Center for Policy Research   Maxwell School of Citizenship and Public Affairs

2005

Why Do Real Estate Brokers Continue to Discriminate? Evidence from the 2000 Housing Discrimination Study

Bo Zhao
Syracuse University

Jan Ondrich
Syracuse University, jondrich@maxwell.syr.edu

John Yinger
Syracuse University, jyinger@maxwell.syr.edu

**Center for Policy Research
Working Paper No. 67**

**WHY DO REAL ESTATE BROKERS CONTINUE
TO DISCRIMINATE? EVIDENCE FROM THE
2000 HOUSING DISCRIMINATION
STUDY**

Bo Zhao, Jan Ondrich and John Yinger*

**Center for Policy Research
The Maxwell School of Citizenship and Public Affairs
Syracuse University
426 Eggers Hall
Syracuse, New York 13244-1020
(315) 443-3114 | Fax (315) 443-1081
e-mail: ctrpol@syr.edu**

April 2005

$5.00

CENTER FOR POLICY RESEARCH – Spring 2005

Timothy Smeeding, Director
Professor of Economics & Public Administration
————

Associate Directors

Margaret Austin
Associate Director,
Budget and Administration

Douglas Holtz-Eakin
Professor of Economics
Associate Director, Center for Policy Research

Douglas Wolf
Professor of Public Administration
Associate Director, Aging Studies Program

John Yinger
Professor of Economics and Public Administration
Associate Director, Metropolitan Studies Program

SENIOR RESEARCH ASSOCIATES

Pablo Beramendi……………..……Political Science
Dan Black.. Economics
Lloyd Blanchard……………….Public Administration
Stacy Dickert-Conlin............................. Economics
William Duncombe .... Public Administration
Gary Engelhardt ....Economics
Deborah Freund ....Public Administration
Madonna Harrington Meyer ....Sociology
Christine Himes.......................................Sociology
William C. Horrace ....Economics
Bernard Jump ....Public Administration
Duke Kao ....Economics
Eric Kingson .... Social Work
Thomas Kniesner ....Economics
Jeff Kubik ....Economics

Andrew London .... Sociology
Len Lopoo .... Public Administration
Jerry Miner .... Economics
John Moran .... Economics
Jan Ondrich... Economics
John Palmer .... Public Administration
Lori Ploutz-Snyder........................ Exercise Science
Jeff Racine .... Economics
Grant Reeher ....Political Science
Stuart Rosenthal .... Economics
Ross Rubenstein..................... Public Administration
Margaret Usdansky…………………………Sociology
Michael Wasylenko .... Economics
Janet Wilmoth .... Sociology

GRADUATE ASSOCIATES

Anna Amirkhanyan..................Public Administration
Megan Bahns……………………………….Sociology
Sonali Ballal………………….. Public Administration
Dana Balter ....Public Administration
Sami Beg……………………Public Administration
Yong Chen ....Economics
Seokjoon Choi………………………………Economics
Christopher Cunningham ....Economics
Ana Dammert...Economics
Mike Eriksen ....Economics
Ying Fang……………………………………. Sociology
Katie Fitzpatrick………………………......Economics
Jose Galdo...Economics
Alexandre Genest……………Public Administration
Andrew Hanson…………………………...Economics
Yue Hu………………………………….....Economics

Hatice Karahan…………………………….Economics
Kristina Lambright …………….Public Administration
Jessica Lee…………………….Public Administration
Liqun Liu……………………………….…..Economics
Long Liu………………………………………Economics
Joseph Marchand…………………….....Economics
Emily NaPier………………………………..Sociology
Emily Pas ……………………………………Economics
Kristenne Robison…………………………Sociology
Cynthia Searcy………………..Public Administration
Claudia Smith……………………….........Economics
Mark Thomas………………..Public Administration
Jeff Thompson .... Economics
Wen Wang……………………...…………Economics
Bo Zhao………………………….....…….…Economics

STAFF

Kelly Bogart ....Administrative Secretary
Martha Bonney..... Publications/Events Coordinator
Karen Cimilluca........... Librarian/Office Coordinator
Kim Desmond ……………Administrative Secretary

Kati Foley……………..Administrative Assistant, LIS
Kitty Nasto…………………….Administrative Secretary
Candi Patterson......................Computer Consultant
Mary Santy……..…………Administrative Secretary

Abstract

This paper studies racial and ethnic discrimination in discrete choices by real estate brokers using national audit data from the 2000 Housing Discrimination Study. It uses a fixed-effects logit model to estimate the probability that discrimination occurs and to study the causes of discrimination. The data set makes it possible to control for auditors' actual demographic and socioeconomic characteristics, along with the characteristics assigned for the purposes of the audit. The study finds that discrimination continues to be strong but also documents a downward trend in both the scope and incidence of discrimination since 1989. The estimations also identify both brokers' prejudice and white customers' prejudice as causes of discrimination.
(*JEL* J71, R31)

Keywords: housing discrimination, audit, fixed-effects logit

Introduction

In 2003, the homeownership rate was 75.4 percent for non-Hispanic whites, but only 48.8 percent for blacks and 46.7 percent for Hispanics (U.S. Department of Housing and Urban Development 2004).[1] Many researchers believe that these disparities arise in part because of housing discrimination, which is defined as systematic unfavorable treatment of minorities. Several studies based upon national audit data from the 1989 Housing Discrimination Study (HDS 1989) find evidence of widespread discrimination. The 2000 Housing Discrimination Study (HDS 2000), which updates and improves upon the earlier study, provides a unique opportunity to determine whether this type of discrimination persists.[2] This study also may shed light on the effectiveness of the 1988 amendments to the Fair Housing Act, which gave the federal government stronger law-enforcement powers to fight discrimination (see Yinger 1995).

This paper addresses the following four questions: Does discrimination persist in the housing sales market? If so, how high is the discrimination level? Has discrimination increased or decreased over the last decade? What are the causes of discrimination? Following the literature, a fixed-effects logit model is applied to the HDS 2000 data to study discrete choices by real estate brokers, such as whether to tell the auditor that the advertised unit was available. HDS 2000 has a feature not found in previous audit studies: it recorded some of the auditors' actual demographic and socioeconomic characteristics, such as income and education. As a result, this paper explicitly controls for an auditor's actual traits, as well as the characteristics assigned for the purpose of the audit.

The paper proceeds as follows. Section 2 presents the existing evidence on housing discrimination based upon the HDS 1989 data. Section 3 describes the HDS 2000 design. The next two sections explain the fixed-effects logit model and data. Sections 6 and 7 test the hypothesis that discrimination exists and measure the discrimination level, respectively. Section

8 compares the HDS 2000 results with the HDS 1989 results (Ondrich, Stricker, and Yinger 1998). The next two sections present and test hypotheses about the sources of discrimination. The final section summarizes the results.

Existing Evidence on Housing Discrimination

Several recent studies of housing discrimination are based on data from HDS 1989. Ondrich, Stricker, and Yinger (1998) use data from the sales audits to examine discrimination in qualitative actions taken by real estate brokers. This is the first paper to employ the fixed-effects logit model to control for the audit-specific fixed effects. They find evidence of discrimination in the housing sales market and evidence that brokers' prejudice and white customers' prejudice are the causes of this discrimination.[3]

Ondrich, Ross, and Yinger (2003) explore brokers' decisions to show a unit to the white auditor, to the black auditor, or to both. They estimate a multinomial logit model and find that agents discriminate and, in suburban areas, practice redlining, defined as withholding units in integrated neighborhoods from all home seekers. They also discover that brokers appear to practice statistical discrimination, defined as treating blacks less favorably based on unfounded stereotypes about their creditworthiness or neighborhood preferences.

Page (1995) uses a fixed-effects Poisson model to test for discrimination in the number of housing units shown to whites and minorities by housing agents. She finds that blacks and Hispanics are shown between 10 and 20 percent fewer units than their white teammates. Her analysis also indicates that statistical discrimination and white customers' prejudice are the major sources of discrimination.

Yinger (1995) shows that an analysis of discrimination in the number of units shown needs to account for an agent's opportunity to discriminate, defined as (his or) her access to available housing units.[4] With controls for the opportunity to discriminate in the analysis,

Yinger finds evidence that housing agents discriminate to protect their business with prejudiced white clients and on the basis of stereotypes about black and Hispanic customers.

Audit studies provide a powerful test for discrimination, but they are not a controlled experiment. Despite the efforts of project managers, audit teammates might differ on traits that affect their treatment.[5] Heckman and Siegelman (1993) and Heckman (1998) emphasize that unobserved auditor characteristics could bias estimates of discrimination in either direction. To address this problem, this paper explicitly controls for several true auditor characteristics.[6]

The Design of the 2000 Housing Discrimination Study

HDS 2000 is an audit study aimed at determining whether minority homebuyers continue to encounter discriminatory treatment at the end of the 20th century.[7] It follows the basic design of HDS 1989 with a few changes in auditors' assigned characteristics and treatment questions.[8] Four minority groups are studied, including black, Hispanic, Asian, and Native American. This paper focuses on the black/white and Hispanic/non-Hispanic-white (henceforth Hispanic/white, for short) audits. In the Hispanic/white audits, all minority auditors have Hispanic surnames, but they differ in skin color and accent.

