Now You See it, Now You Don't: Why Do Real Estate Agents Withhold Available Houses from Black Customers?

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Abstract

This paper develops a new approach to testing hypotheses about the causes of discrimination in housing sales. We follow previous research by using data from fair housing audits, a matched-pair technique for comparing the treatment of equally qualified black and white home buyers. Our contribution is to add precision by shifting the focus from differences in the treatment of teammates during an audit to agent decisions concerning an individual housing unit. Our sample consists of all units seen by either a black or a white auditor in the 1989 national Housing Discrimination Study. We estimate a multinomial logit model to explain a real estate agent's joint decisions concerning whether to show each unit to a white auditor and to a black auditor. We find evidence that real estate agents make and act upon inferences about a customer's preferences on the basis of the customer's initial inquiry and that agents practice redlining, defined as the withholding of units in integrated neighborhoods. We find little evidence to support the conclusion that agents discriminate because of their own prejudice, but some evidence that they discriminate because of the prejudice of their white customers. More importantly, we find strong evidence of statistical discrimination; agents withhold houses from blacks when agents' preconceptions indicate that the probability of a successful transaction is low.

Introduction

Many studies use fair housing audits to measure racial and ethnic discrimination in housing markets. Each audit compares the treatment of an African American or Hispanic home seeker with the treatment of an equally qualified white home seeker.[1] Discrimination is defined as unfavorable treatment based solely on a person's membership in a particular group; in a sample of audits, discrimination is systematic unfavorable treatment of minority auditors. This paper adds to the literature using audits from the 1989 national Housing Discrimination Study (HDS).

The audit methodology makes it possible not only to measure discrimination, but also to test hypotheses about the circumstances under which discrimination occurs. This paper tests hypotheses about the causes of discrimination with a new method that has advantages over those in other studies.[2] In particular, we use HDS information on the addresses of all the houses inspected by at least one auditor to shift the focus of the analysis from an audit to a housing unit. This shift enables us to determine the conditions under which a unit is withheld from the black auditor and leads us to striking new conclusions about the causes of discrimination. We find, unlike any previous study, strong evidence of statistical discrimination associated with real estate agents' preconceptions about black customers.

Most of the existing literature on discrimination in housing availability focuses on minority-white differences in the number of housing units recommended or shown to an auditor (Page 1995; Roychoudhury and Goodman 1992; Yinger 1986, 1995) or on discrete agent choices during an audit (Ondrich, Stricker, and Yinger 1998, 1999). In regressions to test hypotheses about the causes of discrimination, therefore, the dependent variable might be the number of

units recommended or shown and the explanatory variables include average characteristics, such as neighborhood racial composition, over the set of available units. These studies can only test hypotheses that are related to the characteristics of the advertised unit or to average characteristics of all units seen by either auditor.

Shifting the unit of analysis to an individual housing unit makes it possible to determine whether a real estate agent's decision to withhold a house from a minority customer depends on the characteristics of that particular house, and thereby adds new information for testing hypotheses about the causes of discrimination. This information includes whether the unit is the one that was advertised in the newspaper and was the basis of the audit; the physical characteristics of the unit, such as the number of bedrooms it contains; and the characteristics of that unit's neighborhood, such as its racial or ethnic composition.

The shift to a unit-based analysis also eliminates an endogeneity problem that arises in previous audit studies because a real estate agent's decisions simultaneously determine the number of units shown to a customer (a dependent variable in the old approach) and the characteristics of those units (explanatory variables); in our approach, an agent's decision to show a unit obviously cannot affect the characteristics of that unit. Moreover, our approach expands the sample size from the number of audits to the number of units shown to either auditor, thereby making it easier to separate the effects of different variables on an agent's showing decision.

Finally, the shift to a unit-based analysis sheds light on the extent to which real estate agents' tendency to show a housing unit to any customer, black or white, depends on the characteristics of the unit or its neighborhood. As a result, we are able to explore hypotheses about real estate agents' marketing behavior, such as whether they practice redlining, defined as

a tendency to withhold from all customers the units located in integrated neighborhoods. No previous study has examined this type of behavior.[3]

This paper is organized as follows. The first two sections describe the Housing Discrimination Study and explain our new approach to studying discrimination in general terms. The third section outlines hypotheses about the causes of discrimination and demonstrates how to test them with audit data. The fourth through sixth sections present our econometric procedure, our data, and our estimation results. The final section summarizes our key findings.

The Housing Discrimination Study

In the Housing Discrimination Study, each audit was conducted by two teammates, a white person and a member of a minority group. To ensure equal qualifications, teammates were matched according to sex and age, given the same training, assigned similar socioeconomic characteristics for the purposes of the audit, and sent to the same real estate agency within a short time of each other. After visiting an agency to inquire about the same advertised unit as well as similar available housing, teammates independently recorded what they were told and how they were treated.

The HDS audits were conducted in 25 metropolitan areas, selected to allow valid estimates of unfavorable treatment in the United States. Black-white audits were conducted in 20 areas and Hispanic-white audits were conducted in 13 areas (with both types of audits in 8 areas) during May through August, 1989. Both sales and rental audits were conducted. Each audit was based on audit teammates' inquiries about the availability of a housing unit mentioned in an advertisement randomly selected from the major metropolitan newspaper. Audit teammates were assigned incomes and family characteristics that made them qualified for this advertised unit. This paper is based on 1,081 black-white sales audits. Because of the HDS

sampling procedures, our results apply to discrimination that qualified black home seekers can expect to encounter when they inquire about housing that is advertised in a major newspaper. For more details on HDS, see Yinger (1995).

New federal anti-discrimination enforcement activities authorized by the 1988 Fair Housing Amendments Act have been implemented since the HDS data were collected, so these data may overstate the incidence of discrimination today. The available evidence does not support this possibility (see Yinger 1998). Even if discrimination has declined since 1989, however, there is no reason to believe that recent developments have altered the factors that lead housing agents to discriminate, which are the focus on this study. Moreover, no other data set comes close to HDS in terms of providing the information needed to test hypotheses about the causes of discrimination—particularly the information for a unit-based approach.

The Decision to Show a Housing Unit

Each HDS auditor recorded the address of every house or condominium that he or she inspected. We compared the addresses of housing units shown to the white and black teammates in a given audit to determine which units were shown to only one teammate and which units were shown to both.[4] Our sample consists of the 2,465 units—both advertised and other—shown to either teammate.

The real estate agents have access to available housing units both in their files or through a multiple listing service (MLS), and they must decide which units to show each customer. An audit study observes two decisions about each available unit: whether the agent shows it to the white customer and whether he shows it to the black customer. These two decisions result in four possible outcomes for each available housing unit and each audit team: the unit is shown to both customers, the unit is shown to the white customer only, the unit is shown to the black

customer only, and the unit is not shown to either customer. In a later section, we develop a multinomial logit model for analyzing these outcomes as a function of the (actual and assigned) characteristics of the auditor, the housing agency, the audit, and the housing unit, given that one outcome (the unit is not shown to either auditor) is never observed.

Hypotheses Tests Concerning Marketing

The shift to a unit-based data set opens the door to testing hypotheses about marketing behavior by real estate agents that does not involve discrimination. This type of test is possible because the unit-based data set involves two observations for each housing unit, one for each audit teammate, and it is possible to determine whether units are more likely to be shown to both teammates than to a single teammate, irrespective of race, under some circumstances.

Although this type of behavior does not involve discrimination on the basis of a customer's race, it has the potential to shed light on discrimination in two ways. First, it can reveal whether real estate agents respond to incentives that are not connected to the race of a customer. Any finding that they do so increases the plausibility of a finding that they respond to similar incentives directly related to a customer's race. Second, one kind of marketing behavior, redlining against houses in integrated areas, has a discriminatory dimension even though it applies equally to black and white customers. Our approach makes it possible to observe this type of behavior, which is illegal under the Fair Housing Act.[5]

Because little is known about marketing behavior by real estate agents, our strategy is to identify categories of variables that might influence this behavior, instead of attempting to develop hypotheses for each variable separately. We now turn to the five classes of variables we have identified along with the general hypotheses associated with each class. The last four sets of variables, along with the general hypothesis associated with them, are described in the first

column of Table 1. A detailed example of the definitions of these four sets of variables is presented in Table 2.

Auditor, Agent, and Audit Characteristics. This set of variables includes characteristics of the auditor, such as age and family structure; of the real estate agent, such as age, ethnicity, and sex; and of the real estate agency, such as its size (see Table 3). It also includes specific features of the audit, such as when and where it was conducted and whether the minority auditor went first or second. Including these variables makes it possible to test a variety of hypotheses about agent marketing behavior, such as whether male or female agents market housing more aggressively.

Characteristics of the Unit Being Shown. This set of variables describes the housing unit that defines the observation and its neighborhood (see Table 4). Including these variables leads to tests of the general hypothesis that agents are more likely to market some types of units than others. For example, an agent might be more eager to market a unit located closer to his office because less time is required to get there. In addition, variables describing the racial composition of the neighborhood make it possible to test for redlining, which exists if agents are more likely to market units in white than in integrated neighborhoods. This type of redlining could occur because agents believe that lenders and home insurance companies practice redlining against these neighborhoods (see Schill and Wachter 1993) and want to avoid wasting time showing houses that are unlikely to sell. This neighborhood-discrimination hypothesis is supported by Galster, Freiberg, and Houk (1987), Newburger (1995), and Turner (1992), who find that houses located in minority neighborhoods are less likely than houses in white neighborhoods to be advertised in the newspaper or marketed through an open house.

