Changes in Rental Housing Discrimination Since 1989

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Abstract

This study examines the incidence and causes of housing discrimination in qualitative treatment by rental agents, using national audit data sets from the 2000 Housing Discrimination Study (HDS 2000) and the 1989 Housing Discrimination Study (HDS 1989). Using the fixed-effects logit method described by Chamberlain (1980), we control for unobservable factors shared by audit teammates and conduct hypothesis tests for the incidence and causes of discrimination. We find evidence that discrimination is present in HDS 2000 and is caused by both the prejudice of agents and their response to the prejudice of White clients. We also explore changes in discrimination since 1989 and changes in the causes of discrimination since 1989.

As did previous studies of HDS 1989 and HDS 2000, we find that rental housing discrimination against Blacks still exists but also that it declined significantly between 1989 and 2000. These studies indicate that, since 1989, discrimination against Hispanics has not declined as much or as consistently as has discrimination against Blacks. Our new analysis yields several hints about changes in the causes of discrimination between 1989 and 2000. We find a significant increase in discrimination against Blacks by large rental housing agencies and by Hispanic rental agents. We also find significant decreases in discrimination against Hispanics by female agents and that Hispanic renters with children face less discrimination in 2000 than they did in 1989.

Section 1. Background and Introduction

Housing discrimination remains an important urban policy issue. Housing agents who discriminate may both impose financial loss on homeseekers[1] and increase social inequality. Housing discrimination may restrict access to local public goods, because these goods are directly linked to residential location. Housing discrimination may also play an important role in the labor market, especially in regard to employment opportunities, by limiting minority access to some locations. The Fair Housing Act, as amended in 1988, prohibits housing discrimination, and the federal government has supported fair housing audits to determine how much housing discrimination still exists. This study examines the current status of and changes in the incidence and causes of housing discrimination in qualitative treatment by rental agents, using audit data from two national audit studies: the 2000 Housing Discrimination Study (HDS 2000) and the 1989 Housing Discrimination Study (HDS 1989).

This research complements previous studies of HDS 1989 and HDS 2000. Our regressions add new control variables and other refinements to the analysis of the same types of behavior in Turner et al. (2002). Our analysis also overlaps to some degree with Choi, Ondrich, and Yinger (2005), but this article addresses a wider range of rental agents' behaviors. Moreover, this study is the first to explore changes in the causes of rental housing discrimination over time.

By way of preview, we find, as did previous studies, that rental housing discrimination against Blacks still exists but also that it declined significantly between 1989 and 2000. These studies indicate that, since 1989, discrimination against Hispanics has not declined as much or as consistently as has discrimination against Blacks. Our new analysis yields several hints about changes in the causes of discrimination between 1989 and 2000. We find a significant increase in discrimination against Blacks by large rental housing agencies and by Hispanic rental agents. We also find significant decreases in discrimination against Hispanics by female agents and that Hispanic renters with children face less discrimination in 2000 than they did in 1989. As discussed in the following text, these findings are linked to specific hypotheses about the causes of discrimination but are also clearly worthy of further investigation.

The Paired-Test Methodology

In the housing discrimination studies, HDS 1989 and HDS 2000, each audit consists of successive visits to the same housing agency by two audit teammates, or auditors: one a non-Hispanic White and one a minority. The teammates are matched by gender and age and receive training in representing themselves as having similar socioeconomic characteristics, such as marital status, number of children, and income, which the audit manager adjusts for the cost and type of unit about which they are inquiring. Advertised units are found by randomly sampling advertisements from major metropolitan newspapers. Both teammates then visit, in random order, the agency placing the randomly selected advertisement and inquire about the advertised unit. Each auditor independently records the behavior and characteristics of the agent that he or she meets. (For more information about audit methodology, see Turner et al., 2002; Yinger, 1995.)

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[1] Yinger (1995) estimates that the annual cost of housing discrimination in the sales housing market is about $2.0 billion for Blacks and $1.2 billion for Hispanics.

The Housing Discrimination Studies

The audit methodology has been used to examine the incidence and causes of discrimination in housing since the 1970s. HDS 2000 is the third national audit study sponsored by the U.S. Department of Housing and Urban Development (HUD) to examine racial and ethnic discrimination in housing. Both the 1977 Housing Market Practices Study and HDS 1989 found a significant level of discrimination in sales and rental housing markets.

We focus on the HDS 2000 data on rental housing markets. These data include 1,152 Black-White, 731 Hispanic-White, 226 Asian-White, and 100 Native American-White rental audits.[2] The Black-White audits were conducted in 16 metropolitan areas,[3] the Hispanic-White audits in 10 areas,[4] and the Asian-White and Native American-White audits in 2 areas[5] during 2000.

The next section presents the methodologies implemented in this study, including the fixed-effects logit method and several methods for measuring the incidence of discrimination. The third section presents hypotheses concerning the causes of discrimination. The estimation results for HDS 2000 are reported in the fourth section. Changes in the incidence of discrimination are discussed in the fifth section. The sixth section presents the changes in causes of discrimination between 1989 and 2000. The last section presents conclusions and discusses policy implications.

Section 2. Econometric Models

Yinger (1986) explains that audit teammates who go through the same training, visit the same agency, and ask about the same advertised unit will share values of unobservable variables. Chamberlain's (1980) fixed-effects logit framework can be used to account for the role of shared unobservable characteristics in the determination of qualitative dependent variables, such as discrete actions by real estate agents. Chamberlain's (1980) fixed-effects logit framework has been used by Whittington (1992), Christian, Gupta, and Lin (1993), Korenman and Winship (1995), and, more recently, Fisman and Raturi (2003) and Anderson and Newell (2004). Ondrich, Stricker, and Yinger (1999, 1998) used the fixed-effects logit framework to analyze sales and rental data from HDS 1989. The present study refines and extends analysis in Choi, Ondrich, and Yinger (2005) on differences in the incidence of discrimination in rental housing between HDS 2000 and HDS 1989 and uses the fixed-effects logit methodology to present new results on differences in the causes of discrimination.

The probability that a real estate agent treats a customer favorably can be estimated using a logit model. In the usual case, customers can be treated as being independent of each other; however, the case of an audit is different. Because the audit teammates share unobservable variables, the visits constituting the audit can no longer be considered independent of each other. The probabilities

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[2] HDS 1989 conducted 781 Black-White and 767 Hispanic-White rental housing audits.

[3] Atlanta, Austin, Birmingham, Chicago, Dayton-Springfield, Denver, Detroit, Houston, Los Angeles, Macon, New Orleans, New York, Philadelphia, Pittsburgh, Orlando, and Washington, D.C.

[4] Austin, Chicago, Denver, Houston, Los Angeles, New York, Pueblo, San Antonio, San Diego, and Tucson.

[5] Los Angeles and Minneapolis.

that each member of the pair is treated favorably are determined by a common unobserved fixed effect that reflects visits to the same agency and the identical training of the auditors. This fixed effect may be related to the other characteristics of the auditors.

Although it is not possible to estimate the fixed effect as in linear regression, Chamberlain (1980) shows that the fixed effect can be removed from the logistic probability function by conditioning on the event that exactly one auditor is treated favorably. When both auditors are treated favorably or when both auditors are treated unfavorably, the observations constituting the audit pair are dropped from the analysis. The loss of degrees of freedom is the price that must be paid to achieve consistent estimates when the unobservables are correlated with the included regressors. Random-effects techniques that do not control for these correlations produce inconsistent estimates. Chamberlain's (1980) estimation allows for the recovery of the intercept (which we weight to be nationally representative) and a coefficient vector that can be used to test hypotheses about the causes of discrimination. (For further details, see Ondrich, Stricker, and Yinger, 1998.)

The Fixed Absolute Gap

The intercept in this analysis can be interpreted as a log odds ratio in a perfect audit; that is, an audit in which teammates differ only in their minority status. The odds ratio is important in the paired-audit methodology because it can be identified when fixed-effects techniques are used. Fixed-effects techniques preserve the consistency of parameter estimates without estimating the group-specific intercepts of the model. In the classical linear regression model, this result is achieved by using deviations from the group mean in place of the original variable. Because of the linearity of this model, it is possible to recover the fixed effects because the group-specific residual mean is an unbiased estimator of each fixed effect. Where fixed-effects techniques are available for nonlinear models (for example, Chamberlain's (1980) fixed-effects method for the binary logit model), the values of the fixed effects typically cannot be recovered. Therefore, the logit event probabilities cannot be predicted.

