SEX DISCRIMINATION IN RESTAURANT HIRING: AN AUDIT STUDY*

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In an audit study of sex discrimination in hiring, comparably matched pairs of men and women applied for jobs as waiters and waitresses at restaurants in Philadelphia. In high-price restaurants (where earnings are higher), job applications from women had an estimated probability of receiving a job offer that was lower by about 0.4, and an estimated probability of receiving an interview that was lower by about 0.35. Both estimated differentials are statistically significant. Additional evidence suggests that customer discrimination partly underlies the hiring discrimination.

I. INTRODUCTION

The overall sex gap in wages can be broken into an across-occupation and a within-occupation component. The sex gap related to across-occupation segregation has alternatively been attributed to human capital investment [Polachek 1981], preferences [Daymont and Andrisani 1984], and employment discrimination [Beller 1982; Bergmann 1974]. The sex gap that remains within occupations may reflect pure pay discrimination between men and women working alongside one another. It may also reflect segregation across high- and low-wage firms [Blau 1977; Groshen 1991], or segregation across jobs within occupations and perhaps also within firms [Seiling 1984]. This "vertical" segregation may arise for any of the reasons used to explain segregation across occupations.

In this paper we investigate the role of discrimination in vertical segregation among waiters and waitresses. There is a sizable sex gap in wages even in this narrow occupation. In the 1993 outgoing rotation group files of the CPS, the ratio of mean weekly earnings of waitresses to mean weekly earnings of waiters is 0.71, and the ratio of median weekly earnings is 0.75. Restricting attention to full-time workers, the corresponding ratios are 0.75

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and 0.73. Finally, in a log weekly earnings regression estimated for full-time waitpersons, including the usual controls, the estimated coefficient of the dummy variable for waitresses is −0.18 (standard error 0.04).[1]

Along what dimensions might vertical segregation among waiters and waitresses contribute to this earnings gap? Although there is no existing hard evidence on this point, researchers of sex differences in labor markets have suggested that males are favored in high-price, formal restaurants, where wages and tips are higher.[2] In *Pink Collar Workers* Howe [1977] writes that in "the heart of Manhattan's most expensive restaurant district, there were only a relative handful of 'tablecloth restaurants' that hired women for anything but hat-checking. At the same time further uptown and downtown, farther west and east, throughout the other boroughs . . . the overwhelming majority of those serving food were women" [p. 104]. Howe also cites the 1972–1973 U. S. Department of Labor *Occupational Outlook Handbook* noting that "Jobs for waiters tended to be concentrated in those restaurants, hotel dining rooms, private clubs, and other establishments where meal service was formal," and she claims that wages and tips are highest in precisely those jobs in which waiters are concentrated [p. 104]. Similarly, Bergmann [1986] claims that friction between waitresses and other male employees in restaurants leads to the segregation of waiters into high-price restaurants, and waitresses into low-price restaurants. She writes that, "In American restaurants that offer fine food and/or a luxurious setting, the size of the check allows for tips big enough to attract male waiters. In cheaper restaurants, the owners put up with the friction rather than supplement the tips to an extent necessary to be able to have male waiters" [p. 99n]. Furthermore, Bergmann claims that "Many of the restaurants that employ . . . male waiters have never hired a waitress" [p. 124], and if they do, they have "assigned them to different parts of the restaurant or different shifts, with the males getting the assignments in which the tips are higher" [p. 124n].[3]

1. The regression estimates are based on a sample of 1012 individuals. The controls include race, marital status, union membership, schooling, age and its square, SMSA, and Census region.

2. There is no large-scale data set of which we are aware that would permit the comparison of earnings of waitpersons in high- and low-price restaurants.

3. Bergmann does suggest, however, that "Recently, some restaurants have started using males and females interchangeably" [1986, p. 124n].

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To investigate the potential role of sex discrimination in vertical segregation among waiters and waitresses, we conducted a small-scale "audit study" patterned on studies of race discrimination in hiring pioneered by researchers at the Urban Institute [Cross et al. 1990; Turner, Fix, and Struyk 1991; Kenney and Wissoker 1994]. Specifically, as part of a research project in an undergraduate economics research seminar, we sent two male and two female college students to apply for jobs as waiters and waitresses at 65 restaurants in Philadelphia. We divided the restaurants into high-, medium-, and low-price categories, with the goal of estimating sex differences in the receipt of job offers in each price category. We designed the study so that a male and female pair applied for a job at each restaurant, and so that, on paper at least, the male and female candidates were on average identical.