Characteristics of the Advertised Unit. This set of variables describes the housing unit that is the basis for the audit—the one that the auditors inquire about when they arrive at the

agent's office. The variables are defined in Table 4, but the values now refer to the advertised unit associated with a given housing unit, not the housing unit itself.[6] Including these variables in the estimation makes it possible to test the general hypothesis that an agent's behavior is influenced by the nature of a customer's request. If so, the characteristics of the advertised unit, such as whether it is located in an integrated neighborhood, may affect the probability that other available houses are shown.

Characteristics of the Unit Being Shown When it is the Advertised Unit. These variables are also defined in Table 4, but their value is zero unless the unit actually is the advertised unit. The inclusion of these variables leads to tests of the general hypothesis that the advertised (i.e., requested) unit is marketed in a different way from other available units (which may or may not have been advertised). Statistical significance for variables in this category indicates that an agent's marketing behavior is different when it involves a unit that the agent has advertised and the customer has identified. Units with these traits might be marketed differently because (a) an agent only advertises units he is eager (or uneager—the sign could go either way) to market, (b) an agent's marketing behavior is different when he is aware that a customer already knows that a unit is up for sale, or (c) an agent infers that the unit initially requested, that is, the advertised unit, best meets the customer's preferences and therefore should be marketed particularly vigorously, at least to that customer.

Variables to Describe the Match between the Unit Being Shown and the Advertised Unit. These variables compare each characteristic (defined in Table 4) of the unit that defines an observation with the same characteristic for the advertised unit. Their inclusion in the estimation makes it possible to test another dimension of the **inferred-preferences** hypothesis in the previous paragraph, namely, whether agents make inferences about a customer's preferences on the basis of the initial request and are therefore less likely to show units that differ from the

advertised unit. For example, an agent might be less likely to show a unit with an asking price far above or far below that of the advertised unit. To test for this, we include one variable to measure the difference between the price of the unit and of the advertised unit if this difference is positive and another to measure this difference if it is negative. In the case of qualitative variables, we simply multiply the variable for the unit being shown by the variable for the advertised unit.

An agent may also interpret the neighborhood in which the advertised unit is located as an indication of the auditor's neighborhood preferences. The HDS auditors were instructed not to explicitly reveal any neighborhood preferences. Nevertheless, real estate agents may make inferences about neighborhood preferences on the basis of an auditor's initial request. Now suppose agents believe they can save themselves time by following these inferences. If a customer, black or white, requests a unit in an integrated area, then, according to this argument, an agent will be more likely to show him other units in integrated neighborhoods. In other words, this inferred-preference hypothesis predicts that both blacks and whites will be more likely to be shown a unit located in the type of neighborhood (white or integrated) that matches the neighborhood of the advertised unit than a unit located in another type of neighborhood.

Finally, in an effort to conserve their time, agents may tend not to show units that greatly increase the distance they must drive. To test this hypothesis, we include the distance between a unit and the advertised unit.

Established Hypotheses Tests Concerning Discrimination

Existing audit studies test hypotheses about the causes of discrimination by determining whether differences in treatment between minority and white auditors are associated with auditor, agent, or audit characteristics, such as those in Table 3. See Galster (1990b), Ondrich, Stricker, and Yinger (1998, 1999), or Yinger (1995) for a review. In this section, we review

hypotheses in the literature and present additional hypothesis tests made possible by a unit-based data set.

The **agent-prejudice hypothesis**, which is based on Becker (1971), states that housing agents discriminate because of their own personal prejudice. It can be tested by determining whether discrimination is influenced by variables correlated with prejudice. One can ask, for example, whether discrimination is influenced by the ethnic group of the real estate agent. Black agents are presumably less prejudiced against black customers than are white agents, on average, so a finding that black agents are less likely to discriminate supports this hypothesis. Another test of the agent-prejudice hypothesis is based on the assumption that one can make inferences about an agent's prejudice by the houses he accepts as listings. This assumption leads to the prediction that an agent who advertises a listing in a black or integrated neighborhood, where some of his customers are more likely to be black or Hispanic, will be less likely to discriminate.

The **customer-prejudice hypothesis** says that housing agents discriminate to protect their actual or potential business with prejudiced white customers.[7] Agents who work in a largely white area (as indicated by the location of their office or of the advertised unit) are more likely to discriminate, therefore, than are agents who work in minority neighborhoods. Moreover, this hypothesis indicates that discrimination may be particularly high in integrated neighborhoods where the introduction of a few minority households could result in tipping, and thereby drive away the agent's existing contacts. This hypothesis also suggests that larger real estate agencies, which have a broader customer base, are less likely to discriminate than smaller agencies, which may depend on obtaining customers from particular neighborhoods. A finding that larger agencies are less likely to discriminate is also consistent with the hypothesis that they devote more resources to fair-housing education, either because of economies of scale in such training or because their visibility makes them more likely targets of discrimination suits.

A final hypothesis is that real estate agents practice **statistical discrimination**. This type of discrimination is well known for employment (Arrow 1972; Cain 1986; Phelps 1972) and lending (Ladd 1998; Yinger 1995) but not for the marketing of houses. In general, statistical discrimination is said to exist if an economic agent treats people in different groups differently because the agent believes that (a) it is profitable to base treatment on some unobserved characteristic and (b) this characteristic differs across groups.[8] These beliefs might be accurate, in which case statistical discrimination is profitable (but still illegal) or it might be based on an inaccurate stereotype, and therefore lead to unprofitable behavior.[9] An application of this concept to housing can be found in Yinger (1995), who finds evidence to support the view that landlords are reluctant to rent to single black women because of the stereotype that these women are often on welfare.

Several authors have proposed an explanation for discrimination, sometimes called the "perceived preference" hypothesis, that is equivalent to statistical discrimination, but this equivalence is not widely recognized (see Yinger 1998). The perceived preference hypothesis says that real estate agents have preconceptions about the types of neighborhoods that people in different groups prefer and, to save themselves time and trouble, steer each customer toward the neighborhoods that fit these preconceptions. We will pursue this type of hypothesis below, but with increased precision that comes from our ability to focus on individual housing units.

Hypotheses Tests About Discrimination with a Sample of Units

The structure of our unit-based data set creates new opportunities to test these hypotheses by interacting the race of the auditor with the four types of housing characteristics defined earlier. The general hypotheses about discrimination associated with these four types of variables are summarized in the second column of Table 1.

Characteristics of the Unit Being Shown Interacted with Auditor Race. Including these variables lead to tests of the general hypothesis that units with certain characteristics or in certain neighborhoods are more likely than other units to be withheld from black customers. This general hypothesis could be associated with more than one underlying behavioral hypothesis. For example, the customer-prejudice hypothesis implies that to prevent tipping discrimination could be relatively high for units located in an integrated neighborhood.

Statistical discrimination also might be linked to unit or neighborhood characteristics. Real estate agents might believe, for example, that all households prefer to live with members of their own race and that a housing transaction is unlikely to be completed when a black customer is matched to a white neighborhood or a white customer is matched to a black or integrated neighborhood. This belief might even dominate the neighborhood preferences that can be inferred from an auditor's initial housing request. This statistical discrimination based on preconceived preferences predicts that blacks are more likely to encounter discrimination when a housing unit is in a white area than when it is in a black or integrated area, a different prediction from that of the customer-prejudice hypothesis.[10]

Real estate agents may also believe that lenders are unwilling to approve a mortgage (or insurance companies to provide home insurance) when the race or ethnicity of a customer does not match that of the neighborhood where the relevant house is located.[11] Because a transaction cannot proceed without a mortgage (and home insurance), agents may want to avoid investing time showing houses where the race or ethnicity of the customer and neighborhood do not match. This statistical discrimination based on expected lender behavior has exactly the same prediction about discrimination across neighborhoods as does the previous type.

Another type of statistical discrimination is linked to the price of a unit. In particular, real estate agents may assume that black customers are unlikely to be qualified for a relatively

expensive house; despite the fact that audit teammates are equally qualified, therefore, agents' doubts about black customers' qualifications rise with the price of a unit.[12] To avoid wasting their time on unlikely matches, therefore, the tendency of agents to withhold a unit from black customers increases with unit price. This statistical discrimination based on preconceived purchasing power predicts, in other words, that discrimination will be higher for more expensive units.

Characteristics of the Advertised Unit Interacted with Auditor Race. Including these variables leads to tests of the general hypothesis that discrimination depends on the nature of the black customer's initial request. For example, the customer-prejudice hypothesis suggests that agents may want to work with black customers who reveal, through their initial request, a willingness to move into a neighborhood undergoing racial transition, but may not want to work with black customers who reveal a preference for a stable integrated area.

Characteristics of the Unit Being Shown When it is the Advertised Unit Interacted with Auditor Race. The general hypothesis associated with these variables is that the factors influencing discrimination are different for advertised units than for other units. The agent-prejudice hypothesis suggests, for example, that the advertised unit might be more likely than other units to be withheld from a black customer because it is a desirable unit that does not fit agents' stereotypes of blacks. In contrast, the customer-prejudice hypothesis suggests the opposite; units that the agent wants to reserve for white customers are not advertised.

Variables to Describe the Match between the Unit Itself and the Advertised Unit Interacted with Race. Including these variables makes it possible to examine the general hypothesis that inferences about a customer's preferences based on his or her initial request are, because of agent's preconceptions, treated differently depending on whether the customer is black or white. A request to see a unit in an expensive neighborhood, for example, might be

accepted as an indication of neighborhood preferences for a white customer but rejected for a black customer because of a preconception about the types of neighborhoods blacks prefer. Acting on such a belief, that is, refusing to show houses in expensive neighborhoods to blacks even when they are requested, is a form of statistical discrimination.