It is possible, however, to estimate the odds ratio, defined as

$$R = \frac{P_w / (1 - P_w)}{P_m / (1 - P_m)}, \qquad (1)$$

where P_w is the probability that favorable treatment is given to the White auditor and P_m is the probability that favorable treatment is given to the minority auditor. In our regressions, the intercept is the log of this odds ratio with the same values of the explanatory variables for the White and minority auditors. It is possible to calculate synthetic probabilities of discrimination based on the odds ratio (see Ondrich, Stricker, and Yinger, 1998). In this study, the method of the fixed absolute gap will be used. We assume that P_m falls short of P_w by the fixed absolute amount d. Combining this assumption with equation 1 leads to

$$d = \frac{P_w (R - 1)(1 - P_w)}{P_w + R(1 - P_w)} . \qquad (2)$$

In section 4, we present estimates of d based on our fixed-effect logit estimations.

Section 3. Hypotheses and Related Issues

The hypotheses that we want to explain are based on the beliefs or perceptions of the rental agents. Measuring or testing these hypotheses can be done only by indirect means, however, because agents' beliefs and perceptions cannot be observed. The existing audit studies test the hypotheses about the causes of discrimination by determining whether differences in treatment between minority and White auditors are related to the auditor's, agent's, or neighborhood's characteristics (Ondrich, Ross, and Yinger, 2003; Ondrich, Stricker, and Yinger, 1999, 1998; Page, 1995). These papers identify several hypotheses about the causes of discrimination. These hypotheses are not mutually exclusive, and more than one cause is involved in most cases. In this section, we review the three main hypotheses and associated tests.

The Agent-Prejudice Hypothesis

The agent-prejudice hypothesis states that discrimination may occur because agents have strong personal biases against racial or ethnic minorities. This hypothesis cannot be tested directly, because no method exists for measuring an agent's prejudice, but it can be tested indirectly by determining whether an agent's treatment of minorities varies with characteristics that are possibly related to the agent's prejudice.

The race, age, and gender of the agent and the age and gender of the auditors may affect the agent's prejudice against minorities.[6] A minority agent may be less prejudiced against his or her own minority customers than a White agent would be. Therefore, evidence that Black agents are less likely to discriminate against Blacks or that Hispanic agents are less likely to discriminate against Hispanics supports the agent-prejudice hypothesis. Also, the finding that bias against minorities is higher among older male agents predicts that, compared with female agents, male agents are more likely to discriminate and that older agents may be more averse to dealing with minority customers than are younger agents. In addition, this finding suggests that agents may be less favorably disposed to minority male auditors than to minority female auditors (Ondrich, Ross, and Yinger, 2003; Ondrich, Stricker, and Yinger, 1999, 1998).

The Customer-Prejudice Hypothesis

The customer-prejudice hypothesis states that rental agents may avoid renting to minority customers to protect their actual or potential business with prejudiced White customers. Agents may assume that Whites feel uncomfortable when Hispanics or Blacks move into their building or neighborhood; the agents then cater to these perceived feelings by discriminating against minorities.

The customer-prejudice hypothesis predicts that agents discriminate more against a minority customer if some of that customer's characteristics are particularly likely to upset their prejudiced White customers. Such characteristics may include low income and having children in the family. The customer-prejudice hypothesis also predicts more discrimination when the agent's office is in a White neighborhood. Although we do not observe the location of the agent's office directly, the

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[6] Evidence on variation in prejudice by age and gender is provided by Schuman, Steeh, and Bobo (1985).

racial/ethnic composition of the neighborhood in which the advertised unit is located provides a proxy for the rental agent's current customer base, because the agent's office is likely to be at the same location or nearby (Ondrich, Stricker, and Yinger, 1999).[7]

Our specification recognizes that the predictions described previously may interact with each other. For example, the discrimination Blacks or Hispanics encounter in a largely White neighborhood may depend on their income. To explore this possibility, we interact the income level assigned to an audit with an indicator variable for whether the unit is located in a largely minority neighborhood. More specifically, we use six categorical variables to represent the following groups: (1) high-income minorities who seek housing in largely White areas, (2) high-income minorities who seek housing in largely minority areas, (3) middle-income minorities who seek housing in largely White areas, (4) middle-income minorities who seek housing in largely minority areas, (5) low-income minorities who seek housing in largely White areas, and (6) low-income minorities who seek housing in largely minority areas.

The sixth category is omitted in our regressions, so a positive sign for any of the other variables indicates that a minority household in that category encounters more discrimination than does a low-income minority household seeking housing in a largely minority area. According to the customer-prejudice hypothesis, discrimination is higher in White neighborhoods than in minority neighborhoods and higher against low-income households than against high-income households. Thus, the hypothesis of an interaction between neighborhood and minority income predicts a negative sign for the second and fourth variables and a positive sign for the fifth variable. These two effects conflict with each other in the first and third variables, however, so the hypothesis does not make a clear prediction about their signs. A positive sign for the first or third variable indicates that the effect of the neighborhood on an agent's discrimination is stronger than the effect of income; a negative sign indicates the reverse.

The customer-prejudice hypothesis can also be linked to some characteristics of the rental agency (Ondrich, Stricker, and Yinger, 1999; Yinger, 1995). Larger agencies may discriminate less because they have a broader client base and, therefore, need not be as concerned as smaller agencies about the impact of their actions on their attractiveness to White customers.[8] To test this prediction, we include a proxy for agency size, namely the maximum number of agents encountered by either teammate. To distinguish the role of agency size from the number of rental units a particular agent has to work with, we also include a variable indicating whether a unit similar to the advertised unit was available to show to either teammate. This variable is not linked to a particular hypothesis but indicates whether agents are more likely to discriminate when the advertised unit is the only one they have to show.

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[7] In HDS 2000, as in HDS 1989, the vast majority of advertised apartments are in neighborhoods with a White majority. To ensure that a reasonable number of audits fall into the minority neighborhood category, we follow Ondrich, Stricker, and Yinger (1999) by defining a largely White area as one in which the minority composition is less than 20 percent. In the case of property managers, a more precise test of the customer-prejudice hypothesis might come from the racial/ethnic composition of the building in which the advertised unit is located, but this information is not available.

[8] Turner et al. (2002) discuss the possibility that larger firms have more experience serving customers in a range of different customer groups and are more likely to tailor their practices to fit their perceptions of each group's preference.

Some predictions of the agent-prejudice and customer-prejudice hypotheses cannot be separated. For example, it is difficult to determine whether it is the housing agents or their potential White customers who have stronger prejudices against younger Blacks and Hispanics than against older ones.

The Statistical Discrimination Hypothesis

The statistical discrimination hypothesis[9] states that statistical discrimination occurs when agents treat people in different groups differently because they believe that group membership is correlated with unobserved characteristics that affect the profitability of their actions. In the rental housing market, for example, a rental agent may use customers' race or ethnicity as a signal about their preferences for housing type or neighborhood.

As with the customer-prejudice hypothesis, the statistical discrimination hypothesis can be linked to the racial or ethnic composition of the neighborhood in which an apartment is located. Rental agents may believe, for example, that all households prefer to live with their own racial or ethnic group and that a housing rental is unlikely to be successful when a minority customer is matched to an advertised unit located in a largely White neighborhood area (Ondrich, Ross, and Yinger, 2003). If agents have these beliefs and act on them, the probability of discrimination is higher when the advertised unit is located in a White instead of a minority neighborhood. This prediction is, of course, the same as the prediction based on customer prejudice.

Ondrich, Ross, and Yinger (2003) find that real estate brokers discriminate more against higher income Black customers, apparently discounting statements by these customers (but not by their identically qualified White teammates) that they can afford to buy expensive houses. A similar stereotype may be at work in the rental housing market. If so, agents may discriminate against high-income minorities to save themselves the time of showing units that they believe these minority customers cannot afford. More specifically, this hypothesis predicts that higher income minority customers will encounter more discrimination, even in minority neighborhoods.

Thus, the statistical discrimination hypothesis predicts a positive sign for the first, third, and fifth interaction variables described in the previous section. Its predictions for the second and fourth variables are ambiguous, however, because these variables combine a higher income (meaning more discrimination) with a minority neighborhood (meaning less discrimination). A positive sign for these variables would suggest that the impact of higher income on discrimination is stronger than the impact of location in a minority neighborhood.

Summary

This discussion is summarized in exhibit 1, which lists the variables we use to test these three hypotheses and their expected signs in our fixed-effects logit estimations. As indicated earlier, these tests are all indirect, and any rejection of the expected signs in this exhibit could indicate either that the underlying hypothesis is incorrect or that the variable we have identified is not closely linked to that hypothesis.

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[9] Several scholars have proposed a perceived preference hypothesis that is equivalent to the statistical discrimination hypothesis (Ondrich, Ross, and Yinger, 2003).

