositional shifts due to changing demographic and income trends. Rates for groups that are stable in terms of demographics and income give us a clearer indication of the effects of housing policies. We also use logistic regression analysis to compute overall adjusted homeownership rates that are simultaneously free of the effects of trends in several demographic and income variables. By removing the effects of changes in demographic and income variables, we are better able to judge the impact of narrowly defined housing market policies. Similarly, we compute an adjusted white–black homeownership gap that uses logistic regression analysis to remove the effects of racial differences in demographics and income, providing a clearer picture of the trend over time in the other forces that affect the white–black gap.

Our adjusted rates may enable subsequent research to better disentangle the complex set of forces that determine the homeownership rate. In addition to the possible public policy initiatives mentioned above, these forces include the level of interest rates, which, in addition to directly affecting housing costs, partially determines the ability of households to qualify for mortgages; the tax code, which most analysts argue encourages homeownership through its exemption from taxation of the implicit rental income from owner-occupied housing;[7] and financial innovations of the last 20 years, such as the growth of mortgage securitization and home equity loans, which might be expected to loosen the financing constraints that keep some from owning homes.[8]

Although the aggregate homeownership rate varies only slightly over the period we study, homeownership rates for several subgroups of the population have changed in remarkable ways. For instance, younger households have generally seen substantial declines in homeownership rates, with the opposite being the case for older households. The rate for households with heads between 35 and 39 years of age dropped by 7 percentage points, while the rate for those with heads between 55 and 74 rose by 5.5 percentage points. Thus, no simple picture of the narrow forces determining homeownership emerges from looking within specific age groups. Apparently, these forces affect young and old households differently or other demographic and income shifts obscure the effect of such forces even within age groups.

We find that ownership rates for smaller households rose while those for larger households declined.

TABLE 1

Homeownership rates: Whites and blacks (percent)

Year	Overall	White	Black	White minus black
1977	64.6	67.5	43.3	24.2
1995	63.8	67.9	40.7	27.2
1997	64.8	68.5	44.2	24.3
Percentage point change				
1977–95	–0.8	0.4	–2.6	3.0
1995–97	1.0	0.6	3.5	–2.9
1977–97	0.2	1.0	0.9	0.1

Source: Authors' tabulations of 1977, 1978, and 1983–97 *March Current Population Surveys*.

For instance, households without children had a nearly 3 percentage point higher homeownership rate in 1997 than in 1977, while those with four or more children had a more than 10 percentage point decline. The divergent trends in homeownership with respect to household size imply that a homeownership rate calculated at the individual level has actually declined noticeably relative to one calculated at the household level. Thus, policymakers impressed with the positive effects of homeownership on children's educational outcomes may have an overly optimistic sense of the trend in the number of children living in ownership settings.

Another remarkable change has been the greatly increased importance of education as an indicator of homeownership. In 1977, the difference between homeownership rates for those without a high school degree and those with postgraduate education was less than 6 percentage points. By 1997, however, the gap had increased to over 20 percentage points; the rate for those without a high school degree dropped by more than 8 points and the rate for those with more than a college degree rose by more than 7 points. This trend resembles the spreading of the wage and income differentials associated with education. Separately examining homeownership rates for different deciles of the income distribution reveals a further connection with increasing income inequality. Homeownership rates actually increased for most income deciles between 1977 and 1997, but the 7 point drop for the lowest income decile kept the overall rate little changed. These results suggest that policymakers concerned with increasing homeownership may want to focus their efforts on policies targeting households with low levels of education and income.

Our quantitative analysis using logistic regression models finds that the increasing age of the population raised homeownership rates by more than 1 percentage point between 1977 and 1997. However, this effect was more than offset by other demographic changes, especially the decline in the fraction of household heads that are married. In fact, the combined effect of the demographic variables (including region, but not education or income) was to lower homeownership rates by more than 2 percentage points. Finally, changes in income and education had an almost precisely offsetting positive effect on homeownership rates over the full sample period. Our measure of the adjusted homeownership rate grew by 0.2 percentage points from 1977 to 1997, about the same as the unadjusted rate. The pattern over time was somewhat different, however. In particular, our adjusted rates show a smaller decline over the 1977 to 1995 period and about half as large an increase from 1995 to 1997.

Significant changes in policies or other narrow forces affecting the housing market are not necessary to explain most of the history of adjusted homeownership rates. The slight decline in homeownership between 1977 and 1995 can be explained by demographic factors, such as the decline in marriage rates. Similarly, we estimate that the normal response to the growth in real incomes from 1995 to 1997 was enough to explain about half of the jump in the homeownership rate over that period.

We also find that the increase in household income inequality during the last 20 years has had a significant effect on the homeownership rate. If the economy had generated the same total increase in real income over the period but in a more uniform manner, homeownership rates would have risen more. Specifically, if all households had experienced the same proportional increase in income as was found in the aggregate personal income statistics, we estimate that the homeownership rate would have risen by an additional 1.2 percentage points.

Cross-sectional differences between white and black households in demographics and income explain approximately two-fifths of the observed difference in homeownership rates. As we noted, in 1997, the white–black ownership gap was approximately 24.3 percentage points (68.5 percent versus 44.2 percent). After adjusting for differences in demographic and income variables, the gap shrinks to 13.0 percentage points. The large gap in homeownership rates remaining even after adjustment for demographic and income factors is consistent with earlier research on this topic.[9] Our analysis cannot determine to what extent the remaining gap is due to discrimination, different tastes for homeownership, or differences in other determinants of homeownership that are not measured in the CPS. One such factor may be inherited wealth. Several studies have shown that blacks inherit less wealth than whites, and wealth may affect homeownership through its effect on permanent income and by easing the down payment constraint.[10]

Changes in background income and demographic factors do not explain much of the change over time in the white–black homeownership differential. Black educational attainment moved closer to that of whites, which tended to help close the gap, but blacks had a more rapid decline in marriage rates and a less pronounced age increase, which tended to widen the gap by about the same amount. Thus, the change in our adjusted white–black gap over the full 1977 to 1997 period was similar to the change in the raw gap. Moreover, the pattern over time in adjusted and unadjusted rates was relatively similar. In particular, we

still find a remarkable 2.5 percentage point decline in the white–black homeownership differential from 1995 to 1997. Thus, our results leave open the possibility that the regulatory changes of the mid-1990s are narrowing the white–black gap in homeownership rates.

Below, we use the CPS data to examine trends in demographic and income variables as well as homeownership rates for specific demographic and income groups. In the following section, we employ a logistic regression procedure to compute aggregate homeownership rates adjusted for demographic and income changes. Then, we present adjusted estimates of the white–black homeownership difference and its trend over time.

Cross-sectional determinants of homeownership

We use March CPS data to examine trends in homeownership rates for a number of specific demographic and income groups.[11] By examining the trends within groups, we can identify developments that are obscured in the aggregate homeownership rate by shifts in population between groups with different homeownership propensities. We also note how changes in the demographic and income characteristics of the population are likely to affect the aggregate homeownership rate. This, of course, depends on both the magnitude of differences in homeownership rates between groups and the size of compositional shifts.

After briefly discussing the March CPS data, we examine breakdowns of the population by a number of demographic and income variables. For each variable, we note the homeownership trends within groups and the likely effect on aggregate homeownership rates of changes in the relative size of the groups defined by the variable.

CPS data

Our analysis is based on the *March Current Population Survey* (CPS) micro data for 1977 through 1997. The CPS is a monthly, nationally representative survey of approximately 50,000 households conducted by the Census Bureau.[12] Perhaps best known as the source for the monthly unemployment rate, the CPS is also a primary source for the Census Bureau's estimates of the homeownership rate. In addition, the CPS records extensive demographic and educational information on the members of surveyed households. We focus on the March files because of the detailed income data that are only collected in that month. Unfortunately, we discovered errors in the source data for the years 1979 to 1982 that prohibit their use in this article.[13]

Many of the household characteristics we examine are actually characteristics of the household head. However, the Census Bureau's definition of "householder" changes over time. Thus, to ensure comparability over time, we redefine the household head in the way the Census did before 1980. That is, if the householder is married with a spouse present, we choose the household head to be the male marriage partner. This allows us to define the age, race, sex, marital status, and level of education of a household in a consistent way. We limit our analysis to households with heads between the ages of 18 and 74 to ensure enough data to analyze in each age group with similar homeownership rates. Eliminating older households causes our unadjusted rates to be slightly lower than the official statistics and to have a slightly lower trend. However, the basic patterns remain the same.

