"PROPERTY VALUES DROP WHEN BLACKS MOVE IN, BECAUSE...": RACIAL AND SOCIOECONOMIC DETERMINANTS OF NEIGHBORHOOD DESIRABILITY *

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Are housing prices lower in neighborhoods with high concentrations of black residents? If so, is this relationship evidence of pure discrimination, or can it be explained by considering nonracial neighborhood traits? These questions derive their importance from the link between mobility patterns and residential segregation, and the consequent relationship between high levels of segregation and a host of deleterious outcomes. I assess the magnitude and motivations of racial aversion by conducting a hedonic price analysis of geocoded data from the Panel Study of Income Dynamics. I find clear evidence of lower property values in neighborhoods with relatively high proportions of black residents. However, whether it is blacks' race or their socioeconomic status that affects property values depends on whether housing units are rented or owner-occupied.

"It seems like the property values drop when black families move in," observed a white woman when asked why she would move if more than three black families lived in her neighborhood (Farley et al. 1994:775). This comment resonates with conventional wisdom about the effect of integration on predominantly white neighborhoods and is supported by empirical work that finds whites averse to black neighbors. The woman's words reveal a distaste for living near blacks that is reflected in a low assessment of property values. While racial prejudice and discrimination may account for the woman's preference for a segregated neighborhood, there is at least one other possible explanation. This same woman went on to say that the reason property values drop when blacks move in is "because they [blacks] do not keep up their houses" (p. 775). This suggests an aversion to neighbors who do not maintain their homes, rather than to blacks per se. Is this woman offering an aversion to rundown property to cover up her racist intentions, or would she actually move if new neighbors of any race did not maintain their homes?

There are many reasons why people might be averse to black neighbors. One is pure discrimination—that whites dislike blacks because they are black (Bobo and Zubrinsky 1996). A second explanation stresses the proxy component of racial aversion—white people avoid black neighbors not because they are black, but because of "other neighborhood concerns, correlated with racial mix, which affect people in such a way as to produce cumulative patterns of invasion and succession" (Taub, Taylor, and Dunham 1984: 177). For example, if the only factor in assessments of neighborhood quality is the poverty rate, highly integrated neighborhoods will be considered less desirable because higher poverty rates among blacks mean that the average mixed-race neighborhood contains more poor people than does the average homogeneous, white neighborhood.

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The distinction between pure discrimination and racial proxies is important in part because the two explanations have distinct implications for integration policy. If whites avoid blacks because they are black, then stable integration is unlikely; no matter what policy is pursued, whites will still object to living near blacks. Alternatively, if whites avoid blacks because of characteristics associated with being black, then stable integration can be achieved through policies that promote racial integration while minimizing undesirable nonracial characteristics.[1]

In light of this distinction between racial proxies and pure discrimination, my analysis pursues two goals. First, I assess the magnitude of whites' aversion to black neighbors. Second, I consider the impact of several nonracial neighborhood factors on aversion to black neighbors. This exercise tests the pure discrimination and racial proxy hypotheses. To achieve these goals I employ hedonic price analysis, a method that is common in economics but seldom used in sociology.

NEIGHBORHOOD TRAITS AND NEIGHBORHOOD DESIRABILITY

One sociological approach to neighborhood desirability stresses the importance of racial prejudice and discrimination in assessments of neighborhood quality (Bobo 1997; Bobo, Klugel, and Smith 1997; Bobo and Zubrinsky 1996; Zubrinsky and Bobo 1996). Together with several collaborators, Bobo argues that negative conceptions of other racial groups, in particular blacks, guide whites' ranking of neighborhoods. As a result, neighborhood preferences are directly related to the proportion of residents who are black. Bobo identifies this aversion to black neighbors as part of a new "laissez-faire racism."

If Bobo is correct about whites' preferences, then large effects of racial animus on behavioral indicators of neighborhood desirability (e.g., moving, property values) might be observed even if all whites do not exhibit extreme prejudice. This potential was realized by Schelling (1971), whose tipping model starts with the assumption that whites have varying preferences for black neighbors. When a black family moves into a neighborhood, it disturbs the racial equilibrium. In response, whites who are already in the most integrated neighborhood they will tolerate decide to move. These openings create opportunities for more black families to join the neighborhood. When the second wave of blacks arrives, their presence prompts the departure of whites who are slightly more tolerant than those who initially fled. Again, blacks acquire some of the newly available homes, and a third wave of whites departs. This process continues, provided there are enough blacks who want to live in the neighborhood, until even the most tolerant whites feel uncomfortable and leave.

Many studies provide direct or indirect information about the link between racial composition and neighborhood desirability. Researchers tend to focus on what people say or what they do. Studies that consider expressed preferences usually rely on vignettes, either neighborhood diagrams or factorial surveys, to assess the effect of neighborhood traits on neighborhood desirability. Neighborhood diagrams present respondents with pictures of hypothetical neighborhoods and, based solely on differing racial compositions, ask for evaluations of each area (Farley et al. 1993; Zubrinsky and Bobo 1996). Factorial surveys also ask respondents to rate hypothetical neighborhoods, but they use verbal cues instead of pictures (Bobo and Zubrinsky 1996; Clark 1991, 1992; Schuman, Steeh, and Bobo 1985; St. John and Bates 1990). Usually racial composition is the only neighborhood trait considered in factorial surveys.

Evidence from vignette studies overwhelmingly supports the hypothesis that racial composition, usually measured as percent black, affects neighborhood desirability. In the Detroit area, a majority of whites (87 percent) say they would move into a neighborhood that is 7 percent black, but only 29 percent of whites say they would select a 53 percent black neighborhood (Farley et al. 1994). In Los Angeles, the average white prefers a neighborhood that is 75 percent white and 25 percent black, but almost no whites want to live in a neighborhood that is

[1] Throughout "nonracial" refers to ecological factors that, while perhaps correlated with racial composition because of historical and contemporary discrimination, are not themselves indicators of racial composition.

more than 60 percent black (Clark 1992). In Oklahoma City, whites rate neighborhoods less favorably as percent black increases, even when crime, neighborhood cleanliness, neighborhood cohesion, and distance from downtown are held constant (St. John and Bates 1990).