Exhibit 1

Expected Signs

Explanatory Variables	Hypotheses		
	Agent Prejudice	Customer Prejudice	Statistical Discrimination
Agent's characteristics			
Agent is Black	(–)		
Agent is Hispanic	(–)		
Agent's age[a]	(+)		
Agent is female	(–)		
Agency's size		(–)	
Auditor's characteristics			
Auditor's age	(–)		
Auditor has children		(+)	
Auditor is female			
Neighborhood and other variables			
High-income * White area[b, c]		(?)	(+)
High-income * minority area[b, c]		(–)	(?)
Middle-income * White area[b, c]		(?)	(+)
Middle-income * minority area[b, c]		(–)	(?)
Low-income * White area[b, c]		(+)	(+)
Both auditors meet same agent			
Similar unit is available		(–)	

[a] *Agent's age is coded as 1 = 18–30, 2 = 31–45, 3 = 46–65, and 4 = older than 65.*

[b] *High income: monthly income greater than $7,500; middle income: monthly income $2,500–$7,500; low income: monthly income less than $2,500.*

[c] *White area: percentage of minority neighbors less than 20 percent; minority area: percentage of minority neighbors at least 20 percent.*

Section 4. Estimation and Test Results for HDS 2000

Exhibit 2 presents the results for discrimination against Blacks, and exhibit 3 presents the results for Hispanics. Each exhibit includes eight types of treatment: (1) "advertised unit available" means that the auditor is told that the unit in the advertisement is available for rent; (2) "advertised unit inspected" means that the auditor is allowed to inspect the advertised unit; (3) "similar unit available" means that the auditor is told that a unit similar to the advertised unit is available; (4) "similar unit inspected" means that the auditor is allowed to inspect a unit similar to the advertised unit; for (5) "how many units recommended" and (6) "how many units inspected," the value for the White auditor is 1 and the value for the minority auditor is 0 if more units are recommended to (or, in the second case, inspected by) the White auditor. The opposite assignment is made when more units are recommended to (inspected by) the minority auditor. When the number of units is identical across auditors, the value for both auditors is 1. For (7) "incentive provided," the agent offers the auditor a rebate or free rent for a period of time or waives a security deposit. Finally, (8) "asked to fill out application" means that the agent asked the auditor to fill out an application for the apartment at some point during the audit.

For the eight types of treatment, the first three rows of exhibits 2 and 3 present the proportion of audits in which the White and minority auditors are favored as well as the difference between these two proportions, which is often called net incidence of discrimination.[10] In exhibit 2, the net incidence in the third row ranges from 0.0 percent for "similar unit available" to 7.4 percent for "how many units inspected." Exhibit 3 indicates that non-Hispanic Whites are more favored than their Hispanic teammates in HDS 2000 for most of the treatment types. The net incidence ranges from 0.6 percent for "asked to fill out application" to 9.0 percent for "how many units recommended."

Exhibit 2

Incidence of Discrimination in HDS 2000 (Black-White Audits)

	Type of Treatment			
	Advertised Unit Available	**Advertised Unit Inspected**	**Similar Unit Available**	**Similar Unit Inspected**
Probability of				
White favored	0.141	0.159	0.159	0.085
Black favored	0.090	0.110	0.159	0.072
Net incidence	0.051	0.049	0.000	0.013
Estimate of				
Discrimination	0.620	0.586	0.036	0.031
(Standard error)	(0.383)	(0.337)	(0.286)	(0.479)
Odds ratio	1.861	1.788	1.037	1.032
Fixed-absolute-gap measure	0.060	0.064	0.005	0.002
Number of observations	258	303	360	178
	Type of Treatment			
	How Many Units Recommended	**How Many Units Inspected**	**Incentive Provided**	**Asked To Fill Out Application**
Probability of				
White favored	0.285	0.235	0.097	0.185
Black favored	0.226	0.161	0.062	0.161
Net incidence	0.059	0.074	0.035	0.025
Estimate of				
Discrimination	0.672	0.695	1.543	0.375
(Standard error)	(0.240)	(0.282)	(26.331)	(0.250)
Odds ratio	1.958	2.005	4.703	1.456
Fixed-absolute-gap measure	0.116	0.102	0.075	0.050
Number of observations	576	446	180	390

HDS 2000 = 2000 Housing Discrimination Study.

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[10] Another measure, called gross incidence, is the share of audits in which the White auditor is favored over the minority. As discussed in the literature (Ondrich, Ross, and Yinger, 2000; Turner et al., 2002), the net measure is a lower bound on the incidence of discrimination while the gross measure approximates an upper bound.

Exhibit 3

Incidence of Discrimination in HDS 2000 (Hispanic-White Audits)

	Type of Treatment			
	Advertised Unit Available	**Advertised Unit Inspected**	**Similar Unit Available**	**Similar Unit Inspected**
Probability of				
White favored	0.150	0.139	0.156	0.093
Black favored	0.073	0.093	0.107	0.073
Net incidence	0.077	0.046	0.049	0.020
Estimate of				
Discrimination	1.866	0.362	0.040	0.428
(Standard error)	(0.442)	(0.342)	(0.243)	(0.545)
Odds ratio	6.464	1.432	1.041	1.535
Fixed-absolute-gap measure	0.123	0.038	0.005	0.030
Number of observations	157	165	194	118

	Type of Treatment			
	How Many Units Recommended	**How Many Units Inspected**	**Incentive Provided**	**Asked To Fill Out Application**
Probability of				
White favored	0.316	0.235	0.107	0.179
Black favored	0.226	0.161	0.074	0.173
Net incidence	0.090	0.074	0.033	0.006
Estimate of				
Discrimination	0.435	0.106	– 0.208	– 0.017
(Standard error)	(0.197)	(0.226)	(0.420)	(0.221)
Odds ratio	1.546	1.112	0.812	0.983
Fixed-absolute-gap measure	0.086	0.018	– 0.022	– 0.003
Number of observations	384	259	129	250

HDS 2000 = 2000 Housing Discrimination Study.

The Existence of Discrimination

If the intercept in the fixed-effects logit estimation is positive and significant, the result supports the existence of discrimination. The test results for the Black-White and Hispanic-White audits are presented in exhibits 2 and 3 for each type of behavior. The fourth row of each exhibit presents estimates of the intercept and its standard error. The fifth row gives the results for the estimated White-minority odds ratio for receiving favorable treatment from the rental agent (the exponential of the intercept). The sixth row of each exhibit presents the results for the fixed-absolute-gap measure of the difference in treatment based on the estimated odds ratio.

In the Black-White audits, the null hypothesis of no discrimination can be rejected at the 5-percent level (based on a one-tailed test) for the "advertised unit available," "advertised unit inspected," "how many units recommended," and "how many units inspected" treatment types. In the Hispanic-White audits, "advertised unit available" and "how many units recommended" are the only treatment types for which the null hypothesis is rejected at the 5-percent level (based on a one-tailed test).

When many significance tests of the same type are performed, the null hypothesis may be rejected by chance a number of times even when the null is true. As discussed by Heckman and Walker (1990), the criterion for rejecting the null hypothesis when multiple comparisons are made involves an adjustment of the significance level for a single test. If n tests are performed, then an α-percent significance test can be achieved by rejecting the null if at least one of the p-values is below α/n.

In the present context, we are examining eight treatment types for the Black-White audits and eight treatment types for the Hispanic-White audits. Therefore, for each type of audit, a 5-percent significance test of discrimination can be achieved by rejecting the null if at least one of the p-values is below 0.0625 percent. Similarly, a 1-percent significance test of discrimination can be achieved by rejecting the null if at least one of the p-values is below 0.0125 percent. For a two-tailed test, the null is rejected at the 5-percent level if any of the eight test statistics exceeds 2.73 in absolute value and is rejected at the 1-percent level if any of the eight test statistics exceeds 3.23 in absolute value. For a one-tailed test of discrimination, the null is rejected at the 5-percent level if any of the eight test statistics exceeds 2.50 and is rejected at the 1-percent level if any of the eight test statistics exceeds 3.02. The maximal test statistic (in absolute value) is 2.80 in the Black-White audits and 4.22 in the Hispanic-White audits. Thus, the null hypothesis of no discrimination is rejected at the 5-percent level in both sets of audits.

The regression-based fixed-absolute-gap measure of differential treatment is greater than the simple net incidence measure in all cases except one—"similar unit inspected" in the Black-White audits, where the net incidence is 1.3 percent while the fixed-absolute-gap measure is only 0.2 percent. In Hispanic-White audits, on the other hand, the situation is largely reversed. The fixed-absolute-gap measure is greater than the simple net measure in only two cases—"advertised unit available" and "similar unit inspected."