Race of household head

We have already noted the more than 20 percentage point difference in homeownership rates between white and black households. As panel A of figure 2 shows, the white–black ownership gap increased in the late 1980s, but after strong growth in black homeownership in the last two years of the sample, the gap was significantly narrowed. As table 2 shows, from 1977 to 1997, the white homeownership rate increased by 1.0 percentage point while the rate for blacks increased by 0.9 percentage points, leaving the gap virtually unchanged.

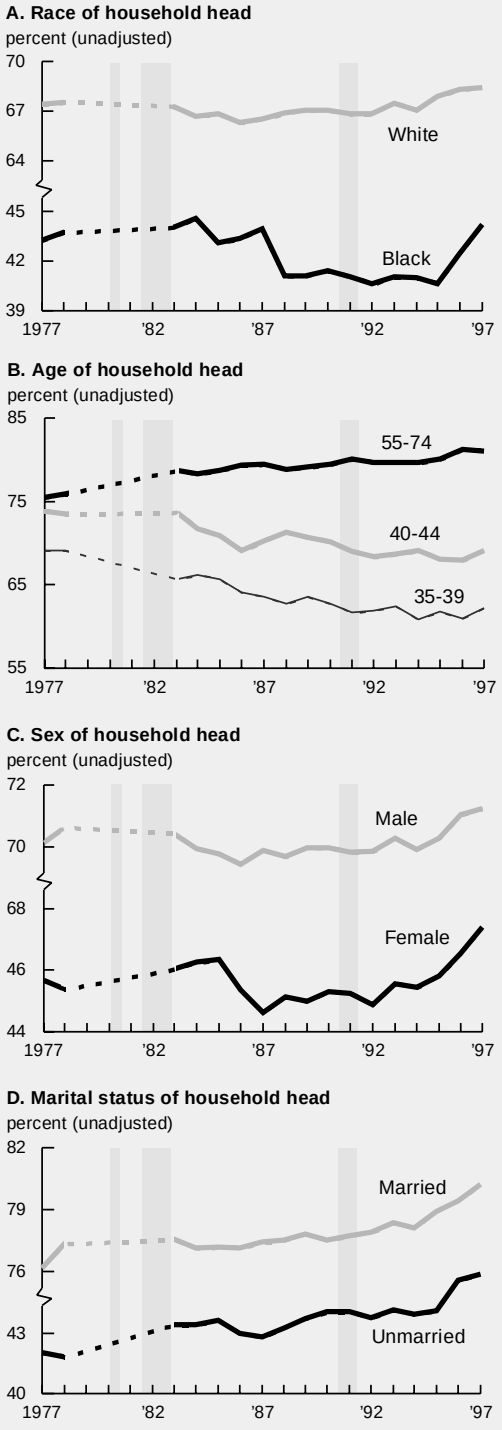
The fact that both the white and black homeownership rates increased by more than the overall rate (of 0.2 percentage points) is one indication of the importance of demographic shifts. In this case, the greater population growth in the black and other race categories more than offset increasing homeownership rates within these groups. As table 2 (on page 59) shows, from 1977 to 1997, the fraction of households headed by whites declined 4.3 percentage points from 87.9 percent to 83.6 percent. Households headed by blacks increased by 1.7 percentage points and households headed by other minorities increased by 2.6 percentage points. Given the ownership rate differentials, the shift in racial composition has the effect of lowering the aggregate ownership rate over the period we analyze.

Age of household head

Not surprisingly, there is a life cycle component to homeownership. For instance, in 1977 only 19.8 percent of household heads aged 18–25 owned their homes, compared with 75.5 percent of the 55–74 year olds. As shown in panel A of figure 3, for both 1977 and 1997, homeownership rates increase rapidly with age until household heads are approximately 40.

FIGURE 2

Homeownership rates by race, age, sex, and marital status



Note: Shaded areas indicate recessions. Dashed line represents period with missing data.

Source: Authors' calculations based on U.S. Department of Commerce, Bureau of the Census, *Current Population Survey*, March 1977–78 and 1983–97.

Thereafter, the increases are more gradual. In the case of the 1977 data, homeownership rates begin to decline with age for household heads over 65. In the most recent data, however, homeownership holds steady or increases with age until at least age 75. There are many possible explanations for the generally increasing age profile. Young households might not have sufficient financial capital to purchase, they may prefer to remain mobile for employment possibilities, or they may be unsure about future demands for housing due to uncertainty about marriage and children.

Comparing the two lines in panel A of figure 3, one can see that homeownership rates have generally fallen relative to 1977 for household heads under about 55 and have generally risen for older household heads. For instance, as shown in table 2 (on page 59), the homeownership rate for household heads between 35 and 39 years of age fell a rather dramatic 7.0 percentage points, while rates for those between 55 and 74 rose by 5.5 percentage points. As panel B of figure 2 shows, this divergence of homeownership rates for younger and older households has been fairly continuous over the last 20 years. Whatever forces have affected homeownership must have affected younger and older households differently.

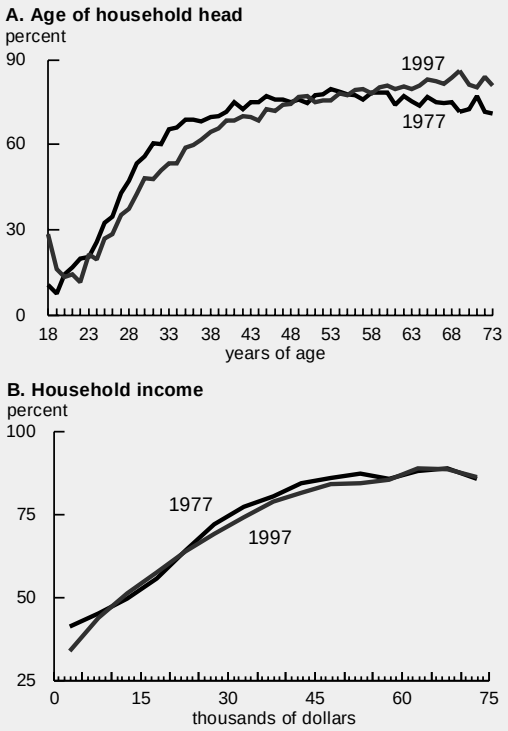
Table 2 also displays a decline in the fraction of household heads at the extremes of the age distribution and an increase in the fraction in the 35 through 55 age groups. Since homeownership rates are relatively high in the over 55 age category, the drop in this group's fraction of the population would tend to lower the overall homeownership rate. We will see in the next section, however, that the quantitatively more important effect is the drop in the fraction of the population in the under 30 age group for which homeownership rates are very low. This change, which corresponds to the movement of the baby boom generation into the prime homeownership ages, has tended to increase the aggregate homeownership rate.

Sex and marital status of household head

The difference in homeownership rates between female-headed and male-headed households is comparable to the white–black differential, although it has received less attention. Panel C of figure 2 shows that in recent years, female-headed households' homeownership rates have risen slightly faster than male-headed rates. However, table 2 shows that even in 1997, the male-headed rate of 71.3 percent was nearly 24 percentage points higher than the female-headed rate. Because of the way we define the household head, female household heads cannot be married with a spouse present. Thus, the gap between male-headed

FIGURE 3

Homeownership rates by age, income, and income percentile



Source: Authors' calculations based on U.S. Department of Commerce, Bureau of the Census, *Current Population Survey*, March 1977–78 and 1983–97.

and female-headed homeownership rates is closely related to the gap shown in panel D of figure 2 between the homeownership rates of heads that are married with spouse present and those that are not. The gap between married and unmarried homeownership rates, 34.4 percentage points in 1997, is even larger than that between female- and male-headed households or between white- and black-headed households.