Information about the determinants of neighborhood desirability also emerges from studies of mobility behavior. One variant of this approach uses transition matrices to evaluate mobility as a single event (Gramlich, Laren, and Sealand 1992; Massey, Gross, and Shibuya 1994; South and Crowder 1998). Massey and his colleagues show that racial composition is an important factor in the residential mobility of whites and that its effect dominates concerns about the neighborhood poverty rate. Among nonpoor whites, at least 70 percent of movers select new neighborhoods that are in nonpoor areas where no more than 30 percent of residents are black. The probability of moving to a neighborhood that is at least 60 percent black is almost zero for this group. Similar preferences are also evident among poor whites, although their odds of selecting a predominantly white neighborhood are lower.

Researchers also employ regression analysis and distinguish factors that affect the odds of leaving one's current neighborhood from those factors that influence the choice of a destination (Frey 1979; Galster 1990; Goodman and Streitwieser 1983; Harris 1997; South and Crowder 1997b, 1998; South and Deane 1993). These models often include city characteristics, characteristics of the average surrounding suburb, and differences between the city and its average suburb as predictors of mobility behavior.

The regression approach produces inconsistent support for the hypothesis that people base moving decisions on neighborhood racial composition. Frey (1979) reports that while whites do not give much weight to racial composition when deciding whether to move, racial composition is a major factor in selecting a new neighborhood. More recent work is split about whether racial composition affects the selection of destinations (Goodman and Streitwieser 1983; Ottensmann and Gleeson 1992), but largely supports Frey's conclusion that the incidence of white mobility is unrelated to the proportion of neighbors who are black (Harris 1997; South and Crowder 1997b; South and Deane 1993; but see South and Crowder 1998).

Most research supports Bobo's contention that people base their assessments of neighborhood desirability on racial composition. However, it is not clear why racial composition matters. Questions about the meaning of apparent racial determinants of neighborhood desirability arise in part because a complementary body of work suggests that neighborhood desirability is related to nonracial neighborhood factors. According to this literature, people choose neighborhoods in an effort to avoid low socioeconomic status (SES) neighbors and associated social problems. Those with low incomes, weak attachments to the labor force, and low levels of education are considered undesirable neighbors because of their perceived lack of adherence to mainstream values (Auletta 1982; Jencks 1992; Katz 1989; W. J. Wilson 1987). Out-of-wedlock birth, crime, unemployment, and low levels of educational attainment are all more common in neighborhoods with high proportions of low SES residents (Jargowsky 1997; Krivo and Peterson 1996; Massey 1996; Massey and Denton 1993; Wilson 1987). In addition, concerns that poverty, joblessness, and associated problems may be contagious lead people to protect their families from "the wrong crowd" by selecting neighborhoods with as few low SES residents as possible (Jencks and Mayer 1990).

Skogan (1990) elaborates on the relationship between neighborhood SES, social problems, and neighborhood decline. He identifies a process by which physical "disorder" leads to decline. This process begins when poverty, drug use, or some other problem reduces residents' abilities or desires to maintain their neighborhood. The abandoned and dilapidated buildings that result harbor rats and garbage, provide shelter for squatters, increase the risk of fires, house undesirable activities, and detract from the physical attractiveness of the neighborhood. In response, those who live close to deteriorating buildings feel less satisfied with the neighborhood, and some decide to move. Vacancies are filled by less affluent families because those with the ability to select more attractive neighborhoods avoid deteriorating areas. The new residents lack the resources

to maintain their homes and further decay occurs. As this process of deterioration and mobility continues, neighborhood desirability declines.

In attempting to reconcile theories that highlight nonracial determinants of neighborhood desirability with those that emphasize responses to racial composition, it is important to consider how racial and nonracial factors interact. Unfortunately, much research fails to adopt a comprehensive approach to neighborhood desirability. Many studies assess the importance of racial *or* nonracial neighborhood factors, rather than racial *and* nonracial neighborhood factors. Considering multiple factors allows one to distinguish between the pure discrimination (Bobo and Zubrinsky 1996) and racial proxy hypotheses (Clark 1992; Harris 1997; Taub et al. 1984). The former argues that racial composition matters because people are sensitive to their neighbors' race, while the latter is essentially a story about omitted-variable bias. The racial proxy hypothesis maintains that when people evaluate neighborhoods, racial preferences simply represent a desire to live in areas free of crime, deteriorating buildings, ineffective public schools, and other social ills. Because of the concentration of many social problems in neighborhoods with relatively large black populations (Massey 1995; Massey and Denton 1993; Peterson and Krivo 1993), selecting a "good" environment usually means choosing a predominantly white neighborhood. The racial proxy hypothesis further predicts that if models are properly specified, that is, they adequately control for neighborhood social composition and social problems, racial composition will not have a significant effect on neighborhood desirability.

Most of the cited studies provide little insight into whether aversion to black neighbors is a proxy for nonracial aspects of neighborhoods. Fortunately, some work does go beyond simply estimating the total effect of racial composition. St. John and Bates (1990) observe a significant effect of percent black on neighborhood desirability in a model that also includes measures of social climate, social problems, and location. Further support for the pure discrimination hypothesis appears in work by Bobo and Zubrinsky (1996) and Schuman et al. (1985) on expressed preferences, by Frey (1979) on destination selection, and by Massey, Gross, and Shibuya (1994) and Galster (1990) on mobility behavior. However, not all work that considers racial and nonracial factors refutes the racial proxy hypothesis. Frey (1979), Harris (1997), and Taub et al. (1984) provide clear evidence of racial proxies. Each estimates a model that regresses mobility incidence or mobility intentions on percent black. In each case there is a large total effect of race. Next, models are reestimated with controls for a host of nonracial neighborhood factors. Consistent with the racial proxy hypothesis, all three studies find that the direct effect of percent black is not significant, but coefficients for nonracial factors are significant (also see Marshall 1979; South and Crowder 1997b).[2]

While these studies represent a significant improvement over work that fails to consider nonracial factors and thus advance our understanding of the relationship between neighborhood traits and neighborhood desirability, they clearly do not reach a consensus. Discrepancies are partly a result of variations in the outcomes examined (i.e., behavior versus intentions), differences in samples (i.e., national versus one metropolitan area), and disagreement about the unit of analysis (i.e., census tract versus city versus county), but there are also several methodological issues that raise questions about the results of most sociological studies of neighborhood desirability.