Estimation Technique

A sales audit involves two visits to a real estate agency and has two critical properties. First, even after controlling for observable variables, the outcomes for the two visits are not independent because the auditors are paired on unrecorded characteristics, receive similar training, are sent to the same real estate agency at about the same time, and are instructed to inquire about the same advertised unit. Second, for every relevant unit that is available in that agency, four outcomes are possible: the unit is shown to both auditors, the unit is shown to the white auditor only, the unit is shown to the black auditor only, or the unit is not shown to either auditor. A unit can appear in our sample only if it falls into one of the first three cases, so we face a selection bias in the sample of observed units.[13]

To solve the selection bias problem, we must condition the sample space on units being shown to at least one auditor. Our approach is built on the Independence of Irrelevant Alternatives (IIA) property of the multinomial logit model. This property states that the ratio of probabilities (relative odds) of any two outcomes does not depend on the presence or characteristics of a third outcome in the set of outcomes. The IIA property of the multinomial logit model follows from the assumption that the disturbance terms in the stochastic "utility" functions for the outcomes of each housing unit are statistically independent (see Boersch-Supan, 1987). This assumption is implausible without controlling for the first property, that is, for omitted variables that are common to all units within a given audit.[14] Once the IIA property has

been used to adjust sample probabilities for the included outcomes, we treat the unobserved audit-specific effects as random effects and thereby remove them from the analysis. These steps lead to a model in which distinct housing units represent statistically independent observations conditional on observed unit, agency, and auditor characteristics, as well as unobserved audit-level effects.[15]

The starting point of the econometric analysis is the construction of two indicator variables, Y_W and Y_B, for each unit that the agency has available. Y_W (Y_B) equals one if the unit is shown to the white (black) auditor. Conditional on relevant covariates and an unobserved audit-specific effect for each auditor, the probabilities of a unit being shown take the simple binary logit form:

$$
\begin{aligned}
P(Y_W = 1 \mid Z_W, Z_B, \theta_W, \theta_B) &= P(Y_W = 1 \mid Z_W, \theta_W) \\
&= \exp\{\theta_W + Z_W'\beta\} / \left(\exp\{\theta_W + Z_W'\beta\} + 1 \right) \\
P(Y_B = 1 \mid Z_W, Z_B, \theta_W, \theta_B) &= P(Y_B = 1 \mid Z_B, \theta_B) \\
&= \exp\{\theta_B + Z_B'(\beta + \delta)\} / \left(\exp\{\theta_B + Z_B'(\beta + \delta)\} + 1 \right),
\end{aligned}
\tag{1}
$$

where Z_W (Z_B) is a column vector of observed characteristics of the white (black) auditor and her visit, the unit itself, the advertised unit, and the real estate agent and agency; β is the vector of coefficients associated with Z_W; δ gives the difference in the coefficient vectors of blacks and whites; and θ_W (θ_B) is the unobserved effect for the white (black) auditor.

Conditional on Z_W, Z_B, θ_W, and θ_B, the random variables Y_W and Y_B for each unit are assumed to be statistically independent. The probabilities for the four possible joint events are:

$$
\begin{aligned}
P(Y_W = 1, Y_B = 1 \,|\, Z_W, Z_B, \theta_W, \theta_B) &= \exp\left\{\theta_W + Z_W'\beta + \theta_B + Z_B'(\beta+\delta)\right\}/D \\
P(Y_W = 1, Y_B = 1 \,|\, Z_W, Z_B, \theta_W, \theta_B) &= \exp\left\{\theta_W + Z_W'\beta\right\}/D \\
P(Y_W = 0, Y_B = 1 \,|\, Z_W, Z_B, \theta_W, \theta_B) &= \exp\left\{\theta_B + Z_B'(\beta+\delta)\right\}/D \\
P(Y_W = 0, Y_B = 0 \,|\, Z_W, Z_B, \theta_W, \theta_B) &= 1/D,
\end{aligned}
\tag{2}
$$

where

$$
D = \exp\left\{\theta_W + Z_W'\beta + \theta_B + Z_B'(\beta+\delta)\right\} + \exp\left\{\theta_W + Z_W'\beta\right\} + \exp\left\{\theta_B + Z_B'(\beta+\delta)\right\} + 1. \tag{3}
$$

Equations (2) and (3) define a four-choice multinomial logit model of real estate agent behavior for each unit available to the agent.

This four-choice multinomial logit model cannot be estimated in the usual manner because no units for which the agent chooses the fourth outcome in (2), namely $(Y_W = 0, Y_B = 0)$ appear in the data set. Therefore, it is necessary to adjust the first three probabilities in (2) for the sample selection criterion. Letting S be the indicator for sample selection, the sample selection probability is given by

$$
P(S = 1 \,|\, Z_W, Z_B, \theta_W, \theta_B) = 1 - P(Y_W = 0, Y_B = 0 \,|\, Z_W, Z_B, \theta_W, \theta_B) = (D-1)/D. \tag{4}
$$

Conditional on $S = 1$, joint probabilities for the three outcomes observed in the data are:

$$
\begin{aligned}
P(Y_W = 1, Y_B = 1 \,|\, S = 1, Z_W, Z_B, \theta_W, \theta_B) &= \exp\left\{\theta_W + Z_W'\beta + \theta_B + Z_B'(\beta+\delta)\right\}/(D-1) \\
P(Y_W = 1, Y_B = 0 \,|\, S = 1, Z_W, Z_B, \theta_W, \theta_B) &= \exp\left\{\theta_W + Z_W'\beta\right\}/(D-1) \\
P(Y_W = 0, Y_B = 1 \,|\, S = 1, Z_W, Z_B, \theta_W, \theta_B) &= \exp\left\{\theta_B + Z_B'(\beta+\delta)\right\}/(D-1).
\end{aligned}
\tag{5}
$$

Equation (5) defines a three-choice multinomial logit model. Because the random effects are unobserved, the conditional probabilities in a standard likelihood function cannot be evaluated for given values of the parameters. Accordingly, the pair (θ_W, θ_B) is integrated out of the

likelihood function over their joint distribution using the Heckman-Singer (1984) nonparametric mixing distribution.[16] This logit model leads to estimates for β and δ.

Data

Our HDS unit-based data set is described in Tables 3 and 4, which presents means and standard deviations for all variables except location and time dummies. The neighborhood data in Table 4 is based on the 1990 Census, which was neither available for the HDS reports nor used for any previous research based on HDS data.[17] This table reveals, for example, that the average asking price was $137,805, that 45.0 percent of the units were advertised units, and that 17.9 percent of the units were in integrated neighborhoods. We define an integrated neighborhood as a census tract with a population more than 15 percent black. This may seem like a low percentage for such a dividing line, but few houses in the HDS data set are located in neighborhoods that are heavily integrated or predominantly black (see Turner and Mickelsons 1992).[18] Moreover, as shown below, the 15 percent dividing line has explanatory power.

Estimates of the incidence of discrimination are presented in Tables 5 through 7. These tables also provide hints about the variables that might influence when discrimination takes place. Formal, multivariate hypothesis tests are presented below. Each table contains five columns of sample statistics. The first column gives the number of observations in the relevant subsample. The second column indicates the probability that a unit is shown to both the white and black auditor. This probability, along with all other probabilities in these tables, is weighted to account for the HDS sampling plan (see Urban Institute 1991). The third column indicates the probability that a unit is shown to the white but not the black auditor, which is the probability that the white is favored, and the fourth column shows the probability that the black is favored.

The difference between columns (3) and (4) is called the net incidence of adverse treatment, which is widely used as a measure of discrimination.[19]

Panel A of Table 5 shows that the net incidence of adverse treatment for the entire sample is 12.6 percent. The other panels reveal that this net incidence is by no means the same under all circumstances. Table 6 examines differences in adverse treatment based on a unit's neighborhood characteristics. This table does not reveal any clear patterns. Somewhat surprisingly, for example, net incidence is not much different in white and integrated neighborhoods. Table 7 investigates whether adverse treatment depends on the match between the unit being shown and the advertised unit. The closeness of the match appears to matter. For example, net adverse treatment is high for units that are more expensive (panel A) or in more expensive neighborhoods (panel B) than the advertised unit.

Estimation Results

We estimate three versions of our multivariate model, one with all the variables defined earlier, one that leaves out the variables interacting characteristics of the unit being shown and of the advertised unit, and one that leave out the variables involving characteristics of the advertised unit when it is the unit being shown. The appropriate likelihood-ratio tests lead us to reject, at the 1 percent level, both restricted models in favor of the complete one.[20] In other words, advertised units are treated differently than other units, and housing agents do appear to make inferences about a customer's preferences on the basis of his or her initial request.

Results for the complete model are presented in Tables 8, 9, and 10. Table 8 contains multinomial logit coefficient estimates for auditor, agent, and audit characteristics. Tables 9 and 10 focus on the estimates for housing unit characteristics. Table 9 presents the coefficient estimates for white auditors (β_W) and Table 10 presents estimates of the difference between the

coefficients for white and black auditors (δ_{WB}). In the first column of Tables 8 and 9, a negative coefficient implies that an increase in the variable decreases the likelihood that the auditor is shown a unit; in the second column of Table 8 and in Table 10, a negative coefficient implies that an increase in the variable increases the probability that a black auditor will encounter discrimination.