As table 2 shows, homeownership rates for both male-headed and female-headed households rose 1 percentage point or more faster than the aggregate rate over the 1977 to 1997 period. Even more dramatically, rates for both unmarried and married household heads increased by about 4 percentage points, while the aggregate rate barely changed. The trends within groups defined by sex of head and, especially, marital status of head suggest a growing tendency toward homeownership that is obscured in the aggregate rate by a shift in the population toward household types with lower homeownership rates. Table 2 shows that the fraction of female-headed households increased by 4.6 percentage points and the fraction of unmarried household heads increased by 11.2 percentage points. Given the differences in homeownership rates between the groups, both of these shifts would tend to significantly reduce aggregate homeownership rates.

Household size and composition

Another important household characteristic is the number of members and the split between adults and children. In general, households with fewer members have seen rising homeownership rates, while those with more members have seen falling rates. In particular, as panel A of figure 4 shows, households without children have seen rising rates of homeownership, to the point where their homeownership rate now exceeds that for households with one child or three or more children. As table 2 shows, the latter group has experienced a decline of over 10 percentage points in its homeownership rate, while households with no children have seen an increase of nearly 3 percentage points. Somewhat similarly, when stratified by the number of adults, the homeownership rate has been increasing for households with one or two adults but falling for households with more adults, such as those in which extended families reside.

The divergent trends in homeownership rates for large and small households means that the trend in homeownership looks significantly less strong when viewed at the individual rather than household level. That is, the standard, household-based measure counts all households equally, rather than giving greater weight to the households with more people. In fact, when we weight the homeownership rate by the number of individuals in the household, we find that homeownership rates declined by 1.8 percentage points over our sample period to a level of 68.2 percent in 1997. This is in contrast to the 0.2 percentage point increase in the standard, household-based rate. When we weight the rate by the number of children, we find an even greater decline, from 67.4 percent in 1977 to 62.3 percent in 1997.

Table 2 shows that the population of households has shifted toward those with fewer members. The fraction without children grew 1.9 percentage points

and the fraction with a single adult increased dramatically from 22.2 percent in 1977 to 27.3 percent in 1997. Households with four or more adults declined by about the same amount.[14] Given the recent increases in homeownership among households without children, the shift toward households with fewer children

TABLE 2

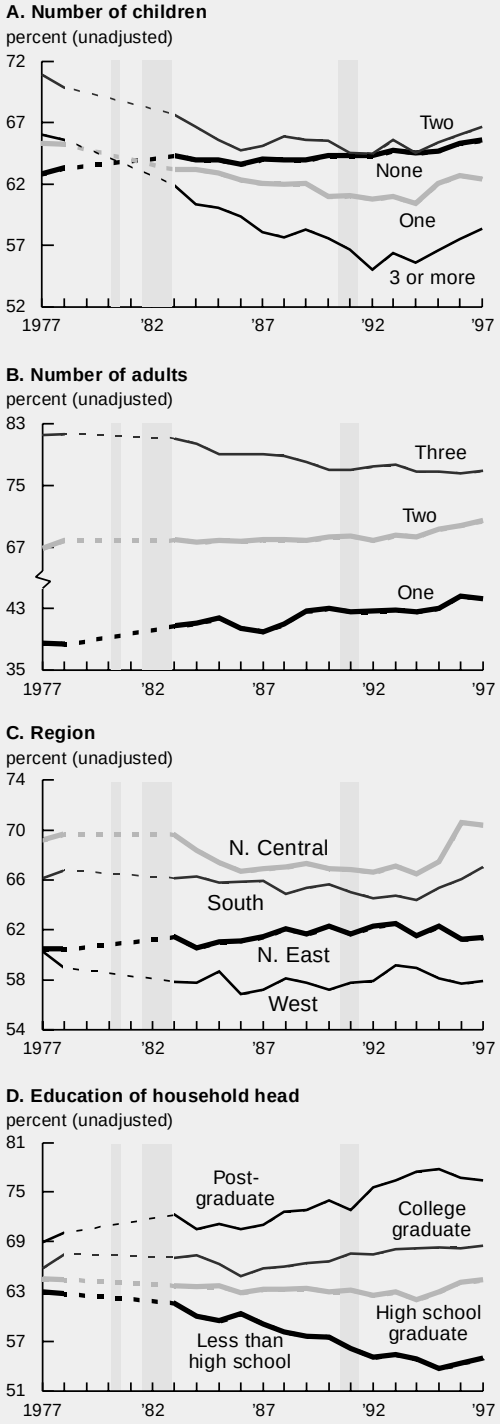
Homeownership rates and percent of population
(percent)

	Homeownership rates			Percent of population		
	1977	1997	Change, 1977–97	1977	1997	Change, 1977–97
Overall	64.6	64.8	0.2			
Race of household head						
White	67.5	68.5	1.0	87.9	83.6	4.3
Black	43.3	44.2	0.9	10.7	12.5	1.7
Other minority	49.6	51.9	2.3	1.4	3.9	2.5
Age of household head						
18–24	19.8	17.5	–1.3	8.6	5.3	–3.3
25–29	42.6	34.6	–8.0	12.1	9.2	–2.9
30–34	61.4	51.1	–10.3	11.3	11.4	0.1
35–39	69.3	62.3	–7.0	9.4	13.3	3.9
40–44	73.9	69.1	–4.8	8.6	12.5	3.9
45–54	76.9	75.2	–1.7	18.7	20.5	1.8
55–74	75.5	81.0	5.5	30.4	26.6	–3.8
Sex of household head						
Male	70.2	71.3	1.2	77.4	72.8	–4.6
Female	45.7	47.4	1.7	22.6	27.2	4.6
Marital status of household head						
Married, spouse present	76.1	80.3	4.2	66.2	55.0	–11.2
Unmarried or spouse absent	42.1	45.9	3.8	33.8	45.0	11.2
Children						
None	62.9	65.7	2.8	62.0	63.9	1.9
One	65.3	62.5	–3.4	16.6	16.3	–0.3
Two	71.0	66.7	–4.3	13.5	13.1	–0.4
Three	68.1	61.2	–7.4	5.4	4.9	–0.5
Four or more	61.6	51.0	–10.6	2.5	1.8	–0.7
Adults						
One	38.6	44.4	5.8	22.2	27.3	5.1
Two	66.9	70.5	3.6	50.7	51.0	0.3
Three	79.8	76.2	–3.6	14.5	14.3	–0.2
Four or more	83.5	78.5	–5.0	12.6	7.5	–5.1
Region						
North East	60.6	61.4	0.8	22.7	19.3	–3.4
North Central	69.3	70.4	1.1	26.4	23.6	–2.8
South	66.2	67.1	0.9	31.9	35.5	3.6
West	60.3	57.9	–2.4	19.0	21.6	2.6
Education of household head						
Less than high school	63.1	55.0	–8.1	33.4	15.3	–18.1
High school graduate	65.6	64.9	–0.7	34.3	33.2	–1.1
Some college	62.5	63.8	1.3	14.8	25.7	10.9
College graduate	65.9	68.6	2.7	9.7	16.6	6.9
Postgraduate	68.9	76.4	7.5	7.9	9.3	1.4

[a]Households of a given type as a percentage of all households.
Source: Authors' tabulations of 1977, 1978, and 1983–97 *March Current Population Surveys*.

FIGURE 4

Homeownership rates by household size, region, and education



Note: Shaded areas indicate recessions. Dashed line represents period with missing data.

Source: Authors' calculations based on U.S. Department of Commerce, Bureau of the Census, *Current Population Survey*, March 1977–78 and 1983–97.

may not have a dramatic effect on aggregate homeownership. However, homeownership rates for households with two or more adults remain more than 25 percentage points lower than those for households with two or more adults. Thus, the shift toward fewer adults per household would tend to decrease homeownership.

Region of household

Panel C of figure 4 reveals that there has been a stable ranking of Census regions by homeownership. The highest rates are found in the North Central region, where over 70 percent of household heads were homeowners in 1997, while the lowest rates are found in the West, where under 60 percent of households owned their homes. The North Central region's lead shrunk following the recession of 1981–82, which was especially severe in many of those states. More recently, the growth in homeownership rates has been especially strong in the North Central and South regions. This strength mirrors the relatively strong growth in output and employment in those regions in the 1995 to 1997 period.[15]

The effect of the changing regional composition of households is ambiguous. On the one hand, the biggest increase in the fraction of households has been in the South, where homeownership rates are above average, and the biggest decline has been in the North East, where rates are below average, shifts that would tend to raise the aggregate rate. On the other hand, the West, which has the lowest homeownership rates, has gained in share of households, while the North Central region, which has the highest rates, has declined in share of households, shifts which would tend to reduce the aggregate rate.