First, studies that rely on expressed preferences probably measure preferences with error. Stated preferences about neighborhood racial and social composition may deviate from respondents' true preferences because of social pressure (Clark 1992; Kuran 1995; Schuman et al. 1985). This leads to underestimated effects of race and inflated nonracial effects, as people attempt to conform to norms of colorblindness. In addition to deceit, measurement error also affects estimates derived from preference studies because mobility intentions are an imperfect indicator of mobility behavior. Many people

[2] A third group of studies finds that both racial and nonracial factors are important determinants of neighborhood desirability (Morenoff and Sampson 1997; South and Crowder 1997a).

indicate dissatisfaction with their neighborhood and plan to move, but fail to do so (Duncan and Newman 1976; Landale and Guest 1985; Speare 1974). In part this is also a problem of omitted variables, as failure to consider life-cycle issues, employment, housing supply, and neighborhood availability leads to biased estimates of the role of racial and nonracial preferences in neighborhood desirability (Harris 1997; Rossi 1955).

Second, behavior studies that rely on transition matrices are limited by two constraints. First, transition matrices cannot be constructed for continuous variables. Information is lost when continuous data are converted to discrete measures, and decisions about how to partition distributions can bias results. Second, transition matrices cannot easily accommodate multiple predictors. Nested matrices can be used, but this solution quickly becomes unmanageable as even a modest number of independent variables quickly produces uninterpretable results. Alternatively, several variables could be combined into a single summary measure, but this solution also suffers from the limitations of discrete variables that generally plague transition matrices.

Finally, traditional regression studies of destination selection are limited by their choice of outcome variables. One option is to examine predictors of racial composition in the tracts people select (South and Crowder 1998). While this approach is biased because it ignores nonracial neighborhood traits, the remedy for this oversight is not apparent. Including nonracial factors as independent variables does not test the racial proxy hypothesis, and creating summary measures that account for racial and nonracial factors suffers from the problems that plague transition matrices. A second approach assesses the odds of selecting city versus suburban destinations (Frey 1979; Goodman and Streitwieser 1983; South and Crowder 1997b). This approach is an improvement in that it allows for a broad array of destination traits to be examined, but it fails to account for the substantial heterogeneity within cities and suburbs (Alba and Logan 1991; Logan and Alba 1993; Logan et al. 1996; Massey and Denton 1993). Instead, this approach adopts a false dichotomy between undesirable cities and idyllic suburbs that produces results that are often difficult to interpret. Is a family that selects a suburban neighborhood deciding to live near blacks or whites? What is the socioeconomic status of their new neighborhood? If these critical questions cannot be answered, then we cannot draw clear conclusions from this line of research.

A Different Approach

Regression analysis, transition matrices, and vignettes each represent ineffective methods of identifying determinants of neighborhood desirability. A different approach is clearly needed. The ideal data for this research should contain information on the characteristics of every available neighborhood, unbiased estimates of households' satisfaction with each alternative, and identification of the neighborhoods that households select. With such data, it would be simple to reconstruct implicit preference equations by regressing desire for a given neighborhood, or the odds that a neighborhood is selected, on neighborhood characteristics. In lieu of such data, I employ hedonic price analysis.

Hedonic price analysis uses information about the prices people pay for housing to estimate preferences for dwelling and neighborhood characteristics. The unit of analysis is the housing unit. The hedonic model is represented by the following equation:

$$\ln(P) = \alpha_0 + \alpha_1 D + \alpha_2 W + \alpha_3 R + \alpha_4 NR + \varepsilon, \quad (1)$$

where P is annual housing expenditures, D is dwelling characteristics, W is a dummy variable identifying white households, R is neighborhood racial composition, and NR is nonracial neighborhood traits. The dependent variable is logarithmic and the independent variables are linear.[3] As a result, coefficients identify the percent change in annual housing prices associated with a one-unit change in the corresponding independent variable.

[3] Numerous studies have concluded that this semi-log specification is most appropriate for hedonic price models (Chambers 1992; Kiel and Zabel 1996; Yinger 1979). Limited testing of alternative specifications did not identify any that were clearly superior.

I estimate two race effects. The first is a household race effect (α_2), which captures the price differential between blacks' housing units and whites' housing units. There are at least three reasons to suspect household race effects. First, the quality of housing units may vary by race of occupant in ways that are not accounted for by the available data. Second, neighborhood heterogeneity and persistent housing market discrimination suggest that blacks live in the least desirable sections of any given neighborhood. Third, discrimination by landlords, real estate agents, and lenders may lead blacks to experience price discrimination when they rent or purchase housing (Yinger 1995). In empirical work the household race effect tends to be positive, which implies that the unobserved amenities whites enjoy dominate price discrimination (Chambers 1992; Kiel and Zabel 1996).[4]

In addition to the household race effect, the hedonic model also estimates a neighborhood race effect (α_3). This effect, which describes the relationship between prices and neighborhood racial composition, is an indicator of neighborhood racial preferences as they are currently manifested in the housing market. If α_3 is negative, I conclude that people pay a premium to live in neighborhoods with relatively few black neighbors, and thus neighborhood desirability is inversely related to percent black.

As a method for assessing the importance of various neighborhood determinants of neighborhood desirability, hedonic price analysis has several shortcomings. First, it reports preferences in the housing market, rather than among particular subgroups of the population. Property values result from bids by all potential buyers. As such, determinants of neighborhood desirability cannot be estimated separately for each racial group. Second, the hedonic model reports trait prices at the intersection of the supply and demand curves.[5] These forces cannot be disentangled to produce separate estimates of the effect of neighborhood characteristics on mobility incidence and destination selection. Instead, the net effect of traits is obtained. Third, trait prices are determined by the preferences of the marginal consumer, not the average consumer. Linneman (1981) recognizes this aspect of the housing market and concludes that even if "it is known that on average the trait Z_i is undesirable, one cannot a priori conclude that Z_i will possess a negative coefficient in the clearing function" (p. 134).

Despite these shortcomings, hedonic price analysis remains a useful method for describing the effect of neighborhood characteristics on neighborhood desirability. First, hedonic price analysis evaluates the importance of neighborhood characteristics independent of a respondent's previous location. Consequently, the method does not require the assumptions about cities and suburbs that plague the traditional regression approach. Second, hedonic price analysis accommodates discrete and continuous independent variables. No bias-inducing decisions about how to convert continuous measures are necessary. Third, unlike transition matrices and neighborhood diagrams, hedonic price analysis easily accommodates multiple predictors. Finally, hedonic price analysis uses the prices people pay for their homes to assess the importance of neighborhood factors, rather than relying on evaluations of hypothetical neighborhoods, so many of the aforementioned concerns about studies of expressed prefer-

[4] While I do not focus on household race effects and make no effort to estimate the contributions of its various components, I nevertheless include race of householder in all models because, as Chambers (1992) notes, failing to do so substantially biases estimates of neighborhood race effects.