The purpose of an audit study is to provide much more direct evidence on discrimination than is provided by other empirical methods. For example, inferences regarding sex discrimination in hiring are sometimes drawn from an estimated sex difference in employment rates controlling for the sex composition and other observed characteristics of the applicant pool. Such estimates (which are common in hiring discrimination lawsuits) may lead to incorrect conclusions if there are differences between men and women that are unobserved by the econometrician.[4] Incorrect conclusions may also be reached if the rates at which men and women apply for jobs differ.[5] The audit methodology offers a potentially powerful means of overcoming both of these problems. Unobservable differences between men and women are eliminated, at least in principle, by matching their characteristics, and differences in application rates are eliminated because outcomes for a male and female applicant to the same employer are compared. Nonetheless, audit studies are not without their potential pitfalls, which we discuss in later sections.

Our findings provide strong evidence of discrimination

4. The same is also true of wage regression estimates used to draw inferences regarding wage discrimination against women based on "residual" wage differentials between men and women.

5. In fact, in a *Newsweek* article discussing an early version of this study, one restaurant owner explained the lack of waitresses in his upscale restaurant as "a question of us seeing an endless number of male applicants and few female applicants" [*Newsweek* April 10, 1995]. The issue of whether the differential job application rate itself stems from discrimination is sometimes raised in hiring discrimination suits.

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against women in high-price restaurants, and weaker evidence of discrimination in women's favor in low-price restaurants. Of the thirteen job offers from high-price restaurants, eleven were made to men. In contrast, of the ten job offers from low-price restaurants, eight were made to women. In addition, information gathered from restaurants included in the study suggests that earnings are substantially higher in high-price restaurants, so that the apparent hiring discrimination we find has implications for sex differences in earnings among waitpersons. The following sections describe the study fully, and provide a statistical analysis of the data we collected.

The Urban Institute audit studies, which focused on discrimination against black and Hispanic men, also tended to find evidence of hiring discrimination, although not as pronounced as the evidence in this paper. For example, Kenney and Wissoker [1994] report that in 22 percent of their cases only Anglos received job offers, while in 8 percent of cases only Hispanics received offers. Turner, Fix, and Struyk [1991] report that in 15 percent of cases only white applicants received offers, whereas in 5 percent of cases only black applicants received offers. The comparable summary figures for this study indicate that, in high-price restaurants, 43 percent of cases resulted in only males receiving offers, versus 4 percent of cases in which only females received offers. The greater disparity in this study may reflect more pronounced discrimination against women than against minorities, or unique features of the particular labor market studied.

Among the possible sources of the discrimination that we find are employer discrimination and customer discrimination.[6] According to the EEOC's interpretation of Title VII of the Civil Rights Act of 1964, both types of discrimination are illegal. Title VII permits employers to hire based on sex only when it is a "bona fide occupational qualification reasonably necessary to the normal operation of that particular business or enterprise." The EEOC interprets the bona fide exception very narrowly; Section 1604.2 of the Code of Federal Regulations specifies that the exception does not apply to "The refusal to hire an individual because of the preferences of coworkers, the employer, clients or

6. Employee discrimination cannot, by itself, explain segregation of women by price category, whereas the other two forms of discrimination can, depending on the distribution of employers and customers across restaurants in different price categories.

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customers" unless it is "necessary for the purpose of authenticity or genuineness . . . , e.g., an actor or actress." Epstein argues that the EEOC and the courts "look with considerable hostility on any explicit sex classification, save perhaps those that are based on the need to accommodate the personal privacy of clients and customers in certain intimate situations involving bodily functions, hygiene, and the like" [1992, p. 288].

Although uncovering the source of discrimination is generally not the purpose of an audit study, it is nonetheless of interest to attempt to identify the primary source of hiring discrimination against women in high-price restaurants. We therefore also present some additional evidence showing that the proportion male among the waitstaff is significantly positively related to the proportion male among the clientele, both overall and (more so) within the high- and medium-price restaurant categories. At the same time the proportion male among the waitstaff is not positively related to whether hiring decisions are made by male owners and managers. While not definitive, this evidence is inconsistent with a preference on the part of male owners and managers for male employees. On the other hand, it is consistent with preferences of male customers for the types of restaurants that tend to hire male waitpersons.