HDS 2000 sampled 20 metropolitan areas, including 16 sites for the black/white audits and 10 sites for the Hispanic/white audits.[9] Overall, 1,060 black/white audits and 724 Hispanic/white audits were conducted between May 2000 and January 2001. Each audit was conducted by a pair of auditors, one non-Hispanic white and one minority, who were matched by gender and age.[10] They were assigned the same socioeconomic characteristics, such as marital status, family size, and income, to ensure that they were equally qualified for buying an advertised house.[11] Teammates also received the same training on how to behave in front of brokers. To the extent possible, in other words, the white and minority auditors were made to be identical in the agent's eyes except for their race or ethnicity. The audit manager randomly chose

a housing advertisement in a major local Sunday newspaper.[12] Then audit teammates were sent to inquire about this advertisement within a short time period. After her visit, each auditor reported on the information she received from the agent and how she was treated.

Unlike HDS 1989, HDS 2000 collected extensive information on each auditor's true characteristics, such as income, education, current tenure status, and auditing experience. This type of data gives us the ability to control for differences in teammates' true traits.

As in the case of previous audit studies, results from HDS 2000 must be interpreted with care. Because newspaper advertisements form the sampling frame, the results presented here should be interpreted as a measure of discrimination that eligible minorities might come across when they ask about the units advertised in the major local newspapers. Discrimination could be higher or lower under other circumstances (and at different stages of a housing transaction).

The Fixed-Effects Logit Model

This paper uses a fixed-effects logit model as the econometric framework. The model was developed by Chamberlain (1980) as a conditional logit that accounts for the unobserved heterogeneity in a panel setting. Chamberlain's fixed-effects logit method has been used by Whittington (1992), Christian, Gupta, and Lin (1993), Korenman and Winship (1995), Fisman and Raturi (2003), and Anderson and Newell (2004). Yinger (1986) first points out that in fair housing audits, teammates could share some unobserved factors because they are assigned the same socioeconomic characteristics, go through the same training, and visit the same agency to inquire about the same advertised unit. If these common unobserved factors are correlated with right-hand-side variables, estimation results will be biased. Ondrich, Stricker, and Yinger (1998, 1999) show that the fixed-effects logit model can be used to correct the potential bias in the case of qualitative dependent variables, such as whether the auditor was told that the advertised unit was available. Following their studies, this paper focuses exclusively on qualitative dependent

variables and therefore ignores important quantitative broker's actions, such as how many units were shown to each auditor.

A broker's decision about the treatment of a potential homebuyer can be represented by the following equation:

$$\Pr(Y_{ij} = 1 \mid W, X, \delta, \beta, \gamma, \alpha_i) = f(\delta W_{ij} + \beta X_{ij} + \gamma W_{ij} X_{ij} + \alpha_i), \qquad (1)$$

where $Y_{ij} = 1$ stands for favorable treatment, f is assumed to be a logistic distribution function, i is the audit index, j is the visit index, W_{ij} equals 1 for the white auditor and 0 for the minority auditor, α_i represents the audit-specific fixed effect, and X_{ij} is a vector of explanatory variables that will be defined later. Although the order in which the white and minority auditors visited the agency was random, it simplifies the discussion to associate visit index value 1 with the white auditor and visit index value 0 with the minority auditor. This association of the visit index values is made throughout the discussion below.

In a fixed-effects logit model, α_i is removed from the probability function, conditional on the sum of Y_{ij}. The conditional probability function can be expressed by

$$\Pr(Y_{i1} - Y_{i0} = 1 \mid Y_{i1} + Y_{i0} = 1, X_{i1}, X_{i0}, \delta, \beta, \gamma) = f\left(\delta + \beta(X_{i1}^* - X_{i0}^*) + \gamma X_{i1}\right). \qquad (2)$$

In an application of equation (2) to audit data, only a subset of the explanatory variables (identified with an asterisk) appears in $(X_{i1}^* - X_{i0}^*)$, because most of the X's are assigned to be equal across teammates. The conditioning on the sum of outcomes substantially reduces the sample size. Only the audits in which teammates are treated differently stay in the final subsample for the regression, but Chamberlain (1980) proves that this approach yields consistent

estimates of the population parameters subject to mild restrictions on the rate at which the sequence of α_i's is allowed to become unbounded.

Ondrich, Stricker, and Yinger (1998) show that the estimate of discrimination can be interpreted as a national average estimate if the interaction terms are expressed as deviations from the (nationally representative) sample averages. With this refinement, equation (2) becomes:

$$\Pr(Y_{i1} - Y_{i0} = 1 \mid Y_{i1} + Y_{i0} = 1, X_{i1}, X_{i0}, \delta_w, \beta, \gamma) = f\left(\delta_w + \beta(X_{i1}^* - X_{i0}^*) + \gamma(X_{i1} - \bar{X}_1)\right), \qquad (3)$$

where $\bar{X}_1$ is the weighted national mean of X_{i1} and $\delta_w = \delta + \gamma \bar{X}_1$.[13] With this formulation, δ_w captures any systematic difference in treatment across teammates that arises even if white and minority auditors are identical, i.e., $X_{i1} = X_{i0}$, and the white auditor is an average homebuyer, i.e., $X_{i1} = \bar{X}_1$. This difference can be interpreted as a measure of racial or ethnic discrimination, so a significance test for δ_w is a test of the null hypothesis that no discrimination exists.[14] In addition, elements of γ indicate whether the impact of minority status on treatment varies with X, and, as we will see, provide tests of hypotheses about the causes of discrimination.

In this logit model, δ_w shows the impact of minority status on the log odds of favorable treatment and therefore does not directly indicate the probability of discrimination. Under the assumptions of $X_{i1} = X_{i0}$ and $X_{i1} = \bar{X}_1$, e^{δ_w} is equal to the ratio of the white and minority odds of favorable treatment, R, defined as $R = \dfrac{P_w}{1 - P_w} \bigg/ \dfrac{P_m}{1 - P_m}$, where P_w and P_m represent the probabilities of favorable treatment of the white and minority auditors, respectively. One way to interpret the magnitude of the odds-ratio measure, δ_w, is to translate it into a probability measure using the assumption that P_m falls short of P_w by a fixed amount, d, which is called a fixed absolute gap (Ondrich, Stricker, and Yinger 1998).[15] This gap is given by $d = \dfrac{P_w(R-1)(1-P_w)}{P_w + R(1-P_w)}$.

Data

This paper studies a variety of brokers' discrete choices in three broad categories. The first category is related to housing availability, including whether the advertised unit was available, whether similar units were available, whether the advertised unit was shown, whether similar units were shown, whether more units were recommended to an auditor than to her teammate, and whether more units were shown to an auditor than to her teammate.[16] These variables reflect crucial treatments in which discrimination directly blocks minority access to housing. The second category indicates whether the broker made an effort to speed the sale of a housing unit to the auditor. Two variables, namely, whether the broker told the auditor that she was qualified to buy a home and whether the agent made a follow-up contact, belong to this group.[17] The last category is about financing assistance, including whether the agent volunteered to help the auditor find financing, whether the agent discussed downpayment, whether the agent pre-qualified the auditor for financing, and whether the agent suggested lenders. Compared with Ondrich, Stricker, and Yinger (1998), this paper examines three new variables in housing availability (*similar units available*, *more units recommended*, and *more units shown*), three new variables in financing assistance (*downpayment discussed*, *pre-qualified buyer for financing*, and *lenders suggested*), and one new variable in sales effort (*qualified auditor for buying*).[18]

Tables 1 and 2 present the incidence of treatments, with no statistical controls, for the black/white and Hispanic/white audits, respectively. In each table, the first two entries are the weighted shares of audits in which favorable action was taken for whites and for minorities, respectively. The final entry records the difference between these two shares, often called the net incidence of unfavorable treatment. For the black/white audits, all net incidence measures are positive, ranging from 0.007 (or 0.7 percent) for *advertised unit available* to 0.125 for *more units shown*. For the Hispanic/white audits, all net incidence measures are positive except for

advertised unit available, *advertised unit inspected*, and *more units shown*. The other net incidence values fall between 0.011 for *follow-up contact made* and 0.111 for *financial help offered*.

Table 3 lists the explanatory variables in our data set. These variables can be classified into four groups: basic variables, auditors' true characteristics, month and site dummies, and neighborhood characteristics for the advertised unit. Each of these groups can be entered as a difference between teammates ($(X_{i1}^* - X_{i0}^*)$ in equation (3)) or as the value for the white teammate relative to the national average ($(X_{i1} - \overline{X}_1)$ in equation (3)). The first versions of these variables insulate the estimates of discrimination from bias due to differences in observable teammate characteristics; the second versions help test hypotheses about the causes of discrimination. The links to such hypotheses are explained in Section 9.