Education of household head

Panel D of figure 4 shows the substantial increase in importance of education as an indicator of homeownership rates. In 1977 rates for the various educational groups were relatively close. For instance, table 2 shows that the rate for those with postgraduate education, 68.9 percent, was only 5.8 percentage points higher than the rate for those who did not graduate from high school. By 1997, however, the gap in rates between these groups had increased to 21.4 percentage points, driven in approximately equal measure by increasing rates for those with postgraduate education and decreasing rates for those without high school diplomas. Although the gap between groups toward the center of the educational distribution increased less dramatically, the difference in homeownership rates between those with a college degree and those without college increased from only 0.3 percentage points in 1977 to 3.7 percentage points in 1997.

Changes in the distribution of educational attainments would clearly tend to increase aggregate homeownership rates. One-third of 1977 household heads had less than a high school education; by 1997 the fraction was below one-sixth. Moreover, there were significant increases in the proportion of the population with some college, college degrees, and postgraduate education. These changes have the effect of raising homeownership levels.

Household income

Panel B of figure 3 shows that homeownership rates rise with real income. The pattern for 1997 is remarkably similar to that for 1977 except at the lowest income levels, where the rate of homeownership has dropped quite significantly. The fact that homeownership rises with income means that the increase in real incomes over the sample period would tend to raise the aggregate homeownership rate. Note, however, that homeownership increases with income at a decreasing rate. Thus, a given increase in total income will tend to have a large effect if it is concentrated at the low end of the income distribution. For instance, an extra $1,000 of income will make little difference to the chance that a household head with income above $50,000 (in 1982 dollars) is a homeowner, but it will have a more significant effect on the chance that a household head with income of $10,000 will own a home. Thus, the fact that the increase in household incomes over the last two decades has been greatest at the high end of the income distribution will have tended to hold down the increase in homeownership relative to a situation in which income gains had been more evenly distributed.

Table 3 summarizes the relationship between income and ownership by income decile. In 1977, slightly more than 42 percent of household heads in the lowest income decile owned homes. Ownership rates increase monotonically through the income distribution to above 60 percent for the median group and almost 88 percent for the highest decile. The most significant change between 1977 and 1997 occurred in the lowest income decile. While ownership rates were generally up for the higher deciles, those for the lowest decile fell a dramatic 7 percentage points. For the highest 90 percent of households, there was an increase in ownership of 1 percentage point over the 20-year period, significantly more than the increase in the aggregate rate which was held down by the large decline in homeownership among the 10 percent of households with the lowest incomes.

The bottom portion of table 3 shows the change in homeownership rates for groups with approximately constant real incomes. Specifically, it categorizes households according to the decile into which they would have fallen in the 1987 real income distribution. Again, the most significant change is that the lowest income group had the largest decline in homeownership. Finally, the fraction of individuals in the highest 1987 income deciles increased, which would tend to increase homeownership rates.

Effects of demographics and income growth on homeownership

The demographic and income trends detailed in the last section imply divergent predictions for the aggregate homeownership rate. On the one hand, the movement of the baby-boom generation into the prime homeownership ages, the increase in the level of education, and the increase in real incomes suggest that, in the absence of changes in government policy or other changes in narrow housing market conditions, homeownership rates should have risen over the last 20 years. On the other hand, the decline in the proportion of households headed by married people, the increase in households headed by women, and the increase in the number of nonwhite households would tend to have decreased the overall homeownership rate.

Below, we quantify the importance of the above factors and present estimates of how the homeownership rate would have changed if these factors had remained constant. The resulting standardized or adjusted homeownership rates provide a better indication of any trends in homeownership that may be due to government policies narrowly affecting the housing market or to such factors as tax policy, interest rates, or financial innovation. To compute these adjusted rates, we select 1987, the middle year of our sample, as the standard for demographic and income levels. For a given year, we then ask what the homeownership rate would have been, given the homeownership rates for individual demographic and income groups then prevailing, if the proportions of those groups in the population had been the same as in 1987.

We begin by standardizing the homeownership rate only for changes in the age distribution, a case that has been frequently emphasized in policy discussions. Consider the data shown in table 2 for the age of household heads. In 1977, homeownership rates ranged from 19.8 percent for household heads between the ages of 18 and 24 to 76.9 percent for household heads between 45 and 54. The overall homeownership rate in 1977, 64.6 percent, is the average of the rates shown in the first column of table 2 weighted by the actual 1977 proportions shown in the fourth column. To compute the adjusted rate, we weight the average

TABLE 3

Homeownership rates by income level
(percent)

	Level			Change		
	1977	1995	1997	1977–95	1995–97	1977–97
Income decile						
1	42.3	32.3	35.3	–10.0	3.0	–7.0
2	46.0	44.4	45.2	–1.6	0.8	–0.8
3	50.1	50.4	51.8	0.3	1.4	1.7
4	53.7	54.1	56.7	0.4	2.6	3.0
5	60.6	63.0	62.5	2.4	–0.5	1.9
6	68.7	67.4	68.1	–1.3	0.7	–0.6
7	73.5	73.0	75.2	–0.5	2.2	1.7
8	79.1	80.5	80.1	1.4	–0.4	1.0
9	84.5	83.9	84.6	–0.6	0.7	0.1
10	87.7	89.1	88.6	1.4	–0.5	0.9
2–10	67.1	67.3	68.1	0.2	0.8	1.0
1987 income decile						
1	42.1	32.4	35.1	–9.7	2.7	–7.0
2	46.1	44.8	45.0	–1.3	0.2	–1.1
3	50.5	51.2	51.3	0.7	0.1	0.8
4	53.9	54.4	56.7	0.5	2.3	2.8
5	62.4	63.6	62.0	1.2	–1.6	–0.4
6	70.3	67.9	67.6	–2.4	–0.3	–2.7
7	75.9	73.1	74.4	2.8	0.7	3.5
8	81.3	79.7	79.3	1.6	–0.4	1.2
9	86.3	84.1	83.6	–2.2	–0.5	–2.7
10	88.0	88.6	88.0	0.6	–0.6	0.0
2–9	65.3	64.3	64.8	–1.0	0.5	–0.5

Source: Authors' tabulations of 1977, 1978, and 1983–97 *March Current Population Surveys*.

of the rates for individual age ranges by the proportion of the groups in the 1987 population.[16]

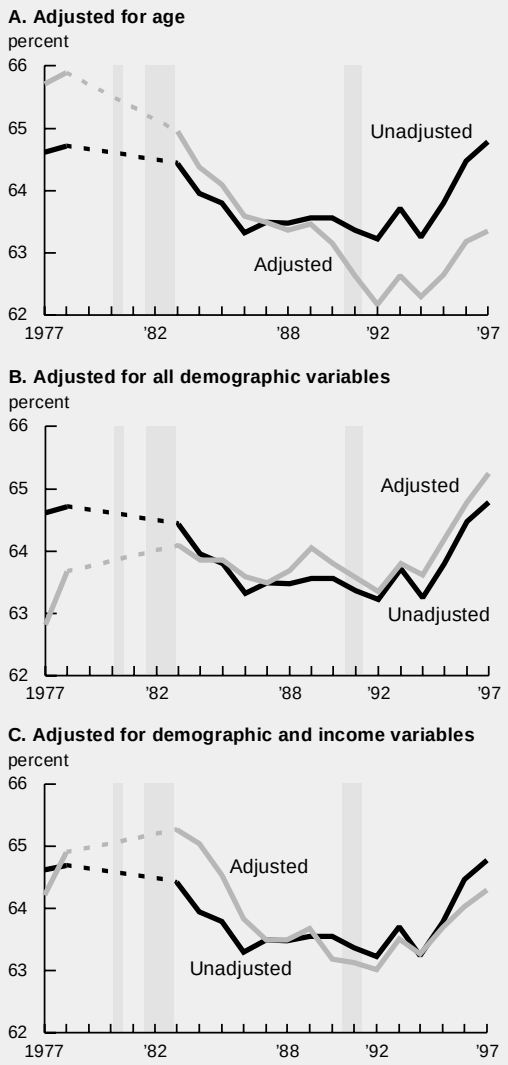
The results are plotted in panel A of figure 5, along with the unadjusted rates. Relative to unadjusted rates, age-adjusted rates were higher before 1987 and lower afterwards. As table 4 shows, the age-adjusted homeownership rate fell 3.0 percentage points from 1977 to 1995, while the unadjusted rate fell only 0.8 percentage points. Then, from 1995 to 1997, the age-adjusted rate rebounded by 0.7 percentage points, slightly less than the gain shown in the unadjusted rate. Over the whole period, the age-adjusted rate decreased by nearly 2.5 percentage points, whereas the unadjusted rate was essentially unchanged.