[5] This characteristic of the model could lead to significant bias in estimates of neighborhood race effects if institutional factors restrict blacks to a subset of neighborhoods, thereby inflating prices in black neighborhoods and producing a positive trait price for neighborhood percent black. While exclusion has certainly been prominent in the housing market historically (Massey and Denton 1993; Taeuber and Taeuber 1965), it is unlikely that housing discrimination causes significant bias in my estimates. Recent evidence suggests that the housing market has been opening up over the past several decades (Cutler, Glaeser, and Vigdor 1997), and that housing discrimination is less pronounced in the rental market than among owner-occupied units (Yinger 1995). Additionally, Chambers (1992) shows that "there is no clear evidence that exclusion has elevated the overall price of ghetto or border housing above prices in the white submarket" (p. 225).

ence do not apply. Neither politically correct responses nor the gap between intentions and behavior affects results. Thus, while the hedonic model probably underestimates the magnitude of aversion to any given trait extant among the general population, it provides important information about trait prices under current market conditions.

Economists have conducted hedonic price analyses of housing for more than 25 years, but the method has rarely been employed by sociologists (F. Wilson 1979). Economic studies tend to focus on the relationship between neighborhood desirability and such factors as commuting time, environmental pollution, precipitation, temperature, tax rates, crime, and street noise (Blomquist, Berger, and Hoehn 1988; Diamond and Tolley 1982; Gyourko and Tracy 1991; Linneman 1980). Racial composition is seldom included in these models. The failure to connect econometrics with sociological theory means that we have limited knowledge about the relationship between racial composition and property values.

Of course not all economists ignore racial composition. Yinger (1979) reviews work on the relationship between race and housing prices and concludes that there is evidence of aversion to black neighbors and discounts to white homebuyers. More recently, Chambers (1992) and Kiel and Zabel (1996) have used hedonic price analysis to assess racial effects on property values. Chambers examines 1975 and 1979 data for Chicago and finds inconsistent evidence of race effects. His analysis does not support the claim that blacks pay higher prices than do whites, but he identifies some conditions under which neighborhood racial composition is significant. Kiel and Zabel use 1978–1991 data from the American Housing Survey to examine racial effects on the value of owner-occupied dwellings in Philadelphia, Chicago, and Denver. They confirm Chambers's conclusion that blacks are not paying more than whites for comparable housing, and they report broader evidence of racial aversion than Chambers observed.

I improve on this previous research in three important ways. First, I use national data, whereas Yinger (1978, 1979), Chambers (1992), and Kiel and Zabel (1996) each examine data for three or fewer metropolitan areas. This is a significant difference because the relationship between racial composition and property values varies by metropolitan area (Kiel and Zabel 1996). A national sample allows me to examine geographical differences and make broader generalizations than is possible with limited data.

Second, I estimate coefficients for tenure and for regional submarkets, as well as for the national housing market. This contrasts with Yinger, who examines data for homeowners in one city; Chambers, who analyzes data for Chicago; and Kiel and Zabel, who ignore rental units.

Third, I define neighborhoods as census tracts. While there is no consensus about how neighborhoods should be defined (White 1987), tracts are commonly used by quantitative social scientists (Brooks-Gunn et al. 1993; Gramlich et al. 1992; Massey et al. 1994). Census tracts are defined by the U.S. Bureau of the Census with the intention of capturing neighborhoods (U.S. Bureau of the Census 1992). In defining neighborhoods as tracts, my work differs from Chambers, who uses residence zones as the geographic unit of analysis. There are 24 residence zones in the Chicago metropolitan area, which means that the average zone includes more than 250,000 people (U.S. Bureau of the Census 1981). By contrast, the average census tract includes about 4,000 people (White 1987). Thus, tracts are less heterogeneous than zones and should facilitate more precise estimates of neighborhood effects.

DATA

Data are from the Panel Study of Income Dynamics (PSID), a longitudinal survey conducted annually by the Survey Research Center of the University of Michigan. Initiated in 1968, the PSID now includes data on 37,500 individuals who resided in one of 4,800 initial sample households, were the offspring of those individuals, or were their co-residents. Because of an initial oversampling of low-income families, the PSID sample is not representative of the U.S. population. To correct for biases, I use PSID sample weights in all analyses.[6]

[6] Standard errors are computed with a Huber/White estimator (Greene 1993; StataCorp 1995).

The PSID focuses on economic and demographic behavior. Respondents are queried about sources of income, changes in family structure, the acquisition of job skills, residential mobility, and myriad related issues. I examine data from a special geocoded version of the PSID that was prepared in response to growing interest in contextual effects. The file contains aggregate data from the 1970 and 1980 U.S. censuses, as well as codes representing each respondent's address at 12 geographic levels.[7]

My analysis examines data from the 1980 PSID for dwelling units in metropolitan areas. I employ these restrictions for three reasons. First, not all variables are available each year. For example, the PSID does not contain a description of the respondent's dwelling (i.e., one-family house, two-family house, or apartment) in 1973, 1974, or 1982. Second, at the time this research was conducted geocodes were not available for addresses in 1969, 1975, 1977, 1978, or any year after 1985. Third, most places outside metropolitan areas are not tracted (U.S. Bureau of the Census 1992), so a focus on metropolitan areas facilitates an analysis of tract traits.

