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## **AN EMPIRICAL ANALYSIS OF THE CAUSE OF NEIGHBORHOOD RACIAL SEGREGATION**

By

Keith R. Ihlanfeldt  
Benjamin P. Scafidi

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## **An Empirical Analysis of the Causes of Neighborhood Racial Segregation**

Keith R. Ihlanfeldt and Benjamin P. Scafidi  
Andrew Young School of Policy Studies  
Georgia State University

### **ABSTRACT**

The perennial debate over the causes of housing segregation between whites and blacks has intensified in recent years, with a greater diversity of opinions than ever before. While suggestive evidence on these causes proliferates, direct evidence connecting competing hypotheses to observed levels of housing segregation is rare due to the unavailability of data. This study provides direct evidence on the causes of housing segregation using new data from the Multi-City Study of Urban Inequality. The central finding is that blacks' preferences for black neighborhoods and whites' preferences for white neighborhoods are major causes of housing segregation.

## I. INTRODUCTION

Despite significant changes in the legal context and sociological climate, neighborhood racial segregation remains pervasive within America today.<sup>1</sup> In a number of recent studies, strong evidence has been offered linking this segregation to the social and economic problems of blacks.<sup>2</sup> Black versus white disparities in unemployment, wage rates, labor market knowledge, test scores, unmarried motherhood, and high school graduation can all at least partly be attributed to housing segregation.

The debate over the causes of neighborhood racial segregation has been going on for a long time.<sup>3</sup> During the 1980s, part of this debate was carried on between George Galster and W.A.V. Clark in a series of papers published in *Population, Research and Policy Review*.<sup>4</sup> Clark felt that the preferences of whites for white neighborhoods and whites' superior economic status are the key determinants of neighborhood racial segregation, while Galster emphasized racial discrimination in the housing and mortgage markets as the overarching cause of housing segregation. Recently, the segregation debate has intensified as the result of the publication of books by Thernstrom and Thernstrom (1997) and Patterson (1997). The Thernstroms agree with Clark that racial differences in income and wealth are an important cause of housing segregation, but they disagree that white preferences are important. Regarding the latter, they compare interview evidence from different points in time, which suggests that "Prejudice against sharing a neighborhood with African-Americans has declined so precipitously that whites today are actually far more nervous about the prospect of having a next-door neighbor who they think is a religious fanatic than they are about having one who is black" (p. 221). Orlando Patterson also downplays the causal significance of

white preferences and emphasizes instead blacks' desires to live in black neighborhoods: "The answer, which liberal students of segregation repeatedly insist on sidestepping, is that persisting segregation is partly--and for most middle-class Afro-Americans, largely--a voluntary phenomenon" (p. 46). Other recent contributors to the housing segregation debate disagree with Patterson that segregation is voluntary and continue to emphasize that discrimination against blacks remains the single most important factor accounting for housing segregation (Yinger, 1998; Massey and Denton, 1993).

For the most part, the above positions regarding the causes of housing segregation have been based upon indirect and suggestive evidence, such as surveys of racial attitudes and housing market audits, without any direct connection made to housing segregation. Recently, Cutler, *et al.* (1999) have provided more direct evidence by relating alternative causes of housing segregation to estimated differences in the price of housing paid by blacks and whites across metropolitan areas with different degrees of housing segregation. They conclude that contemporary residential segregation is caused by whites' preferences to live in white neighborhoods and is not caused by discrimination against blacks or blacks' preferences to live in black neighborhoods. However, as discussed below, the validity of Cutler, *et al.*'s evidence rests upon a strong assumption.

The extreme diversity of opinions regarding the causes of housing segregation underscores the need for empirical research directly connecting segregation to each of its multiple possible causes. The paucity of such research reflects the substantial data needed to simultaneously test competing hypotheses. Fortunately, new data from the Multi-City Study of Urban Inequality (MCSUI) Household Surveys permit the estimation of models that account for most of the factors

that allegedly contribute to housing segregation. The purpose of this paper is to present our results from using these data to estimate models that explain the racial composition of the neighborhoods selected by individual blacks and whites. The independent variables entering these models are aligned to each of the hypotheses that have been advanced to explain housing segregation. The results from these estimated models are used to decompose housing segregation into its underlying determinants. The central finding is that blacks' preferences for black neighborhoods and whites' preferences for white neighborhoods are major causes of housing segregation.

In Section II we discuss the possible causes of housing segregation and review what evidence exists on each of these causes. The MCSUI data are described in Section III. Section IV contains our estimated equations followed by the presentation of our results in Section V. Our conclusions are found in Section VI.

## II. THE CAUSES OF NEIGHBORHOOD RACIAL SEGREGATION

Neighborhood racial segregation may be caused by numerous factors. Below we describe each factor and review what evidence exists on its importance.

1) Racial differences in the ability to afford housing. Because it is older and contains smaller quantities of housing services, housing located nearer the center of metropolitan areas is generally cheaper than housing located farther out (Mills and Lubuele, 1997). If blacks are less able than whites to afford more expensive housing, this may result in a black-in, white-out pattern of housing segregation.

Many studies have investigated racial differences in the ability to pay for housing as a cause of housing segregation by comparing the segregation of blacks and whites controlling for income

(Denton and Massey, 1988; Kain, 1985, 1986; Taeuber and Taeuber, 1965; Massey and Denton, 1993; Gabriel and Rosenthal, 1989). These studies find a high level of housing segregation even among middle and high income households, which suggests that racial differences in the ability to afford housing do not explain neighborhood racial segregation. However, these studies use current rather than permanent income. Numerous studies have documented that housing expenditure decisions are based on permanent income (Mayo, 1981). Because blacks have less wealth and less stable incomes than whites, blacks with identical current incomes as whites may have lower permanent income. The use of current income will therefore bias results against finding that racial differences in the ability to afford housing account for housing segregation.