Overall, these results imply a disturbing pattern of discrimination against minorities by rental agents. The types of treatment with relatively high probabilities of discrimination by agents include those with a great impact on access to rental housing, such as making the advertised unit available and showing the advertised unit.

The Causes of Discrimination

Exhibits 4 and 5 present brief descriptions of the explanatory variables and summary statistics. A positive coefficient for a level variable indicates that the variable increases the probability that the White auditor receives more favorable treatment than does the minority auditor. Because of the interrelationships across the three sets of hypotheses (agent prejudice, customer prejudice, and statistical discrimination), it seems advantageous to present all of the results for the Black-White audits followed by the results for the Hispanic-White audits. Coefficient estimates for difference variables are not reported. Unless otherwise indicated, we focus on results that are significant at the 5-percent level based on a two-tailed test.

Exhibit 6 presents the results for the Black-White audits. We find a limited degree of support for the agent-prejudice hypothesis in the Black-White audits. Specifically, in the "advertised unit inspected" estimation, significantly less difference in treatment occurs when the agent is Black. We also find evidence that a Hispanic agent is more likely to discriminate against a Black customer in

the "how many units recommended" treatment type. Neither of the associated test statistics is large enough to reject the null hypothesis of no discrimination using the multiple comparisons test.

Several results in the Black-White audits support the customer-prejudice hypothesis. We find evidence that high-income minorities are less likely to encounter discrimination in the "advertised unit available" treatment type, but the magnitude of the test statistic is not large enough to reject the null in a multiple comparisons test. The coefficient of "similar unit available" has a negative sign and is significant at the 5-percent level in the "advertised unit available," "advertised unit inspected," and "how many units inspected" estimations. (The maximal value of the test statistics is high enough to reject the null in a multiple comparisons test.) These results support the prediction that discrimination in introducing or showing an advertised unit will decrease when the agent has some flexibility in what can be shown; that is, the agent has similar units.

Despite this prediction, we also find results that contradict the customer-prejudice hypothesis. The results for the "advertised unit inspected," "how many units inspected," and "incentive

Exhibit 4

Variables Used in Testing the Hypotheses and Basic Statistics (Black-White Audits)

Explanatory Variables	HDS 2000		HDS 1989	
	Mean	Standard Deviation	Mean	Standard Deviation
Agent's characteristics				
Agent is Black	0.134	0.341	0.071	0.257
Agent is Hispanic	0.052	0.222	0.039	0.195
Agent's age[a]	2.001	0.863	1.621	0.801
Agent is female	0.603	0.484	0.681	0.444
Agency's size	1.454	0.723	1.515	0.911
Auditor's characteristics				
Auditor's age	32.350	9.500	35.594	8.437
Auditor has children	0.345	0.472	0.068	0.253
Auditor is female	0.537	0.498	0.568	0.495
Auditor's monthly income	$4,050	$2,100	$2,921	$1,598
Neighborhood and other variables				
High-income * White area[b, c]	0.035	0.323	0.027	0.163
High-income * minority area[b, c]	0.038	0.192	0.018	0.135
Middle-income * White area[b, c]	0.279	0.441	0.196	0.397
Middle-income * minority area[b, c]	0.510	0.501	0.280	0.449
Low-income * White area[b, c]	0.009	0.091	0.234	0.424
Both auditors meet same agent	0.473	0.499	0.586	0.492
Neighborhood's characteristics				
Percent of Black neighbors	23.247	30.873	15.053	19.268
Percent of Hispanic neighbors	7.738	11.956	10.034	13.655
Number of observations	1,128		801	

HDS 2000 = 2000 Housing Discrimination Study. HDS 1989 = 1989 Housing Discrimination Study.

[a] Agent's age is coded as 1 = 18–30, 2 = 31–45, 3 = 46–65, and 4 = older than 65.

[b] High income: monthly income greater than $7,500; middle income: monthly income $2,500–$7,500; low income: monthly income less than $2,500.

[c] White area: percentage of minority neighbors less than 20 percent; minority area: percentage of minority neighbors at least 20 percent.

Exhibit 5

Variables Used in Testing the Hypotheses and Basic Statistics (Hispanic-White Audits)

Explanatory Variables	HDS 2000		HDS 1989	
	Mean	Standard Deviation	Mean	Standard Deviation
Agent's characteristics				
Agent is Black	0.039	0.194	0.033	0.178
Agent is Hispanic	0.141	0.348	0.099	0.299
Agent's age[a]	1.994	0.895	1.501	0.911
Agent is female	0.616	0.482	0.629	0.465
Agency's size	1.357	0.643	1.481	0.979
Auditor's characteristics				
Auditor's age	35.740	11.520	35.594	8.437
Auditor has children	0.324	0.464	0.068	0.253
Auditor is female	0.569	0.495	0.568	0.495
Auditor's monthly income	$4,112	$2,834	$2,921	$1,598
Neighborhood and other variables				
High-income * White area[b, c]	0.023	0.151	0.027	0.163
High-income * minority area[b, c]	0.070	0.252	0.018	0.135
Middle-income * White area[b, c]	0.122	0.322	0.184	0.387
Middle-income * minority area[b, c]	0.671	0.478	0.270	0.444
Low-income * White area[b, c]	0.016	0.123	0.179	0.383
Both auditors meet same agent	0.418	0.493	0.588	0.492
Neighborhood's characteristics				
Percent of Black neighbors	5.742	10.766	5.962	9.307
Percent of Hispanic neighbors	20.677	20.532	22.830	19.984
Number of observations	709		787	

HDS 2000 = 2000 Housing Discrimination Study. HDS 1989 = 1989 Housing Discrimination Study.

[a] Agent's age is coded as 1 = 18–30, 2 = 31–45, 3 = 46–65, and 4 = older than 65.

[b] High income: monthly income greater than $7,500; middle income: monthly income $2,500–$7,500; low income: monthly income less than $2,500.

[c] White area: percentage of minority neighbors less than 20 percent; minority area: percentage of minority neighbors at least 20 percent.

provided" estimation suggest that larger agencies discriminate more against minority customers than do smaller agencies. This conclusion is also supported by the multiple comparisons test. It is inconsistent with the prediction that minority customers who visit large agencies encounter less discrimination because large agencies have a broad customer base.

No evidence to support the statistical discrimination hypothesis in the Black-White audits exists. When we ran specifications that included minority percentages in the neighborhood along with the interactions of level of income with dummies for whether the unit is in a minority neighborhood, we obtained results (arguably) consistent with statistical discrimination in two cases. Despite this observation, we believe that interpreting the minority percentage coefficients in the presence of the income-racial composition interaction variables is problematic. The specifications that include the interaction variables but exclude minority percentages have the cleanest interpretations. In these specifications, there is no evidence to support the statistical discrimination hypothesis in the Black-White audits.

Exhibit 6

Estimates of the Causes of Discrimination in HDS 2000 (Black–White Audits)[a] (1 of 2)

Explanatory Variables	Type of Treatment							
	Advertised Unit Available		Advertised Unit Inspected		Similar Unit Available		Similar Unit Inspected	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Intercept	0.6209	0.3836	0.5865	0.3373	0.0364	0.2862	0.0319	0.4748
Agent's characteristics								
Agent is Black	0.1698	0.5049	– 1.0972	**0.4751**	0.2535	0.3885	0.3699	0.5962
Agent is Hispanic	0.2009	0.7262	0.2407	0.7233	0.9446	0.6020	– 0.4229	0.9500
Agent's age[b]	0.0207	0.2149	– 0.0797	0.2027	– 0.0047	0.1686	0.2093	0.2868
Agent is female	– 0.1599	0.3901	– 0.4197	0.3602	– 0.1130	0.2937	0.1472	0.4801
Agency's size	– 0.1082	0.2211	**0.5501**	**0.2352**	0.1850	0.1949	0.5491	0.3191
Auditor's characteristics								
Auditor's age	0.0211	0.0188	0.0238	0.0168	– 0.0214	0.0130	– 0.0258	0.0232
Auditor has children	– 0.2290	0.3406	– 0.1597	0.3126	0.1889	0.2723	0.1192	0.4077
Auditor is female	0.0190	0.3397	0.0255	0.3009	– 0.4681	0.2556	– 0.0190	0.4143
Neighborhood and other variables								
High-income ∗ White area[c,d]	– 0.9393	0.8129	– 0.4413	0.8089	– 0.5046	0.6337	– 0.7948	0.9589
High-income ∗ minority area[c,d]	**– 1.6371**	**0.8271**	– 1.2512	0.9128	– 0.4064	0.7654	1.6094	1.2863
Middle-income ∗ White area[c,d]	– 0.5449	0.7140	– 0.5245	0.6350	0.0134	0.5175	– 0.0541	0.8064
Middle-income ∗ minority area[c,d]	– 0.2934	0.6738	– 0.4742	0.5782	0.3953	0.5110	0.2320	0.7764
Low-income ∗ White area[c,d]	– 1.5702	1.6624	– 0.2987	0.9840	0.3972	0.7284	1.4249	1.4128
Both auditors meet same agent	– 0.0450	0.3521	0.2650	0.3116	0.2163	0.2488	– 0.2177	0.3927
Similar unit is available	**– 0.9917**	**0.3575**	**– 0.9637**	**0.3101**	—	—	0.9622	0.6209