The basic variables include auditor characteristics, such as age, sex, and assigned income; agent characteristics such as race, sex, and age; and agency characteristics, such as whether a multiple listing service was used. True characteristics cover the auditor's actual socioeconomic information along with home seeking and auditing experience. The socioeconomic information includes income, education, employment, and immigration status. Three dummy variables indicate the auditor's home seeking experience, including whether she lived in the audit metropolitan area, whether she was a homeowner, and whether she was actually hunting for a home. Neighborhood characteristics include racial and ethnic composition, median house value, per capita income, and percentage of owner-occupied housing units for the census tract in which the advertised unit was located.[19]

Differences between teammates in their actual characteristics might affect differences in their treatment, so an analysis that controls for these differences might paint a different picture of unfavorable treatment than the simple percentages in Tables 1 and 2. An auditor with experience in home seeking might be treated better, for example, because she knows more about the local

housing market and the buying process and can ask better questions. Auditing experience may help the auditor present herself in a more professional way and may also lead to better treatment. The addition of these variables therefore represents a significant advance over Ondrich, Stricker, and Yinger (1998).   Although the explanatory variables other than the auditor's true characteristics are similar to those in Ondrich, Stricker, and Yinger (1998), we also add three new neighborhood characteristics (median house value, per capita income, and percentage of owner-occupied housing units) and one new agency characteristic (whether the agency used the Internet). [20]

Audit teammates shared assigned factors but differed in their true characteristics and in the characteristics of the agents they encountered.   Tables 4 and 5 provide information on the magnitude of these differences.   Table 4 shows that, compared with their teammates, black auditors had higher actual incomes, and higher probabilities of having a job and of actually hunting for a home, while white auditors had more education and were more likely to live in the audit metropolitan area.   Table 5 shows that compared with their teammates, Hispanic auditors also had higher actual incomes and a higher probability of being employed, while white auditors had more education and were more likely to be homeowners.   It also demonstrates that 20 percent of Hispanic auditors had a discernible accent and that the difference in darkness of skin tone between Hispanics and whites is significant.   Overall, white and minority teammates did not encounter agents with significantly different characteristics, but they did differ on several true characteristics—differences that need to be considered in estimating discrimination.

Testing the Hypothesis that Discrimination Exists

Our first major question is: "Does housing discrimination exist?" The answer to this question is affirmative if the estimated δ_w in equation (3) is positive and statistically significant. Tables 6 and 7 present the estimation results for each type of treatment for the black/white and

Hispanic/white audits, respectively. The first column of each table is the number of observations, that is, the number of audits in which teammates were treated differently. Other entries are the estimated values of δ_w with different sets of explanatory variables. The first estimates (in the second column) are based on regressions with the basic variables, entered as both the difference in the variable between teammates and the value for the white auditor (relative to the national mean). The estimates in the third column add differences in audit teammates' true characteristics; when compared with the estimates in the second column, these estimates indicate whether the inclusion of these differences alters the estimate of δ_w. The estimates in the fourth column add white auditors' true characteristics (expressed as a deviation from the weighted sample mean). The other columns are based on regressions that successively add month and site dummies, and neighborhood characteristics, all interacted with race variable and expressed as deviations from the national average. Once added, each block of variables is retained in subsequent columns. Any estimate with a p-value below 5 percent for a two-tailed test is regarded as statistically significant.

First, consider the estimates of δ_w in the last column of Table 6, which we believe are the most reliable estimates. For the black/white audits, in the category of housing availability, $\hat{\delta}_w$ is positive and significant for *similar units inspected*, *more units recommended*, and *more units shown*. Discrimination is also found in sales effort for *qualified auditor for buying* and in financing assistance for *downpayment discussed* and *pre-qualified buyer for financing*.

Most of these results for the black/white audits are robust to changes in the explanatory variables. The six significant estimates of δ_w in the last column also have the p-values below 5 percent in all previous columns. For these variables, the estimated magnitudes are larger in the last column than in the second column for every result except for *more units recommended*; that is, adding controls tends to raise the estimated level of discrimination. In contrast, the addition

of differences in teammates' true characteristics (that is, moving from the second column to the third column) raises the p-value from below 5 percent to above 5 percent in two cases: *similar units available* and *follow-up contact made*. For these variables, a failure to observe these variables could lead to an overstatement of the magnitude and statistical significance of discrimination.[21]

For the Hispanic/white audits, we find less evidence of discrimination. No estimate of δ_w in the last column of Table 7 is significant for a variable describing housing availability or sales effort. In the category of financing assistance, $\hat{\delta}_w$ is positive and significant for *financial help offered* and *lenders suggested*. The result for *downpayment discussed* is significant at the two-tailed 10 percent level, which provides weak evidence of discrimination.

The results for *financial help offered* and *lenders suggested* are quite robust across specifications, but some other results are strongly affected by the addition of controls. Adding differences in teammates' true characteristics pushes the p-values for two variables, namely, *similar units available* and *pre-qualified buyer for financing*, from below 5 percent to above 5 percent, and the addition of other variables raises these p-values even more. Another variable, *follow-up contact made*, almost becomes significant when teammate differences in true characteristics are included (with a p-value of 5.1 percent), but it is not close to significant in a regression that includes all the explanatory variables. Moreover, the result for *downpayment discussed*, which is highly significant with basic variables, is not affected by the inclusion of teammate differences but has a p-value of only 8.2 percent in the final column. These results remind us that controls for differences in auditors' true characteristics can shift the results in either direction and that other controls are needed, as well.

Overall, the results demonstrate the continuing existence of housing discrimination. Blacks face discrimination in a wide range of agents' actions, whereas Hispanics are treated unfairly with regard to financing assistance. For the most part, brokers do not block minorities

from gaining access to the advertised units, but they continue to take discriminatory actions in recommending and showing similar units. This may reflect the behavior, documented by Ondrich, Ross, and Yinger (2003), that brokers advertise the units they are most willing to sell to minorities while strictly controlling other houses.

The Probability of Discrimination

Our next question concerns the probability that a minority home seeker encounters discrimination. Tables 8 and 9 present the probability measures derived earlier for the subset of agent's actions involving discrimination (as indicated by a positive and significant $\hat{\delta}_w$) for the black/white and Hispanic/white audits, respectively. In each table, the first entry reports the simple net incidence measure with no controls, which is copied from Table 1 or 2, and the second entry shows the fixed absolute gap measure.

The results for the black/white audits in Table 8 indicate that the estimated fixed absolute gap ranges from 14.6 percent (*similar units inspected*) to 39.5 percent (*pre-qualified buyer for financing*). Except in the case of *similar units inspected*, the estimates are always above 25 percent, which shows that blacks still face a disturbingly high probability of encountering discrimination for a wide range of brokers' actions. These results also indicate that the multivariate estimate of the probability of discrimination significantly exceeds the simple net incidence measure for all agents' actions.

Table 9 presents the results for three dependent variables for the Hispanic/white audits. The fixed absolute gap ranges from 10.8 percent (*downpayment discussed*) to 33.0 percent (*financial help offered*). These results indicate that Hispanic home seekers face a probability above 10 percent of encountering discrimination in several aspects of financial assistance provided by brokers. Moreover, as in the case of the black/white audits, adding statistical controls raises the estimated probability of discrimination.

- 12 -

The Trend in Discrimination

Comparing the results for HDS 2000 and HDS 1989 sheds light on the trend in discrimination over the last decade. This paper and Ondrich, Stricker, and Yinger (1998) have five dependent variables in common, including *advertised unit available*, *advertised unit inspected*, *similar units inspected*, *follow-up contact made*, and *financial help offered*. These variables provide an overview of treatments concerning housing availability, sales effort, and financing assistance. The results from the two studies are comparable because they are based on similar data collection efforts and the same econometric methodology.

Tables 10 and 11 present the comparison results for the black/white and Hispanic/white audits, respectively. As discussed earlier, the existence of discrimination is indicated by the significant coefficient estimate for δ_w. For the black/white audits, the 1989 study uncovers discrimination in all types of broker's actions while the 2000 study only finds one significant result, for *similar units inspected*. For the Hispanic/white audits, the 1989 study has significant $\hat{\delta}_w$ for all dependent variables except for *financial help offered*, which is the only variable for which this paper finds discrimination.

Discrimination obviously appears in fewer types of brokers' actions in 2000 than in 1989, which signals that the scope of discrimination has declined. It is particularly noteworthy that brokers appear to have stopped practicing the most direct form of discrimination, namely, discrimination in showing the advertised unit. Nevertheless, brokers continue to discriminate in showing similar units and they appear to have picked up a new type of discrimination against Hispanics, namely, in providing financing help. These conclusions are based, of course, only on the five common dependent variables and might not apply to a broader set of agents' actions.

Tables 10 and 11 also compare the estimated probabilities of discrimination for HDS 2000 and HDS 1989. Table 10 reveals a broad pattern of decline in the discrimination level for

- 13 -

the black/white audits. The drop in the simple net incidence measure ranges from 2.2 percentage points (*advertised unit inspected*) to 10.1 percentage points (*financial help offered*). The decrease in the fixed absolute gap measure is between 6.9 percentage points (*follow-up contact made*) and 11.2 percentage points (*advertised unit available*). In one case (*similar units inspected*), however, the fixed absolute gap measure actually increases by 0.9 percentage points.