II. The Study

We are interested in whether a job applicant's sex affects the likelihood of receiving either a job interview or a job offer. Formally, denote the unobserved probability of either of these outcomes as P^*. The relationship we estimate is

$$P^*_{ij} = \alpha + \beta F_{ij} + \varepsilon_{ij}, \tag{1}$$

where i refers to the individual, j refers to the restaurant, and equation (1) is estimated separately for each price category of restaurant. We can estimate β a number of ways, including estimating equation (1) as a probit model or a linear probability model. In the latter case, **b**, the estimate of β, measures the amount by which the probability that a female receives an interview or offer differs from the probability for a male. Also, so long as no other variables affect the outcome in equation (1), β can be estimated, and the statistical significance of **b** can be obtained, from a simple

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comparison of the difference between the proportions of women and men receiving a job interview or offer. This is the "paired difference-of-means" test.[7]

If we simply drew observations from real-world job applicants and outcomes, there is a variety of reasons—such as differences in human capital investment, past work experience, etc.—to expect F to be correlated with ε. If it is, then **b** is a biased estimator of the sex difference in outcomes for workers identical in every respect except sex, a difference that would be interpreted as discrimination. The estimate of β would still be more informative than simply comparing the numbers of men and women who receive job offers because, by taking account of who applied for jobs, it would control for differences in job application rates of men and women.

However, the audit study methodology seeks to go considerably farther, and remove sources of correlation between sex and other determinants of the job application outcome (i.e., between F and ε). The principle underlying the methodology in our particular context was to try to get as close as possible to the following experiment: send pairs of men and women, who are identical in every respect except their sex, to apply for jobs at restaurants in different price categories, and observe whether there are any statistically significant differences between the sexes in the receipt of job offers. In this ideal experiment, by matching characteristics of men and women, we remove any correlation between F and ε. By observing differences between male and female applicants to the same restaurant, we eliminate the influence of different application rates (as well as any restaurant-specific effects). If we can approach this experimental ideal, then **b** provides an estimate of discrimination. We took numerous steps to get as close to this ideal experiment as possible.

The first step was to make the male and female applicants (or "testers") identical on paper. To do this, we created a set of three resumes that were quite similar in terms of personal his-

7. The paired difference-of-means test results in the same estimate **b** as does the linear probability model [Yinger 1986].

This test can also take account of correlation between outcomes for individuals at the same restaurant (that is, a restaurant-specific component μ_j of the error term ε_{ij}). This common error component can be similarly handled in the linear probability or probit model by introducing random effects (as in Kenney and Wissoker [1994]). Once we introduce covariates other than F into equation (1), one of these latter two methods is required, if we are to obtain a single estimate of β for each price category.

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tory and past work experience. Although the resumes were designed to be similar, to avoid sex differences in outcomes that might be attributable to differences in the impressions potential employers gained from the resumes, the resumes were rotated among the job applicants over the course of the study. Specifically, over the three-week period during which the resumes were dropped off at restaurants, each of the two men and two women used each resume for one week.[8]

Each resume indicated that the applicant had some experience in both local restaurants and national chains. To boost the likelihood of job offers from restaurants in the high-price category, where we suspected offers might be harder to obtain, each resume was designed to convey the type of experience and knowledge that might make an applicant attractive to such restaurants. Thus, two of the resumes indicated some involvement in restaurant-related activities (such as wine tasting), while the third emphasized the high quality and range of the applicant's previous experience. In addition to restaurant and restaurant-related experience, each resume also indicated some general retail experience, a high-school education, some involvement in social action, and personal interests that were not strongly sex-typed (since men and women had to use the resumes). Finally, in order to minimize employers checking references, possibly through personal contacts with other restaurant owners in Philadelphia, each resume indicated that the candidate had come from another city, and acquired their work experience in that city.[9] The three resumes are reproduced in the Appendix.

The second step was to minimize the effects of differences in personality or appearance that might affect job offers, and that might be related to sex. Three elements of the research design address this concern. First, two men and two women were used to search for jobs, rather than just one of each sex.[10] This should

8. Of course, the name and telephone number of the applicant at the top of the resume was changed to correspond to the person using the resume. One of the female testers had a name that was sex-neutral. Since (for reasons discussed below) we wanted potential employers to know the sex of the job applicant based solely on information from the resume, this person used a different, traditionally female name for the course of the study.