Another group of studies focus on actual differences in housing expenditures between blacks and whites (Zubrinisky and Bobo, 1996; Farley, *et al.*, 1978; Farley, *et al.*, 1993). If housing expenditures are measured correctly, this approach improves upon the use of current income. These studies find considerable overlap in the housing expenditures of blacks and whites, which suggests that blacks can afford much of the housing occupied by whites. It does not appear, therefore, that blacks inability to afford more expensive housing excludes them from white neighborhoods. However, the comparisons of black and white homeownership costs include only out-of-pocket costs and not the opportunity cost of the homeowner's equity. Because equity is lower for blacks than whites, this omission also biases results against finding that racial differences in the ability to afford housing contributes to housing segregation.

2) Demographic differences between blacks and whites. In addition to permanent income, demographic characteristics are known to affect the type of housing occupied, where type is defined

on the basis of both structural and neighborhood characteristics. Since housing types tend to be segregated within metropolitan areas, racial differences in demographic characteristics may cause housing segregation.

The only study to investigate whether demographic differences between blacks and whites cause housing segregation is by Miller and Quigley (1990). They define seven types of households based on size and composition. Using 1970 and 1980 census data for San Francisco, they find that only 4 percent of the segregation by race can be explained by the segregation by household type.

3) Occupational differences between blacks and whites. While occupational segregation between blacks and whites has declined over time, it is still the case that blacks are under-represented among white-collar workers, craft workers, and farmers and they are over-represented everywhere else (Hamermesh and Rees, 1993). Because occupations have different spatial distributions within metropolitan areas (Ihlanfeldt and Sjoquist, 1991), housing segregation may result from racial differences in work locations.

Pascal (1967) provides the only evidence on racial differences in job location as a cause of housing segregation. Using 1960 census data, he finds that these differences explain 37 percent and 27 percent of the variation across census tracts in the proportion of households who are non-white in Chicago and Detroit, respectively. He recognizes, however, that these percentages are likely biased upward by the endogeneity of work location.

4) Racial differences in preferences for housing and neighborhood attributes (other than the racial composition of the neighborhood). It is well recognized that differences in culture may affect preferences over a wide range of consumer activities. If blacks are willing to pay more or less than

whites (controlling for permanent income) for particular housing attributes, the tendency for similar housing units to spatially cluster may result in housing segregation.

Galster (1979) finds no consistent interracial patterns in the willingness to pay for various housing and neighborhood attributes using 1967 data on households residing in St. Louis, Missouri.

Ihlanfeldt and Boehm (1991), on the other hand, focus exclusively on neighborhood preferences and find that many neighborhood variables differentially affect the utilities of the black and white households included in the 1985 American Housing Survey. Neither of these studies related racial differences in preferences to housing segregation.

5) Racial differences in preferences for neighborhood racial composition. Each racial group may voluntarily self-segregate in order to be surrounded by neighbors of their own group. Preferences for same-race neighbors may reflect a wide variety of factors, including prejudice against the other race, a desire to share culture, or expectations of interracial hostility. Among whites, a stated preference for white neighbors may also result from perceptions that black neighbors lower property values (Leven, *et al.*, 1976).

Over the years, household interviews have frequently included questions which ask respondents to rank neighborhoods based on their racial composition. There have been two consistent findings: 1) whites express a strong preference for all or mostly white neighborhoods; and 2) blacks prefer neighborhoods that are racially mixed but that contain at least half blacks.<sup>5</sup> However, comparisons over time suggest a decline in white intolerance of black neighbors and growth in the minority of blacks that prefer all or mostly black neighborhoods.



None of the studies that have provided interview evidence on the neighborhood preferences of blacks and whites have empirically related these preferences to observed levels of housing segregation. Struyk and Turner (1986), however, have investigated these relationships using the Urban Institute Housing Market Simulation Model. They worked with two hypothetical metro areas—one with archetypal characteristics of the northeast and the other with archetypal characteristics of the west. Residential allocations were first made under the assumptions that whites prefer all white neighborhoods and blacks are race-neutral. Results show that housing segregation declined by a modest 12 percent when white preferences are made non-operative within the model.<sup>6</sup>

6) Housing and mortgage market discrimination. Discrimination may constrain blacks' opportunity to acquire housing in white neighborhoods. Whites may refuse to rent, sell, or loan to blacks or offer blacks housing and financing on less favorable terms.

Evidence of racial discrimination in mortgage lending is provided by Munnell, *et al.* (1996), who find that banks systematically rejected a higher percentage of black applicants than comparable white applicants. Conflicting evidence is provided by Berkovic, *et al.* (1996), who find that blacks have higher default rates than whites even taking into account a richer set of characteristics data than Munnell had available.<sup>7</sup> There are, however, shortcomings of these and related studies, which have caused one team of reviewers to conclude “Analyzes of mortgage approval and default rates appear to have reached the point of strained differences, without firm conclusions” (Mills and Lubuele, 1997, p. 736).

The best evidence on housing market discrimination comes from fair housing audit studies. Audits involve pairs of blacks and whites, artificially matched by characteristics, who apply for the

same housing and any disparate treatment gets recorded. Numerous audit studies conducted over the past 30 years have consistently shown that in both the rental and homeownership markets black auditors are less favorably treated than white auditors (Yinger, 1995).<sup>8</sup>

While the audit evidence is consistent with the hypothesis that housing discrimination contributes to neighborhood racial segregation, there is little direct evidence on the strength of the connection. Only one study has estimated the effects of housing market discrimination on segregation. Galster (1987) estimated a multi-equation model using 1970 census data on 40 metro areas. His dependent variables included an index of centralization of black population with respect to white population and a housing segregation index based on relative interracial exposure rates. His measure of housing market discrimination was the frequency of discriminatory treatment of blacks recorded in the audits conducted for each metro area as part of the 1977 Housing Market Practices Survey. Interestingly, the degree of discrimination was not found to increase housing segregation; however, higher levels of black centralization were found where discrimination was more severe.