Results Concerning Agent Marketing and Redlining

The results in the first column of Table 8 and Table 9 explore the determinants of agent marketing behavior. Table 8 reveals that, with one notable exception, agents' marketing behavior is not significantly tied to auditor, agent, or audit characteristics. The exception is that a unit is more likely to be shown if both auditors saw the same agent (row 11, first column). This result simply reflects differences across agents in the propensity to show any particular unit.

One striking implication of Table 9 is that real estate agents first make inferences about a customer's preferences on the basis of his or her initial housing request and then, presumably to maximize the probability of a match, concentrate on showing units most consistent with those inferences. Five sets of findings support this view. First, advertised units are far more likely to be shown than other units (row 1, first column). This finding suggests that agents are particularly willing to show a unit when a customer has expressed both an interest in it and a knowledge that it is for sale. To some degree, this finding, unlike those that follow, may also reflect the possibility that agents advertise the units they are most willing to show to many customers.

Second, agents are less likely to show a unit that has either more or fewer bedrooms than the advertised unit (row 3, third and fourth columns) or that is in a neighborhood with more or less old housing than the neighborhood in which the advertised unit is located (row 5, third and fourth columns). Agents are also less likely to show units in neighborhoods that have a higher

average value than the advertised unit's neighborhood (row 4, third column), but this result is only significant at the 10 percent level. Apparently, agents do not want to waste their time showing units that do not match a customer's (inferred) preferences, so the more an available unit deviates from a customer's initial request, the less likely the customer will see it.

Third, a real estate agent's propensity to show a unit increases with the advertised unit's asking price (row 2, second column), unless the unit is the advertised unit (row 2, fifth column, significant at the 10 percent level). The first of these results could reflect the fact that an agents' commission, and hence his incentive to make a sale, is proportional to the price of the house. The second result indicates that this incentive to increase marketing effort as asking price increases is offset by the incentive to increase marketing effort on units that match the customer's inferred preferences, which of course the advertised unit does by definition.

Fourth, agents are less likely to show a house that is new instead of old, particularly if it is the advertised unit (row 7, first and last columns); however, new houses other than the advertised unit are no less likely to be shown if the customer asked to see an advertised unit that is new (row 7, third column, significant at the 10 percent level).[21] Again, the results in the first and last columns say nothing about inferred preferences. Instead, they suggest that new houses are often in a development containing similar units and that agents tend to show only some units, which could be model units or simply the most convenient units, and therefore are less likely to show any particular new unit, even the advertised one. Whatever the interpretation of these results, however, the result in the third column shows inferred preferences at work; when a customer inquires about a new unit, other new units, not just model units or convenient units, are shown at the same rate as are older units.

Fifth, inferred preferences, along with some signs of redlining, show up in the marketing efforts for units located in central cities and in integrated neighborhoods. Agents tend not to

show units in integrated neighborhoods (row 10, first column), but this redlining does not occur when the agent can infer from the auditor's request that the auditor prefers such a location (row 10, third column). In the case of advertised units, agents also practice redlining against white neighborhoods that are close to integrated neighborhoods (row 11, fifth column). Table 9 also reveals that agents are less likely to show central city units when the advertised unit is in the central city (row 9, third column), but this effect is weaker for the advertised unit itself (row 9, fifth column). Finally, redlining against integrated neighborhoods appears to be less likely in the central city than in the suburbs (row 14, first column).

To provide more insight into these complex relationships, Tables 11 and 12 sum the relevant coefficients to show net effects for advertised and non-advertised units in various neighborhood situations compared to units in white, suburban neighborhoods.[22] These tables also present t-statistics and the number of observations in each cell. Table 11 shows that advertised units are about evenly split between central cities and suburbs, but are more likely to be located in white than in integrated areas. The coefficients suggest that advertised units are marketed less strenuously if they are in the central city or in an integrated neighborhood, but only the effect for suburban integrated neighborhoods is statistically significant (at the 10 percent level). Although this result is not highly significant, it is striking to find evidence that agents are likely to steer a customer away from a unit in an integrated neighborhood even when she explicitly asks to see it.

Table 12 provides corresponding results for non-advertised units. This table is more complicated than Table 11 because outcomes for non-advertised units depend on outcomes for the advertised unit. Three results stand out in this table. First, the table confirms the role of inferred preferences concerning integrated neighborhoods.[23] In every case, the probability that a unit will be shown is higher if it is in the same type of neighborhood, white or integrated, as the

advertised unit. Specifically, the entries in the first row (both units in integrated areas) are always larger than the corresponding entries in the second row (only the inspected unit in an integrated area) and the entries in the fourth row (both units in white areas) are always larger than the corresponding entries in the third row (only the inspected unit in a white area).

Second, Table 12 strengthens the conclusion that agents practice redlining against suburban, integrated neighborhoods. The strongest result, in the last column of the first row, indicates that auditors are significantly less likely to be shown units in integrated than in white neighborhoods even if they inquire about just such a unit. The coefficients in the last two columns of the second row are also negative and significant (one at only the 10 percent level); these results could reflect either inferred preferences or redlining. Combined with the results of Galster, Freiberg, and Houk (1987), Newburger (1995) and Turner (1992), these results show that the impact of redlining is cumulative; not only do agents tend not to advertise units in integrated neighborhoods, but even when they do advertise such a unit, they tend not to show other available units in integrated neighborhoods to any customer, black or white.

Third, the results in Table 12 confirm that, contrary to the prediction of inferred preferences, a non-advertised unit in the central city is less likely to be shown when the advertised unit is in the central city than when it is in the suburbs. In fact, the entries in the second column are all statistically indistinguishable from zero, whereas three of the entries in the first column are negative and significant.[24] The negative, significant coefficients in the last row of the first column provide evidence of redlining against central city neighborhoods; even when a customer inquires about a unit in a white neighborhood in the central city, she is unlikely to be shown other units in such neighborhoods. This type of redlining, which is not illegal, could arise if agents believe central city neighborhoods, unlike suburban ones, are very different from each other and interpret an auditor's initial query as a preference for the particular neighborhood in

which the advertised unit is located, not for the central city in general. In this case, other central city units are unlikely to be in the same or similar neighborhoods and therefore are relatively unlikely to be shown.

Given the small sample sizes involved, the results in the second and third columns of Table 12 should be interpreted with caution. However, one possible explanation is consistent with the existence of inferred preferences. Because almost no central city units are shown to either auditor when the initial request involves a unit in the suburbs, the central city units that are shown may have unobserved features that make them similar enough to the customer's request to be worth showing;[25] in fact, judging from the small, insignificant coefficients in the second column, these units are just as worth showing as units in white suburbs, the omitted category. Thus, these coefficient estimates may reflect the impact of the unobserved features, not the impact of inferred preferences. Ironically, therefore, agents' decisions to withhold units in response to inferred preferences may make it impossible for us to observe other responses to inferred preferences with our data. This same phenomenon could explain why the coefficients in the third column are not significantly different from those in the fourth column.

Results Concerning Discrimination

Results concerning discrimination can be found in the second column of Table 8 and Table 10. Only two of the results in Table 8 are statistically significant. First, black auditors encountered less discrimination if their assigned audit identity was to be married rather than single (row 2, second column). This result should not be given much weight, however, because over 90 percent of the auditors played the role of a spouse (see Table 2) and it is consistent with all three main hypotheses about discrimination.[26] Second, large firms, as identified by the maximum number of people encountered by either auditor, are less likely to discriminate than are small firms (row 10, second column). This result supports the customer-prejudice

hypothesis, which says that smaller firms are particularly concerned about losing business from prejudiced whites in the community where they operate. It also is consistent with the possibility that larger firms invest more in fair housing education.

Table 8 provides extensive evidence that the marketing behavior of real estate agents is not the same for black and white customers. First, agents' marketing efforts increase with asking price for whites (Table 7, row 2, second column) but not for blacks (Table 8, row 2, second column). This difference is smaller, but still exists, for the advertised unit (see row 2, fifth column, significant at the 10 percent level). We interpret these results as an indication that real estate agents practice statistical discrimination based on a preconception about the ability of black customers to purchase expensive homes. Agents appear to believe that the higher the price range, the less likely it is that a black customer will be able to complete a transaction; to avoid wasting time on unlikely transactions, therefore, agents are reluctant to show high-priced units to blacks.

This preconception could take the form of a belief that black customers, unlike white customers, are unlikely to be qualified for expensive houses, even if they explicitly ask to see them, or a belief that the more expensive the housing, the more likely it is that blacks will encounter discrimination from lenders.[27] Moreover, this preconception might accurately reflect an agent's past experience with black customers, or it might draw on general societal stereotypes and have no predictive power at all. In either case, acting on the basis of this preconception, as agents appear to do, constitutes statistical discrimination because it involves using a perceived average trait for a group to predict an outcome for an individual member of that group.[28] This preconception also appears to be so strong that it is not offset by the information in a customer's initial housing request. Discrimination increases with asking price even for the advertised unit, although as noted above the effect is smaller than in the case of other units.[29]

Second, for blacks, but not for whites, a unit is more likely to be shown if its value is below that of the advertised unit (row 2, fourth column). This result suggests that real estate agents expect blacks, but not whites, to request more expensive units than they can afford.[30] Acting on this preconception, that is, offsetting the inferred preferences of black customers concerning housing price, is another case of statistical discrimination.

Third, Table 10 reveals that agents increase their marketing efforts for blacks if a unit is in a neighborhood that has an average house value below (row 4, fourth column) or has less old housing than (row 5, fourth column) the advertised unit's neighborhood. The simplest explanation for these results is that agents act on the basis of preconceptions about the types of housing and neighborhood that blacks prefer. In particular, agents appear willing to offset, for blacks but not for whites, the neighborhood preferences that can be inferred from the neighborhood in which the advertised unit is located. Recall that housing price is held constant in our regressions. As a result, agents are acting as if they believe that blacks would be willing to save money by living in a neighborhood with low average values or by avoiding established neighborhoods in exchange for some other housing or neighborhood characteristics of equal value—despite the contrary information in their initial request.