9. We received no indication from any of the potential employers that they had checked on the job references on the resumes. Even if they did so, the effects should have been sex-neutral.

10. In fact, one potential problem arose because one of the female students in the research seminar who served as a job applicant was Asian. Thus, when we test for sex differences in outcomes, we ask if the results differ whether we com-

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help to reduce the effect of personality characteristics that are unique to any individual tester. Of course, to the extent that there are personality differences that differ systematically by sex, and that are valued differently by restaurant owners, even an infinitely large sample of testers will not help.[11] All that the researcher can do in this case is to attempt to eliminate sex-related personality differences that might influence employers' decisions. Even if we eliminate observed personality differences, employers might nonetheless prefer to hire one sex or the other because of stereotypical views of personality differences between the sexes. However, under EEOC guidelines, hiring based on such preferences would be illegal. The same regulations cited in the Introduction explicitly bar "The refusal to hire an individual based on stereotyped characterizations of the sexes." Thus, as long as we have eliminated observed personality differences, a finding indicating preferences for hiring men points to discrimination as defined by the law.

As a second means of attempting to eliminate the influence of differences in personality, or of experimenter effects, the testers were instructed to maintain an even demeanor throughout all contacts with the restaurants, and to dress similarly. However, because these data were collected as part of a research seminar, the testers did not receive the type of professional training used in the well-funded Urban Institute studies [Cross et al. 1990; Turner, Fix, and Struyk 1991], nor were the testers ignorant of the questions raised in the study (as in Ayres and Siegelman [1995]). Because of these limitations, the case for assuming that any influence of personality or of experimenter effects was eliminated is weaker than in these other studies. However, it is important to emphasize that there is probably no foolproof method of avoiding these types of effects.

Because of these limitations on the training of testers and

pare outcomes for both men and both women, or just for both men and the non-Asian woman.

11. One might argue that we reduce this problem by looking for sex differences in the receipt of job offers in different price categories of restaurants. If males or females turn out to be relatively favored in all three price categories, perhaps because one of the testers simply came across as more or less impressive than the rest, then an interpretation based on differences in personality or appearance might be difficult to refute. However, if males are favored in one price category (such as high-price restaurants), and females in another category, then such an interpretation is less tenable, although it is still possible that different characteristics of personality or appearance are valued in restaurants in different price categories.

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the number of testers, we employed a second means of minimizing (and perhaps eliminating) effects of differences in personality and appearance, as well as experimenter effects. While hiring decisions were based on interviews in which personality and appearance can play a role, we endeavored to get employers to make a decision regarding whether or not to interview an applicant based solely on the information in the resumes. In particular, when the job applicants stopped into restaurants, the strategy they followed was to give their resume to the first employee they encountered. This was frequently a host, or a waitperson or busperson setting up, since we tried to have applicants stop into restaurants during times when business was slow, such as the late morning. The applicant requested that this employee give the resume to the owner or manager, with instructions to call if there was any possibility of being interviewed for the job. Because interviews are therefore based almost solely on the information from the resumes, a comparison of results for receipt of interviews and job offers can be used to gauge the role of differences in personality or appearance. If there are no differences in outcomes by sex for interviews, but there are for job offers, then it is possible that personality or appearance differences affect the outcomes. However, sex differences in outcomes at the interview stage cannot be attributed to personality or appearance differences.[12]

Because we were interested in differential treatment of men and women in restaurants in different price categories, we used *Zagat's Philadelphia Restaurant Guide* to identify three price categories: high-price (average meal price over $30); medium-price ($15–$30); and low-price (less than $15).[13] We did not restrict attention to restaurants advertising for positions, since some initial "trial runs" of our job application procedure revealed that restaurants hired on a fairly continual basis, generally without advertising. We avoided strictly ethnic restaurants since we suspected they might prefer to hire members of the same ethnic group, although this, of course, might be regarded as discriminatory.

Over a three-week period in the spring of 1994, pairs of male

12. This principle is also exploited in a study by McIntyre, Moberg, and Posner [1980], who compare differential responses of companies to fictitious resumes made comparable by randomizing across the entries on the resume, and then randomly indicating sex or race. This study found significant evidence of more favorable responses to men than to women.