The most recent evidence on the causes of housing segregation comes from Cutler, *et al.* (1999). Because their evidence is more direct than that provided by previous research and covers both categories 5 (preferences) and 6 (discrimination) above, their work merits more extensive comment. Cutler, *et al.* first theoretically demonstrate that different hypothesized causes of constant-quality housing segregation imply different relationships between the difference in the average price paid for housing between blacks and whites and the level of housing segregation. If segregation is caused by white preferences for white neighborhoods, then the black/white difference in housing price will decrease as segregation rises. If discrimination and/or black preferences for black

neighborhoods are the causes of segregation, then the black/white difference in price will rise with segregation. These predictions are not controversial and can be traced back to very early models of residential segregation (Becker, 1957; Bailey, 1959, 1966; and Muth, 1969).

To determine whether the relationship between the black/white housing price differential and segregation is direct or inverse, Cutler, *et al.* use 1990 Public Use Microdata Samples for 237 MSAs to regress house price on the interaction of black head of household and a dissimilarity index (and a set of controls). The dissimilarity index measures the level of housing segregation within the occupant's MSA. The estimated coefficient on the interaction is negative and statistically significant. They therefore conclude that white preferences for white neighborhoods is the cause of housing segregation.

Cutler, *et al.* are aware of the difficulty of controlling for quality differences in comparing the price paid for housing between blacks and whites:

The advantage of this test is that it substantially reduces potential problems from unobserved quality relative to tests of mean housing costs alone. Unobservable quality differences will bias our results only if the quality of black relative to white housing is related to the level of segregation in the city. We know of no reason why this should be the case, and when we do observe limited quality measures, we find that including quality measures generally strengthen or does not affect our results (p. 480)

The problem is that Cutler, *et al.*'s limited quality measures do not include measures of employment access and school quality. There is considerable evidence that these variables have important effects on house price and that they are relatively low in value for blacks living in more segregated cities.<sup>9</sup>

It is therefore unclear whether the observed inverse relationship between the black/white house price

difference and segregation reflects whites' willingness to pay more to live in white neighborhoods or unobserved housing and neighborhood quality differences between the races.

### III. DATA

The MCSUI data were collected by conducting face-to-face interviews with households across four metropolitan areas: Atlanta (April-September 1992), Boston (May 1993-November 1994), Detroit (April-September 1992), and Los Angeles (September 1993-August 1994). Members of non-white racial groups and residents of low-income neighborhoods were oversampled in each area. After excluding all racial groups other than non-Hispanic whites and blacks and those observations with missing values, our total sample size equals 3,621 (1,619 whites and 2,002 blacks).<sup>10</sup> The data provide information on respondents' demographic characteristics, work history, and racial attitudes, including their preferences regarding the racial/ethnic mix of neighborhoods. In addition, our analysis was made possible by the assignment of respondents to 1990 Census block groups. Although the location of these groups is not available, the racial composition of each block group is provided.

To gauge the neighborhood racial preferences of whites, a series of five cards was prepared showing a range from an all white neighborhood to a neighborhood with eight houses occupied by black families and six occupied by white families (see Figure 1).<sup>11</sup> Each white respondent was first shown the card with all white neighbors and asked to imagine that he or she lived in such a neighborhood. The respondent was then asked to imagine a situation where a black family has moved into the neighborhood and was shown the card having one black family (and 14 white families) in the neighborhood. The respondent was asked how comfortable she or he would feel

living in such a neighborhood, using a four-point scale ranging from “very comfortable” to “very uncomfortable.” If the respondent stated that he/she would feel somewhat or very uncomfortable, comfort rankings of the other neighborhoods containing larger numbers of black families were not requested. But if the respondent stated that he/she would feel very or somewhat comfortable he/she was shown each subsequent card showing more and more black families, until either an uncomfortable response was given or the fifth card was reached.

The above set of questions was used to construct a residential preference index for whites (*RPI\_W*) that equals the total number of black houses pictured on each of the cards that the white respondent gave favorable comfort ratings to.<sup>12</sup> As shown in Table 1, *RPI\_W* varies little between the unweighted and weighted data. Among the five possible *RPI\_W* values, 34 percent of the white respondents have a zero value, indicating they would be uncomfortable if even one black family moved into the neighborhood. However, significant percentages of whites are comfortable living with blacks and close to 20 percent would remain comfortable even if the neighborhood became majority black.

In addition to *RPI\_W*, we used dummy variables to represent white responses to the survey questions (n1 - n4). Whites were categorized into five groups based upon their comfort level in neighborhoods with alternative numbers of black families (see Table 2).

To measure the preferences of blacks, different questions were used than the questions asked of whites.<sup>13</sup> Each black respondent was asked to imagine that he/she had been looking for a house and had found a nice one that he/she can afford. The respondent is told that the house could be located in several neighborhoods that differ only in racial makeup, and shown a series of five cards

(see Figure 2) that differed from those shown to whites. Respondents were asked to rank the five neighborhoods from most to least preferred. We use the percentage black in the most preferred neighborhood as our residential preference index for blacks (*RPI\_B*). As for whites, we also used dummy variables to represent blacks' residential preferences (d2 - d4\_5).