Exhibit 6

Estimates of the Causes of Discrimination in HDS 2000 (Black–White Audits)[a] (2 of 2)

Explanatory Variables	Type of Treatment							
	How Many Units Recommended		How Many Units Inspected		Incentive Provided		Asked To Fill Out Application	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Intercept	**0.6012**	**0.2345**	**0.6955**	**0.2823**	1.5483	26.3319	0.3759	0.2503
Agent's characteristics								
Agent is Black	0.0873	0.3225	– 0.5421	0.3737	– 0.0427	0.6823	0.1277	0.4307
Agent is Hispanic	**1.2002**	**0.4894**	0.0962	0.5433	0.0192	1.1588	0.3640	0.6168
Agent's age[b]	– 0.0689	0.1314	0.1262	0.1550	0.3932	0.2690	0.2095	0.1549
Agent is female	– 0.1572	0.2344	– 0.1978	0.2787	0.1068	0.4987	– 0.2591	0.2757
Agency's size	0.2687	0.1440	**0.4923**	**0.1746**	**0.6704**	**0.3139**	0.0087	0.1677
Auditor's characteristics								
Auditor's age	– 0.0075	0.0106	0.0014	0.0123	0.0255	0.0232	– 0.0118	0.0119
Auditor has children	0.2633	0.2113	– 0.0609	0.2500	0.3640	0.4319	0.0388	0.2478
Auditor is female	– 0.0238	0.2016	– 0.0380	0.2385	– 0.7311	0.4494	0.0873	0.2430
Neighborhood and other variables								
High-income * White area[c, d]	0.2259	0.4916	– 0.4665	0.6168	– 0.2296	1.0888	– 0.5310	0.5180
High-income * minority area[c, d]	– 0.1203	0.6024	0.1984	0.8218	1.5594	1.9439	1.2475	0.9167
Middle-income * White area[c, d]	0.3495	0.4183	– 0.1841	0.5224	0.1937	0.8133	– 0.3088	0.4646
Middle-income * minority area[c, d]	0.5253	0.4056	– 0.1194	0.4944	**1.5734**	**0.7943**	– 0.0603	0.4461
Low-income * White area[c, d]	0.9227	0.6260	0.8758	0.7134	15.019	532.20	– 1.4363	0.7048
Both auditors meet same agent	**0.4387**	**0.2008**	0.1876	0.2414	– 0.3630	0.4645	– 0.2386	0.2416
Similar unit is available	– 0.4839	0.2538	**– 0.7744**	**0.2680**	0.0331	0.4641	0.0476	0.2481

HDS 2000 = 2000 Housing Discrimination Study.

[a] *Bold coefficients are statistically significant at the 5-percent level (two-tailed test).*

[b] *Agent's age is coded as 1 = 18–30, 2 = 31–45, 3 = 46–65, and 4 = older than 65.*

[c] *High income: monthly income greater than $7,500; middle income: monthly income $2,500–$7,500; low income: monthly income less than $2,500.*

[d] *White area: percentage of minority neighbors less than 20 percent; minority area: percentage of minority neighbors at least 20 percent.*

We turn now to the results for the Hispanic-White audits, which are presented in exhibit 7. First, there is evidence to support the agent-prejudice hypothesis. Specifically, for "similar unit inspected," female agents are significantly less likely to discriminate against Hispanics than are male agents (at the 1-percent level for the individual significance test and at the 5-percent level for the multiple comparisons test). Contrary to the agent-prejudice hypothesis, older agents are less likely to discriminate against Hispanics than are younger agents in the "how many units recommended" regression. Despite this observation, the result that older agents are less likely to discriminate against Hispanics is not supported by a multiple comparisons test.

As was the case with the statistical discrimination hypothesis in the Black-White audits, conclusions for both the customer-prejudice hypothesis and the statistical discrimination hypothesis in the Hispanic-White audits changed across preliminary specifications. Specifications that included minority percentages in the neighborhood along with the interactions of level of income with dummies for whether the unit is in a minority neighborhood frequently found significance for the minority-percentage coefficient. Despite this finding, in the cleanest specification, which excludes the minority-percentage variable, all coefficient estimates for the interaction variables are statistically insignificant. Therefore, there is no evidence for or against the statistical discrimination hypothesis in the Hispanic-White audits.

Because the coefficient estimates for the interaction variables are all statistically insignificant, they also provide no support for or against the customer-prejudice hypothesis. Moreover, none of the other coefficient estimates is consistent with the customer-prejudice hypothesis in the Hispanic-White audits. Some results, however, are inconsistent with the customer-prejudice hypothesis. In the "similar unit inspected" estimation, for example, a Hispanic prospective renter with children receives more favorable treatment from an agent than a non-Hispanic White in similar circumstances, which contradicts the prediction of the customer-prejudice hypothesis.

To summarize the results for the three hypotheses, there is (1) support for the agent-prejudice hypothesis in the Hispanic-White audits, (2) conflicting evidence on the customer-prejudice hypothesis in the Black-White audits, and, finally, (3) no support for or against the statistical discrimination hypothesis in either the Black-White audits or the Hispanic-White audits.

Exhibit 7

Estimates of the Causes of Discrimination in HDS 2000 (Hispanic-White Audits)[a] (1 of 2)

Explanatory Variables	Type of Treatment							
	Advertised Unit Available		Advertised Unit Inspected		Similar Unit Available		Similar Unit Inspected	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Intercept	**1.8861**	**0.4428**	0.3623	0.3422	0.0400	0.2433	0.4283	0.5450
Agent's characteristics								
Agent is Black	0.4871	2.0628	0.6429	1.5129	0.0418	1.2467	0.7376	2.1296
Agent is Hispanic	1.3298	0.9178	1.1462	0.7715	– 0.8181	0.6140	– 0.2424	1.1085
Agent's age[b]	– 0.4127	0.3398	– 0.2191	0.2617	– 0.2462	0.2516	– 0.5025	0.3824
Agent is female	– 0.8933	0.6129	0.2145	0.4874	– 0.0322	0.4157	**– 2.2907**	**0.8326**
Agency's size	– 0.1648	0.2839	– 0.0878	0.2464	0.1453	0.2543	– 0.5717	0.3711
Auditor's characteristics								
Auditor's age	0.0103	0.0314	0.0283	0.0265	0.0109	0.0265	– 0.0479	0.0372
Auditor has children	0.0261	0.5013	0.4209	0.4766	– 0.7209	0.3933	**– 1.4611**	**0.7051**
Auditor is female	– 0.6877	0.5368	– 0.3629	0.4298	– 0.3993	0.3627	0.7380	0.6378
Neighborhood and other variables								
High-income * White area[c, d]	1.1255	1.3580	– 0.9686	1.4687	0.7376	1.1545	0.2669	1.9007
High-income * minority area[c, d]	0.5360	1.8345	– 1.8801	1.4929	0.2862	1.1520	– 0.1656	2.2057
Middle-income * White area[c, d]	– 0.4065	1.0396	– 1.3180	1.3313	1.0959	0.9370	1.0936	1.3057
Middle-income * minority area[c, d]	0.8793	0.9427	– 1.0417	1.2384	0.5360	0.8732	1.5434	1.2873
Low-income * White area[c, d]	– 0.5880	1.6237	—	—	0.2399	1.7585	—	—
Both auditors meet same agent	0.7057	0.5791	0.1427	0.4348	0.0235	0.3906	**– 3.2505**	**0.8764**
Similar unit is available	0.5511	0.4899	0.6698	0.4635	—	—	– 0.5898	1.0701

Exhibit 7

Estimates of the Causes of Discrimination in HDS 2000 (Hispanic–White Audits)[a] (2 of 2)