13. According to *Zagat's,* these prices are based on dinner including an appetizer, main course, and one drink, excluding the tip.

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and female job applicants dropped off resumes at 65 restaurants (just over 20 per week). In each week, applications were made to restaurants in all three price categories. The pairings of males and females and the order in which the resumes were dropped off (male or female first) were alternated from restaurant to restaurant, to attempt to avoid any systematic biases in the estimated outcomes by sex. Of the 130 job applications, as of approximately one month after we completed dropping off the resumes, 54 resulted in job interviews, and 39 of those interviews resulted in job offers. (No job offers were made without interviews.)

Given the data we collected, we first estimate β for each price category of restaurant, and test for statistical evidence of discrimination, using the paired difference-in-means test that allows for correlated outcomes at the same restaurant. This test statistic is

$$\frac{[\bar{y}_m - \bar{y}_f]}{\sqrt{\mathrm{var}(y_m) + \mathrm{var}(y_f) - 2\mathrm{cov}(y_m, y_f)}}, \tag{2}$$

where y_m is equal to one if the male applicant to a restaurant received an offer (or interview), and y_f is a similar variable for the female applicant to the same restaurant.[14] Equation (2) yields the same estimate as the random effects linear probability estimator that allows a correlation between the errors for job applicants at the same restaurant [Yinger 1986].

We also compute the "symmetry test" proposed by Heckman and Siegelman [1993]. This test is based on the difference between the number of audits in which the male received an offer (or interview), and the female did not (N_m), and the number in which the female received an offer and the male did not (N_f). Let P_m and P_f equal the probabilities of each of these outcomes. Then the null hypothesis of symmetric treatment is $P_m/(P_m + P_f) = ½$. The likelihoods under the null and the alternative, from which a likelihood ratio test can be constructed, are easily calculated from the multinomial distribution.[15]

Finally, when we want to test whether other factors (such as the resume used) affect the outcome, we estimate equation (1) as a linear regression.[16]

14. This statistic is normally distributed in large samples, and has a t distribution in small samples if ε is normally distributed.

15. This is a large sample test. Heckman and Siegelman [1993] also discuss small sample "conditional sign" tests that tend to reject the null of no discrimination (symmetric treatment) somewhat more frequently.

16. We initially estimate the model with random effects, to allow for the same correlation between outcomes at the same restaurant as the paired difference-in-means test allows.

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III. Results

A. Descriptive Statistics and Basic Tests

Table I reports on the outcomes for job offers and job interviews for each price category of restaurants, and reports tests of the null hypothesis of no discrimination by sex. Panel A covers high-price restaurants. The first row reports evidence on job offers. Males received job offers in 48 percent of the cases, whereas females received offers only in 9 percent. The paired-differences test rejects the null hypothesis of no sex discrimination at better than the 5 percent level (the p-value is 0.01), in favor of the hypothesis of discrimination against women.[17] Panel A also reveals that in 43 percent of the cases an offer was made only to the male applicant, while only in 4 percent of cases was an offer made only to the female applicant. The symmetry test results in a test statistic for the difference in these proportions. This test similarly rejects the null hypothesis of no discrimination, with a p-value of 0.01.

The second row of Panel A looks at the receipt of interviews in high-price restaurants. Recall that one of the main purposes of studying interviews is to attempt to eliminate the effects of personality differences or experimenter effects that are correlated with sex. The results for interviews, however, are very similar to those for job offers, indicating that such factors do not drive the job offer results. Males received interviews in 61 percent of the cases, whereas females received interviews only in 26 percent. The paired-differences test rejects the null hypothesis of no sex discrimination (p-value = 0.04), as does the symmetry test (p-value = 0.02).

Panel B reports results for medium-price restaurants. The outcomes for both job offers and interviews again favor males. Men received job offers in 48 percent of the cases, compared with 29 percent for women. They received interviews in 62 percent of the cases, compared with 43 percent for women. However, the results of the paired-difference and symmetry tests indicate that the evidence for medium-price restaurants is considerably weaker. The evidence against the null of no discrimination is not significant for either test, for either job offers or interviews.