The relatively substantial decline in age-adjusted homeownership rates has been frequently noted by analysts who argue that homeownership rates are likely to begin to fall significantly once the effects of the maturation of the baby boom generation are fully felt.[17] Age-adjusted rates are also cited by those who argue that the trend in homeownership has been disappointing enough to warrant policy changes designed to make homeownership more accessible to more households. However, as we have previously noted, several other demographic changes may have acted to decrease homeownership rates. To obtain a clearer indication of the narrow forces affecting the housing market, one must control for these factors as well.

To adjust homeownership rates for changes in several background factors simultaneously, we employ a generalized adjustment procedure based on logistic regression analysis. The procedure, which is described in detail in the technical appendix, is to estimate a statistical model (the logistic regression model) for each year, relating household characteristics to homeownership probabilities. Then, to get the adjusted

FIGURE 5

Adjusted homeownership rate



Notes: Shaded areas indicate recessions. Dashed line represents period with missing data. Rates are standardized to the 1987 distribution of the variables for which rates are adjusted. See text and technical appendix for details of computation.

Source: Authors' calculations based on U.S. Department of Commerce, Bureau of the Census, *Current Population Survey*, March 1977–78 and 1983–97.

rate for, say 1977, we use the model estimated using 1977 data to predict the homeownership probability for each household in the 1987 sample and compute the mean over 1987 households of this predicted probability. The result is an estimate of the homeownership probability that would have prevailed in 1977 if the distribution of background factors had been as it was in 1987. Thus, changes in such adjusted rates reflect changes in factors that affect homeownership conditional on the background factors, not changes in the background factors themselves.

TABLE 4

Actual and adjusted percentage point change in homeownership rates

	1977–95	1995–97	1977–97
Actual	–0.8	1.0	0.2
Adjusted for:			
Age	–3.0	0.7	–2.3
All demographic and regional variables[a]	1.5	1.0	2.5
All demographic, regional, education, and income variables	–0.3	0.5	0.2

[a]Age of household head, sex of head, marital status of head, household size and composition, race of head, and region.

Notes: Rates are standardized to the 1987 distribution of the variables for which rates are adjusted. See text and technical appendix for details of comparison.

Source: Authors' tabulations of 1977, 1978, and 1983–97 *March Current Population Surveys*.

The results of adjusting for a fuller set of demographic and regional factors are shown in panel B of figure 5. These demographically adjusted rates control for the age, race, sex, and marital status of the household head, the number of children, the number of adults, and the census region of the household. The result of adjusting for all these factors simultaneously is essentially the opposite of adjusting for age alone. The demographically adjusted homeownership rates are mostly lower than unadjusted rates before 1987 and higher afterwards. Thus, on net, demographic change has acted to suppress growth in homeownership. As shown in table 4, demographically adjusted homeownership rates increased by 2.5 percentage points from 1977 to 1997, with the jump from 1995 to 1997 being the same as in the unadjusted rate. Evidently, the negative effects of factors such as the decrease in marriage rates of household heads were stronger than the positive effects of the aging of the baby-boom generation.

The increase in demographically adjusted homeownership rates shown in panel B of figure 5 implies that nondemographic factors must, on net, be acting to increase homeownership rates. Some of these factors, however, are likely part of larger trends in the economy that have little to do with public policy with respect to housing markets or changes in the availability of mortgage financing. In particular, education levels and real incomes generally have increased over the last 20 years for reasons that have little to do with housing policy. Both of these factors would be expected to increase homeownership rates.

The adjusted rates shown in panel C of figure 5 control for all the demographic and regional variables in panel B, as well as for changes in the education and income distribution. As shown in table 4, the combined effects of demographic, regional, educational, and income changes approximately cancel each other. Over the entire 1977 to 1997 period, the adjusted rate grew by the same 0.2 percentage points as the unadjusted rate. The time path, however, was somewhat different. Though the adjusted rate was lower than the unadjusted in 1977, over most of the early 1980s it was higher. Throughout the late 1980s and early 1990s, the two rates were relatively close, but the increase from 1995 to 1997 was only half as much for the adjusted rate as for the unadjusted.

Overall, the results shown in panel C of figure 5 and the last row of table 4 suggest that remaining factors, such as housing policy, financial innovation, or fluctuations in interest rates, that have affected homeownership rates since 1977 must have been approximately constant or nearly offsetting. The adjusted rate in 1997 was almost the same as 20 years earlier. The sharp increase in the last two years of the sample period also appears somewhat less remarkable on the basis of adjusted data. Evidently, normal responses to the increase in real incomes account for about half the increase since 1995.

Table 5 provides an indication of the importance of changes in individual demographic, regional, educational, and income factors to the homeownership rate. The figures are based on the same variables and basic statistical model underlying the last row of table 4. However, rather than applying the statistical model for each year to the same 1987 population, we applied the same 1987 statistical model to data in various years. Thus, we evaluated the effects of changes in background factors on the homeownership rate over time using a common cross-sectional benchmark.[18] As shown in table 5, the cross-sectional statistical model for 1987 predicts that the aging of the population from 1977 to 1997 increased homeownership by 1.2 percentage points. The increase in homeownership rates caused by the aging of the population is less than one might infer on the basis of the results in table 4, which show that adjusting only for age lowers the growth in homeownership rates by 3.5 percentage points. The results from figure 4 are likely to be misleading because age is correlated with other factors affecting homeownership, notably income. Thus, the estimated relationship between age and homeownership that is the basis for the age-adjusted rates likely reflects both the true effects of age and the effects of variables that are correlated with age. By simultaneously controlling for all demographic and income characteristics, the analysis presented in table 5 is able to isolate the true effect of an older population.

The aging of the population, while important, is quantitatively less significant for homeownership rates than the decrease of 2.5 percentage points attributed to the decline in marriage rates among household heads over the sample period. Changes in the racial composition of the population and decreases in the typical size of households together acted to bring down the homeownership rate by another 1 percentage point. Increasing levels of education predict a 1.2 percentage point increase in homeownership. Finally, the increase in real incomes was enough to generate another 1.6 percentage point increase in the rate of homeownership. The effect of this factor was especially important from 1995 to 1997, accounting for a 0.5 percentage point increase in homeownership rates.

TABLE 5

Percentage point change in homeownership due to changes in demographic, regional, educational, and income distributions

	1977–95	1995–97	1977–97
Effect[a] of changes in distribution of:			
Demographic and regional variables	–2.0	–0.1	–2.1
Age	0.9	0.3	1.2
Sex of household head	0.1	0.0	0.1
Marital status of head	–2.2	–0.3	–2.5
Household size and composition	–0.3	–0.0	–0.3
Race	–0.6	–0.0	–0.7
Region	0.1	0.0	0.1
Education and income variables	2.5	0.5	2.8
Education change	1.2	0.0	1.2
Income change	1.0	0.6	1.6
Effect[b] of hypothetical proportional income growth	2.2	0.6	2.8

[a]Approximation to effect of changes in variable on homeownership rates based on linearization of logistic regression function for 1987. See text and technical appendix for details of computation.

[b]Predicted change in rates assuming constant 1987 demographic characteristics with proportional income growth.

Source: Authors' computations based on 1977, 1978, and 1983–97 *March Current Population Surveys*.