As shown in Table 11, Hispanic home seekers also experienced a decline in the probability of discrimination, except in the case of *financial help offered*. For this financing variable, the increase between 1989 and 2000 is 6.7 percentage points for the simple net incidence and 26.1 percentage points for the fixed absolute gap. This is a substantial increase in the incidence of discrimination. In contrast, the probability of discrimination declines substantially for the other four agents' actions in this table, with declines of 3 to 9 percentage points for the simple net incidence and declines between 10 to 30 percentage points for the fixed absolute gap.

Hypotheses about the Causes of Discrimination

Three main causes of housing discrimination have been discussed in the literature: brokers' prejudice, white customers' prejudice, and statistical discrimination (see Yinger 1995; Ondrich, Ross, and Yinger 2003). The broker-prejudice hypothesis states that real estate agents discriminate to satisfy their own prejudice. Because measures of brokers' prejudice are not available, this hypothesis cannot be tested directly. Nevertheless, some indirect tests are available because brokers' prejudice is likely to vary with other brokers' characteristics. First, minority agents are likely to have less prejudice against their own racial or ethnic group members and thus, to discriminate less. Second, prejudice increases with the agent's age and is stronger for men than for women, so older, male agents are likely to discriminate more than younger, female agents (see Schuman, Steeh, and Bobo 1985). Third, the broker who has

resources and market power is more likely to act upon her prejudice. This paper uses whether the broker has units similar to the advertised unit and maximum number of people encountered by either auditor at the agency as proxies for the flexibility and the size of the agency.

Brokers also may have stronger prejudice against minorities who have certain characteristics. A higher level of discrimination against younger, black men than against older black men or against black women could be a sign that brokers' prejudice builds on stereotypes about the propensity of younger black men to commit crimes. In addition, brokers may be more likely to feel prejudice (and practice discrimination) against Hispanics with certain traits, such as a heavy accent or a dark skin tone.

The customer-prejudice hypothesis postulates that some brokers discriminate against minority homebuyers in order to satisfy their white clients' prejudice and thereby to preserve their current and future business with their prejudiced white customer base. The share of prejudiced whites among a broker's customers cannot be observed, of course, but we can observe where the advertised unit is located, and the location of this unit provides information about the likely location of the broker's customer base.

Prejudiced whites are opposed to neighborhood integration and may be especially upset about the entry of blacks or Hispanics into their neighborhoods when the areas are at risk of tipping, which will result in neighborhood racial transition. Black neighborhoods and Hispanic neighborhoods may be closer to the tipping point than white neighborhoods. Therefore, the customer-prejudice hypothesis predicts that discrimination against blacks or Hispanics will be higher when the advertised unit is located in a neighborhood that may tip. This hypothesis, however, does not imply higher discrimination against Hispanic home seekers in a neighborhood with many blacks, or black home seekers in a neighborhood with many Hispanics. In the first case, prejudiced whites may be more concerned with new black entries than with new Hispanic entries; in the latter case, prejudiced whites may be more concerned with new Hispanic entries.

- 15 -

Therefore, the customer-prejudice hypothesis is consistent with lower discrimination against blacks in Hispanic neighborhoods and lower discrimination against Hispanics in black neighborhoods.

Ondrich, Stricker, and Yinger (1998) also propose that neighborhoods full of prejudiced white homeowners are more threatened by the entry of blacks than are white renter neighborhoods, so this hypothesis also predicts that discrimination increases with the percentage of housing units that are owner-occupied. We extend this logic to consider neighborhood incomes and house values. In other words, we hypothesize that the concerns of prejudiced white customers about the entry of minorities into their neighborhood increase with house values and incomes, and we test this hypothesis by determining whether discrimination is higher in neighborhoods where average house values and incomes are higher.

The prejudice of a broker's white clients may also depend on the characteristics of the minority homebuyer. White customers may have stronger prejudice against minorities who are younger or who have low incomes, children, a heavy accent, or dark skin. An aversion to minority families with children, for example, might arise because of concerns about school integration. The broker-prejudice hypothesis and the customer-prejudice hypothesis make the same prediction for three of these variables (auditor's age, accent, and skin color), so the estimated coefficients on these three variables cannot be used to distinguish between these two hypotheses.

Finally, agents' incentives to cater to the prejudice of their white clients may depend on their own characteristics. If a broker works for a large real estate agency, for example, she is less likely to be restricted to a set of prejudiced white clients, and an older broker may have a more established reputation that is less threatened by perceptions about a single transaction involving a minority purchaser. These examples suggest that older brokers and brokers in large agencies are less likely to discriminate. Moreover, if a broker works in an agency using a multiple listing

directory or the Internet to serve customers, she can employ these tools to steer minorities away from the neighborhood where the sale may offend hostile white clients and therefore may feel less need to discriminate in other types of actions.

The last hypothesis is that agents practice statistical discrimination, defined as using membership in a certain group as a signal about unobserved preferences or constraints that might influence the broker's profits. Brokers may, for example, presume either that minority home seekers prefer living near people in their own racial or ethnic group instead of in a largely white neighborhood, or that lenders refuse to grant loans to minorities in white neighborhoods. If so, brokers may believe that showing housing in white neighborhoods to minority customers is a poor use of their time.

As explained earlier, our data set contains information on auditors' true characteristics. These characteristics are difficult to link to hypotheses about the causes of discrimination largely because they cannot be directly observed by agents (with the exception of accent and skin tone for Hispanics). Nevertheless, auditors might send signals about these characteristics during their conversations with brokers, or these characteristics might be proxies for observable traits, such as articulateness or aggressiveness. Because we do not know whether these characteristics, or variables correlated with them, are observed by brokers, we cannot clearly link them to any hypotheses. As a result, we include interactions with these characteristics in our regressions to see whether they are associated with variation in discrimination, but we regard these interaction variables as exploratory and interpret them cautiously and on a case-by-case basis.

Testing Hypotheses about the Causes of Discrimination

We test hypotheses about the causes of discrimination through the interaction terms in equation (3). Our results are presented in Tables 12 (black/white audits) and 13 (Hispanic/white audits). These tables only present results for agents' actions that appear to involve

discrimination. In addition, the results in these tables are based on regressions with a complete set of interaction variables. Virtually all of the significant results in these tables are also significant if they are included in more parsimonious regressions.

The six regressions in Table 12 reveal several clues about the causes of discrimination against black homebuyers. First, as the broker-prejudice hypothesis predicts, black brokers are less likely to discriminate against black customers in *similar units inspected*. Second, black homebuyers are less likely to encounter discrimination in *similar units inspected*, *downpayment discussed*, and *pre-qualified buyer for financing* when the advertised units are in Hispanic neighborhoods (defined as tracts in which Hispanics make up more than 15 percent of the population) than in white neighborhoods. This result is consistent with the customer-prejudice hypothesis.[22] Third, for *more units recommended*, brokers who use the Internet to serve clients discriminate less than other brokers. This result supports the customer-prejudice hypothesis. Fourth, for *qualified auditor for buying*, two significant results show the evidence of white customers' prejudice: older agents are less likely to discriminate and discrimination increases with per capita income of the advertised unit's neighborhood. Fifth, in the regression for *pre-qualified buyer for financing*, the probability of discrimination decreases with the broker's age, which supports the customer-prejudice hypothesis. Finally, black females are more likely than black males to encounter discrimination in *pre-qualified buyer for financing*. This result suggests either that brokers' stereotypes about black customers do not have the simple form hypothesized earlier or else that brokers do not think black females are likely to obtain a mortgage (an example of statistical discrimination).

As shown in Table 13, only a few interaction terms are significant for the Hispanic/white audits. For *financial help offered*, we find that older Hispanic home seekers encounter less discrimination than younger ones, which is consistent with both the broker-prejudice and customer-prejudice hypotheses. For *downpayment discussed*, a Hispanic auditor with a heavy

accent faces a higher probability of discrimination than one with no accent, which supports both the broker-prejudice and customer-prejudice hypotheses, as well. Finally, for *lenders suggested*, the negative sign on the variable indicating that the broker uses the Internet reinforces the comparable result for the black/white audits and is consistent with incentives linked to white customers' prejudice.

In both Tables 12 and 13, several true auditor characteristics have significant coefficients. For the black/white audits, actual homeowners encounter less discrimination for both *similar units inspected* and *more units shown.* Although information on actual homeownership was not directly observed by brokers, it may have been indirectly revealed to them during the interview. Compared with renters, for example, homeowners are likely to be more familiar with the process of buying a house and to know more about the local housing market. It is important to note, however, that this variable is not picking up a difference in true homeownership between audit teammates; instead, it indicates that differences in treatment between blacks and whites are not as great when **both** auditors seem to know more about the local housing market (or otherwise reveal their actual homeownership). To put it another way, the signals that come from being an actual homeowner, whatever they are, have a larger impact on the treatment of blacks than on the treatment of whites.

In addition, Table 12 reveals that the level of discrimination for both *downpayment discussed* and *pre-qualified buyer for financing* declines when both teammates were foreign-born. Agents may be able to infer an auditor's foreign birth from something that is said in the conversation—or by hearing an accent. This result suggests that they can make this inference and that it has a more favorable impact on black than on white auditors. One possible explanation of this finding is that brokers' prejudice (or their anticipated prejudice from white customers) is linked to black people who grow up in America, not to foreign-born blacks.