Table 1 describes selected variables from the PSID and the 1980 census. The dependent variable in all analyses is annual housing expenditures, which is based on each respondent's report of annual rent or house value. To obtain annual expenditures from house values, I follow previous studies (Blomquist et al. 1988; Gyourko and Tracy 1991) and apply Peiser and Smith's (1985) capitalization rates to the value of owner-occupied dwellings. Once rental and owner-occupied prices are in the same metric, I add annual property taxes to the annual value of owned property, and convert annual housing expenditures to 1992 dollars (U.S. Bureau of the Census 1994). One potential problem with this measure is that respondents may not have a good sense of how much their homes are worth. Recent research finds that people tend to overestimate the value of their homes. However, because this error does not vary systematically across the neighborhood traits examined, imperfect estimates of housing values will not bias coefficients for neighborhood traits (Goodman and Ittner 1992; Kiel and Zabel 1996).[8]

The equations predicting annual housing expenditures focus on the role of neighborhood characteristics, but also include features of the household, dwelling unit, and geographic setting that may affect property values. Race of household head is treated as a control variable, and its coefficient measures the household race effect. Dwelling controls include the number of rooms in the home, whether it is a single-family dwelling, and whether it is owner-occupied.[9] Controls for geographic setting are region and metropolitan area population. Neighborhood measures are drawn from the 1980 census. One neighborhood racial factor is examined—

[7] See Hill (1992) for further information about the PSID.

[8] The results do not differ substantively when the sample is limited to households that moved during the previous year, a group that presumably has a good sense of the market value of their homes.

[9] One potential shortcoming of the PSID is that it provides little information about characteristics of the dwelling unit. This is problematic here only if controlling for additional housing traits would significantly alter estimates of the relationship between neighborhood traits and housing costs. An alternative to the PSID is the American Housing Survey (AHS). While the AHS does contain detailed dwelling information, it provides no data for areas smaller than counties. Thus, neighborhoods would have to be defined as counties, a choice that would likely introduce substantial noise into neighborhood-level measures and bias their estimates toward zero.

In an effort to determine the magnitude and direction of the bias created by controlling for just three dwelling characteristics, I examined data from the 1996 AHS. The AHS identifies residential dwelling units that are in the same "pseudo-tract." Pseudo-tracts are similar to census tracts, and on average contain 98 sample housing units (U.S. Bureau of the Census 1998). With pseudo-tracts as proxies for neighborhoods, I used the race of sample household heads to estimate neighborhood racial composition. Next, I estimated hedonic models, first with the PSID dwelling unit characteristics and then with an additional group of dwelling unit characteristics available in the AHS. This exercise suggests that controlling for the three PSID dwelling unit characteristics leads to estimates of neighborhood race effects that are biased by ±.04, a difference that is not statistically significant at conventional levels (tables available on request).

Table 1. Description of Variables Used in the Analysis: Panel Study of Income Dynamics and the 1980 U.S. Census

Variable	Mean	Standard Deviation	Description
PSID Measures			
Annual housing expenditure	$7,281	$5,800	Renters: "About how much rent do you pay a month?" Monthly rent was multiplied by 12. Owners: "Could you tell me what the present value of your home is—I mean about what would it bring if you sold it today?" These values were multiplied by a capitalization rate of .0785 and added to estimated annual property taxes. Annual housing expenditures are expressed in 1992 dollars.
Number of rooms	5.28	1.84	"How many rooms do you have (for your family), not counting bathrooms?"
Single-family house	.64	.48	"Do you live in a one-family house, a two-family house, an apartment, or what?" Respondents in one-family homes are coded 1, otherwise 0.
Homeowner	.61	.49	Coded 1 if the respondent is a homeowner, otherwise 0.
Northeast	.27	.44	Coded 1 for respondents in the Northeast, otherwise 0.
Midwest	.27	.44	Coded 1 for respondents in the Midwest, otherwise 0.
West	.22	.41	Coded 1 for respondents in the West, otherwise 0.
South	.24	.43	Coded 1 for respondents in the South, otherwise 0.
White	.82	.38	Coded 1 for non-Hispanic white household heads, otherwise 0.
Census Tract Measures, 1980			
Metropolitan area population	22.04	23.12	Metropolitan area population (in 100,000s) in 1980.
Percent black	12.90	26.43	Percent black in 1980 census tracts.
Percent affluent	27.63	17.07	Families reporting annual incomes greater than $30,000 ($51,142 in 1992 dollars).
Percent poor	11.10	10.31	Percent of residents in households with annual incomes below the poverty line.
Percent with no college	64.57	17.59	Percent of residents at least 25 years old who have no more than 12 years of schooling.
Percent unemployed	6.98	4.86	Percent of residents at least 16 years old who are in the civilian labor force and unemployed.

percent black. Four nonracial factors, all components of neighborhood socioeconomic status, are also considered: percent affluent, percent poor, percent with no college education, and percent unemployed.

Because of a concern that the effect of racial composition on desirability is a function of percent black (Galster 1990; Schelling 1971; Yinger 1979), I use dummy variables to measure neighborhood racial composition.[10] Each dummy variable represents a segment of the distribution of percent black. After considering several coding schemes, I divided the distribution into three segments: less than 10 percent black, 10 percent to 60

[10] I also considered splines and a quadratic term as methods of capturing nonlinear racial effects. Dummy variables fit the data better than did either alternative.

Table 2. Percentage Distribution of Census-Tract Percent Black and Mean Annual Housing Expenditure by Tenure and Region, 1980

Variable	Census-Tract Percent Black: Less than 10 Percent	10 to 60 Percent	At Least 60 Percent	Total
Total				
Unweighted N	2,213	634	1,301	4,148
Percentage (weighted)	78.49	11.55	9.95	99.99
Mean annual housing expenditure	$8,042	$5,325	$3,546	$7,281
By Tenure				
Renters:				
Unweighted N	829	374	913	2,116
Percentage (weighted)	68.61	16.24	15.15	100.00
Mean annual housing expenditure	$4,260	$3,676	$2,807	$3,945
Homeowners:				
Unweighted N	1,384	260	388	2,032
Percentage (weighted)	84.91	8.51	6.58	100.00
Mean annual housing expenditure	$10,025	$7,367	$4,649	$9,445
By Region				
Northeast:				
Unweighted N	528	110	113	751
Percentage (weighted)	82.56	11.72	5.72	100.00
Mean annual housing expenditure	$8,090	$4,837	$2,866	$7,410
Midwest:				
Unweighted N	586	106	343	1,035
Percentage (weighted)	80.24	7.48	12.28	100.00
Mean annual housing expenditure	$7,445	$4,899	$3,250	$6,740
West:				
Unweighted N	595	96	116	807
Percentage (weighted)	87.34	7.76	4.90	100.00
Mean annual housing expenditure	$9,473	$8,943	$4,130	$9,170
South:				
Unweighted N	504	322	729	1,555
Percentage (weighted)	64.15	19.28	16.57	100.00
Mean annual housing expenditure	$7,068	$4,542	$3,896	$6,055

percent black, and at least 60 percent black. These ranges are consistent with those used by other researchers (Chambers 1992; Kiel and Zabel 1996). Also, tests of other ranges of the percent black distribution produced none that fit the data significantly better. Table 2 presents the distribution of respondents across categories of percent black in the census tract.