Real incomes grew substantially over the 20-year period we study, but as is widely known, the growth was far from uniform.[19] In general, there was more growth at the upper end of the income distribution than at the bottom. For example, 90th percentile real income increased by about 22 percent, while the 10th percentile was essentially unchanged. As noted earlier, ownership rates increase with income at a decreasing rate. In particular, a given increment of income will raise ownership probabilities for those with high incomes less than for those with low incomes. This suggests that the increase in income inequality lowered growth in homeownership rates.

To quantify the effects of increased income inequality, we used our statistical model to ask what would have happened to homeownership rates if all household incomes had grown at the same rate. Because the CPS has limited information on households with very high incomes, we used the personal income totals of the National Income and Product Accounts, which show that personal income per household deflated by growth in the consumer price index was about 17 percent over the period we study. We then computed the income that individuals in the 1987 sample would have had in each year if their income had grown at the same pace as aggregate personal income. We used our statistical model to estimate the effect this would have had on homeownership rates.[20] The results shown in the last row of table 5 suggest that equal growth of incomes would have raised the homeownership rate by about 2.8 percentage points, substantially more than the 1.6 percentage point increase we estimate was associated with the actual change in income. Thus, the increase in income inequality from 1977 to 1997 can be viewed as having decreased homeownership rates by about 1.2 percentage points relative to a case in which there was the same total increase in income, but no increase in relative income inequality.

Effects of demographics and income growth on the white–black gap

As we noted previously, the significant gap between white and black homeownership rates has been the cause of much concern to policymakers and others who fear some or all of this gap could be attributable to racial discrimination by real estate agents or lenders. In this context, the especially rapid increase in black homeownership rates since 1995 is encouraging and could be interpreted as evidence that increased attention to the CRA, Fair Lending Act, and other laws are having beneficial effects on blacks' access to housing and credit.

However, there are significant differences between whites and blacks in many of the factors found in our analysis to influence homeownership rates. In this section, we investigate how much of the gap in homeownership is attributable to differences between whites and blacks in these background factors. We also show how the adjusted white–black gap has varied over time. Since housing market regulations are unlikely to have influenced any of the changes in the background factors, the adjusted gap is the appropriate measure to examine for signs of their effectiveness. Finally, we show how much of the change over time in the white–black homeownership gap is attributable to differential changes between whites and blacks in the background factors.

To adjust for differences in background factors between whites and blacks, we employ a procedure similar to that used earlier to adjust the overall homeownership rate for differences in background factors over time. Specifically, as is described in detail in the technical appendix, we estimate statistical models (logistic regression models) separately for whites and blacks in each year of the sample. We then use each of those models to predict homeownership probabilities for the sample of whites in 1987. The resulting average rates then reflect the distribution of background factors of a common group of households—whites in 1987. Thus, differences across groups or across time in the adjusted rates reflect differences in forces other than the background factors controlled for in the statistical models.

We use the same three sets of background factors as in the previous section. Table 6 shows the actual difference between white and black homeownership rates and the difference after adjusting for age alone, all demographic factors (other than race), and all demographic factors plus education and income.

In 1977, the actual difference between white and black homeownership rates was 24.1 percentage points. After controlling for age, the difference drops to 23.3 percentage points, suggesting that a small portion of the unadjusted white–black difference in homeownership is attributable to differences in the fractions of whites and blacks in age groups with different homeownership rates. Age-specific homeownership rates declined slightly more sharply for blacks than whites over most of the sample period, causing the age-adjusted white–black gap to increase 0.9 percentage points between 1977 and 1995. The nearly 3 percentage point increase in unadjusted black homeownership between 1995 and 1997 is found, however, in the age-adjusted rates as well.

TABLE 6

Actual and adjusted white–black homeownership rate differences
(percent)

	Period			Change		
	1977	1995	1997	1977–95	1995–97	1977–97
Actual	24.1	27.2	24.3	3.1	–2.9	0.2
Adjusted for:						
Age	23.3	24.2	21.2	0.9	–3.0	–2.1
All demographic and regional variables[a]	17.9	18.7	16.0	0.8	–2.7	–1.9
All demographic, regional, education, and income variables	12.7	15.5	13.0	2.8	–2.5	0.3

[a]Age of household head, sex of head, marital status of head, household size and composition, race of head, and region.

Notes: Rates are standardized to the 1987 distribution of the variables for which rates are adjusted. See text and technical appendix for details of comparison.

Source: Authors' tabulations of 1977, 1978, and 1983–97 *March Current Population Surveys*.

Controlling for all demographic and regional factors, as in the third row of table 6, reduces the white–black difference somewhat more significantly—to 17.9 percentage points in 1977. However, the pattern over time is very similar to that in the rates that are only adjusted for age, with the gap rising 0.8 percentage points from 1977 to 1995 and 2.7 percentage points from 1995 to 1997. This pattern differs in the 1977–95 period from the unadjusted gap, which showed a 3.1 percentage point increase.

Adding education and income levels to the list of controls reduces the gap still further. The pattern over time is displayed in figure 6. Panel A shows the unadjusted and adjusted rates for whites and blacks. While adjustment for all demographic, regional, educational, and income differences slightly reduces the change over time in the white homeownership rate, it raises the black homeownership rate in most years by more than 10 percentage points. In most years, this amounts to between 40 percent and 50 percent of the full gap between whites and blacks. For instance, in 1977, the gap after adjusting for all demographic, regional, educational, and income variation was 12.7 percentage points, a little over half the 24.1 percentage point difference in the unadjusted rates.

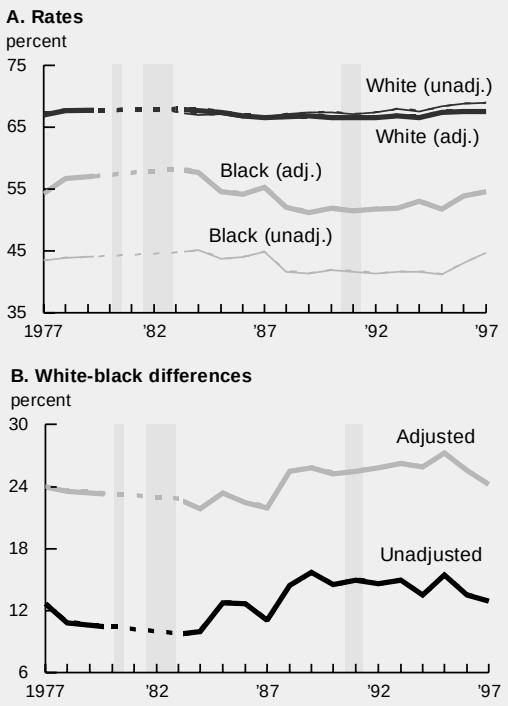
Even after adjusting for income and demographic factors, a large gap remains between white and black homeownership rates. This result, which has also been found by other researchers, is consistent with the finding that wealth levels are higher for whites than for blacks, even after controlling for income and demographics.[21] In part, this appears to stem from differences in the size and frequency of inheritances. In addition, there may be other differences between whites and blacks in the distributions of characteristics not included in the CPS data. Of course, it may also be that the gap in adjusted rates is due in part to discrimination or differences in tastes for homeownership.

Panel B of figure 6 shows more clearly how the unadjusted and adjusted gaps between white and black homeownership rates have evolved over the sample period. In both cases, the gap grew significantly between 1977 and 1995. The adjusted gap grew by 2.8 percentage points versus 3.1 percentage points on an unadjusted basis. The decline in the gap after 1995 was somewhat smaller in the adjusted data, but still a very significant 2.5 percentage points. Over the sample period, both measures changed remarkably little, with the adjusted gap growing 0.2 percentage points versus 0.3 percentage points for the unadjusted data.

Table 7 quantifies the effect of differences in the individual background factors on the gap between white and black homeownership rates. As with the calculations in table 5, the calculations in table 7 are based on the estimated statistical model for a single base year, 1987, applied to data for each year. In table 7, however, we restricted the statistical model further to blacks in 1987 and applied it separately to whites and blacks in each year.[22] The rates we obtain for whites and blacks in each year reflect what homeownership rates would have been if the background factors had had the same effects on homeownership as they did for blacks in 1987. Thus, differences in a given year between the white and black rates are due solely to differences in the background factors. The contribution of each factor to the white–black

FIGURE 6

Adjusted white–black homeownership rates



Notes: Shaded areas indicate recessions. Dashed line represents period with missing data. Rates are standardized to the 1987 distribution of the variables for which rates are adjusted. See text and technical appendix for details of computation.