Table 13 indicates that, for the Hispanic/white audits, auditing experience is associated with more discrimination for both *financial help offered* and *lenders suggested*. The literal interpretation of this result is that when teammates both had auditing experience the Hispanic auditor was more likely to be discriminated against. However, we do not believe that is the story. This result is difficult to interpret because neither the conversation between the auditor and the broker nor the auditor's behavior during the audit can reveal anything about the auditor's auditing experience information to the broker. As a result, there is no reason to believe that auditing experience itself triggered more unfavorable treatments for Hispanics than for whites. Instead, auditing experience might be linked to the accuracy with which the auditors filled out the survey forms. If so, this result might indicate that improved reporting quality as a result of previous auditing experience may be more significant for Hispanics than for whites, which could help uncover more cases of discrimination.[23]

Finally, we find significant interaction terms for three true auditor characteristics, but we cannot explain what these findings mean. Specifically, for the black/white audits (Table 12), we find that discrimination in *pre-qualified buyer for financing* increases with the level of auditors' education. In the case of the Hispanic/white audits (Table 13) discrimination in *financial help offered* increases with auditors' true incomes, and discrimination in *downpayment discussed* decreases when both auditors actually lived in the audit metropolitan area.

In summary, our results support the hypotheses that both brokers' prejudice and the prejudice of brokers' white customers are the causes of housing discrimination, but we do not rule out the possibility that other causes are at work. Moreover, these results also indicate that the causes of housing discrimination may vary from one type of brokers' behavior to the next and are not necessarily the same for blacks and Hispanics. These findings are consistent with those of Ondrich, Stricker, and Yinger (1998) for HDS 1989.

Conclusions

Our analysis of the data from HDS 2000 indicates that black and Hispanic home seekers still encounter discrimination in the housing sales market. Indeed, for some types of brokers' behavior, the probability of discrimination is still disturbingly high. Nevertheless, we also find that both the scope of discrimination and the probability that it will be encountered in any particular agent's action have diminished sharply since 1989. This finding indicates that the housing market situation has improved for black and Hispanic buyers over the last fifteen years. One possible explanation for this improvement is the enactment of the 1988 amendments to the Fair Housing Act, which significantly boosted the federal government's enforcement powers. We also find that discrimination still appears to be caused by both brokers' prejudice and white customers' prejudice, although we cannot rule out other possible explanations. This finding indicates that there is an ongoing role both for education, which may help to eliminate brokers' prejudice, and active anti-discrimination enforcement, which may help to offset the economic incentives that apparently lead some brokers to discriminate. Finally, we find that the addition of auditors' true characteristics sometimes has a significant impact on the estimated probability of discrimination and that these characteristics are correlated with some types of broker discrimination. Further investigation of these findings is clearly warranted.

Table 1. The Incidence of Treatments, Black/White Audits

Broker's Action	Probability of Action for		Net Incidence[a]
	White	Black	
Advertised unit available	0.674	0.667	0.007
Similar units available	0.680	0.645	0.035
Advertised unit inspected	0.492	0.457	0.035
Similar units inspected	0.480	0.411	0.069
More units recommended	0.461	0.356	0.105
More units shown	0.435	0.310	0.125
Follow-up contact made	0.313	0.291	0.022
Qualified auditor for buying	0.314	0.235	0.079
Financial help offered	0.586	0.574	0.012
Downpayment discussed	0.453	0.377	0.076
Pre-qualified buyer for financing	0.426	0.346	0.080
Lenders suggested	0.575	0.560	0.015

Note:

a. Net incidence=the share of audits in which favorable action was taken for white auditors minus the share of audit in which favorable action was taken for black auditors.

Table 2. The Incidence of Treatments, Hispanic/White Audits

Broker's Action	Probability of Action for		Net Incidence[a]
	White	Hispanic	
Advertised unit available	0.681	0.716	-0.035
Similar units available	0.740	0.705	0.035
Advertised unit inspected	0.490	0.519	-0.029
Similar units inspected	0.501	0.472	0.029
More units recommended	0.453	0.395	0.058
More units shown	0.357	0.381	-0.024
Follow-up contact made	0.338	0.327	0.011
Qualified auditor for buying	0.326	0.300	0.026
Financial help offered	0.657	0.546	0.111
Downpayment discussed	0.516	0.425	0.091
Pre-qualified buyer for financing	0.462	0.415	0.047
Lenders suggested	0.627	0.574	0.053

Note:

a. Net incidence=the share of audits in which favorable action was taken for white auditors minus the share of audits in which favorable action was taken for Hispanic auditors.

Table 3. Explanatory Variables[a]

Basic Variables

Standard Auditor Characteristics

Auditor's age	Auditor's age
Auditor female	Whether the auditor was female
Auditor married	Whether the auditor's assigned role was married
Auditor parent	Whether the auditor's assigned role was parent
Auditor's assigned income	Auditor's assigned monthly family income ($000)

Audit Characteristics

White auditor first	Whether the white auditor visited the agency first
Audit in afternoon	Whether the audit took place in the afternoon

Agent/Agency Characteristics

Agent black	Whether the agent was black (black/white audits only)
Agent Hispanic	Whether the agent was Hispanic (Hispanic/white audits only)
Agent female	Whether the agent was female
Agent's age	Agent's age (estimated by auditor)
Agency size	Maximum number of people encountered at the agency by either teammate
Same agent	Whether audit teammates met the same agent
Similar units available	Whether units similar to the advertised unit were available to either teammate
Multiple listing	Whether the agent referred to a multiple listing directory for either teammate
Internet	Whether the agent used the Internet for either teammate

Auditor's True Characteristics[b]

Auditor's true annual income	Auditor's true annual income
Auditor's education	Auditor's true education, in years
Auditor employed	Whether the auditor was employed

Table 3. (continued) Explanatory Variables[a]

Auditor foreign	Whether the auditor was foreign-born
Auditor homeowner	Whether the auditor was a homeowner
Auditor seeking home	Whether the auditor was currently hunting for a home
Auditor in metro area	Whether the auditor lived in the metropolitan area where the audit took place
Auditor experienced	Whether the auditor had experience conducting audits
Auditor's accent[c]	Whether the auditor had a discernable accent (Hispanic/white audits only)
Auditor's skin tone[c]	Darkness of the auditor's skin (Hispanic/white audits only)

Month and Site Dummies

Month dummies	Dummy variables to indicate the month in which the audit took place
Site dummies[d]	Dummy variables to indicate the metropolitan area in which the audit took place

Neighborhood Characteristics[b]

Black neighborhood	Whether the advertised unit was in a census tract more than 15 percent black
Hispanic neighborhood	Whether the advertised unit was in a census tract more than 15 percent Hispanic
Median house value	Median house value in the advertised unit's census tract ($000)
Per capita income	Per capita income in the advertised unit's census tract ($000)
Percentage owner	Owner-occupied housing as a share of units in the advertised unit's Census tract

Notes:

a. These variables define the *X* vector in equations (1) – (3). They enter the estimations as teammate differences (when teammate values are not identical) and as values for the white auditor (expressed as a deviation from the weighted national mean). See equation (3).

b. Four missing data variables are created to control for missing values of the auditor's true characteristics (except auditor's accent and auditor's skin tone), auditor's accent for Hispanics, auditor's skin tone for Hispanics, and neighborhood characteristics for the advertised unit, respectively.

c. For the Hispanic/white audits, auditor's accent and auditor's skin tone always have zero values for whites. The highest value of skin tone for Hispanics is 3.

d. The black/white audits were conducted at 16 sites, including Atlanta, Austin, Birmingham, Chicago, Washington D.C., Denver, Dayton, Detroit, Houston, Los Angeles, Macon County, New Orleans, New York City, Orlando, Philadelphia, and Pittsburgh. The Hispanic/white audits were conducted at 10 sites, including Austin, Chicago, Denver, Houston, Los Angeles, New York City, Pueblo, San Antonio, San Diego, and Tucson.

Table 4. Sample Means of Auditor's True Characteristics and Agent's Characteristics, Black/White Audits

	White	Black	p-Value[a]
Auditor's True Characteristics			
Auditor's true annual income[b]	2.838	3.161	0.000
Auditor's education	15.570	15.119	0.000
Auditor employed	0.613	0.719	0.000
Auditor foreign	0.110	0.119	0.518
Auditor homeowner	0.469	0.446	0.313
Auditor seeking home	0.065	0.299	0.000
Auditor in metro area	0.955	0.899	0.000
Auditor experienced	0.266	0.291	0.221
Agent Characteristics			
Agent black	0.066	0.061	0.657
Agent female	0.583	0.612	0.170
Agent's age[c]	2.418	2.418	0.974

Notes:

a. p-value is the level of significance for difference of means for whites and blacks.

b. Auditor's true annual income is coded as 1=under $10,000, 2=$10,000-19,999, 3=$20,000-29,999, 4=$30,000-39,999, 5=$40,000-49,999, 6=$50,000-74,999, 7=$75,000-100,000, and 8=over $100,000.

c. Agent's age is coded as 1=18-30, 2=31-45, 3=46-65, and 4=over 65.