The bottom of Table 1 shows blacks' preferences for neighborhood racial composition. Again, there is little difference between the unweighted and weighted data. While roughly half of the respondents select the 8 blacks/7 whites neighborhood as most preferred, about 20 percent prefer the 11 blacks/4 whites neighborhood and another 20 percent prefer the all black neighborhood. Among those whose first preference is the 8 blacks/7 whites neighborhood, the overwhelming majority (80 percent) chose a predominately black neighborhood as their second choice. Researchers reporting the results of surveys of racial attitudes frequently emphasize that blacks prefer integrated neighborhoods and therefore black preferences for self-segregation cannot be an important cause of housing segregation.<sup>14</sup> While it may be true that a majority of blacks prefer such neighborhoods, the numbers in Table 1 demonstrate that large percentages of blacks prefer either mostly or totally black neighborhoods. There is, therefore, a potential for black preferences to play an important role in explaining housing segregation.

#### IV. ESTIMATED EQUATIONS

We used ordinary least squares and two-stage least squares to separately estimate for blacks and whites equations explaining the percentage of black residents who reside in each respondent's census block group (PBLACK). These estimates are based on the pooled sample of MSAs.<sup>15</sup> To assess the relative importance of the hypothesized causes of segregation, the results from the

estimation of the PBLACK equations were used to decompose the racial difference in the means of PBLACK into its underlying determinants. In this section, each of our equations and our decomposition methodology are described in turn.

### Percent Black Regressions

The dependent variable in the PBLACK equations equals the number of black residents in a census block group divided by the number of black plus white residents in the block group.<sup>16</sup> To explain PBLACK we include variables known to affect residential location that are aligned with the hypotheses that have been put forward to explain neighborhood racial segregation. The equations estimated for whites and blacks can be expressed generally as:

$$PBLACK\_W = f(\text{permanent income, life cycle stage, occupation, residential mobility, neighborhood racial preference, city});$$

$$PBLACK\_B = f(\text{permanent income, life cycle stage, occupation, residential mobility, neighborhood racial preference, perceived discrimination, perceived hostility, city}).$$

The permanent income of the family is the predicted income obtained from estimating an auxiliary regression of current income on a set of instrumental variables, which is assumed correlated with the family's long run expected income but uncorrelated with transitory income.<sup>17</sup> The stage in life-cycle categorization is based jointly on the marital status, gender, and ages of household heads, the presence of children in the household, and the age of the youngest child.<sup>18</sup> There are nine occupational categories, with one category reserved for labor force nonparticipants. A measure of the respondent's residential mobility--the number of years at the present address--is included because, while housing segregation remains at a relatively high level, blacks have over time

increased their infiltration of traditional white neighborhoods (Kain, 1985). Immobile whites will therefore tend to live in neighborhoods with more blacks, while immobile blacks will tend to live in traditional black neighborhoods. Preferences for neighborhood racial composition are measured by *RPI\_B* and *RPI\_W* for blacks and whites, respectively. These preferences are alternatively measured using dummy variables (*n*'s for whites and *d*'s for blacks). Black respondents' perceptions of discrimination are measured by three dummy variables indicating whether they believe that blacks often miss out on good housing because 1) whites will not rent or sell to blacks; 2) real estate agents will not show, sell, or rent to blacks; and 3) banks and lenders will not loan money to blacks to purchase a home. The variable measuring blacks' perceptions of white hostility toward blacks was constructed from questions that were asked about six specific communities within the respondent's metropolitan area. These communities are dispersed throughout each MSA and were selected for their diversity and wide name recognition. We first used census data to determine those communities that were majority white. Our variable equals the percentage of these areas for which the respondent answered *upset* to the following question: "Now thinking about [AREA], if a black family moved into that area, do you think they would be welcome, or do you think that the people already living there would be upset?" Complete variable descriptions along with their means and standard deviations can be found in Table 2.

Ideally, both perceived discrimination (and hostility) and actual discrimination would enter the PBLACK equations estimated for blacks. While it is perceptions that affect choices, actual discrimination may affect the choice sets of blacks without their awareness. For example, racial steering may cause blacks to end up in black neighborhoods and blacks may be unaware they have



been victims of discrimination. Actual discrimination not registered by our perception measures is part of the residual portion of housing segregation that is unexplained.<sup>19</sup>

Finally, note that both the white and black PBLACK equations contain city variables. These are metropolitan area dummy variables included to capture any systematic city-specific effects that are not measured by the other regressors. One important city-specific effect is the number of racially mixed neighborhoods that exist within each metro area. Fewer mixed neighborhoods will cause PBLACK\_W to decline and PBLACK\_B to increase, because a larger number of whites and blacks preferring an integrated neighborhood will end up in their second most preferred neighborhood--a predominately black neighborhood for blacks and a predominately white neighborhood for whites. A number of factors may affect the number of racially mixed neighborhoods available within a particular metro area, including the relative number of blacks and whites, the extent to which the area is divided by topographical features, and the aggregate neighborhood preferences of blacks and whites.<sup>20</sup> The latter factor suggests that there may be a macroeconomic preferences effect that contributes to housing segregation in addition to the microeconomic effects we measure. For example, a decrease (increase) in the mean value of *RPI\_W* (*RPI\_B*) will decrease the number of mixed neighborhoods, which, as noted above, will decrease PBLACK\_W and increase PBLACK\_B, resulting in a higher level of housing segregation within the metro area.<sup>21</sup>

### The Need for 2SLS

Two reasons suggest that the disturbance term from an estimated OLS PBLACK regression is contemporaneously correlated with the measure of neighborhood racial preferences: measurement error in the preference variable and the endogeneity of these preferences. The possibility of

measurement error is straightforward, because an unknown percentage of respondents may fail to reveal their true willingness to live with members of the other racial group. The endogeneity argument is more complex and is based on the “Contact Hypothesis.”