Source: Authors' calculations based on U.S. Department of Commerce, Bureau of the Census, *Current Population Survey*, March 1977–78 and 1983–97.

homeownership gap in 1977, 1995, and 1997 is as shown in the first three columns of table 7 (given an approximation as described in the technical appendix).[23]

As shown in table 7, the most important difference in background factors affecting the white–black homeownership gap is that in income. Differences in the distribution of white and black incomes explain a little over 9 percentage points of the gap in all three years, with the contribution of this factor changing little over time. The generally higher levels of education among whites also have the effect of increasing the gap between white and black homeownership rates, but this factor diminished in importance over time as black educational attainment improved. Specifically, differences in education explained 1.7 percentage points of the homeownership gap in 1977, but only 0.8 percentage points in 1997. Two other factors that tend to increase the gap in homeownership have increased in importance over time. The lower rates of marriage among black household heads contributed 5.7 percentage points to the gap in 1977 and 6.2 percentage points in 1997 and the lower ages of black household heads contributed 3.0 percentage points to the gap in 1977 and 4.1 percentage points in 1997. Differences in the proportion of households headed by women and in the regional distribution of households tend to decrease the gap in homeownership rates by about 1.5 percentage points and 2.5 percentage points, respectively.

Altogether, our analysis indicates that a substantial portion of the white–black difference in

TABLE 7

Effect of differences in demographic, regional, educational, and income distributions on white–black homeownership
(percent)

	Level			Change		
	1977	1995	1997	1977–95	1995–97	1977–97
Effect[a] of differences in:						
Demographic and regional variables	–1.2	0.0	0.2	1.2	0.1	1.3
Age	3.0	4.1	4.1	1.1	0.0	1.1
Sex of household head	–1.3	–1.5	–1.5	–0.2	–0.1	–0.3
Marital status of head	5.7	6.2	6.2	0.5	0.0	0.5
Household size and composition	–0.3	–0.1	–0.2	0.2	–0.1	0.2
Region	–2.6	–2.4	–2.2	0.2	0.2	0.4
Education and income variables	11.0	10.1	10.2	–0.9	0.1	–0.8
Education	1.7	0.9	0.8	–0.8	–0.0	–0.8
Income	9.4	9.2	9.3	–0.1	0.1	–0.1

[a]Approximation to effect of changes in variable on homeownership rates based on linearization of logistic regression function for blacks in 1987. See text and technical appendix for details of computation.

Source: Authors' computations based on 1977, 1978, and 1983–97 *March Current Population Surveys*.

homeownership rates is attributable to differences in demographic, regional, educational, and income factors. However, an even larger proportion of the difference remains unexplained by the factors we considered. The remaining gap may be due to differences in background factors not measured in the CPS data, to discrimination, or perhaps to differences in preferences for homeownership between whites and blacks. Our analysis is not able to distinguish between these possibilities.

Our results also show that only a small portion of the significant increase in the white–black homeownership gap that occurred from 1977 to 1995 is explained by changes in background factors. Moreover, relatively little of the rapid decline in the gap that has occurred since 1995 is attributable to changes in the background factors. Thus, increased attention to anti-discrimination measures in the last several years may have had some positive impact on black homeownership rates.

Conclusion

After adjusting for a wide range of demographic and income factors, we find that the long-term trend in homeownership is very similar to that found in the raw data. From 1977 to 1997, both unadjusted and adjusted homeownership rates increased very slightly. The aging of the baby boom generation, the increase in educational attainment, and the growth in real incomes all caused homeownership rates to increase significantly. However, the sharp drop in the fraction of married household heads, the decline in the size of the typical household, and the fall in the share of white households together had an almost precisely offsetting effect. We also find that the increase in income inequality over the period held back growth in homeownership relative to the rate that would have been seen with a more equal distribution of the same total income gains.

Though our adjusted rates increased by almost the same amount as the unadjusted rates over the full 20-year period, they declined less over the 1977 to 1995 period and increased less in the last two years. It follows that the set of forces that more narrowly affect homeownership, such as interest rates, financial innovations, and public policies toward housing must have been approximately balanced over the period. In particular, our adjusted rates suggest that there was no sharp deterioration in the conditions that support homeownership in the 1980s and early 1990s, unlike what one might be tempted to conclude on the basis of raw or age-adjusted rates. Rather, growth in homeownership during this period was held back by demographic changes, such as the decline in the fraction of married household heads. Similarly, the gains in homeownership in the last two years appear to be largely related to more rapidly growing real incomes, rather than a response to any special change in housing policy or other factors peculiar to housing markets.

Our analysis also suggests that about 40 percent of the difference between white and black homeownership rates can be explained by differences in demographic and income factors known to affect homeownership. We cannot determine how much of the remaining difference is due to discrimination, different preferences for homeownership, or differences in background characteristics that are not measured in the CPS. In future research, we hope to use data sets such as the Panel Study of Income Dynamics to determine how much of the white–black homeownership gap is due to differences in wealth, a factor that has been found to differ between whites and blacks even after controlling for income and demographic differences.

Finally, very little of the trend over time in the white–black differential in homeownership is explained by changes in demographic and income variables. In particular, relatively little of the dramatic drop in the gap since 1995 reflects changes in factors we consider. Thus, it may be that the recent amendments to the CRA and fair lending laws or their more vigorous enforcement are having a positive effect on black homeownership rates.

Adjustment methodology and decompositions

From the CPS, we have data on homeownership and background characteristics for a sample of households in each year. Let N_t denote the sample in year t and for each $i \in N_t$, let h_i denote the indicator variable that equals one if the household owns its home and zero otherwise, and let the vector x_i denote the relevant background characteristics. Finally, let w_i be the CPS household weight, a factor calculated by the Census Bureau to produce nationally representative estimates of means of household-level variables. Then we calculate the aggregate homeownership rate in year t as

$$h_t = \frac{\sum_{i \in N_t} w_i h_i}{\sum_{i \in N_t} w_i} = \sum_{i \in N_t} w_i' h_i,$$

where $w_i' = w_i / \sum_{i \in N_i} w_i$ is the proportion of the total year t sample weight accounted for by member i. Similarly, for a particular subsample N_{dt}, let $w_{di}' = w_i / \sum_{i \in N_{dt}} w_i$ denote the proportion of the subsample weight accounted for by i. Then, the homeownership rate at time t for that subsample is calculated as

$$h_{dt} = \sum_{i \in N_{dt}} w_{di}' h_i.$$

If the proportion of the total year t sample weight accounted for by N_{dt} is denoted as $w_{dt}' = \sum_{i \in N_{dt}} w_i / \sum_{i \in N_t} w_i$, then the aggregate homeownership rate can be written as $h_t = \sum_d w_{dt}' h_{dt}$, where the sum is taken over all possible values of the variable d.

The standard procedure for adjusting the aggregate homeownership rate for changes in the proportion of the sample accounted for by different values of d is to pick a base year, which in our case is 1987, and then reweight the above sum using base year weights:

$$\tilde{h}_t = \sum_d w_{d87}' h_{dt}.$$

We refer to $\tilde{h}_t$ as the d-adjusted homeownership rate. Notice that it can also be written as

$$\tilde{h}_t = \sum_{i \in N_{87}} w_i' \tilde{h}(i,t),$$

where $\tilde{h}(i,t) = h_{dt}$ if $i \in N_{d87}$. That is, the adjusted rate for year t is the weighted average over the base year sample of a particularly simple statistical model fit to the year t sample. That model says that the probability of homeownership just depends on the group, d, to which the sample member belongs. Our generalization of the standard adjustment procedure allows the statistical model to be richer.