RESULTS

The analysis proceeds in three parts. First, I assess the total effect of racial composition on annual housing expenditures by estimating a reduced model that includes all controls and independent variables, with the exception of the nonracial neighborhood traits. Second, I explore the racial proxy argument by adding nonracial factors to the reduced model and estimating the direct effect of racial composition on property values.[11] Third,

[11] This is not the true direct effect because crime, school quality, and other potentially important neighborhood traits are not included in the model. As a result, if any neighborhood race effect remains after controlling for neighborhood SES, I cannot definitively conclude that this is evidence of pure discrimination. Some or all of

Table 3. Unstandardized Coefficients from the Regression of Annualized Housing Expenditures on Selected Independent Variables: All Households, 1980

	Model 1		Model 2	
Independent Variable	Coefficient	S.E.	Coefficient	S.E.
Percent black:				
Between 10 and 60 percent	−.163**	(.040)	−.023	(.035)
At least 60 percent	−.460**	(.057)	−.093	(.059)
White household	.175**	(.042)	.060	(.038)
Percent affluent	—	—	.006**	(.001)
Percent poor	—	—	−.006**	(.002)
Percent with no college	—	—	−.006**	(.001)
Percent unemployed	—	—	−.009**	(.003)
Number of rooms	.158**	(.009)	.134**	(.009)
Single-family dwelling	.028	(.036)	.024	(.034)
Homeowner	.420**	(.036)	.411**	(.034)
Metropolitan area population	.005**	(.001)	.003**	(.001)
Northeast	−.019	(.035)	.078*	(.032)
Midwest	−.022	(.030)	.047	(.030)
West	.237**	(.032)	.262**	(.032)
Constant	7.286**	(.061)	7.832**	(.100)
Adjusted R^2	.49		.58	

*$p < .05$ **$p < .01$ (two-tailed tests)

I evaluate both models separately for rental, owner-occupied, and regional housing submarkets to ascertain whether the importance of racial and nonracial neighborhood traits varies by tenure or region.

Table 3 reports coefficients from the reduced model, Model 1, for all dwelling units. Racial composition is the only neighborhood trait included in the model.[12] Hedonic coefficients indicate that housing units lose about 16 percent of their value when neighborhood racial composition increases from less than 10 percent black to between 10 percent and 60 percent black. For the average dwelling, this is equivalent to a $1,187 reduction in annual costs. An even larger reduction in housing value is associated with moving from a neighborhood in which less than 10 percent of residents are black to one where at least 60 percent of the neighborhood is black. In this scenario, dwellings lose 46 percent of their annual value, which is equivalent to about a $3,351 reduction in annual housing costs for the average unit. These race effects are highly significant, both statistically and substantively, and are consistent with the observation that "property values drop when black families move in" (Farley et al. 1994:775).

Model 1 in Table 3 provides a strong affirmative response to the question, "Are housing prices affected by the proportion of local neighbors who are black?" However, it offers no evidence about why racial composition matters. To address the issue of motivation, I consider whether sensitivity to black neighbors can be explained by a desire to live in high SES neighborhoods. Model 2 in Table 3 assesses the effect of racial and non-

the surviving racial aversion may yet be a proxy for nonracial factors.

[12] In this and all subsequent equations, tracts less than 10 percent black are the omitted category. As a result, the two dummy variables for percent black indicate how much annual housing costs would change if the unit moved from one of the least integrated neighborhoods to an area with a higher concentration of black residents.

racial neighborhood traits on annual housing expenditures by including all predictors in one equation.[13]

Coefficients for the nonracial neighborhood traits indicate that these factors play an important part in determining property values. Each coefficient is in the hypothesized direction, and all are statistically significant. For each percentage-point increase in the percentage of affluent neighbors, annual housing costs increase by .63 percent. For the average home, the effect of a marginal increase in a neighborhood's percent affluent is a $46 annual increase in housing costs. Similarly, increases in the three low-status neighborhood measures lead to reductions in property values. The magnitude of these effects for percent poor, percent with no college, and percent unemployed is in the range of −.63 percent to −.88 percent, implying that the average home is worth between $46 and $64 less per year when neighborhood socioeconomic status experiences a marginal decline.

Model 2 in Table 3 also provides insight into why people avoid black neighbors. There is strong evidence that lower housing costs in more integrated neighborhoods are primarily a response to the neighborhood's socioeconomic status rather than the race of its residents. After controlling for neighborhood SES, there is no longer a significant relationship between racial composition and annual housing costs.[14] Compared to the reduced model, estimates based on this more complete model show at least an 86 percent reduction in the monetary consequences of integration. Evidence of a preference for high SES neighbors, combined with the lack of a significant net effect of percent black, provides strong support for the racial proxy hypothesis. Clearly, housing is more valuable in less integrated neighborhoods largely because people prefer well-educated, affluent neighbors, and each of these traits is more prevalent among whites than among blacks.

Submarkets

The results so far assume that the processes determining housing prices do not vary by region or tenure. There are at least four reasons why this assumption may be incorrect. First, there are consistent significant effects of tenure and region on annual housing costs. In the full model, people pay 41 percent more to own a home, and at least 8 percent more if their residence is located in the West or Northeast. Second, mean annual housing expenditures vary across tenure and regional subgroups (Table 2). Third, several recent studies find significant variation by region in whites' racial preferences (Clark 1991), the stability of integration (Lee and Wood 1991), and segregation levels (Farley and Frey 1994). Fourth, renters and owners do not have equal stakes in their neighborhoods. To an owner, a home is both a residence and an investment; to a renter, a home is a place to live. This difference means that, compared with renters, owners give greater weight to future property values when determining a dwelling's current value.