Finally, Panel C reports results for low-price restaurants. In contrast to the preceding results, the outcomes for both job offers

17. Unless otherwise noted, from this point on statements regarding statistical significance refer to the 5 percent significance level in two-sided tests.

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TABLE I

DESCRIPTIVE STATISTICS AND BASIC TESTS

	# Audits (1)	No offers/ interviews (2)	Offer/inter. to both (3)	Offer/inter. to male only (4)	Offer/inter. to female only (5)	Male success (6)	Female success (7)	Test statistics h_0: no discrimination (p-value) Paired difference (8)	Symmetry (9)
A. High-price									
Offers	23	.48	.04	.43	.04	.48	.09	.01	.01
Interviews	23	.26	.13	.48	.13	.61	.26	.04	.02
B. Medium-price									
Offers	21	.43	.19	.29	.10	.48	.29	.18	.11
Interviews	21	.29	.33	.29	.10	.62	.43	.18	.11
C. Low-price									
Offers	21	.62	.10	.00	.29	.10	.38	.01	.02
Interviews	21	.52	.10	.10	.29	.19	.38	.18	.11

P-values are reported for two-sided tests. (In the paired-difference tests, when the covariance is ignored, the *p*-values are slightly higher.)

and interviews at low-price restaurants favor females. Men received job offers in only 10 percent of the cases, compared with 38 percent for women. They received interviews in 19 percent of the cases, compared with 38 percent for women. With respect to hiring, the evidence against the null of no discrimination is significant for either test. However, with respect to interviews the evidence against this null is not significant.

To summarize, for low-price restaurants the job offer evidence suggests statistically significant evidence of discrimination against men. However, the interview evidence is not statistically significant, so we cannot rule out the possibility that the job offer results for low-price restaurants are influenced by personality differences or experimenter effects. However, the evidence does indicate hiring discrimination against women in high-price restaurants, as the evidence is statistically significant for both job offers and interviews.

Heckman and Siegelman [1993] also focus on whether it is appropriate to pool observations across pairs of job applicants, which essentially asks whether subsets of pairs of applicants drive the results, possibly because the degree of "match" between male and female testers varies across pairs of applicants. For example, if in a particular pairing of male and female testers the male always creates a more favorable impression than the female, but in other pairs this is not the case, then results may be driven by the first pair. Because we alternated the pairings of males and females, tests for pooling are complicated by the fact that observations from different pairs are not independent. However, the possibility with which we are most concerned is that the results are driven by pairs in which males were matched to female 2, since female 2 was Asian, and may have experienced differential treatment for this reason. The non-Asian (female 1) had a higher job offer rate at the medium-price restaurants (0.45 versus 0.10), while female 2 had a higher rate at the low-price restaurants (0.56 versus 0.25). The same pattern of outcomes occurred for interviews. However, neither female had much success at the high-price restaurants; each received just one job offer and three interviews. When the tests in Table I were recalculated using only pairs involving the non-Asian woman, the evidence of discrimination against women in high-price restaurants remained statistically significant. For offers, both the paired-difference test and the symmetry test led to a p-value of 0.01. The corresponding p-values for interviews were 0.05 for both tests.

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The evidence of discrimination against men in low-price restaurants was not statistically significant for offers or interviews, reflecting the higher success rate of the Asian woman at low-price restaurants.[18]

B. Multivariate Analyses

Table II reports estimates of linear probability models, which allow us to test the statistical strength of the relationships in Table I once we control for some other potential influences on the job offer and interview decisions. As the notes to the table describe, the results were the same using probit estimates, and estimating the linear probability models with correlated errors across observations on the same restaurant (random effects). In the latter case, the data did not reject the restriction of no correlated errors.[19]

Columns (1) and (2) of Table II report estimates for high-price restaurants. Panel A reports the paired-difference estimates (used to obtain the p-values in Table I). As already reported, for both offers and interviews, females did significantly worse than males, with a 0.39 (0.35) lower probability of an offer (interview).

Panel B reports the corresponding regression estimates when some control variables of interest are added.[20] First, the resumes were designed to provide impressions of job applicants that were roughly equivalent. In addition, as mentioned above, the resumes were rotated among job applicants, so that each resume was used approximately the same number of times by men and women. Nonetheless, to assess whether the distribution of the resumes affects the results, dummy variables for the resume that the job applicant used are added. Second, we examine the pooling problem raised by Heckman and Siegelman [1993], by asking whether the results are driven by particular pairings of applicants. To explore this question, we include dummy variables for the possible pairings of males and females. Finally, as discussed above, female 2 (who is Asian) had relatively more success

18. In the multivariate analysis that follows, we also control for the pooling problem by including dummy variables for the male-female pair on which each observation is based.