An alternative explanation for the results in rows 4 and 5 is that real estate agents steer blacks toward neighborhoods that are less desirable and less established, presumably, following the customer-prejudice hypothesis, to avoid the nicer, more established neighborhoods where the agents conduct most of their business. The results in row 4 indicate that blacks are steered toward neighborhoods that are less desirable, as measured by average house value. The results in row 5 indicate that blacks are steered toward neighborhoods with less old housing, controlling for average value. At a given price level, neighborhoods with less old housing are likely to be

less established than others and could even be new developments where real estate agents have few contacts. Our data do not allow us to determine which of these two explanations is correct.

Fourth, the results in the row 8 of Table 10 provide more evidence that real estate agents' preconceptions about blacks influence their inferences about black customers' preferences. In particular, agents are more likely to show a non-advertised unit to blacks if both it and the advertised unit have some problems (row 8, third and fifth columns).[31] Agents do not go out of their way to show units with problems to blacks, but they are more likely to show these units to blacks when the initial request indicates a willingness to consider a house with some problems. This type of request has no impact on the treatment of a white auditor (see Table 9), but it appears to confirm agents' stereotypes about black customers and therefore leads agents' to show other units with problems to blacks. Thus, this result provides further evidence of statistical discrimination, as agents treat blacks and whites differently based on preconceptions about what customers from different racial groups prefer.

Fifth, Table 10 also indicates that redlining against suburban integrated neighborhoods does not occur as often when the customer is black (row 10, column 1). In central cities, however, units in integrated neighborhoods, which do not face significant redlining (see Table 12), are less likely to be shown to blacks than to whites (row 14, first column).[32] These results are consistent with the customer-prejudice hypothesis, which says that discrimination may be higher in integrated areas threatened with tipping, arguably those central cities, and lower in more stable integrated areas, arguably those in suburbs. The central city/suburb distinction may not accurately identify integrated areas threatened with tipping. It seems reasonable to suppose, however, that agents concerned about tipping will not advertise units in neighborhoods where tipping is likely; after all, it is more difficult to discriminate once a unit has been announced in the newspaper. It follows that neighborhoods threatened with tipping, and the associated higher

discrimination, will be observed only for non-advertised units, which is exactly the pattern in Table 10, although the lower effect for advertised units is not quite significant at the 10 percent level (row 14, fifth column).

One additional result in Table 10 is intriguing, but only significant at the 10 percent level. In particular, the farther a unit from the agent's office, the more likely the agent will show it to blacks (row 12, first column). This result provides mild support for the customer-prejudice hypothesis; selling units far from the agent's office to blacks is unlikely to have repercussions for the agent's reputation with his established white customers.

Finally, one might ask whether the effects found here are large in magnitude, as well as statistically significant. Table 13, which focuses on discrimination in non-advertised units, provides an answer. The results in the first row yield the breakdown of outcomes for our actual sample of non-advertised units. This row indicates that 9.1 percent of these units were shown to both auditors, 54.4 percent were shown to the white auditor only, and 36.5 percent were shown to the black auditor only, for a net incidence of 17.9 percent (= 54.4 – 36.5). Every unit appears in a single audit, and every audit is defined by an advertised unit. The second row eliminates all differences between non-advertised units and the advertised unit that defines its audit. This baseline case predicts treatment for a non-advertised unit that has the average characteristics of the advertised units in our sample and that is identical (in terms of observable characteristics) to the advertised unit that defines the audit. For two tract variables, namely whether the tract is in the central city or in an integrated neighborhood, we define this baseline case using the mode, not the mean. The modal category is a unit in a white, suburban tract. The second row of Table 13 indicates that, for a baseline unit defined in this way, our estimates predict a 50.8 percent chance that the unit will be shown to the white auditor only and a 27.0 percent chance that it will be shown to the black auditor only, for a predicted net incidence of 23.8 percent.

The third and fourth rows use our estimates to determine how the baseline estimate would change if the asking price of a unit goes up or down by one standard deviation, holding constant the asking price of the advertised unit. Raising the asking price has little impact on the net measure (third row), but lowering the asking price lowers the predicted net incidence of discrimination by almost 30 percent, from 23.8 percent (row 2) to 17.3 percent (row 4). This effect corresponds to the highly significant coefficient in row 2 of Table 10. Similarly, raising the average house value in a unit's tract by one standard deviation has little impact on net incidence (fifth row), but lowering this average value cuts the net incidence measure by about 34 percent, from 23.8 percent (row 2) to 15.8 percent (row 6). The effect of altering the share of old housing in a unit's tract is similar, with little impact from an increase (row 7) and a large impact of a decrease (row 8). In fact, lowering average value by one standard deviation cuts net incidence by about 25 percent (to 17.6). The effects in rows 6 to 8 correspond to the significant coefficients in rows 4 and 5 of Table 9.

Finally, Table 13 shows that the predicted net incidence of discrimination falls dramatically when a unit is in an integrated neighborhood but the advertised unit is not. In fact, the result in the last row of this table reveals that the predicted net incidence measure falls to zero if the unit is in a suburban integrated tract and the advertised unit is in a white suburban tract.[33] Thus, the significant effect in row 10 of Table 10 is large, indeed.

Conclusions

This paper develops a new way to use fair housing audit data to test hypotheses about the causes of discrimination. We examine all the units shown to either the white or the black auditor using a multinomial logit model. This model estimates the probability that an auditor sees a unit

as a function of the auditor's race; characteristics of the unit being shown, including the racial composition of its neighborhood; and a variety of other variables.

We find that agents interpret a customer's initial request as an indication of the customer's preferences. As a result, agents are relatively likely to show the advertised unit and relatively unlikely to show units that differ from the advertised unit in terms of asking price, size (number of bedrooms), or neighborhood quality (average house value, share of old housing).

In addition, we find evidence that real estate agents practice redlining in the suburbs, defined as a low marketing effort in or near integrated neighborhoods. This behavior, which is illegal under the Fair Housing Act, arises even for advertised units, that is, even for units that a customer explicitly asks to see. This behavior does not take place, however, in central cities.

The focus of the paper is to determine whether discrimination is driven by agent prejudice, customer prejudice, or statistical discrimination. We find little evidence to support the agent-prejudice hypothesis. Discrimination does not depend on the race of the real estate agent or on any of the other variables with which this hypothesis can be linked. We find some evidence to support the customer-prejudice hypothesis. Specifically, larger real estate agencies are less likely to discriminate, and, as in several other studies, discrimination is relatively high in integrated neighborhoods where tipping appears to be likely.

Our most striking results point to the existence of statistical discrimination. First, agents' marketing efforts for blacks, unlike those for whites, do not increase with the asking price of the advertised unit but they do increase as the asking price of the unit falls below that of the advertised unit. These results indicate that agents believe the probability of a successful transaction with a black customer decreases as the asking price increases, regardless of that customer's initial request. This belief could reflect an agent's experience with black customers but it can not, of course, reflect the qualification of the black auditors. In any case, acting on this

belief is a form of statistical discrimination, because it uses a preconceived characteristic of blacks on average as a signal about an individual black customer.

Second, we find extensive evidence that real estate agents make different inferences about the preferences of black and white customers who make exactly the same housing request. Discrimination is relatively low for units in neighborhoods with an average house value or with a share of old housing below that in the advertised unit's neighborhood, and it is relatively low for units with visible problems so long as the advertised unit has problems. These effects are not linked to particular housing traits, as such, but instead are linked to differences between a unit and the unit initially requested. Thus, agents typically accept the initial request as an accurate portrayal of a white's preferences but adjust the initial request made by a black to conform with their preconceptions. In the case of housing units with visible problems, agents refuse to accept the initial request as a sign that whites want a house with problems, but have no trouble making this inference for blacks. These actions are all further examples of statistical discrimination.

Previous research has not uncovered the prevalence of statistical discrimination largely because it could not connect discrimination to the characteristics of individual housing units. Our results indicate that real estate agents' preconceptions are a central cause of housing discrimination and that statistical discrimination is widely practiced in housing sales. We hope that these topics will be a focus of future research. Both our method and our results should be of interest to both scholars and policy makers interested in discriminatory behavior. We show that discrimination by real estate agents responds both to their own preconceptions and to rather subtle economic signals, which makes it both difficult to detect and difficult to extinguish.

Endnotes

1 To keep the exposition concise, this paper refers to non-Hispanic whites as whites. This usage is imprecise, however, because many Hispanics are themselves white. In addition, this paper defines "race" as a socially defined category associated with a physical characteristics, such as skin color. For more on both points, see Yinger (1995).

2. HDS was conducted by researchers from the Urban Institute and Syracuse University. John Yinger was the HDS research director and Jan Ondrich was the HDS econometrician. Steve Ross has worked extensively with the HDS data in partnership with Ondrich and Yinger. The HDS data are used by Page (1995); Ondrich, Ross, and Yinger (1999); Ondrich, Stricker, and Yinger (1998, 1999); Turner and Michelsons (1992); and Yinger (1995).

3. As we will see, however, scholars have investigated related types of broker marketing behavior and redlining by lenders.

4. Some address information is missing, especially unit numbers for condominiums, which made up 16 percent of the housing units in the sample. As a result, we developed procedures to rule out the possibility that teammates saw the same unit when teammates saw units that had the same, incomplete, address information but differed in some observable characteristic, such as number of rooms or location in the building.