Within that portion of the sociology literature that focuses on prejudice, the Contact Hypothesis is one of the most prominent theories. Jackman and Crane (1986) offer the following definition:

This theory [the Contact Hypothesis] holds that the sharp rupture between the social lives of whites and blacks promotes whites’ ignorance about blacks. This ignorance feeds erroneous, oversimplified, negative beliefs about blacks, which in turn engender feelings of hostility and discriminatory social and political predispositions toward blacks. By bringing whites into personal contact with blacks, erroneous images of blacks can be corrected and hostile dispositions softened (p. 460).

Sigelman and Welch (1993) argue that the Contact Hypothesis applies to both blacks and whites.

That is, greater interracial contact will foster positive racial attitudes among both races. Both Jackman and Crane and Sigelman and Welch offer evidence that white preferences for racially mixed neighborhoods depend on the presence of black neighbors. Sigelman and Welch’s results for blacks, however, are inconsistent. While neither study controls for the endogeneity of residential location, their evidence, as well as the logic of the Contact Hypothesis itself, suggests that neighborhood racial preferences are endogenous to PBLACK, rendering OLS an inconsistent estimator for the PBLACK equation.

Fortunately, the Contact Hypothesis not only implies preferences are endogenous, but also provides guidance on the selection of instruments for preferences that can serve to identify the PBLACK equation. The knowledge that one race is no better or worse than another may come from interracial personal contact outside the neighborhood or from instruction on race received from

others. To measure opportunities for interracial contact outside the neighborhood, we include as instruments the region of the country where the respondent lived most of the time while growing up, whether the respondent's served in the military, whether the respondent received any formal job training after high school, and whether the respondent lived in the same metro area all of his or her life. To measure opportunities to acquire racial knowledge from others, we include as instruments the respondent's educational level, the educational levels of the respondent's parents, how frequently the respondent attends religious services, and the religion of the respondent. To better identify the PBLACK equations, we also include a number a variables that others have found significantly affect neighborhood racial preferences: the gender, age, and political ideology of the respondent (Farley, *et al.*, 1994; Zubrinsky and Bobo, 1996; Sigelman and Welch, 1993). Political party affiliation and ancestry are also used as instruments. (See Table 2 for the means and definitions of all of the variables used as instruments.)

### Housing Segregation Decompositions

To estimate how much of actual housing segregation is explained by each of its hypothesized causes, black and white variable means and PBLACK regression estimates are used to construct segregation decompositions. The amount of segregation observed, SEG, is defined as the difference in the mean percentage of blacks in the neighborhoods occupied by black and white respondents:

$$SEG = PBLACK\_B - PBLACK\_W, \quad (3)$$

where *PBLACK\_B* equals the mean of PBLACK for black respondents, and *PBLACK\_W* equals the mean of PBLACK for white respondents. A well-known property of least squares regression is that

the mean of the dependent variable is equal to the sum of the means of the independent variables multiplied by their estimated coefficients:

$$\begin{aligned} \text{PBLACK\_B} = & \alpha^B + \beta^B \overline{\text{INC}^B} + \eta^B \overline{\text{LC}^B} + \theta^B \overline{\text{OCC}^B} + \delta^B \overline{\text{YEARS}^B} \\ & + \gamma^B \overline{\text{RPI\_B}} + \sigma^B \overline{\text{H}} + \pi^B \overline{\text{D}} \end{aligned} \quad (4)$$

$$\text{PBLACK\_W} = \alpha^W + \beta^W \overline{\text{INC}^W} + \eta^W \overline{\text{LC}^W} + \theta^W \overline{\text{OCC}^W} + \delta^W \overline{\text{YEARS}^W} + \gamma^W \overline{\text{RPI\_W}} \quad (5)$$

where Greek letters represent estimated coefficients and  $\overline{\text{INC}}$ ,  $\overline{\text{LC}}$ ,  $\overline{\text{OCC}}$ , and  $\overline{\text{YEARS}}$  are means of permanent income, life-cycle stage, occupation, and years at present address, respectively.

$\overline{\text{RPI\_B}}$  and  $\overline{\text{RPI\_W}}$  are the mean values of the neighborhood racial preference indexes of blacks

and whites, respectively.  $\overline{\text{H}}$  and  $\overline{\text{D}}$  are the means of the perceived hostility and perceived

discrimination variables. The subtraction of (5) from (4) decomposes SEG into its separate causes:

$$\begin{aligned}
SEG = & [\alpha^B - \alpha^W] + \beta^B [\overline{INC^B} - \overline{INC^W}] - \overline{INC^W} [\beta^W - \beta^B] + \eta^B [LC^B - LC^W] - \\
& \overline{LC^W} [\eta^W - \eta^B] + \theta^B [\overline{OCC^B} - \overline{OCC^W}] - \overline{OCC^W} [\theta^W - \theta^B] + \\
& \delta^B [\overline{YEARS^B} - \overline{YEARS^W}] - \overline{YEARS^W} [\delta^W - \delta^B] + \gamma^B \overline{RPI\_B} - \\
& \gamma^W \overline{RPI\_W} + \sigma^B \overline{H} + \pi^B \overline{D}
\end{aligned}
\tag{6}$$

The effects of the components of (6) on SEG are determined as follows: For each variable that is measured the same between blacks and whites (INC, LC, OCC, and YEARS), the racial difference in means on that variable is set equal to zero and SEG is recomputed. The percentage change in SEG yields an estimate of the importance of that variable in explaining housing segregation. This same procedure is followed for coefficient differences on these variables. A different procedure must be followed for neighborhood preferences, because these are measured differently between blacks and whites. To determine the effect of black preferences, the percentage change in SEG from setting  $\gamma^B$  equal to zero is computed. When  $\gamma^B$  is equal to zero, black preferences have no affect on SEG. The effect of white preferences is obtained by computing the percentage change in SEG from setting  $RPI\_W$  equal to the value (17) representing whites' indifference to the race of their neighbors. The effects of perceived hostility and discrimination are

determined by computing the percentage change in SEG from setting  $\sigma^B$  and  $\pi^B$  equal to zero, respectively.