19. We also estimated random effects probit models. The estimated correlations between errors for observations on the same restaurant were insignificant, with asymptotic t-statistics near or below one, so the random effects specification again was not needed.

20. Recall that the regression estimate without controls is identical to the paired-difference estimate.

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TABLE II

TESTS OF DISCRIMINATION IN JOB OFFERS AND INTERVIEWS, WITH CONTROL VARIABLES

	High-price		Medium-price		Low-price	
	Offer (1)	Interview (2)	Offer (3)	Interview (4)	Offer (5)	Interview (6)
A. Paired difference						
Female-male	−.39	−.35	−.19	−.19	.29	.19
	(.13)	(.16)	(.14)	(.14)	(.11)	(.14)
B. Regression estimates with control variables						
Female	−.46	−.46	.08	.14	.11	.02
	(.16)	(.21)	(.24)	(.22)	(.16)	(.18)
Resume 2	−.05	−.20	.01	.14	.02	.12
	(.14)	(.16)	(.16)	(.16)	(.16)	(.17)
Resume 3	.02	.02	.11	.20	.05	.14
	(.15)	(.18)	(.18)	(.17)	(.12)	(.14)
Paired with female 2	.00	.01	−.13	−.11	.25	.23
	(.11)	(.18)	(.18)	(.16)	(.24)	(.25)
Paired with male 2	−.13	−.23	.03	−.07	.03	.06
	(.21)	(.19)	(.22)	(.21)	(.14)	(.17)
Female 2	−.00	−.01	−.37	−.63	.15	.16
	(.11)	(.18)	(.17)	(.16)	(.25)	(.26)
Sample size	46	46	42	42	42	42

Panel A reports paired-difference estimates, with the standard errors in parentheses; these are the estimates used in column (8) of Table I. Panel B reports linear probability model estimates. Heteroskedasticity-consistent standard errors are reported in parentheses. An intercept was included in all specifications. Female 2 is the Asian female. The conclusions in Panel B were unchanged in probit estimates, and in linear models estimated with random effects (allowing a correlation between audits of the same restaurant). For the latter, in an LM test for each specification, the null hypothesis of no correlation between errors for observations on the same restaurant could not be rejected (or, in one case, the estimated variance component was not positive).

in low-price restaurants, relatively less success in medium-price restaurants, and lower success overall. Thus, to obtain estimates that identify sex differences only from comparisons between the two males and female 1, we add a dummy variable for female 2.

Turning to the regression results for high-price restaurants, the estimated effects of the resume dummy variables on the probability of either a job offer or an interview are small and statistically insignificant, as was intended in the design of the resumes and the experiment. The estimates also indicate that the effects of the pairings are small and statistically insignificant. Finally, the estimated coefficient of the dummy variable for female 2 is effectively zero (reflecting the fact that in high-price restaurants, the two females had nearly identical outcomes). More importantly, the estimated difference in outcomes between males and females is unchanged by the inclusion of these control variables. The estimate in the first row of panel B indicates that, net of these variables, the probability that females received either offers or interviews was significantly lower than that for men, by 0.46.

Columns (3) and (4) repeat this analysis for the medium-price restaurants. As for high-price restaurants, the estimated effects of the resumes and the pairings are insignificant. The only significant coefficient for the control variables is that for the dummy variable for female 2, who had much less success at the medium-price restaurants. Nonetheless, the main finding of no significant differences between the treatment of males and females at medium-price restaurants holds up in the regression analysis.

Finally, columns (5) and (6) report results for the low-price restaurants. In this case, none of the estimated coefficients for the resumes or pairings, or female 2, are significant. However, a number of the estimated coefficients are a bit larger in absolute value, with the result that the estimated advantage for females in receiving job offers becomes smaller and statistically insignificant, when the control variables are added.

To summarize, the regression analysis provides confirming evidence of hiring discrimination against women in high-price restaurants. It also bolsters the validity of the study design, especially for the high-price restaurants, by showing that factors (such as resumes, pairings, and individual characteristics) that were intended to be uncorrelated with sex do not generate biases in the estimated sex differences in outcomes.