Table 5. Sample Means of Auditor's True Characteristics and Agent's Characteristics, Hispanic/White Audits

	White	Hispanic	p-Value[a]
Auditor's True Characteristics			
Auditor's true annual income[b]	2.503	2.748	0.001
Auditor's education	14.799	14.328	0.000
Auditor employed	0.667	0.816	0.000
Auditor foreign	0.164	0.169	0.824
Auditor homeowner	0.401	0.321	0.002
Auditor seeking home	0.216	0.239	0.324
Auditor in metro area	0.936	0.950	0.285
Auditor experienced	0.272	0.248	0.315
Auditor's accent	0.000	0.202	0.000
Auditor's skin tone[c]	0.000	1.193	0.000
Agent Characteristics			
Agent Hispanic	0.077	0.084	0.630
Agent female	0.554	0.562	0.751
Agent's age[d]	2.336	2.437	0.190

Notes:

a. p-value is the level of significance for difference of means for whites and Hispanics.

b. Auditor's true annual income is coded as 1=under $10,000, 2=$10,000-19,999, 3=$20,000-29,999, 4=$30,000-39,999, 5=$40,000- 49,999, 6=$50,000-74,999, 7=$75,000-100,000, and 8=over $100,000.

c. Auditor's skin tone is coded as an integer between 0 and 3, where 0=white and 3=the highest darkness degree.

d. Agent's age is coded as 1=18-30, 2=31-45, 3=46-65, and 4=over 65.

Table 6. Tests of the Hypothesis that Discrimination Exists, Black/White Audits[a, b]

Broker's Action	Number of Observations[c]	Basic Variables	Auditor's True Characteristics (Differences)	Auditor's True Characteristics (Interactions)	Month and Site Dummies	Neighborhood Characteristics
Advertised unit available	340	0.066 (0.581)	-0.009 (0.947)	-0.084 (0.590)	0.044 (0.805)	0.031 (0.864)
Similar units available	373	0.347 (0.003)	0.255 (0.061)	0.202 (0.201)	0.230 (0.212)	0.235 (0.206)
Advertised unit inspected	373	0.184 (0.102)	0.118 (0.361)	0.071 (0.629)	0.084 (0.613)	0.268 (0.220)
Similar units inspected	419	0.433 (0.000)	0.377 (0.004)	0.410 (0.006)	0.600 (0.001)	0.611 (0.001)
More units recommended	875	0.310 (0.000)	0.235 (0.005)	0.212 (0.021)	0.231 (0.021)	0.217 (0.031)
More units shown	802	0.370 (0.000)	0.347 (0.000)	0.406 (0.000)	0.495 (0.000)	0.495 (0.000)
Follow-up contact made	340	0.317 (0.015)	0.065 (0.659)	0.100 (0.551)	0.074 (0.745)	0.191 (0.437)
Qualified auditor for buying	355	0.443 (0.000)	0.549 (0.000)	0.417 (0.015)	0.514 (0.029)	0.697 (0.006)
Financial help offered	383	0.059 (0.595)	0.099 (0.437)	0.177 (0.224)	0.229 (0.167)	0.220 (0.198)
Downpayment discussed	418	0.303 (0.005)	0.344 (0.007)	0.391 (0.007)	0.478 (0.003)	0.486 (0.003)
Pre-qualified buyer for financing	369	0.600 (0.000)	0.640 (0.000)	0.821 (0.000)	1.104 (0.000)	1.143 (0.000)
Lenders suggested	376	0.195 (0.086)	0.026 (0.849)	0.077 (0.622)	-0.038 (0.843)	-0.061 (0.762)

Notes:

a. The first row of Columns 2-6 lists the specifications of the explanatory variable set. Each specification includes the ones designated by all previous columns and the explanatory variable block designated by the current column. See Table 3 for details of each explanatory variable block. "Differences" are differences between teammates. "Interactions" are values for the white auditor (relative to the national average). See equation (3).

b. The cells of Columns 2-6 give the estimated values of δ_w from equation (3). p-values are in parentheses.

c. Number of observations=number of audits in which teammates were treated differently.

Table 7. Tests of the Hypothesis that Discrimination Exists, Hispanic/White Audits[a, b]

Broker's Action	Number of Observations[c]	Basic Variables	Auditor's True Characteristics (Differences)	Auditor's True Characteristics (Interactions)	Month and Site Dummies	Neighborhood Characteristics
Advertised unit available	196	-0.075 (0.661)	0.012 (0.952)	-0.034 (0.876)	-0.200 (0.471)	-0.235 (0.408)
Similar units available	229	0.311 (0.045)	0.305 (0.090)	0.037 (0.869)	-0.150 (0.623)	-0.221 (0.517)
Advertised unit inspected	259	-0.119 (0.424)	-0.102 (0.532)	-0.340 (0.104)	-0.461 (0.073)	-0.440 (0.210)
Similar units inspected	259	0.272 (0.061)	0.292 (0.064)	0.251 (0.189)	0.124 (0.601)	0.160 (0.505)
More units recommended	609	0.104 (0.234)	0.092 (0.331)	0.044 (0.704)	0.150 (0.251)	0.150 (0.260)
More units shown	518	0.010 (0.914)	0.022 (0.836)	-0.048 (0.705)	-0.119 (0.422)	-0.155 (0.319)
Follow-up contact made	205	0.290 (0.102)	0.400 (0.051)	-0.015 (0.955)	0.239 (0.448)	0.320 (0.337)
Qualified auditor for buying	250	0.148 (0.356)	0.062 (0.736)	-0.060 (0.797)	-0.068 (0.821)	-0.075 (0.810)
Financial help offered	234	0.822 (0.000)	0.917 (0.000)	1.340 (0.000)	1.400 (0.000)	1.374 (0.000)
Downpayment discussed	280	0.575 (0.000)	0.498 (0.001)	0.506 (0.012)	0.439 (0.070)	0.438 (0.082)
Pre-qualified buyer for financing	235	0.338 (0.028)	0.313 (0.063)	0.217 (0.297)	0.085 (0.756)	0.110 (0.693)
Lenders suggested	227	0.492 (0.002)	0.472 (0.006)	0.507 (0.026)	0.509 (0.096)	0.695 (0.038)

Notes:

a. The first row of Columns 2-6 lists the specifications of the explanatory variable set. Each specification includes the ones designated by all previous columns and the explanatory variable block designated by the current column. See Table 3 for details of each explanatory variable block. "Differences" are differences between teammates. "Interactions" are values for the white auditor (relative to the national average). See equation (3).

b. The cells of Columns 2-6 give the estimated values of δ_w from equation (3). p-values are in parentheses.

c. Number of observations=number of audits in which teammates were treated differently.

Table 8. Approximations of the Probability of Discrimination, Black/White Audits

Broker's Action	Net Incidence[a]	Fixed Absolute Gap[b]
Similar units inspected	0.069	0.146
More units recommended	0.105	0.263
More units shown	0.125	0.305
Qualified auditor for buying	0.079	0.256
Downpayment discussed	0.076	0.313
Pre-qualified buyer for financing	0.080	0.395

Notes:

a. Net incidence=the share of audits in which favorable action was taken for white auditors minus the share of audits in which favorable action was taken for black auditors.

b. Fixed absolute gap=fixed amount by which the probability of favorable treatment of blacks falls short of the probability of favorable treatment of whites.

Table 9. Approximations of the Probability of Discrimination, Hispanic/White Audits

Broker's Action	Net Incidence[a]	Fixed Absolute Gap[b]
Financial help offered	0.111	0.330
Downpayment discussed	0.091	0.108
Lenders suggested	0.053	0.171

Notes:

a. Net incidence=the share of audits in which favorable action was taken for white auditors minus the share of audits in which favorable action was taken for Hispanic auditors.

b. Fixed absolute gap=fixed amount by which the probability of favorable treatment of Hispanics falls short of the probability of favorable treatment of whites.

Table 10. Comparing the HDS 2000 Results with the HDS 1989 Results, Black/White Audits

Broker's Action	$\hat{\delta}_w$ [a]		Net Incidence [b]			Fixed Absolute Gap [c]		
	2000	1989[d]	2000	1989[d]	2000-1989	2000	1989[d]	2000-1989
Advertised unit available	0.031	0.860*	0.007	0.076	-0.069	0.007	0.119	-0.112
Advertised unit inspected	0.268	0.607*	0.035	0.057	-0.022	0.066	0.149	-0.083
Similar units inspected	0.611*	0.690*	0.069	0.091	-0.022	0.146	0.137	0.009
Follow-up contact made	0.191	0.655*	0.022	0.093	-0.071	0.039	0.108	-0.069
Financial help offered	0.220	0.706*	0.012	0.113	-0.101	0.054	0.147	-0.093

Notes:

a. * stands for significance at the two-tailed 5 percent level.

b. Net incidence=the share of audits in which favorable action was taken for white auditors minus the share of audits in which favorable action was taken for black auditors.

c. Fixed absolute gap=fixed amount by which the probability of favorable treatment of blacks falls short of the probability of favorable treatment of whites.

d. The HDS 1989 results come from Table 3 of Ondrich, Stricker, and Yinger (1998), with a correction of typographical error of the fixed absolute gap for advertised unit available. The value in their table was 0.134, whereas the correct value is 0.119.