## V. RESULTS

Tables 3 and 4 report OLS and 2SLS results from estimating PBLACK equations for whites and blacks, respectively.<sup>22</sup> Separate OLS results are reported for the two alternative methods of measuring neighborhood racial preferences--categorical variables versus an index. Because of the complexity of estimating 2SLS with categorical endogenous variables, our 2SLS models were estimated using only the residential preferences indexes. We do not believe this decision affects our conclusions, because the indexes performed as well as or better than the dummy variable representation of preferences in the estimated OLS models.<sup>23</sup> Hausman tests indicate that the null hypothesis of the exogeneity of preferences can be rejected at the 1 percent level for blacks and at the 11 percent level for whites. We therefore focus on the 2SLS results, although in the case of whites there is little difference between the OLS and 2SLS estimates.

### PLBLACK Results for Whites

Diagnostics for the 2SLS model estimated for whites are reported at the bottom of Table 3. Following the suggestions of Bound, *et al.* (1995), we report the partial  $R^2$  and the F statistic of the identifying instruments in the first-stage estimation.<sup>24</sup> Both statistics indicate that the quality of our 2SLS estimates is high. We also report Hausman's (1983) overidentification test statistic. A large value of this statistic suggests that one or more of the variables used as instruments has been inappropriately excluded from the PBLACK equation. We reject the hypothesis that this is the case at a high level of confidence.

Turning to the results for individual variables, a higher comfort level with black neighbors increases the PBLACK of whites. A one-standard deviation increase in  $RPI\_W$  increases PBLACK

by 10 percentage points. Permanent income is also highly significant and its estimated coefficient indicates that a one-standard deviation increase will reduce PBLACK by 4 percentage points. Among the occupation categories, repair, professional, sales, and labor are significant at the 5 percent level, all with negative estimated coefficients. In contrast, the life-cycle variables are jointly insignificant. The number of years at the current address has the expected positive sign and is statistically significant.

The OLS results show that *RPI\_W* and the dummy variable representation of white preferences (n1 - n4) yield roughly equivalent results. This helps justify the index approach to measuring preferences and the exclusive use of *RPI\_W* in the 2SLS model.

#### PBLACK Results for Blacks

Diagnostics for the 2SLS model estimated for blacks indicate that for them the quality of the estimates is also high and that variables used as instruments have not been inappropriately excluded from the PBLACK equation.<sup>25</sup>

*RPI\_B* is highly significant with the anticipated positive sign. A one-standard deviation increase in *RPI\_B* causes an 8 percentage point increase in PBLACK. Permanent income is also highly significant and its estimated coefficient indicates a one-standard deviation increase would reduce PBLACK by 3.3 percentage points. The occupation variables are jointly insignificant. In contrast to the results for whites, the life-cycle variables are jointly significant. Relative to young single males, all other life-cycle groups live in higher PBLACK neighborhoods. The effects are statistically significant at the 5 percent level for half of the variables.



Entering the PBLACK equations for blacks but not for whites are the perceived hostility and perceived discrimination variables. The hostility variable is statistically significant with the expected positive sign. A one-standard deviation increase in this variable causes PBLACK to rise about 2 percentage points. None of the discrimination variables is significant at the 5 percent level, but the variable indicating perceived discrimination by real estate agents is significant at the 7 percent level. However, as is true for the hostility variable, the magnitude of the effect is modest: PBLACK is 2.4 percentage points higher if discrimination is perceived. As expected, years at the current address is positive and significant.

In contrast to the results for whites, in the case of blacks the estimated coefficient on *RPI\_B* is substantially larger for the 2SLS (.356) than the OLS (.056) model. Not surprisingly, the Hausman test statistic clearly indicates that OLS is an inconsistent estimator for the PBLACK equation. Again, however, it is reassuring that *RPI\_B* and the dummy variable preference measures (d2 - d4\_5) perform similarly in the OLS model.

### Housing Segregation Decompositions

Table 5 presents the results from implementing our decomposition methodology. Computed changes in SEG are based on the 2SLS estimates reported in the previous tables.

Blacks' preferences for neighborhood racial composition account for the largest amount of SEG. If blacks' preferences had no effect on the racial mix of neighborhoods chosen by blacks, the level of housing segregation would decline by 32 percent. This result supports Orlando Patterson's argument (see Section I) that contemporary housing segregation reflects blacks' desires to live in black neighborhoods. As noted above, this desire may reflect a variety of factors, including the wish

to share culture, prejudice against whites, and expectations of unfavorable treatment by whites against blacks in white neighborhoods.<sup>26</sup>

White neighborhood racial preferences also contribute to housing segregation, but to a lesser extent than do black preferences. If whites were indifferent to the color of their neighbors, housing segregation would decline by 24 percent. While racial differences in occupation and life-cycle stage contribute little to housing segregation, the lower permanent incomes of blacks do matter. If the racial difference in permanent income was eliminated, housing segregation would decline by 7 percent. Finally, eliminating blacks' perceptions of white hostility and discrimination against blacks would only reduce segregation by 3 percent and 1 percent, respectively.

Racial differences in estimated coefficients also make a modest contribution to SEG. If there were no differences in occupation and life-cycle coefficients between blacks and whites, housing segregation would decline by 7 percent and 4 percent, respectively.

SEG decompositions were also done based on estimated PBLACK equations that included current rather than permanent income. As expected, the amount of housing segregation explained by the racial difference in current income is smaller (2.6 percent) than the amount explained by the difference in permanent income (7 percent).