To allow trait prices to vary by tenure and region, I estimate the reduced and full models separately for renters, owners, and each of the four regions. Table 4 reports findings for regional submarkets. Model 1 excludes neighborhood SES. Consistent with research that reports lower levels of residential segregation in the West (Farley and Frey 1994), coefficients for racial composition in the reduced model are least negative in this region: Western housing loses no more than 33 percent of its value when located in neighborhoods that are more than 10 percent black. By contrast, reductions in annual costs are as much as 40 percent in the South, 52 percent in the Midwest, and 70 percent in the Northeast for dwellings located in neighborhoods that are more than 10 percent black.[15]

[13] An examination of correlation coefficients shows that while some relationships are strong, as high as ±.74, my findings do not result from multicollinearity. Standard errors for the percent black variables change little between the reduced and full models, and substantial reductions in neighborhood race effects can be obtained by controlling for only one nonracial trait at a time.

[14] An F-test supports the hypothesis that the racial composition coefficients jointly equal zero ($F_{2,4132} = 1.25$, $p = .29$).

[15] Only three race effects differ significantly between regions. They are between the Northeast and West, Midwest and West, and West and South for 10 percent to 60 percent black tracts.

Table 4. Unstandardized Coefficients from the Regression of Annualized Housing Expenditures on Selected Independent Variables, by Region, 1980

	Model 1		Model 2	
Independent Variable	Coefficient	S.E.	Coefficient	S.E.
Northeast				
Percent black:				
Between 10 and 60 percent	−.210*	(.092)	.010	(.084)
At least 60 percent	−.695**	(.189)	−.214	(.176)
White household	.113	(.129)	−.113	(.097)
Percent affluent	—	—	.011**	(.002)
Percent poor	—	—	−.006	(.005)
Percent with no college	—	—	−.004	(.002)
Percent unemployed	—	—	−.020*	(.009)
Adjusted R^2	.46		.59	
Midwest				
Percent black:				
Between 10 and 60 percent	−.193*	(.077)	−.114	(.068)
At least 60 percent	−.517**	(.119)	−.132	(.128)
White household	.145	(.100)	.074	(.098)
Percent affluent	—	—	.004*	(.002)
Percent poor	—	—	−.002	(.003)
Percent with no college	—	—	−.008**	(.002)
Percent unemployed	—	—	−.010	(.005)
Adjusted R^2	.51		.61	
West				
Percent black:				
Between 10 and 60 percent	.142	(.081)	.205**	(.067)
At least 60 percent	−.331**	(.094)	−.157	(.102)
White household	.241**	(.062)	.101	(.054)
Percent affluent	—	—	.008**	(.002)
Percent poor	—	—	−.007	(.004)
Percent with no college	—	—	−.005*	(.002)
Percent unemployed	—	—	−.001	(.007)
Adjusted R^2	.57		.65	
South				
Percent black:				
Between 10 and 60 percent	−.241**	(.062)	−.105	(.055)
At least 60 percent	−.399**	(.093)	−.020	(.098)
White household	.187**	(.069)	.140*	(.069)
Percent affluent	—	—	−.002	(.003)
Percent poor	—	—	−.012**	(.003)
Percent with no college	—	—	−.010**	(.002)
Percent unemployed	—	—	−.003	(.007)
Adjusted R^2	.44		.51	

Note: Models also include all controls, except controls for region.

*$p < .05$ **$p < .01$ (two-tailed tests)

Model 2 in Table 4 adds neighborhood SES variables to the previous equation to address the question of why aversion to blacks appears in regional models. As for the national sample, controlling for nonracial factors results in dramatic reductions in the neighborhood race effect: The full model shows no evidence of a significant aversion to black neighbors in any region.[16] Instead, neighbors' income, employment status, and educational attainment are the significant neighborhood-level determinants of property values in all regions. These results provide further support for the racial proxy hypothesis.[17]

Table 5 presents results separately for renters and homeowners. Model 1 reports a negative relationship between racial composition and prices in both submarkets. Three of the four neighborhood race coefficients are statistically significant, and the cost of integration is greater in neighborhoods with a heavier concentration of black residents. However, responses to racial composition are not comparable for renters and owners; they differ in the magnitude of the response to racial composition. The annual expense of rental property is only significantly lower when percent black exceeds 60 percent, in which case costs decline by 31 percent compared to similar units in tracts that are less than 10 percent black. By contrast, owner-occupied units lose between 22 percent and 59 percent of their value when the percentage of black neighbors exceeds 10 percent. This difference in sensitivity to racial composition, which is statistically significant in neighborhoods that are at least 60 percent black, supports the hypothesis that homeowners are more deeply invested in their homes than are renters.

Model 2 in Table 5 reports coefficients from the full model. Once again, tenure status affects neighborhood trait prices. Rental prices are sensitive to the local poverty rate and the percentage of residents who have not attended college. Neither percent affluent nor percent unemployed has a significant impact on the annual cost of rental housing. By contrast, purchase prices are significantly related to all neighborhood SES variables except percent poor. Model 2 also shows differences in why renters and owners pay more to live near relatively few blacks. For renters, the full model offers compelling evidence of racial proxies. After controlling for neighborhood SES, the effect of percent black on rental prices is small and not significantly different from zero. Support for the racial proxy hypothesis is inconsistent for homeowners. While each coefficient for percent black is about 65 percent less negative in the full model than in Model 1, racial composition continues to be a significant predictor of prices in neighborhoods that are at least 60 percent black. Homes located in these predominantly black areas, as opposed to neighborhoods that are less than 10 percent black, lose 21 percent of their annual value after controlling for neighborhood SES. This finding is consistent with the pure discrimination hypothesis and suggests that, possibly because of the sizable investment associated with owning a home, buyers in predominantly black neighborhoods are concerned about the race of their neighbors and not just their social class.

In failing to reject the pure discrimination hypothesis, results for owner-occupied units in predominantly black neighborhoods differ from those presented for the national housing market, rental and regional submarkets, and the remainder of the owner-occupied submarket. What proportion of these dwelling units are evaluated based on the race, per se, of local residents? Among the sample of 1980 housing units I have examined, only 4 percent are owner-occupied and located in tracts that are at least 60 percent black. Thus, although pure discrimination cannot be rejected as an accurate description of why racial composition affects prices in all neighborhoods, my analysis shows that for 96 per-

[16] After controlling for neighborhood SES, significant regional differences remain between the Midwest and West, and West and South for 10 percent to 60 percent black tracts.