5. For a clear discussion of the illegality of neighborhood-based discrimination in the case of lenders, see FFIEC (1996, p. ii). Redlining by lenders has been extensively studied. See Schill and Wachter (1993) or Yinger (1995) for a review of the literature.

6. In a few cases, particularly with condominiums, there is more than one advertised unit, in which case these characteristics refer to the average unit in this set.

7. This hypothesis, like the previous one, can be traced to Becker's (1971) work on discrimination in labor markets. In particular, Becker showed that an employer might discriminate against black applicants to keep down the wage demands of prejudiced white employees.

8. As Phelps (1972, p. 659) puts it: "the employer who seeks to maximize expected profit will discriminate against blacks or women if he believes them to be less qualified, reliable, long-term, etc. on the average than whites and men, respectively, and if the cost of gaining information about the individual applicants is excessive." In labor markets, the issue is whether employers' adjustments to observable information about worker productivity lead to discrimination. This setting is more complex than the audit setting because the quality of the observable information may differ across groups. See Phelps (1972) and Cain (1986). In a housing audit, the quality of the information about a

customer's purchasing power, which is analogous to productivity, is identical across audit teammates so these complexities do not arise.

9. For further discussion of statistical discrimination and why it is illegal, see Yinger (1998).

10. Using audit data for Detroit, Roychoudhury and Goodman (1992) find some evidence to support this prediction.

11. For reviews of the evidence on discrimination in mortgage lending, see Goering and Wienk (1996) and Ladd (1998). This literature does not indicate whether discrimination varies with neighborhood characteristics.

12. The quote from Phelps in endnote 8 makes it clear that statistical discrimination cannot arise unless the cost of gaining the necessary information is "excessive." In an audit, a housing agent could obtain the information he needs about a customer's purchasing power simply by asking, but apparently, inquiries of this type are not usually made. Moreover, they are more likely to be made for blacks than for whites. In HDS, for example, agents didn't even ask about a customer's income in over half the audits and the probability that they made this inquiry was 8 percentage points higher for blacks than for whites—a difference that was statistically significant. See Yinger (1995, Table 3.3).

13 We observe the outcome for the advertised unit even if it is withheld from both auditors. In this case, however, many of the unit characteristics relevant to the analysis are missing from the data. Thus, we exclude from our sample the few advertised units withheld from both auditors.

14 We ran a model without controls for omitted variables and obtained substantially different results for several coefficients. The complete results, i.e., without audit random effects, are available upon request.

15. HDS sent the same audit-teammate pairs to conduct several audits each. This makes it possible to construct models in which θ_W and θ_B are each the sum of an audit-specific effect and a pair-specific effect. We estimated two such models and found the improvement of fit measured by Akaike's Information Criterion (see Akaike 1973) to be small enough to reject the incorporation of the additional pair-specific effect. See also Ondrich, Ross, and Yinger (forthcoming).

16. Because Z_W and Z_B contain unit-specific information, their values can change across observed units within an audit. Let *j* index an observed unit within an audit. Then conditional on the Z_{Wj}'s and the Z_{Bj}'s and all sample S_j's being one, the joint likelihood contribution of all *J* observed units within an audit is given by

$$L(\beta,\delta)=\prod_{k=1}^{J}\left(\sum_{j=1}^{K}P\left(Y_W=Y_{Wj},Y_B=Y_{Bj}\,\middle|\,S_j=1,Z_{Wj},Z_{Bj},\theta_{Wk},\theta_{Bk}\right)P\left(\theta_W=\theta_{Wk},\theta_B=\theta_{Bk}\right)\right),$$

where (Y_{Wj}, Y_{Bj}) is the observed outcome for unit *j* and *K* is the number of points of increase. The likelihood function to be maximized is the product of joint likelihood contributions across audits in the sample. To specify *K*, we follow Trussell-Richards (1985) by starting with a single point of increase and successively adding a new point until likelihood improvement stops. We stopped at *k*=3. Estimates for $\{(\theta_{Wk}, \theta_{Bk}), k = 1,..., K\}$ and $p_1,..., p_{k-1}$ are available from the authors upon request, where p_i is the probability associated with θ_{Wi} and θ_{Bi} in the mixing distribution. Note that p_K does not provide independent information because the sum of the probabilities is one.

17. Neighborhood characteristics in the HDS reports and in subsequent research using the HDS data (see note 2) are based on a private firm's estimates of demographics in each census tract in 1988.

18. This outcome presumably reflects the neighborhood discrimination discussed above: houses in minority neighborhoods are not advertised in the newspaper.

19. For a discussion of net incidence and other measures of discrimination, see Fix, Galster, and Struyk (1993), Yinger (1995), and, especially, Ondrich, Ross, and Yinger (1999).

20. The complete model with *k* = 3 has 172 parameters; the other two have 148 and 150 parameters, respectively, and the log-likelihood statistics for the three models are -2006.49, -2039.50, and -2030.54, respectively.

21. Qualitatively similar but less significant results, which have the same interpretation, appear for condominiums (row 6).

22. Consider, for example, an advertised unit in an integrated neighborhood in the central city. For this type of unit, all the variables in rows 9, 10, and 14 in Table 9 are switched "on," so the net effect (relative to an advertised unit in a white, suburban neighborhood) involves the sum of all ten coefficients in these three rows. If we had presented odds ratios instead of the log odds ratio, we would, of course, have to multiply coefficients to obtain the net effects.

23. The frequencies also are consistent with the presence of inferred preferences, as agents who advertise in white areas tend not to show units in integrated areas (see the low frequencies in the second row) and agents who advertise in integrated areas tend not to show units in white areas (see the low frequencies in the third row). However, these frequencies might also indicate that real estate agents tend to specialize in either white or integrated areas.

24. Implicit across-cell restrictions in the functional form in Table 10 yield an estimate for the third row of the second column of Table 12 even with no observations in that cell.

The coefficients in several other cells with only two observations also are identified primarily based on across-cell restrictions.

25. Agents who advertise a unit in the suburbs rarely show units in the central city (see the low frequencies in the second column) and agents who advertise in the central city rarely show units in the suburbs (see the low frequencies in the third column). These counts may indicate that agents choose not to show units conflicting with a customer's inferred preferences even if those units are available, or they may indicate that agents with central city listings have access to different information sources about available housing than do agents with suburban listings.

26 . Agent prejudice: Agents might prefer to deal with married blacks than with single blacks. Customer-prejudice: An agent's white customers might prefer to have married black neighbors instead of single black neighbors. Statistical discrimination: Agents may believe that black singles are particularly unlikely to complete a transaction, either because of assumed financial limitations or anticipated discrimination in mortgage lending.

27. We attempted to determine which of these two possibilities was at work using 1990 Home Mortgage Disclosure Act Data, which indicates applications and loan denials by location by race. We could not find any HMDA variables with any explanatory power in our regressions. This could indicate that real estate agents' beliefs do not reflect actual experience with lenders or it could indicate that the HMDA data are not up to the task. For more on these data, see Goering and Wienk (1996). It is also possible that agents believe that white sellers of more expensive homes (or in high-value neighborhoods) tend not to be willing to sell to blacks (even without contact between the agent and the seller, as is typical in a MLS transaction). This seems unlikely, however, because prejudice tends to decline with income and high-value neighborhoods are not usually threatened with tipping.

28. The theory of statistical discrimination predicts that preconceptions not connected to profits will be driven out by competition, at least in the long run, but we have no way to test for a link to profitability. Also, this behavior is not statistical discrimination if the agent acts on the basis of preconceptions that he does not connect to profits. Real estate agents, like other people, are certainly not immune to race-based preconceptions that have nothing to do with profits, but there is no reason to think that these preconceptions are related to particular housing characteristics, as is the case here.

29. Each auditor was assigned an income for each audit that made her more than qualified for the advertised unit, with variation in the extent of over-qualification across audits and with a slightly higher income for the minority teammate in every case. Auditors were instructed not to divulge their income to the agent unless asked. To determine whether agents altered their behavior when confronted with actual income information, we interacted the variables in row 2 of Tables 9 and 10 with a dummy variable indicating whether both auditors were asked about their income. We did not consider queries made to each auditor separately because differences in queries across teammates could be a

signal of discrimination (see Yinger 1995). The interactions with the variables in the third columns of these tables were significant and indicated (a) that when agents realized that a white customer was overqualified, he was more likely to show units with asking prices above that of the advertised unit and (b) that this effect did not arise for blacks. Including these interactions did not alter any of the results in Tables 9 and 10. These findings simply reinforce our basic story, namely that brokers try to show houses that meet a customer's income and preferences, but diverge from this approach for black customers when the information about income or preferences clashes with the broker's preconceptions.

30. This belief might be based on experience. Munnell et al. (1995) find, for example, that, on average, black mortgage applicants have higher loan-to-value and debt-to-income ratios than do whites.

31. In row 8, the coefficients in both the third and fifth columns are highly significant. Since both of these coefficients apply to the advertised unit and the one in the third column is larger in absolute value, they imply that advertised units with problems are also more likely to be shown to blacks than to whites, although this effect is small.

32. A table analogous to Table 12 but for the neighborhood variables interacted with race also reveals that when the advertised unit is in a suburban white neighborhood, agents are significantly less likely (coefficient = 0.596, t-statistic = 2.15) to withhold units in suburban integrated neighborhoods from blacks than from whites. In other words, a request for a unit in a white, suburban neighborhood is more likely to be interpreted as an indication of a customer's neighborhood preferences when the customer is white than when she is black. This result provides more evidence of agent preconceptions—and of statistical discrimination.