Finally, SEG decompositions were done based on PBLACK models estimated separately for Atlanta, Detroit, and Los Angeles.<sup>27</sup> The individual MSA results also show that black and white preferences for neighborhood racial composition play an important role in explaining housing segregation. Black preferences explain 19 percent, 26 percent, and 47 percent of the SEGs for

Detroit, L.A., and Atlanta, respectively. The corresponding percentages for white preferences are 13 percent, 24 percent, and 22 percent.

## VI. CONCLUSIONS

The results of this study suggest that more than one-half of the level of housing segregation can be attributed to blacks' preferences to live among blacks and whites' preferences to live among whites. This is an important finding because it demonstrates that the amount of segregation unexplained after accounting for socioeconomic differences between the races should not be attributed solely to housing market discrimination.<sup>28</sup> Segregation is apparently more of a voluntary phenomenon than is commonly believed.

While we find that preferences for self-segregation matter to housing segregation, we have not identified the factors underlying these preferences. Blacks' preferences to live among blacks may stem from a desire to share culture, prejudice against whites, lower housing prices in black neighborhoods, or blacks' perceptions of white hostility and discrimination against blacks. However, it is important to note that the latter perceptions are included in our estimated PBLACK equation for blacks, so that the estimated black preferences effect is net of these factors. Whites' preferences for self-segregation may also be caused by a variety of factors, including prejudice against blacks, a belief that black neighbors may lower property values, or class prejudice combined with the use of race as a proxy for class.

We also find some support for the hypothesis that racial differences in permanent income explain housing segregation, but the contribution of this factor is relatively small. Like Miller and Quigley (1990), we do not find that demographic differences between blacks and whites matter to

housing segregation. We also find no support for the hypothesis that housing segregation is caused by occupational differences between the races. While blacks' perceptions of white hostility and discrimination matter more than the previous factors, their effects are also relatively small in magnitude.

While our results imply that a significant portion of observed housing segregation may be voluntary, they should not be interpreted to imply that illegal constraints on blacks' residential choices play an unimportant role. While the Multi-City Study of Urban Inequality provides the most useful data thus far available for studying the causes of housing segregation, these data are still incomplete in that no measures of actual discrimination are available. Nevertheless, our results demonstrate that eliminating discrimination may not result in the elimination of racial segregation within urban housing markets.

Finally, it is important to conclude by reiterating that there may be macroeconomic preferences effects that contribute to housing segregation, in addition to the microeconomic preferences effects we measure. To determine the relative importance of these two sets of effects, individual level data containing neighborhood racial preference measures are necessary for a national sample of metropolitan areas. This would permit the estimation of equations explaining the racial composition of the neighborhoods occupied by individual blacks and whites as a function of *both* individual and aggregate level measures of neighborhood preferences.

## NOTES

<sup>1</sup>The best known measure of housing segregation between blacks and whites is the dissimilarity index, which indicates the share of either racial group that would have to move to obtain an even distribution of the two groups across locations. While this index has tended to decline over time in most places, these declines have been modest in magnitude. For

example, Farley and Frey (1993) report that for the 23 metro areas with the largest black populations the average value of the index fell from 78.8 in 1980 to 74.5 in 1990.

<sup>2</sup>For a review of recent evidence on the effects of housing segregation on blacks see Ihlanfeldt and Sjoquist (1998) and Ihlanfeldt (1999).

<sup>3</sup>Important contributors to the early literature on the causes of housing segregation include Becker (1957), Bailey (1959, 1966), Muth (1969), and Pascal (1967).

<sup>4</sup>See Clark (1986, 1988, 1989) and Galster (1988, 1989).

<sup>5</sup>For recent interview evidence on the neighborhood preferences of whites and blacks and comparisons over time in these preferences see Farley, *et al.* (1993).

<sup>6</sup>A very early test of the self-segregation hypothesis as it applies to blacks was performed by Pascal (1967). Using data for Chicago, he compared the observed degree of segregation for Italian-Americans—who are reputed to have a strong tendency toward self-segregation—with that of middle-to-upper-class-income non-whites. The segregation index for non-whites was over five times as large as that for Italian-Americans. According to Pascal, “it would be necessary to posit a truly prodigious desire for segregation among Negroes in comparison to other minorities to generate the drastically different residential patterns they display.” (Pascal, 1970, p.410).

<sup>7</sup>If there is discrimination, then presumably black applicants are held to a higher standard of loan approval than white applicants. The default rate for black mortgage holders, then, should be lower than that for whites if there exists discrimination.

<sup>8</sup>The audit approach to the measurement of discrimination is not without its critics. See Heckman and Siegelman (1993) for criticisms of the use of audits to detect labor market discrimination. Many of their criticisms apply with equal force to the housing market.

<sup>9</sup>Evidence that school quality affects housing values is provided by Jud (1985), Goodman and Thibodeau (1998), Walden (1990), and Black (1999). Evidence that employment access affects housing values is provided by Follain and Malpezzi (1981) and McDonald and McMillen (1990). See Summers and Wolfe (1977) for evidence that predominately black schools offer lower school quality for both blacks and nonblacks. Evidence that blacks have worse employment access in more segregated metro areas is provided by Farley (1987) and Weinberg (1998).

<sup>10</sup>Due to a split ballot random assignment within racial groups used in the Los Angeles and Boston surveys, a number of the measures we employ were available for only a portion of the total samples in these two cities. Hence, our sample is not evenly distributed across MSAs: Detroit (37 percent), Atlanta (34 percent), Los Angeles (16 percent), and Boston (14 percent). Zubrinsky and Bobo (1996) evaluated the effectiveness of the split ballot random assignment in Los Angeles and conclude that the data indicate effective random assignment of respondents.