Table 11. Comparing the HDS 2000 Results with the HDS 1989 Results, Hispanic/White Audits

Broker's Action	$\widehat{\delta}_w$ [a]		Net Incidence[b]			Fixed Absolute Gap[c]		
	2000	1989[d]	2000	1989[d]	2000-1989	2000	1989[d]	2000-1989
Advertised unit available	-0.235	1.483*	-0.035	0.038	-0.073	-0.049	0.246	-0.295
Advertised unit inspected	-0.440	0.784*	-0.029	0.054	-0.083	-0.109	0.189	-0.298
Similar units inspected	0.160	0.774*	0.029	0.063	-0.034	0.040	0.153	-0.113
Follow-up contact made	0.320	1.338*	0.010	0.057	-0.047	0.067	0.168	-0.101
Financial help offered	1.374*	0.306	0.111	0.044	0.067	0.330	0.069	0.261

Notes:

a. * stands for significance at the two-tailed 5 percent level.

b. Net incidence=the share of audits in which favorable action was taken for white auditors minus the share of audits in which favorable action was taken for Hispanic auditors.

c. Fixed absolute gap=fixed amount by which the probability of favorable treatment of Hispanics falls short of the probability of favorable treatment of whites.

d. The HDS 1989 results come from Table 4 of Ondrich, Stricker, and Yinger (1998).

Table 12. Tests of Hypotheses about the Causes of Discrimination, Black/White Audits[a]

	Similar Units Inspected[b]		More Units Recommended		More Units Shown	
	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
Basic Variables						
Auditor's age	0.041	0.074	-0.019	0.119	-0.009	0.504
Auditor female	-0.486	0.168	-0.162	0.408	-0.229	0.299
Auditor married	0.315	0.413	-0.027	0.904	-0.052	0.835
Auditor parent	0.063	0.849	-0.258	0.136	-0.152	0.436
Auditor's assigned income	-0.013	0.830	0.060	0.070	0.047	0.207
Agent black	-1.664	0.009	-0.279	0.427	-0.550	0.170
Agent female	-0.302	0.387	0.034	0.856	0.152	0.474
Agent age	-0.170	0.494	-0.142	0.311	-0.212	0.172
Agency size	0.015	0.934	-0.028	0.789	-0.155	0.174
Similar units available	-	-	0.022	0.937	0.339	0.279
Multiple listing	0.464	0.141	-0.184	0.286	0.031	0.873
Internet	0.808	0.081	-0.508	0.044	0.168	0.572
Auditor's True Characteristics						
Auditor's true annual income	-0.296	0.074	-0.036	0.682	-0.039	0.705
Auditor's education	0.128	0.295	-0.059	0.367	0.075	0.304
Auditor employed	-0.168	0.766	0.018	0.951	-0.059	0.853
Auditor foreign	-0.228	0.783	0.124	0.754	-0.403	0.366
Auditor homeowner	-1.604	0.004	0.089	0.760	-0.730	0.026
Auditor seeking home	0.864	0.254	0.158	0.683	-0.153	0.725
Auditor in metro area	0.226	0.845	0.616	0.244	0.866	0.183
Auditor experienced	-0.995	0.106	0.128	0.700	0.311	0.402
Neighborhood Characteristics						
Black neighborhood	0.409	0.326	-0.047	0.843	-0.150	0.569
Hispanic neighborhood	-0.981	0.035	-0.325	0.240	-0.374	0.225
Median house value	0.001	0.653	-0.002	0.201	-0.001	0.704
Per capita income	-0.002	0.797	0.006	0.451	0.002	0.831
Percent owner	0.001	0.917	0.005	0.258	0.004	0.425

Table 12. (continued) Tests of Hypotheses about the Causes of Discrimination, Black/White Audits

	Qualified Auditor for Buying		Downpayment Discussed		Pre-Qualified Buyer for Financing	
	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
Basic Variables						
Auditor's age	-0.012	0.630	0.024	0.206	-0.001	0.969
Auditor female	0.245	0.572	0.425	0.188	0.975	0.011
Auditor married	0.274	0.532	-0.564	0.127	-0.434	0.303
Auditor parent	-0.343	0.344	0.451	0.131	-0.326	0.350
Auditor's assigned income	-0.003	0.969	0.035	0.512	0.064	0.290
Agent black	1.027	0.181	-0.092	0.879	0.082	0.907
Agent female	-0.093	0.810	0.534	0.082	-0.066	0.859
Agency size	0.161	0.460	0.330	0.068	-0.029	0.890
Similar units available	0.825	0.096	0.520	0.149	-0.366	0.422
Multiple listing	0.345	0.317	0.250	0.400	-0.016	0.962
Internet	0.617	0.299	-0.217	0.629	0.275	0.606
Auditor's True Characteristics						
Auditor's true annual income	0.097	0.618	0.148	0.312	0.144	0.394
Auditor's education	-0.003	0.982	-0.006	0.953	0.268	0.042
Auditor employed	-0.552	0.361	0.082	0.863	-0.775	0.163
Auditor foreign	-0.080	0.913	-2.603	0.000	-1.492	0.033
Auditor homeowner	0.350	0.577	-0.167	0.717	0.143	0.779
Auditor seeking home	0.969	0.228	-0.655	0.359	-0.538	0.507
Auditor in metro area	-0.459	0.705	-0.068	0.943	0.569	0.639
Auditor experienced	0.081	0.907	-0.423	0.431	-0.915	0.128
Neighborhood Characteristics						
Black neighborhood	-0.837	0.085	-0.170	0.681	0.419	0.344
Hispanic neighborhood	0.016	0.980	-1.207	0.012	-1.229	0.036
Median house value	-0.004	0.245	-0.002	0.397	-0.003	0.382
Per capita income	0.047	0.030	0.013	0.383	0.027	0.140
Percent owner	-0.012	0.180	-0.009	0.199	-0.001	0.909

Notes:

a. Each dependent variable is regressed on the complete set of explanatory variables, in Table 3, both in the form of teammate differences (if they exist) and in the form of values for the white auditor (expressed as a deviation from the weighted national mean). See equation (3). Only the second form of the variable is reported here, since it is the one that tests hypotheses about the causes of discrimination.

b. The white auditor/similar units available interaction is dropped out of the regression for *similar units inspected* because there is no variation in the variable when the value of the dependent variable is 1.

Table 13. Tests of Hypotheses about the Causes of Discrimination, Hispanic/White Audits[a]

	Financial Help Offered		Downpayment Discussed		Lenders Suggested	
	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
Basic Variables						
Auditor's age	-0.088	0.006	-0.030	0.224	-0.056	0.058
Auditor female	0.536	0.316	-0.362	0.353	0.342	0.540
Auditor married	0.833	0.186	0.582	0.277	0.934	0.102
Auditor parent	-0.026	0.958	0.004	0.992	-0.771	0.102
Auditor's assigned income	-0.069	0.454	-0.143	0.052	-0.140	0.083
Agent Hispanic	-0.805	0.382	-0.871	0.315	0.336	0.678
Agent female	-0.431	0.448	0.480	0.265	0.503	0.329
Agent age	0.586	0.152	0.106	0.741	0.130	0.738
Agency size	-0.065	0.810	0.377	0.096	0.210	0.432
Similar units available	0.050	0.937	0.794	0.120	0.496	0.429
Multiple listing	-0.654	0.269	-0.370	0.382	-0.616	0.231
Internet	-1.270	0.106	0.044	0.944	-1.312	0.033
Auditor's True Characteristics						
Auditor's accent	-0.979	0.283	-2.663	0.001	-1.407	0.096
Auditor's skin tone	-0.258	0.538	-0.412	0.175	0.022	0.955
Auditor's true annual income	0.991	0.002	0.082	0.754	0.439	0.175
Auditor's education	0.342	0.097	0.132	0.440	-0.096	0.641
Auditor employed	0.282	0.762	0.293	0.727	-0.611	0.542
Auditor foreign	-0.572	0.672	0.245	0.806	-0.450	0.698
Auditor homeowner	-0.936	0.361	-0.898	0.245	-0.077	0.936
Auditor seeking home	-1.251	0.180	-1.110	0.195	-0.214	0.820
Auditor in metro area	-1.735	0.309	-4.030	0.021	0.289	0.857
Auditor experienced	2.163	0.029	0.836	0.298	2.009	0.029
Neighborhood Characteristics						
Black neighborhood	0.258	0.667	-0.448	0.335	0.470	0.366
Hispanic neighborhood	-2.059	0.069	-1.064	0.223	-1.203	0.202
Median house value	0.000	0.969	-0.001	0.778	-0.002	0.659
Per capita income	0.008	0.680	0.018	0.325	0.030	0.173
Percent owner	0.009	0.473	0.015	0.122	0.011	0.392

Note:

a. Each dependent variable is regressed on the complete set of explanatory variables, in Table 3, both in the form of teammate differences (if they exist) and in the form of values for the white auditor (expressed as a deviation from the weighted national mean). See equation (3). Except in the case of accent and skin tone, only the second form of the variable is reported here, since it is the one that tests hypotheses about the causes of discrimination.