33. Discrimination declines relative to the baseline when the unit is in an integrated tract in the central city because the coefficient in row 10 of Table 10 is more than offset by the significant coefficient in the last row of Table 10. However, this combined effect is not statistically significant (t = 0.851).

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Table 1. Variables and General Hypotheses

	Hypothesis For:	
Variable Type	**Variable**	**Interaction with Race**
Characteristics of the unit being shown (the unit that defines an observation	Marketing depends on characteristics of the unit	Discrimination depends on characteristics of the unit
Characteristics of the advertised unit (the unit that is the entry for an audit)	Marketing depends on initial request	Discrimination depends on initial request
Characteristics of the unit being shown when it is the advertised unit (which equal 0 for non-advertised units)	Marketing is different for advertised unit	Discrimination is different for advertised unit
Variables to describe the match between the unit being shown and the advertised unit (which are interactions)	Marketing depends on match with initial request	Discrimination depends on match with initial request

Table 2. Examples for an Audit with Three Units

	Value for Unit 1	Value for Unit 2	Value for Unit 3
Example 1: Discrete Variable[a]			
Characteristics of the unit being shown (the unit that defines an observation)	1	1	0
Characteristics of the advertised unit (the unit that is the entry for an audit; does not vary within an audit)	1	1	1
Characteristics of the unit being shown when it is the advertised unit (which equal 0 for non-advertised units)	1	0	0
The Match between the unit being shown and the advertised unit (an interaction)	1	1	0
Example 2: Continuous Variable[b]			
Characteristic of the advertised unit (the unit that is the entry for an audit; does not vary within an audit)	135	135	135
Characteristic of the unit being shown when it is the advertised unit (which equals zero for non-advertised units)	135	0	0
Difference between the unit being shown and the advertised unit when this difference is positive (an interaction)	0	0	10
Absolute value of the difference between the unit being shown and the advertised unit when this difference is negative (an interaction)	0	15	0

[a]Based on the variable INTEG = 1 if unit is in an integrated area. Unit 1: The advertised unit, in an integrated area; Unit 2: Not the advertised unit, also in an integrated area; Unit 3: Not the advertised unit, NOT in integrated area.

[b]Based on variable ASKPRICE = Asking Price of Unit ($1,000). Unit 1: The advertised unit, ASKPRICE = 135; Unit 2: Not the advertised unit, ASKPRICE = 120; Unit 3: Not the advertised unit, ASKPRICE = 145.

Table 3. Auditor, Agent, and Audit Characteristics

Variable	Mean	Standard Deviation	Minimum	Maximum
Auditor Characteristics				
Age of auditor[a]	37.337	6.988	24	66
Audit role = married couple[a]	0.881	0.323	0	1
Auditor is female[a]	0.605	0.489	0	1
Audit role = previous owner[a]	0.493	0.497	0	1
Agent and Agency Characteristics				
Age of agent	42.392	10.795	20	74
Agent is Black	0.025	0.154	0	1
Agent is female	0.661	0.473	0	1
Agent used an MLS	0.516	0.500	0	1
Advertised unit is not inspected	0.123	0.328	0	1
Maximum number of people encountered	1.811	1.169	0	8
Audit teammates see the same agent	0.547	0.546	0	1
Audit Characteristics				
Audit is in July	0.479	0.500	0	1
Audit is in August	0.055	0.228	0	1
Audit is in the morning	0.329	0.470	0	1
Black auditor goes first	0.508	0.500	0	1

[a]Auditor characteristics refer to the black auditor. White auditor characteristics are the same or similar.

Table 4. Housing Unit Characteristics

Variable	Mean	Standard Deviation	Minimum	Maximum
Unit is the advertised unit	0.450	0.498	0	1
Asking price of unit	137805	82664	11500	520000
Median housing price in unit's neighborhood	158735	116308	22100	500001
Number of bedrooms in the unit	2.815	0.982	0	9
Unit is a condominium	0.263	0.440	0	1
Unit is newly constructed	0.092	0.289	0	1
Unit has visible problems[a]	0.190	0.399	0	1
Advertised unit is in the central city	0.449	0.495	0	1
Distance to integrated tract	2.953	2.916	0.118	21.649
Distance to agent's office	4.073	4.412	0	37.434
Distance to advertised unit	1.515	3.365	0	35.900
Share of housing built before 1940	0.449	0.495	0	1
Unit's neighborhood > 15 percent black	0.178	0.383	0	1

[a]Visible problems include peeling paint (interior or exterior), broken windows, and debris in the yard.

Table 5. Adverse Treatment by Unit Characteristics

	Sample Size	Equal Treatment	White Favored	Black Favored	Net Incidence
A. Entire Sample					
Entire sample	2,465	0.304	0.411	0.285	0.126
B. Whether Unit is Advertised Unit					
Not advertised unit	1,357	0.091	0.544	0.365	0.179
Advertised unit	1,108	0.564	0.248	0.188	0.060
C. Asking Price of Unit Compared to Metropolitan Average					
Lower asking price	1,332	0.302	0.411	0.287	0.124
Higher asking price	1,133	0.307	0.410	0.283	0.127
D. Whether Unit is a Condominium					
Not a condominium	1,818	0.334	0.401	0.265	0.136
Condominium	647	0.219	0.439	0.342	0.097
E. Number of Bedrooms in Unit					
Fewer than three	779	0.268	0.429	0.303	0.126
Three	1,145	0.331	0.397	0.272	0.125
More than three	541	0.299	0.414	0.287	0.127
F. Whether the Unit is Newly Constructed					
Previously owned	2,239	0.321	0.406	0.273	0.133
Newly constructed	226	0.137	0.456	0.407	0.049
G. Whether Unit has Visible Problems					
No problems	1,975	0.273	0.430	0.297	0.133
Problems	490	0.430	0.333	0.237	0.096

Table 6. Adverse Treatment by Neighborhood Characteristics

	Sample Size	Equal Treatment	White Favored	Black Favored	Net Incidence
A. Average Value in Neighborhood Compared to MSA Aveage					
Lower average value	1,458	0.299	0.407	0.284	0.113
Higher average value	1,007	0.311	0.416	0.273	0.143
B. Racial Composition of Neighborhood					
< 5 percent Black	2,025	0.314	0.405	0.281	0.124
> 15 percent Black	440	0.259	0.436	0.305	0.131
C. Central City Location					
In central city	1,098	0.326	0.403	0.271	0.131
In suburbs	1,345	0.283	0.419	0.298	0.120
D. Distance to Integrated Area					
High distance	868	0.323	0.386	0.291	0.094
Low distance	1,597	0.294	0.425	0.282	0.143
E. Distance to Agent's Office					
High distance	819	0.315	0.381	0.304	0.077
Low distance	1,646	0.298	0.426	0.276	0.150
F. Share of Old Housing					
High share	767	0.321	0.419	0.261	0.158
Low share	1,698	0.296	0.408	0.296	0.111

Table 7. Adverse Treatment Based on Characteristics of Unit Compared to Advertised Unit

	Sample Size	Equal Treatment	White Favored	Black Favored	Net Incidence
A. Asking Price of Unit Compared to Advertised Unit					
Unit's price lower	399	0.095	0.499	0.406	0.093
Similar price	1,560	0.324	0.343	0.233	0.110
Unit's price higher	506	0.099	0.551	0.350	0.201
B. Average Value in Unit's Neighborhood Compared to Advertised Unit					
Unit's value lower	313	0.073	0.492	0.435	0.057
Similar value	1,502	0.347	0.326	0.227	0.099
Unit's value higher	650	0.084	0.568	0.348	0.220
C. Number of Bedrooms in Unit Compared to Advertised Unit					
Unit has fewer	216	0.102	0.532	0.366	0.167
Unit has same	1,945	0.357	0.387	0.256	0.131
Unit has more	304	0.109	0.477	0.414	0.063
D. Whether the Unit or Advertised Unit is Newly Constructed					
Both previously owned	2,126	0.332	0.399	0.269	0.130
Unit new	156	0.186	0.417	0.397	0.020
Unit previously owned	113	0.097	0.549	0.354	0.195
Both new	0	0.000	0.000	0.000	0.000
E. Whether Unit or Advertised has Visible Problems					
Neither with problems	1,839	0.286	0.420	0.294	0.126
Unit with problems	240	0.179	0.496	0.325	0.171
Unit without problems	136	0.088	0.574	0.338	0.236
Both with problems	250	0.696	0.176	0.152	0.024

Table 8. Coefficient Estimates for Auditor, Agent, and Audit Characteristics

Variable	Coefficient	Coefficient for Interaction with Race
Auditor Characteristics		
Age of the auditor	-1.1627	0.2887
	(-1.314)	(0.325)
Audit role = married couple	-0.1053	0.4966*
	(-0.289)	(2.445)
Auditor is female	0.2783	1.2789
	(1.187)	(1.004)
Audit role = previous owner	-0.0305	0.0058
	(-0.145)	(0.039)
Agent and Agency Characteristics		
Age of agent	0.1679	0.2127
	(0.267)	(0.344)
Agent is black	0.0500	0.0638
	(0.129)	(0.171)
Agent is female	0.0639	0.0958
	(0.467)	(0.711)
Agent used an MLS	-0.0207	0.0606
	(-0.084)	(0.440)
Advertised unit not inspected	-1.2258	0.3329
	(-1.692)	(1.108)
Maximum number of people encountered	-0.0927	1.2453*
	(-0.879)	(2.398)
Audit teammates see the same agent	1.1425*	0.0006
	(4.826)	(0.005)
Audit Characteristics		
Audit is in July	-1.0230	-0.0240
	(-0.001)	(-0.000)
Audit is in August	-0.7694	-0.1141
	(-1.416)	(-0.400)
Audit is in the morning	0.0726	0.0229
	(0.615)	(0.144)
Black auditor goes first	0.1540	-0.1799
	(0.735)	(-0.446)

Note: t-statistics are in parentheses. An * indicates significance at the 5 percent level (two-tailed test). Estimated with a multinomial logit model. Results for site dummies are not reported.