[17] The significant positive coefficient for Western residences located in 10 percent to 60 percent black census tracts indicates either that there is a substantial taste for integration in this region, or that these neighborhoods contain unobserved amenities that cause prices to be higher than in less integrated areas. However, this result is not a "California effect." Although 56 percent of Western sample households are in California, controlling for California residence has little effect on the coefficients for percent black.

Table 5. Unstandardized Coefficients from the Regression of Annualized Housing Expenditures on Selected Independent Variables, by Tenure, 1980

	Model 1		Model 2	
Independent Variable	Coefficient	S.E.	Coefficient	S.E.
Renters				
Percent black:				
Between 10 and 60 percent	−.088	(.053)	.022	(.048)
At least 60 percent	−.311**	(.064)	−.004	(.072)
White household	.184**	(.052)	.061	(.050)
Percent affluent	—	—	.000	(.002)
Percent poor	—	—	−.010**	(.002)
Percent with no college	—	—	−.007**	(.001)
Percent unemployed	—	—	−.004	(.005)
Adjusted R^2	.18		.28	
Homeowners				
Percent black:				
Between 10 and 60 percent	−.219**	(.054)	−.075	(.048)
At least 60 percent	−.593**	(.090)	−.211*	(.084)
White household	.163**	(.059)	.076	(.053)
Percent affluent	—	—	.008**	(.001)
Percent poor	—	—	−.005	(.003)
Percent with no college	—	—	−.005**	(.001)
Percent unemployed	—	—	−.012**	(.004)
Adjusted R^2	.44		.56	

Note: Models also include all controls, except the control for tenure.
*$p < .05$ **$p < .01$ (two-tailed tests)

cent of housing units, price declines as neighborhood percent black increases because of neighbors' socioeconomic status, not their race.

CONCLUSIONS

I address two questions. Are housing prices lower in neighborhoods with high concentrations of black residents? If so, is this relationship evidence of pure discrimination or can it be explained by considering nonracial neighborhood traits? These questions derive their importance from the link between mobility patterns and racial residential segregation, and the subsequent relationship between high levels of residential segregation and myriad social problems (Cutler and Glaeser 1997; Massey and Denton 1993; Massey and Eggers 1990; Massey, Gross, and Eggers 1991; Massey et al. 1994). Moreover, determining whether the pure discrimination or racial proxy hypotheses best describes the relationship between racial composition and neighborhood desirability is imperative because the two explanations have disparate implications for integration policy.

Although previous work estimates aversion to black neighbors, few studies have explored the motivations for this bias. Instead, most work has focused on racial explanations and has failed to consider the racial proxy hypothesis. Much of previous work uses vignette, regression analysis, or transition matrix approaches, all of which have a limited ability to produce unbiased estimates of the effects of racial and nonracial neighborhood traits on neighborhood desirability. Instead, I have employed hedonic price analysis, a powerful tool for describing the relationship between prices and neighborhood composition under current housing market condi-

tions. This method also provides indirect information about whites, as their numerical superiority in most housing markets means that trait prices largely reflect whites' preferences.

My assessment of housing prices yields three main conclusions. First, with respect to the national market, property values do respond to racial composition. Housing loses at least 16 percent of its value when located in neighborhoods that are more than 10 percent black. This finding corroborates previous sociological research showing that whites, but also members of other racial and ethnic groups, prefer not to have black neighbors (Bobo and Zubrinsky 1996; Clark 1991, 1992; Farley et al. 1994; St. John and Bates 1990; Zubrinsky and Bobo 1996).

Second, for the nation as a whole, my work provides insight into how this observed aversion to black neighbors should be interpreted. I show that housing in neighborhoods with a high percentage of black residents is less valuable not because of an aversion to blacks per se, but rather because people prefer affluent, well-educated neighbors, and these traits are more common among whites than blacks. This finding strongly supports the racial proxy hypothesis. In addition, it begs reconsideration of previous work on the relationship between racial composition and neighborhood desirability. My work confirms Chambers's (1992) finding that estimates of the effect of neighborhood racial composition that do not control for nonracial factors are biased upward, and extends this conclusion beyond the Chicago context. Thus, much previous work probably overstates the effect of racial composition on neighborhood desirability.

Third, there are important submarket differences in the magnitude and motivations of price sensitivity to racial composition. Responsiveness to black neighbors is most extreme among homeowners and in regions outside the West. Homeowners require a 59 percent price reduction as compensation for living in a neighborhood that is at least 60 percent black. Aversion to blacks in the owner-occupied submarket is less clearly motivated by a preference for high SES neighbors. Even after controlling for nonracial neighborhood traits, owner-occupied units are still worth 21 percent less in neighborhoods that are at least 60 percent black than when they are located in predominantly white areas. Therefore, in contrast to the national sample, regional subsamples, and the rental subsample, results for a small segment of the owner-occupied submarket are consistent with the pure discrimination hypothesis. A synthesis of these conclusions is that "property values drop when black families move in" (Farley et al. 1994:775), but whether it is blacks' race or their class that determines property values depends on whether dwellings are rented or owner-occupied and the percentage of current residents that are black.

My work offers a cautiously optimistic message for integration policy. The conclusion that people generally avoid black neighbors for reasons that are related to social class bodes well for stable integration. When black residents and their neighbors have similar socioeconomic statuses, increasing levels of integration should have little effect on property values, and white flight should not ensue. However, my work also suggests that stable integration may not be an attainable goal in all contexts. If home prices in predominantly black neighborhoods are indeed responsive to racial composition, then integration may lead to racial succession in these areas.

My work identifies several clear directions for future research. To definitively conclude that either the racial proxy or pure discrimination hypotheses accurately describe the relationship between racial composition and neighborhood desirability, models must evaluate a broader range of neighborhood traits. Crime and school quality are two factors that might account for the residual effect of racial composition in the owner-occupied submarket. Also, prices may be responsive to changes in neighborhood traits, not just their levels. Unfortunately, data limitations prevented consideration of these factors, but an examination of additional static and dynamic neighborhood traits is planned. Future research also should address how members of various racial groups differ in their conceptions of the relationship between racial composition and neighborhood desirability. Even though the effect of neighborhood racial composition on housing prices is explained by social composition for most dwellings, aversion to blacks for racial rea-

sons may vary across racial groups. Finally, future work could extend the current analysis by broadening its conception of racial composition. As the nation's racial diversity increases, we need to understand not only the effect of black residents on neighborhood desirability, but the effects of Latino and Asian neighbors as well.

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