<sup>11</sup>The neighborhood preference questions appearing in the MCSUI Surveys are based on those asked in the 1976 Detroit Area Study. This was done to facilitate intertemporal comparisons (see Farley, *et al.*, 1993).

<sup>12</sup>A more complicated residential preference index was also used for whites. This index was based on the comfort questions and another set of questions where the respondent was shown all five cards and asked to indicate which neighborhoods he/she would consider moving into. This index was used in previous analyses of neighborhood preferences using MCSUI data (Zubrinsky and Bobo, 1996; Farley, *et al.*, 1997). Because this more complicated index yielded results that are highly similar to those obtained with our simple index, only the latter results are reported.

<sup>13</sup>The researchers of the 1976 Detroit Area Study intended to use identical cards and questions for whites and blacks, but pretests demonstrated that this would be a waste of interviewer time. One problem was that black respondents had no objection to whites moving into their neighborhoods. Other problems are discussed in Farley, *et al.* (1997).

<sup>14</sup>See, for example, Massey and Denton (1993), pages 88-96.

<sup>15</sup>Regression results for the pooled MSA sample rather than those for the individual MSAs are emphasized because we have less confidence in our ability to identify the PBLACK equations for the smaller MSA samples. Larger samples provide greater variability in the instruments we use to predict the residential preference indexes, which we treat as endogenous, as discussed below. Moreover, the finite sample bias in 2SLS estimates declines as sample size expands. Nevertheless, the results obtained using the individual MSA samples are discussed in Section V.

<sup>16</sup>We also used the number of blacks divided by the total population of the block group as the measure of PBLACK. The correlation between the two alternative PBLACK variables is 0.90 and the regression results produced with each variable are highly similar.

<sup>17</sup>The natural log of each household's current income was regressed on years of education, years of education squared, age, age squared, levels of household assets, receipt of AFDC, receipt of SSI, metro area, region where respondent grew up, race and marital status. These variables explained 46 percent of the variance in current income. The antilogarithm of the prediction from this estimated equation served as our measure of permanent income.

<sup>18</sup>Our life-cycle classification is based upon the one developed by the staff of the Housing Assistance Supply Experiment (McCarthy, 1976). It has been used in analysis of housing decisions by Ihlanfeldt and Boehm (1983) and Ihlanfeldt (1980, 1984).

<sup>19</sup>The other hypothesis listed in Section II that cannot be tested with our data is that housing segregation reflects racial differences in preferences for housing and neighborhood attributes. The affect of this factor, therefore, also is part of the unexplained residual.

<sup>20</sup>Evidence that topographical features affect the number of racially mixed neighborhoods is provided by Cutler and Glaeser (1997), who find that an increase in the number of rivers within the metro area increases housing segregation.

<sup>21</sup>These macroeconomic effects from preferences were first articulated by Schelling (1971). His model shows that even weak preferences for same-race neighbors can result in the nonexistence of stable, racially mixed neighborhoods, because black migration into white neighborhoods will cause these neighborhoods to eventually "tip" in favor of all black occupants. In Schelling's model, the individual's preferences for neighborhood racial composition play no role in explaining the racial composition of his neighborhood. An implication of Schelling's model is that the estimated effects of RPI\_W and RPI\_B will be small and statistically insignificant in our estimated PBLACK equations. As reported below, this is not the case. In addition, Ellen (1998) has documented that among Census tracts that were racially integrated in 1970, over one-third had not lost a significant portion of their white population share a full 20 years later. These results suggest that while macroeconomic preferences effects may exist, they do not rule out an important role of individual housing preferences in explaining housing segregation.

<sup>22</sup>Estimated standard errors may be affected by the clustering and stratification of the MCSUI survey design. We investigated this using the "svy" procedures available within Release 6 of STATA, which fully accounts for sample design effects in the use of survey data. Only small differences were found in estimated standard errors between models that did and did not account for these effects.

<sup>23</sup>The adjusted R squared is the same or higher for the indexes as for the dummy variables in the OLS regressions. The indexes and dummy variables also achieved similar levels of statistical significance and produced qualitatively identical results.

<sup>24</sup>The following instruments are statistically significant at the 10 percent level in the first-stage estimation (estimated signs in parentheses): educ2 (+), age (-), fath\_ed1 (-), Protestant (+), no religion (+), republican (-), and liberal (+). See Table 1 for variable definitions.

<sup>25</sup>The following instruments are statistically significant at the 10 percent level in the first-stage estimation (estimated signs in parentheses): educ2 (-), some church (+), little church (+), no\_church (+), republican (-), liberal (-), overseas (+), training (-), and lifer (+). See Table 1 for variable definitions.

<sup>26</sup>Interestingly, while the Hostility variable has the expected positive sign in the first-stage *RPI\_B* equation, it has a *t*-value of only .203. This suggests that the average black who expresses a preference for a black neighborhood is not basing this preference on how he/she might be treated in a white neighborhood.

<sup>27</sup>A decomposition is not possible for Boston because the F-statistic of the identifying instruments in the first-stage estimation of the PBLACK equation estimated for blacks is not statistically significant.

<sup>28</sup>See, for example, Gabriel and Rosenthal (1989), who find that a black household with the same income and other characteristics as the average white suburban household is much less likely to live in the suburbs. They conclude that “our findings point to the importance of racial discrimination as an explanation of the relatively low rate of black household suburbanization.”

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**Table 1**

**Frequencies of Neighborhood Racial Preferences for White and Black Respondents**



**Table 2**

**Summary Statistics for MCSUI Households**

**Table 2**

**Summary Statistics for MCSUI Households - Continued**



**Table 3**  
**PBLACK Results for Whites**



**Table 4**  
**PBLACK Results for Blacks**



**Table 5**  
**SEG Decompositions**