Table 9. Coefficient Estimates for Unit Characteristics[a]

Row/Variable Name	Unit Attribute	Advertised Unit Attribute	Unit Attribute*Adv. Unit Attribute		Advertised Unit*Unit Attribute
			One	Two	
1. Advertised Unit	3.7605*				
	(2.957)				
2. Asking Price[b]		7.3351*	-0.3465	0.3374	-6.5129
		(2.072)	(-0.426)	(0.394)	(-1.858)
3. Number of Bedrooms[b]		-2.6366	-1.3542*	-1.4165*	0.1415
		(-1.001)	(-3.279)	(-2.641)	(0.045)
4. Tract Average Value[b]		-0.0004	-1.3376	0.1517	0.0051
		(-0.002)	(-1.831)	(0.409)	(0.017)
5. Tract Share of Old Housing		-0.0750	-8.3666*	-1.3740*	-0.8549*
		(-0.001)	(-2.511)	(-3.097)	(-2.017)
6. Condominium	-0.4695	-1.0425	0.7204		-1.2580
	(-0.784)	(-1.274)	(0.794)		(-1.940)
7. New Construction	-2.0580*	-0.3816	2.0752		-1.7205*
	(-2.193)	(-0.696)	(1.701)		(-2.292)
8. Problems with Unit	0.4265	0.5113	0.2302		0.8852
	(1.125)	(0.970)	(0.332)		(1.488)
9. Unit in Central City	0.8211	0.3086	-2.4428*		1.0511*
	(1.430)	(0.399)	(-2.591)		(2.006)
10. Tract Integrated	-2.5751*	-1.3209	2.4275*		0.5525
	(-3.009)	(-1.573)	(2.139)		(-0.650)
11. Distance to Integrated Tract	-0.0565	-0.1461	0.0057		0.1944*
	(-0.663)	(-1.251)	(0.496)		(2.332)
12. Distance to Agent's Office	0.0060	-0.0791	-0.0003		0.0409
	(0.0098)	(-0.380)	(-0.110)		(0.622)
13. Distance from Unit to Advertised Unit	-0.0083				
	(-0.133)				
14. Tract Integrated x Unit in Central City	1.8306*				-1.2944
	(2.018)				(-1.164)

[a]Absolute values of t-statistics are in parentheses. The symbol * represents significance at the 5 percent level or higher (two-tailed test). Estimated with a multinomial logit model.

[b]This variable is continuous. The unit attribute does not enter the specification directly. Rather, two variables are included: (1) the difference between unit and advertised unit attribute when the difference is positive, and (2) the absolute value of the difference between unit and advertised unit attribute when the difference is negative. Their estimated coefficients are listed in columns labeled one and two, respectively.

Table 10. Coefficient Estimates for Unit Characteristics Interacted with Race[a]

Row/Variable Name	Unit Attribute	Advertised Unit Attribute	Unit Attribute*Adv. Unit Attribute		Advertised Unit*Unit Attribute
			One	Two	
1. Advertised Unit	0.3566				
	(0.480)				
2. Asking Price[b]		-5.1591*	0.1865	1.0630*	3.7200
		(-3.069)	(0.702)	(7.440)	(1.921)
3. Number of Bedrooms[b]		1.1264	0.2332	-0.1211	-1.2796
		(0.938)	(1.618)	(-0.592)	(-0.684)
4. Tract Average Value[b]		0.1515	-0.1065	0.4550*	0.0090
		(1.437)	(-0.657)	(2.091)	(0.061)
5. Tract Share of Old Housing		-0.0423	0.9461	2.4158*	0.1120
		(-0.000)	(1.102)	(2.185)	(-0.457)
6. Condominium	0.3148	0.6974	-0.5770		-0.6380
	(-1.031)	(1.443)	(-1.064)		(-1.679)
7. New Construction	0.2739	-0.2160	0.2986		0.0439
	(0.934)	(-0.858)	(0.638)		(0.106)
8. Problems with Unit	-0.0974	-0.0956	0.9848*		-0.8127*
	(-0.485)	(-0.406)	(2.675)		(-2.206)
9. Unit in Central City	-0.0009	-0.0276	0.4342		-0.1694
	(-0.003)	(-0.072)	(0.954)		(-0.541)
10. Tract Integrated	0.5957*	0.1136	-0.4332		-0.0953
	(2.085)	(0.387)	(-1.032)		(-0.204)
11. Distance to Integrated Tract	0.0546	0.0769	-0.0053		-0.0286
	(1.441)	(1.586)	(-1.011)		(-0.522)
12. Distance to Agent's Office	0.0440	0.0110	-0.0006		-0.0005
	(1.699)	(0.439)	(-0.377)		(-0.016)
13. Distance from Unit to Advertised Unit	-0.0330				
	(-1.352)				
14. Tract Integrated x Unit in Central City	-0.9263*				0.9138
	(-2.532)				(1.506)

[a]Absolute values of t-statistics are in parentheses. The symbol * represents significance at the 5 percent level or higher (two-tailed test). Estimated with a multinomial logit model.

[b]This variable is continuous. The unit attribute does not enter the specification directly. Rather, two variables are included: (1) the difference between unit and advertised unit attribute when the difference is positive, and (2) the absolute value of the difference between unit and advertised unit attribute when the difference is negative. Their estimated coefficients are listed in columns labeled one and two, respectively.

Table 11. Agent Marketing Behavior by Unit Location, Advertised Units[a]

Unit in Integrated Neighborhood	Unit in Central City	
	Yes	**No**
Yes	-0.642 (-1.199) [124]	-0.916* (-1.648) [73]
No	-0.262 (-0.471) [412]	0.000 (n.a.) [455]

[a]Each cell contains three entries. The first number is the coefficient estimate, the number in parentheses is the t-statistic, and the number of observations is in brackets. An asterisk indicates significance at the 10 percent level or higher (two-tailed test). Based on the multinomial logit results in Table 9

Table 12. Agent Marketing Behavior by Unit Location, Non-advertised Units[a]

Unit in Integrated Neighborhood	Unit in Central City: Yes — Advertised Unit in Central City	Unit in Central City: Yes — Advertised Unit in Suburbs	Unit in Central City: No — Advertised Unit in Central City	Unit in Central City: No — Advertised Unit in Suburbs
Yes				
Advertised unit in integrated neighborhood	-0.951 (-1.199) [62]	1.118 (1.347) [2]	-1.160 (-1.073) [2]	-1.469* (-1.998) [54]
Advertised unit in white neighborhood	-2.058* (-2.432) [21]	0.077 (0.090) [25]	-2.266 (-1.934) [2]	-2.575* (-3.009) [55]
No				
Advertised unit in integrated neighborhood	-2.634* (-2.751) [29]	-0.500 (-0.490) [0]	-1.012 (-0.896) [4]	-1.321 (-1.573) [32]
Advertised unit in white neighborhood	-1.313* (-2.826) [282]	0.821 (1.430) [126]	0.309 (0.399) [9]	0.000 (n.a.) [607]

[a]Each cell contains three entries. The first number is the coefficient estimate, the number in parentheses is the t-statistic, and the number of observations is in brackets. An asterisk indicates significance at the 5 percent level or higher (two-tailed test). Based on the multinomial logit results in Table 9.

Table 13. Predicted Treatment for Non-Advertised Units Under Various Circumstances (share of cases)

	Equal Treatment	White Favored	Black Favored	Net Incidence
Baseline Predictions				
Sample of Non-Advertised Units	0.091	0.544	0.365	0.179
For Mean "Matching" Non-Advertised Unit[a]	0.222	0.508	0.270	0.238
Predictions with One Variable Changed				
Higher Asking Price than Advertised Unit[b]	0.217	0.506	0.278	0.228
Lower Asking Price than Advertised Unit[b]	0.243	0.465	0.292	0.173
Higher Mean Value than Advertised Unit's Tract[b]	0.150	0.560	0.289	0.271
Lower Mean Value than Advertised Unit's Tract[b]	0.247	0.456	0.298	0.158
More Old Housing than Advertised Unit's Tract[b]	0.142	0.539	0.319	0.220
Less Old Housing than Advertised Unit's Tract[b]	0.144	0.531	0.355	0.176
Unit in Integrated Suburban Tract[c]	0.040	0.478	0.482	-0.004
Unit in White Central City Tract[c]	0.337	0.437	0.226	0.211
Unit in Integrated Central City Tract[c]	0.082	0.460	0.458	0.003

[a]Predicted treatment for a non-advertised unit that has the average characteristics of the sample of advertised units and that is associated with an advertised unit with those same characteristics. Two characteristics, namely whether unit is in central city or in an integrated tract, are set at their modes, not at their means. The modal category is a white, suburban tract.

[b]Predicted treatment based on the case in row 2 with only one change, namely an increase or decrease of one standard deviation in the identified characteristic.

[c]Predicted treatment for a non-advertised unit in the type of tract indicated, assuming that the advertised unit is still in a white, suburban tract, as in row 2.