In particular, we fit a logistic regression model in which the predicted probability for a household with characteristics x in year t is

$$h(x,t) = \frac{e^{x\beta_t}}{1+e^{x\beta_t}}.$$

We estimate the parameter vector, β, by (weighted) maximum likelihood from the year t sample. We then apply this model estimated for each year to the base 1987 sample using the same expression, $\tilde{h}_t = \sum_{i \in N_{87}} w_i' h(x_i, t)$, for the adjusted rate. Thus, the changes in the adjusted rate, say from 1977 to 1997, presented in table 4 are:

$$\tilde{h}_{97} - \tilde{h}_{77} = \sum_{i \in N_{87}} w_i' [h(x_i, 97) - h(x_i, 77)].$$

The calculations in table 4 are based on the above procedure where the x_i are various sets of dummy variables. The age-adjusted figures simply have a dummy variable for each age group shown in table 2. In this case, the logistic regression model has the property that the predicted probabilities for each group match the subsample proportion of homeowners. Thus, our procedure reproduces the standard age-adjustment procedure. To adjust for all demographic and regional variables, we let x_i contain dummy variables for each of the levels of the groups of workers in the demographic and regional categories in table 2. Finally, to adjust for all variables including income and education, we add dummy variables for the categories shown for those variables in table 2.

Table 4 displays changes in the *h(x, t)* function applied to the same base period sample weights. It is also informative to see directly the effects of changes in the distribution of background characteristics. For such a calculation, it is natural to use the base period statistical function, *h(x,* 87*)*. Indeed there is an approximate decomposition of the change in the actual homeownership rate into changes due to changes in the *h(x, t)* function and changes due to changes in the background factors:

$$h_{97} - h_{77} \cong (\tilde{h}_{97} - \tilde{h}_{77})$$
$$+\left[\sum_{i \in N_{97}} w_i' h(x_i, 87) - \sum_{i \in N_{77}} w_i' h(x_i, 87)\right].$$

Because the function $h(x, 87)$ is nonlinear in x, it is not possible to uniquely decompose the portion of the change in homeownership rates due to changes in the background characteristics into portions associated with changes in any single component of x. However, we can provide an approximate such decomposition by linearizing $h(x, 87)$ around the (weighted) sample mean, $\bar{x}_{87}$, which results in the following approximation:

$$\sum_{i \in N_{97}} w_i' h(x_i, 87) - \sum_{i \in N_{77}} w_i' h(x_i, 87) \cong$$
$$h(\bar{x}_{87}, 87)(1 - h(\bar{x}_{87}, 87))[\bar{x}_{97} - \bar{x}_{77}]\beta_{87}.$$

On the right hand side of the above expression, there is a unique portion associated with the change in any set of components of x. For example, if $x_i = \left[x_i^{1\prime}\ x_i^{2\prime}\right]'$ then the right hand side of the above expression can be written as

$$h(\bar{x}_{87}, 87)(1 - h(\bar{x}_{87}, 87))\{[\bar{x}_{97}^1 - \bar{x}_{77}^1]\beta_{87}^1$$
$$+[\bar{x}_{97}^2 - \bar{x}_{77}^2]\beta_{87}^2\},$$

and the portion due specifically to changes in the distribution of x_i^1 is $h(\bar{x}_{87}, 87)(1 - h(\bar{x}_{87}, 87))[\bar{x}_{97}^1 - \bar{x}_{77}^1]\beta_{87}^1$. This is the basis for the calculations in table 5 in which we break the right hand side of the above expression down into components associated with each group of variables shown in the table.

In order to adjust the difference between white and black homeownership rates for differences in background characteristics, we extend the above procedures by estimating a separate logistic regression model for each race in each year:

$$h(x, r, t) = \frac{e^{x\beta_{rt}}}{1 + e^{x\beta_{rt}}},$$

where r is w for whites and b for blacks. Then the adjusted rates shown in table 6 are based on the above models applied to the 1987 white sample:

$$\tilde{h}_{rt} = \sum_{i \in N_{w87}} w_i' h(x_i, r, t),$$

where N_{rt} is the sample of households of race r in year t.

The decomposition of the white–black difference shown in table 7 is based on a linearization of $h(x, b, 87)$ around the sample mean of the 1987 black distribution, $\bar{x}_{b87}$, which leads to

$$\sum_{i \in N_{wt}} w_i' h(x_i, 87) - \sum_{i \in N_{bt}} w_i' h(x_i, 87) \cong$$
$$h(\bar{x}_{b87}, b, 87)(1 - h(\bar{x}_{b87}, b, 87))[\bar{x}_{wt} - \bar{x}_{bt}]\beta_{b87}.$$

The left hand side is the difference in white and black rates due to differences in the distribution of background characteristics as measured by the 1987 black statistical model. The linear approximation shown on the right hand side has a unique portion associated with each set of components of x and is the basis for table 7.

NOTES

[1]See, for example, Hurst, Luoh, and Stafford (1998).

[2]See, for example, Galster (1983), Rossi and Weber (1996), Green and White (1994), and DiPasquale and Glaeser (1998).

[3]See, for example, the discussion in Green (1995).

[4]The figures shown in table 1 and in subsequent tables and figures do not exactly match the "official" rates shown in figure 1 because, as we explain below, we have focused our analysis on households with heads aged 18–74.

[5]For evidence of steering, see Yinger (1986). For contrasting views of the evidence on discriminatory lending practices, see Munnell et al. (1996) and Horne (1997).

[6]Evanoff and Segal (1996) discuss this interpretation of the data.

[7]See, for example, Chatterjee (1996), who emphasizes the increased risk burden that households may take on in exchange for the tax benefits of homeownership.

[8]On the increase in mortgage securitization, see, for example, Saunders (1997).

[9]See, for example, Gyourko and Linneman (1996).

[10]See Avery and Rendall (1997), Blau and Graham (1990), Menchik and Jianakoplos (1997), and Hurst, Luoh, and Stafford (1996) for a discussion of white–black wealth differences.

[11]Throughout, we refer to the race, age, sex, and marital status of the household head, the size and composition of households, and the Census region of the household as demographic factors.

We group education levels with income because of the important role of human capital in determining wage and salary income.

[12]Until 1996, there were approximately 60,000 households in the survey.

[13]Contacts at the Census Bureau believe that in these years a small number of individuals not answering the homeownership question were all recorded as homeowners. This causes the aggregate rate calculated from the March surveys to be about 1 percentage point too high. (This error affects certain Census publications, but not the quarterly homeownership rates shown in figure 1.) Unfortunately, it is impossible to determine which households' data were imputed. Thus, we omitted the 1979–82 data.

[14]Through 1979, the CPS defined an adult as age 14 and up; in 1980, the definition changed to age 15 and up. Thus, the reported statistics slightly understate the degree of change.

[15]See, for example, Federal Reserve Bank of Chicago (1997).

[16]The results of this procedure are relatively insensitive to the grouping of ages into intervals as long as some care is taken to avoid combining groups for which homeownership rates are radically different. This consideration is what motivates using narrower age ranges at lower ages. Homeownership, as seen in figure 3, panel A, increases rapidly with age from 20 to 40, but changes much less for higher ages. We obtained very similar results using a fourth-order polynomial in age and the logistic regression procedure described in the technical appendix.

[17]See, for example, Myers, Peiser, Schwann, and Pitkin (1992).

[18]Because the same 1987 base year is used in both calculations, the estimated effect on homeownership of changes in background factors as shown in table 5 is not exactly equal to the difference between the actual and adjusted rates shown in table 4. Moreover, as discussed in the technical appendix, because the logistic regression model on which the computations are based is nonlinear in the background factors, we must employ a linear approximation to quantify the effects of changes in individual factors, such as age and income. Nevertheless, the results in table 5 provide a reasonable indication of the importance of the individual factors in driving the aggregate homeownership rate.

[19]See, for example, Federal Reserve Bank of New York (1995).

[20]We used the linearized version of our model that underlies all of the calculations in table 5.

[21]For previous work on the white–black cross-sectional homeownership difference, see Gyourko and Linneman (1996). For work on wealth differentials, see Avery and Rendall (1997), Blau and Graham (1990), Menchik and Jianakoplos (1997), and Hurst, Luoh, and Stafford (1996).

[22]Using the estimated statistical model for black households in 1987 is motivated by a standard decomposition of racial wage differences into a part due to differences in the background variables and a part due to differences in the statistical models. Using the black statistical model makes this decomposition exact.

[23]Positive numbers indicate factors that increase the size of the difference between white and black homeownership rates, while negative numbers indicate factors that, on their own, would tend to make white rates lower than blacks rates.

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