Explanatory Variables	Type of Treatment							
	How Many Units Recommended		How Many Units Inspected		Incentive Provided		Asked To Fill Out Application	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Intercept	**0.4355**	**0.1977**	0.1062	0.2245	− 0.2088	0.4203	− 0.0174	0.2210
Agent's characteristics								
Agent is Black	− 0.3928	0.7888	− 0.4147	0.9386	− 1.2460	1.1770	− 0.0028	0.9709
Agent is Hispanic	− 0.5105	0.4041	0.5309	0.4858	− 1.1279	0.9881	− 0.7276	0.5061
Agent's age[b]	**− 0.4078**	**0.1627**	− 0.2333	0.1990	− 0.4597	0.3977	0.1829	0.2044
Agent is female	− 0.1457	0.2808	− 0.0092	0.3595	− 1.3465	0.7234	− 0.3328	0.3469
Agency's size	− 0.0910	0.1576	− 0.1073	0.1999	0.2713	0.3292	− 0.1493	0.2415
Auditor's characteristics								
Auditor's age	0.0105	0.0164	− 0.0065	0.0208	− 0.0320	0.0346	− 0.0117	0.0194
Auditor has children	− 0.3508	0.2615	0.2155	0.3460	− 0.4511	0.5853	− 0.4656	0.3189
Auditor is female	− 0.3147	0.2412	− 0.1128	0.3115	− 0.7210	0.6090	0.5774	0.2997
Neighborhood and other variables								
High-income * White area[c, d]	0.4619	0.7472	− 0.0715	0.9310	0.7092	1.7157	1.2177	0.9588
High-income * minority area[c, d]	0.6056	0.8024	− 0.8721	1.0110	− 2.2430	2.0358	0.8591	1.3237
Middle-income * White area[c, d]	0.0970	0.6119	− 0.3806	0.7426	1.6344	1.2623	0.4751	0.8100
Middle-income * minority area[c, d]	0.0393	0.5788	− 0.3739	0.6876	− 0.1853	1.1238	0.3360	0.7636
Low-income * White area[c, d]	− 0.9413	1.3803	—	—	—	—	1.2700	1.2408
Both auditors meet same agent	0.2452	0.2673	− 0.4497	0.3274	**1.8546**	**0.6808**	− 0.5138	0.3276
Similar unit is available	− 0.1511	0.3410	0.4085	0.3928	− 0.3867	0.6268	0.4543	0.3043

HDS 2000 = 2000 Housing Discrimination Study.

[a] Bold coefficients are statistically significant at the 5-percent level (two-tailed test).

[b] Agent's age is coded as 1 = 18–30, 2 = 31–45, 3 = 46–65, and 4 = older than 65.

[c] High income: monthly income greater than $7,500; middle income: monthly income $2,500–$7,500; low income: monthly income less than $2,500.

[d] White area: percentage of minority neighbors less than 20 percent; minority area: percentage of minority neighbors at least 20 percent.

Section 5. Changes in the Incidence of Discrimination Between 1989 and 2000

We compare the results for HDS 2000 and HDS 1989 to examine the trend in discrimination in the rental housing market over the past decade. The dependent variables that we examine in exhibits 6 and 7 provide an overview of treatments concerning housing availability and sales effort. Because we use the same econometric methodology and the data are based on similar data collection efforts, the estimation results of the HDS 1989 and the HDS 2000 should be comparable.

We begin with the results for the Black-White audits. Exhibit 8 presents the estimates of the intercept from our logit models, associated significance tests results, results for the net incidence measures, and, for completeness, the fixed-absolute-gap measures.[11] As explained earlier, a significance test for the intercept is a test of the existence of discrimination. HDS 2000 uncovers discrimination in four out of eight treatment types (two at the 1-percent level and two at the 5-percent level), while HDS 1989 finds discrimination in seven out of eight treatment types (five at the 1-percent level and two at the 5-percent level). In the "similar unit available," "similar unit inspected," and "incentive provided" estimations, we find evidence of the existence of discrimination only in HDS 1989.

In HDS 2000, as mentioned earlier, the net incidence of discrimination against Black customers ranges from 0.0 percent for "asked to fill out application" to 7.4 percent for "how many units inspected." These results are substantially lower than the corresponding net measures found in HDS 1989, which range from 1.8 percent for "asked to fill out application" to 16.1 percent for "how many units inspected." The drops in this incidence measure range from 2.3 percentage points for "incentive provided" to 9.6 percentage points for "how many units recommended."

Declines in the fixed absolute gap between 1989 and 2000 range from 3.6 percent for the "how many units recommended" estimation to 10.6 percent in the "how many units recommended" estimation. Increases in the fixed absolute gap range from 0.2 percent for the "advertised unit available" estimation to 7.4 percent for the "asked to fill out application" estimation.

We turn now to the results for the Hispanic-White audits, which are presented in exhibit 9. For the Hispanic-White audits, HDS 2000 finds discrimination at the 5-percent level in two out of the eight estimations. The null hypothesis of no discrimination for "similar unit inspected" and "how many units inspected" is rejected at the 5-percent level in HDS 1989 but not in HDS 2000.

For most of the treatment types, non-Hispanic Whites are more favored than their Hispanic teammates are in HDS 2000. The net incidence discrimination in HDS 1989 ranges from 3.1 percent for "asked to fill out application" to 11.2 percent for "how many units recommended." Between 1989 and 2000, this measure of discrimination declines in six of the eight cases. The largest decline, 2.6 percentage points, is for "how many units inspected"; the largest increase, 3.0 percentage points, is for "similar unit available."

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[11] To calculate net incidence, we exclude nonnewspaper-advertised samples from HDS 2000 because, in HDS 1989, only newspaper-advertised units were used.

Exhibit 8

Changes in the Incidence of Discrimination Between 1989 and 2000 (Black–White Audits)

Type of Treatment	Intercept (Standard Error)			Net Incidence			Fixed Absolute Gap		
	2000	1989	1989–2000 Change[a]	2000	1989	1989–2000 Change[a]	2000	1989	1989–2000 Change[a]
Advertised unit available	0.620* (0.383)	0.398** (0.188)	0.222 (0.427)	0.051	0.070	– 0.019	0.059	0.057	0.002
Advertised unit inspected	0.586* (0.337)	0.790** (0.198)	– 0.204 (0.391)	0.049	0.125	– 0.076	0.063	0.112	– 0.048
Similar unit available	0.036 (0.286)	0.373* (0.224)	– 0.337 (0.363)	0.000	0.044	– 0.044	0.004	0.040	– 0.036
Similar unit inspected	0.031 (0.424)	0.542* (0.288)	– 0.511 (0.513)	0.013	0.040	– 0.027	0.002	0.038	– 0.036
How many units recommended	0.601** (0.274)	1.069** (0.163)	– 0.468 (0.319)	0.059	0.155	– 0.096	0.105	0.211	– 0.106
How many units inspected	0.695** (0.282)	1.199** (0.193)	– 0.504 (0.342)	0.074	0.161	– 0.087	0.102	0.197	– 0.095
Incentive provided	1.548 (26.331)	0.658** (0.255)	0.890 (26.332)	0.035	0.048	– 0.013	0.075	0.046	0.028
Asked to fill out application	0.375 (0.250)	– 0.179 (0.265)	0.554 (0.364)	0.025	0.018	0.007	0.050	– 0.024	0.074

** Significant at 1-percent level (one-tailed test for first and second columns; two-tailed test for third column).
* Significant at 5-percent level (one-tailed test for first and second columns; two-tailed test for third column).
[a] Change computed as the value for 2000 minus the value for 1989.

Exhibit 9

Changes in the Incidence of Discrimination Between 1989 and 2000 (Hispanic-White Audits)

Type of Treatment	Intercept (Standard Error)			Net Incidence			Fixed Absolute Gap		
	2000	1989	1989–2000 Change[a]	2000	1989	1989–2000 Change[a]	2000	1989	1989–2000 Change[a]
Advertised unit available	1.886 ** (0.442)	0.718 ** (0.228)	1.168 * (0.497)	0.077	0.090	– 0.013	0.125	0.093	0.032
Advertised unit inspected	0.362 (0.342)	0.145 (0.200)	0.217 (0.396)	0.046	0.052	– 0.006	0.046	0.019	0.027
Similar unit available	0.040 (0.243)	0.075 (0.205)	– 0.035 (0.318)	0.049	0.019	0.030	– 0.002	– 0.001	– 0.001
Similar unit inspected	0.428 (0.545)	0.742 ** (0.326)	– 0.314 (0.635)	0.019	0.019	0.000	0.029	0.061	– 0.032
How many units recommended	0.361 ** (0.157)	0.435 ** (0.197)	– 0.074 (0.252)	0.090	0.112	– 0.022	0.083	0.088	– 0.005
How many units inspected	0.179 (0.226)	0.361 * (0.157)	– 0.182 (0.275)	0.074	0.100	– 0.026	0.029	0.054	– 0.025
Incentive provided	– 0.208 (0.423)	1.271 (11.118)	– 1.479 (11.126)	0.033	0.042	– 0.009	0.023	0.077	– 0.054
Asked to fill out application	– 0.017 (0.221)	0.252 (0.390)	– 0.269 (0.448)	0.006	0.031	– 0.025	0.005	0.030	– 0.025

** Significant at 1-percent level (one-tailed test for first and second columns; two-tailed test for third column).

* Significant at 5-percent level (one-tailed test for first and second columns; two-tailed test for third column).