Endnotes

* The authors are Ph.D. candidate in economics, professor of economics, and professor of economics and public administration, respectively. We are grateful to Stephen Ross for his assistance with the data. Please address all correspondence to John Yinger, Center for Policy Research, The Maxwell School, Syracuse University, Syracuse, NY 13244.

1. These figures are from U.S. Department of Housing and Urban Development (2004, Table 29), which provides definitions of these racial and ethnic groups.

2. HDS 2000 was sponsored by the U.S. Department of Housing and Urban Development and conducted by the Urban Institute, the University of Connecticut, and Syracuse University. Preliminary results from HDS 2000 are presented in Turner, Ross, Galster, and Yinger (2002). This paper builds on Chapter 7 of that report and goes beyond it thanks to additional data cleaning and the use of more explanatory variables.

3. Ondrich, Stricker, and Yinger (1999) apply the fixed-effects logit model to the rental audit data. They study landlords' discrete choices and find evidence of discrimination. Their work indicates that landlords discriminate against black and Hispanic renters based upon their own prejudice and white tenants' prejudice.

4. Yinger (1995) also provides a survey of the audit-based literature on discrimination in housing before HDS 1989.

5. For a review of steps to minimize this possibility, see Yinger (1995) or Turner et al. (2002).

6. Controlling for the auditor's true characteristics does not completely eliminate the problem because there still exist other unobservable characteristics. For an alternative approach to this problem, see Ondrich, Ross, and Yinger (2003).

7. HDS 2000 is composed of rental audits and sales audits, which are aimed at studying discrimination in the rental housing market and the sales housing market, respectively. This paper focuses on the sales part.

8. In HDS 1989, for example, some auditors were assigned to be homeowners while others were assigned to be renters. In HDS 2000 all auditors' tenure status was assigned to be renter.

9. The black/white audits were conducted in Atlanta, Austin, Birmingham, Chicago, Washington D.C., Denver, Dayton, Detroit, Houston, Los Angeles, Macon County, New Orleans, New York City, Orlando, Philadelphia, and Pittsburgh. The Hispanic/white audits were conducted in Austin, Chicago, Denver, Houston, Los Angeles, New York City, Pueblo, San Antonio, San Diego, and Tucson. These sites were also used in HDS 1989.

10. The ages of the white and minority auditors are close but not identical, so we control for age differences in our regressions.

11. The minority auditor was always assigned a slightly higher income to avoid the real estate agent's suspicion and to ensure that unfavorable treatment received by the minority auditor did not result from the lower income. The non-random income difference across teammates is not controlled for in our estimations, which might result in understating discrimination, but we think that the impact would be small because the income differences are small and brokers usually did not ask about auditors' incomes.

12. HDS 2000 also conducted some audits that were not based on an advertisement in a major newspaper. These audits are not considered here, but they exhibit similar levels of discrimination. See Turner et al. (2002).

13. A weighing system was used to account for the HDS 2000 sampling design. See Turner et al. (2002).

14. Because it compares the average treatment of white and minority auditors, δw is called a "net" measure of discrimination. As shown by Ondrich, Ross, and Yinger (2000), a net measure may understate discrimination, but can be interpreted as a lower bound estimate.

15. Ondrich, Stricker, and Yinger (1998) also derive an identical measure of the probability of discrimination by assuming that there is a fixed percentage gap between Pw and Pm.

16. A similar unit is defined as a housing unit that has the same number of bedrooms as the advertised unit.

17. A follow-up contact can be a telephone call to the auditor at home, a telephone message left at the auditor's home, a voicemail message, a postal mail, or an E-mail.

18. Ondrich, Stricker, and Yinger (1998) also study whether the broker asked about the auditor's income, whether the broker asked about the auditor's housing needs, and whether the broker invited the auditor to call back. This paper does not examine these dependent variables for the following reasons: asking the auditor about income, defined as unfavorable treatment, can be argued to be a nondiscriminatory routine action by brokers; there is no specific question about whether the auditor was asked about housing needs in the HDS 2000 report forms; an invitation to call back may not be as important as other dependent variables and also the 1989 study does not find evidence of discrimination against blacks in that behavior.

19. We define a black neighborhood and a Hispanic neighborhood as a census tract with a population more than 15 percent black and Hispanic, respectively. We have also tried 20-, 25-, and 30-percent dividing lines, black and Hispanic percentages, and whether the

combined black and Hispanic percentage is above 5, 15, or 30—all of which turn out to have no or weak explanatory power.

20.   Ondrich, Stricker, and Yinger (1998) also consider whether the broker located the office in a white neighborhood and whether the broker advertised a unit located in a central city. They argue that brokers' prejudice may simultaneously determine that she took discriminatory action, located the office in a white neighborhood, and did not advertise a unit from a minorities-concentrated central city. These explanatory variables, however, are not included in this paper for the following reasons: first, the tract number of the broker's office is not coded in HDS 2000, which makes measuring racial and ethnic composition of the agency's neighborhood impossible; second, the 1989 study does not find any indication that brokers reveal their prejudice through their office-setting and advertising choices. Hence, missing brokers' office-setting and advertising variables are not believed to affect our results.

21.   An alternative way to think about this issue is to ask whether estimations that add month and site dummies and neighborhood characteristics (which were available in 1989) to the basic variables lead to the same inferences as the "full-information" estimations in the last columns of Tables 6 and 7. The answer to this question is affirmative for *follow-up contact made* (black/white audits) and *pre-qualified buyer for financing* (Hispanic/white audits), but not for *similar units available* (both types of audit).

22.   It is also consistent with the view that non-Hispanic residents in a neighborhood with some Hispanics do not want their community to be predominated by Hispanics and thus, they would like to accept people from other minority groups, so their community could become more diverse and balanced.

23. Yinger (1995, p. 24) indicates "some early audit studies discovered that minority auditors who encountered blatant unfavorable treatment became upset and were unable to complete their audit forms in an accurate manner, thereby invalidating some audits in which discrimination was the most severe." So a Hispanic auditor with auditing experience might be better able to complete the report accurately, which could help find more discrimination.

References

Anderson, Soren T. and Richard G. Newell. 2004. Information Programs for Technology Adoption: The Case of Energy-Efficiency Audits. *Resource and Energy Economics* 26:27-50.

Chamberlain, Gary. 1980. Analysis of Covariance with Qualitative Data. *Review of Economic Studies* 47:225-238.

Christian, Charles W., Sanjay Gupta, and Suming Lin. 1993. Determinants of Tax Preparer Usage: Evidence from Panel Data. *National Tax Journal* 46:487-503.

Fisman, Raymond and Mayank Raturi. 2003. Does Competition Encourage Credit Provision? Evidence from African Trade Credit Relationships. NBER Working Paper No. 9659.

Heckman, James J. 1998. Detecting Discrimination. *Journal of Economic Perspectives* 12:101-116.

Heckman, James J. and Peter Siegelman. 1993. The Urban Institute Audit Studies: Their Methods and Findings. In *Clear and convincing evidence: Measurement of discrimination in America*, edited by Michael Fix and Raymond J. Struyk. Washington D.C.: The Urban Institute Press.

Korenman, Sanders and Christopher Winship. 1995. A Reanalysis of *the Bell Curve*. NBER Working Paper No. 5230.

Ondrich, Jan, Stephen L. Ross, and John Yinger. 2003. Now You See It, Now You Don't: Why Do Real Estate Agents Withhold Available Houses From Black Customers? *Review of Economics and Statistics* 85:854-873.

Ondrich, Jan, Stephen L. Ross, and John Yinger. 2000. How Common is Housing Discrimination? Improving on Traditional Measures. *Journal of Urban Economics* 47:470-500.

Ondrich, Jan, Alex Stricker, and John Yinger. 1999. Do Landlords Discriminate? The Incidence And Causes of Racial Discrimination in Rental Housing Markets. *Journal of Housing Economics* 8:185-204.

Ondrich, Jan, Alex Stricker, and John Yinger. 1998. Do Real Estate Brokers Choose to Discriminate? Evidence from the 1989 Housing Discrimination Study. *Southern Economic Journal* 64:880-901.

Page, Marianne. 1995. Racial and Ethnic Discrimination in Urban Housing Markets: Evidence from a Recent Audit Study. *Journal of Urban Economics* 38:183-206.

Schuman, Howard, Charlotte Steeh, and Lawrence Bobo. 1985. *Racial Attitudes in America.* Cambridge, MA: Harvard University Press.

Turner, Magery A., Stephen L. Ross, George Galster, and John Yinger. 2002. *Discrimination in Metropolitan Housing Markets: National Results from Phase I of the HDS 2000.* Washington D.C.: The U.S. Department of Housing and Urban Development.

U.S. Department of Housing and Urban Development. 2004. *U.S. Housing Market Conditions.* Washington, D.C., May.

Whittington, Leslie A. 1992. Taxes and the family: The Impact of the Tax Exemption for Dependents on Marital Fertility. *Demography* 29:215-226.

Yinger, John. 1995. *Closed Doors, Opportunities Lost: The Continuing Costs of Housing Discrimination.* New York: Russell Sage Foundation.

Yinger, John. 1986. Measuring Discrimination with Fair Housing Audits: Caught in the Act. *American Economic Review* 76:881-893.