[a] Change computed as the value for 2000 minus the value for 1989.

Between 1989 and 2000, the discrimination in the fixed absolute gap declines in six cases and increases in two. The largest decline, 5.4 percentage points, is for "incentive provided"; the largest increase, 3.2 percentage points, is for "advertised unit available."

Taken together, the overall results for the Black-White audits suggest that discrimination against Blacks has declined significantly over that time period, although considerable discrimination still exists. (It should be noted, however, that this conclusion is not supported by formal significance tests for a change in the intercept; none of the changes are significantly different from 0.) On the other hand, the estimation results for Hispanic-White audits overall indicate that discrimination against Hispanics has not declined as much or as consistently as has discrimination against Blacks since 1989.

Section 6. Changes in the Causes of Discrimination Between 1989 and 2000

To examine changes in the causes of discrimination between 1989 and 2000, we use the same econometric method (that is, fixed-effects logit estimation with identical dependent variables and explanatory variables) that we used to identify the incidence of discrimination. Unless otherwise indicated, we focus on the results for the estimated differences of coefficients between HDS 1989 and HDS 2000 that are significant at the 5-percent level based on a two-tailed test.

Exhibit 10 presents the results for the Black-White audits. In each of the estimations in the Black-White audits, at least one significant difference occurs in a coefficient estimate related to the causes of discrimination. The first significant difference relates to the agent-prejudice hypothesis. In the "how many units recommended" estimation, Hispanic agents are more likely to discriminate against Blacks in 2000 than in 1989. This result is supported by the multiple comparisons test and is consistent with an increase in tensions between Blacks and Hispanics.

The second set of differences concerns agency size. We hypothesized that, because larger agencies have a broader client base, they need not be as concerned as smaller agencies about the effect of their actions regarding minorities on how they are regarded by their potential White customers. As a result, larger agencies may discriminate less than smaller agencies do. In four of the eight estimations in exhibit 10, the likelihood of discrimination by larger agencies against Blacks increased significantly between 1989 and 2000. (The result is confirmed by the multiple comparisons test.) One possible interpretation of these results is that incentives identified by the customer-prejudice hypothesis have become weaker over time; another possibility is that the growth of the Internet or some other development has diminished the differences in the incentives facing large and small agencies.

The third set of differences in the Black-White audits concerns the income-racial composition interaction variables. The customer-prejudice hypothesis maintains that discrimination is not only higher in White neighborhoods than in minority neighborhoods but also is higher against low-income than against high-income households. In the "how many units inspected" estimation, discrimination encountered in White areas by Blacks in all income groups increased significantly between 1989 and 2000. In the "how many units recommended" estimation, discrimination against high-income Black households seeking rental housing in largely White areas increased

Exhibit 10

Changes in Causes of Discrimination Between 1989 and 2000 (Black–White Audits)[a] (1 of 2)

Explanatory Variables	Advertised Unit Available 1989–2000 Change[b]		Advertised Unit Inspected 1989–2000 Change[b]		Similar Unit Available 1989–2000 Change[b]		Similar Unit Inspected 1989–2000 Change[b]	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Intercept	0.2222	0.4274	– 0.2041	0.3911	– 0.3367	0.3636	– 0.5107	0.5554
Agent's characteristics								
Agent is Black	– 0.0296	0.9552	– 1.4521	0.8118	0.9434	0.9621	0.0438	1.1981
Agent is Hispanic	1.4714	1.4325	0.1099	1.1944	2.3780	1.3332	—	—
Agent's age[c]	0.3537	0.2926	0.1340	0.2799	– 0.0728	0.2746	– 0.0850	0.4002
Agent is female	– 0.4638	0.5987	– 0.9269	0.5422	– 0.3146	0.5678	– 0.4786	0.8180
Agency's size	0.1932	0.2727	**0.7762**	**0.2903**	**0.6972**	**0.2990**	0.3452	0.4264
Auditor's characteristics								
Auditor's age	0.0308	0.0314	0.0498	0.0307	0.0238	0.0325	– 0.0528	0.0401
Auditor has children	– 0.1985	0.5745	– 0.3543	0.5282	0.6115	0.5615	0.6820	0.8781
Auditor is female	0.6237	0.5531	0.2899	0.5107	– 0.0708	0.5329	– 0.1302	0.7904
Neighborhood and other variables								
High-income ∗ White area[d,e]	– 1.7975	1.1919	– 0.2091	1.1675	0.8292	1.1901	0.8448	1.6419
High-income ∗ minority area[d,e]	– 2.0377	1.2225	– 0.6640	1.2081	0.8574	1.3000	2.6122	1.7027
Middle-income ∗ White area[d,e]	– 0.7330	0.9057	– 0.1686	0.8731	0.6204	0.9649	1.8824	1.3054
Middle-income ∗ minority area[d,e]	**– 2.0476**	**0.8917**	– 0.6555	0.8338	1.0512	0.8999	0.0742	1.2096
Low-income ∗ White area[d,e]	– 2.3000	1.8202	– 0.2637	1.1963	0.7334	1.1785	2.5526	1.9819
Both auditors meet same agent	0.3879	0.4863	**0.9158**	**0.4400**	0.1513	0.4511	– 0.7720	0.6704
Similar unit is available	**– 1.2026**	**0.5057**	– 0.5315	0.4444	—	—	**2.1815**	**0.8083**

Exhibit 10

Changes in Causes of Discrimination Between 1989 and 2000 (Black–White Audits)[a] (2 of 2)

Explanatory Variables	How Many Units Recommended 1989–2000 Change[b]		How Many Units Inspected 1989–2000 Change[b]		Incentive Provided 1989–2000 Change[b]		Asked To Fill Out Application 1989–2000 Change[b]	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Intercept	– 0.4680	0.2856	– 0.5037	0.3423	0.8897	26.3331	0.5552	0.3645
Agent's characteristics								
Agent is Black	0.1373	0.5812	– 1.0342	0.7771	– 1.0553	1.0776	0.1880	0.8035
Agent is Hispanic	**2.5329**	**0.9075**	0.7059	1.1461	—	—	0.8605	1.2501
Agent's age[c]	– 0.1098	0.1898	0.0051	0.2170	0.1479	0.3961	**0.5846**	**0.2763**
Agent is female	0.0286	0.3826	– 0.5958	0.4649	0.0112	0.8007	0.0294	0.5059
Agency's size	0.2818	0.1876	**0.7751**	**0.2209**	**1.1451**	**0.3912**	0.0003	0.2967
Auditor's characteristics								
Auditor's age	0.0193	0.0199	**0.1796**	**0.0249**	– 0.0023	0.0399	0.0277	0.0306
Auditor has children	0.2432	0.3665	0.0220	0.4274	– 0.0330	0.6697	0.0094	0.5024
Auditor is female	– 0.1846	0.3502	– 0.3290	0.4211	– 0.4494	0.6816	0.0452	0.4827
Neighborhood and other variables								
High-income * White area[d, e]	**1.6344**	**0.8016**	**2.4890**	**1.2280**	0.7871	1.6132	0.2772	1.1794
High-income * minority area[d, e]	0.2867	0.8307	2.0871	1.2466	2.9670	2.2795	1.6995	1.3437
Middle-income * White area[d, e]	0.9228	0.5987	**1.6618**	**0.8475**	0.1111	1.2877	– 1.3809	0.9829
Middle-income * minority area[d, e]	1.0008	0.5767	0.9752	0.7555	2.1352	1.2516	– 0.5605	0.9421
Low-income * White area[d, e]	– 0.6290	0.8146	**2.1805**	**1.0556**	14.3907	532.3012	– 2.3068	1.2724
Both auditors meet same agent	0.4290	0.2943	0.1585	0.3531	– 0.2099	0.6360	0.0740	0.4175
Similar unit is available	– 0.4022	0.3409	– 0.2003	0.3851	– 0.2026	0.6395	– 0.1298	0.4320

Type of Treatment

[a] *Bold coefficients are statistically significant at the 5-percent level (two-tailed test).*
[b] *The changes computed as the value for 2000 minus the value for 1989.*
[c] *Agent's age is coded as 1 = 18–30, 2 = 31–45, 3 = 46–65, and 4 = older than 65.*
[d] *High income: monthly income greater than $7,500; middle income: monthly income $2,500–$7,500; low income: monthly income less than $2,500.*
[e] *White area: percentage of minority neighbors less than 20 percent; minority area: percentage of minority neighbors at least 20 percent.*

significantly over the same time period. Finally, in the "advertised unit available" estimation, the coefficient for a middle-income customer seeking a unit in a minority neighborhood decreased significantly. These results, taken together, suggest that rental agents responded more strongly to the prejudices of their customers in 1989 than in 2000;[12] however, none of these four results are supported by a multiple comparisons test.

The results for the Hispanic-White audits presented in exhibit 11 are more varied. No significant differences occur in four of the eight estimations. In two of the estimations, the likelihood of discrimination against Hispanics by female agents decreased significantly between 1989 and 2000; this result is supported by the multiple comparisons test. The results of multiple comparisons tests also suggest that younger auditors and auditors with children face less discrimination in 2000 than they do in 1989.

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[12] A fourth set of differences is not linked to a specific hypothesis but suggests a change in discriminatory tactics by rental agents. Specifically, compared with behavior in 1989, agents in 2000 are less likely to withhold the advertised unit from a Black customer when a similar unit is available but are more likely to discriminate in inspections of these similar units. In other words, in 2000, rental agents with more than one available unit are more likely to advertise the unit they are willing to show to Blacks and to withhold other units that they are willing to show only to Whites. These results do not hold for the Hispanic-White audits. In fact, when similar units are available, rental agents are more likely to discriminate against Hispanics in showing the advertised unit in 2000 than in 1989.

Exhibit 11

Changes in Causes of Discrimination Between 1989 and 2000 (Hispanic–White Audits)[a] (1 of 2)

Explanatory Variables	Type of Treatment							
	Advertised Unit Available		Advertised Unit Inspected		Similar Unit Available		Similar Unit Inspected	
	1989–2000 Change[b]		1989–2000 Change[b]		1989–2000 Change[b]		1989–2000 Change[b]	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Intercept	1.1476	0.4982	0.2168	0.3968	0.1157	0.3184	−0.3137	0.6351
Agent's characteristics								
Agent is Black	0.0477	2.6401	−0.5793	1.8554	0.8380	1.6631	0.2299	2.5929
Agent is Hispanic	2.0100	1.1651	1.4135	0.9576	−0.6356	0.8479	−1.3080	1.4956
Agent's age[c]	−0.0479	0.4172	0.0693	0.3215	−0.2817	0.3019	−0.3693	0.4619
Agent is female	−0.6075	0.7921	0.7091	0.6428	−0.7081	0.5712	−2.8000	1.0185
Agency's size	−0.0492	0.3406	0.0653	0.2864	0.2942	0.2980	−0.2423	0.4421
Auditor's characteristics								
Auditor's age	0.0141	0.0394	0.0328	0.033	0.0049	0.0342	−0.0893	0.0519
Auditor has children	−0.9561	0.7292	0.1488	0.6159	−0.8332	0.5528	−0.7095	0.9412
Auditor is female	−0.2716	0.6871	−0.3163	0.5664	−0.2836	0.4983	−0.2156	0.8087
Neighborhood and other variables								
High-income * White area[d,e]	1.8881	1.7210	0.7286	1.6859	0.6877	1.4373	−1.0270	2.3106
High-income * minority area[d,e]	1.1473	2.0531	−0.7591	1.7146	−0.2674	1.4346	−0.5061	2.5203
Middle-income * White area[d,e]	−0.1552	1.3204	−0.0722	1.493	0.8428	1.1777	0.2808	1.6845
Middle-income * minority area[d,e]	1.5384	1.1756	−0.1993	1.3939	0.3744	1.0911	0.9831	1.5862
Low-income * White area[d,e]	0.1587	1.8905	—	—	0.3865	1.9099	—	
Both auditors meet same agent	0.9784	0.7028	0.9019	0.5378	0.1795	0.5136	−3.6111	0.9986
Similar unit is available	0.9296	0.6274	1.3249	0.5678	—	—	−1.0510	1.1713

Exhibit 11

Changes in Causes of Discrimination Between 1989 and 2000 (Hispanic-White Audits)[a] (2 of 2)

Explanatory Variables	Type of Treatment							
	How Many Units Recommended 1989–2000 Change[b]		How Many Units Inspected 1989–2000 Change[b]		Incentive Provided 1989–2000 Change[b]		Asked To Fill Out Application 1989–2000 Change[b]	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Intercept	0.0742	0.2524	– 0.2551	0.2740	– 1.4800	11.1261	– 0.2697	0.3881
Agent's characteristics								
Agent is Black	– 1.3925	1.2349	– 1.4144	1.3356	– 11.9640	467.5015	– 0.8682	1.6320
Agent is Hispanic	– 0.1752	0.6202	0.8662	0.6763	0.6486	1.4338	– 1.0114	0.9576
Agent's age[c]	– 0.2189	0.2148	– 0.0444	0.2435	– 0.8664	0.5203	0.5268	0.2895
Agent is female	– 0.8599	0.4185	– 0.7234	0.4691	– 2.4417	0.9592	– 0.4441	0.5843
Agency's size	0.1015	0.2028	0.0852	0.2372	0.4674	0.4798	0.3534	0.3248
Auditor's characteristics								
Auditor's age	– 0.0027	0.0230	– 0.0197	0.0264	– 0.1343	0.0531	0.0134	0.0351
Auditor has children	– 0.7888	0.4240	– 0.2225	0.4810	– 2.3388	0.8967	– 0.6832	0.5569
Auditor is female	– 0.5572	0.3630	– 0.3553	0.4135	– 1.3404	0.8214	1.1877	0.4811
Neighborhood and other variables								
High-income * White area[d,e]	0.5519	0.9957	0.0185	1.1402	2.7755	2.3948	2.1685	1.3726
High-income * minority area[d,e]	0.7268	1.0390	– 0.7509	1.2074	0.5832	2.6687	1.9608	1.6487
Middle-income * White area[d,e]	0.7687	0.7938	0.2911	0.8985	3.2527	1.5938	1.1236	1.1432
Middle-income * minority area[d,e]	0.2824	0.7495	– 0.1308	0.8365	1.4157	1.4796	1.4686	1.0999
Low-income * White area[d,e]	– 0.3168	1.4843	—	—	—	—	1.0130	1.4932
Both auditors meet same agent	0.3998	0.3701	– 0.2951	0.4156	1.9557	0.9118	0.3648	0.4959
Similar unit is available	0.2439	0.4223	0.8035	0.4652	0.9479	0.8326	0.0065	0.4797

[a] Bold coefficients are statistically significant at the 5-percent level (two-tailed test).
[b] The changes computed as the value for 2000 minus the value for 1989.
[c] Agent's age is coded as 1 = 18–30, 2 = 31–45, 3 = 46–65, and 4 = older than 65.
[d] High income: monthly income greater than $7,500; middle income: monthly income $2,500–$7,500; low income: monthly income less than $2,500.
[e] White area: percentage of minority neighbors less than 20 percent; minority area: percentage of minority neighbors at least 20 percent.

Section 7. Conclusions and Policy Implications

Using HDS 2000 data, we analyze the incidence and the causes of rental housing discrimination against Blacks and Hispanics. As did previous studies, we find evidence of discrimination against Blacks in HDS 2000 for a wide range of behaviors by rental agents and evidence that the level of this discrimination has decreased significantly between 1989 and 2000. Since 1989, discrimination against Hispanics has declined for some types of behaviors by agents but increased for others. Also, as did previous studies, we find that discrimination in rental housing has several causes and that these causes vary across types of agents' behaviors.

In the Black-White audits, several changes in the causes of discrimination have emerged between 1989 and 2000. We find strong evidence that discrimination against Black customers by larger agencies has increased since 1989. We also find evidence that discrimination by Hispanic agents against Black customers increased over this period. In the Hispanic-White audits, we find evidence of decreased discrimination by female agents and against Hispanic customers with children.

The evidence presented in this study shows that Black and Hispanic households continue to face discrimination in rental housing markets. This evidence indicates that antidiscrimination enforcement efforts by HUD, such as support for the Fair Housing Assistance Program and the Fair Housing Initiatives Program, are still needed. The evidence in this article also shows that discrimination against Blacks and Hispanics is supported by systematic factors that influence rental agents' incentives. Most importantly, this study uncovers an increase in discriminatory behavior toward Blacks by both Hispanic agents and larger agencies. Possible policy responses to these findings include an antidiscrimination education campaign directed toward Hispanic rental agents and a rental testing program that focuses on relatively large rental agencies.

Acknowledgments

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