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IV. Earnings Differences

The audit results indicate hiring discrimination against women in high-price restaurants. However, as discussed in the Introduction, there is no existing hard evidence that earnings are higher in high-price restaurants than in low- or medium-price restaurants, although this has typically been assumed. If such earnings differences do not exist, then the pattern of hiring discrimination that we have uncovered may be unimportant from the perspective of explaining the sex gap in earnings among waitpersons.

While this question was not the principal focus of this project, we did gather some informal survey evidence via telephone interviews with the restaurants in our sample some time following the audit study. We telephoned the restaurants during non-peak hours, and attempted to talk with a manager, telling them that we were engaged in a small-scale research project on earnings in entry-level jobs. We generally reached a manager, but were occasionally put in touch with a waitperson. We asked for that person's best estimate of the hourly earnings of waitpersons (wages plus tips). In general, there was a great deal of reluctance to discuss tip income, since the IRS works rather hard to monitor compliance with tax payments on tip income.[21] In addition, even among those respondents willing to talk, some refused to be pinned down to any earnings estimates, and others did so only after being assured that we were only seeking their best estimate, and understood that earnings of waitpersons could be highly variable, and that tip earnings were often unknown to managers. Other restaurants were unwilling to talk for other reasons, and a few had closed.

Table III reports summary statistics. For each price category of restaurants we report the average minimum, maximum, and midpoint of hourly earnings using the figures reported directly, the averages when we fill in the missing minimum and maximum (and sometimes midpoint) with the available data, and the averages when we drop the high and low values for each category. Regardless of how we calculate average hourly earnings, the data indicate large positive earnings differentials in high-price restaurants relative to both medium- and low-price restaurants, and

21. See, e.g., the Internal Revenue Service's *Tip Income Study* [1990].

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TABLE III
INFORMATION ON HOURLY EARNINGS BY RESTAURANT PRICE CATEGORY

	Minimum/hr.	Midpoint/hr.	Maximum/hr.
A. High-price (N = 10)			
Average	$16.24	$21.79	$21.81
Average filling in all cells	$19.67	$20.56	$21.47
Average filling in all cells, deleting high and low values	$17.49	$18.57	$19.69
B. Medium-price (N = 9)			
Average	$10.43	$12.53	$13.94
Average filling in all cells	$11.27	$12.53	$13.90
Average filling in all cells, deleting high and low values	$11.22	$12.61	$13.82
C. Low-price (N = 9)			
Average	$8.62	$10.65	$11.31
Average filling in all cells	$9.84	$10.65	$11.45
Average filling in all cells, deleting high and low values	$10.15	$11.08	$12.02

Respondents sometimes gave a range of hours and a range of earnings, and sometimes reported only a minimum figure. Minimum, maximum, and midpoint hourly earnings estimates were constructed from these, using midpoints of wage or earnings ranges and midpoints of ranges of hours per shift to construct the midpoint estimate. "Average filling in all cells" is computed after filling in missing minimums and maximums with midpoints, and after filling in midpoints and maximums with minimums when only the latter are reported.

smaller positive differentials in medium-price relative to low-price restaurants. For example, using the averages for the midpoints deleting the highest and lowest values, average hourly earnings in high-price restaurants ($18.57) are 47 percent higher than earnings in medium-price restaurants ($12.61), and 68 percent higher than earnings in low-price restaurants ($11.08). The same qualitative conclusion emerges from comparisons of any of the other averages. Thus, the hiring advantage that men seem to enjoy in high-price restaurants translates into substantial earnings advantages.

V. THE NATURE OF DISCRIMINATION

While the audit study was designed solely to test for hiring discrimination in the restaurant industry, it is nonetheless of interest to attempt to understand the nature or source of the dis-

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crimination that we find. As discussed in the Introduction, two likely candidates are employer discrimination—presumably in the form of a preference of male owners/managers for male waitpersons—and customer discrimination—presumably in the form of a preference of male customers for restaurants that tend to hire male waitpersons.

To attempt to assess the role of each of these, we collected additional evidence (subsequent to the audit study) from a sample of restaurants included in the audit study, on (i) the proportion of the waitstaff that is male, (ii) the proportion of the clients that is male, and (iii) the sex of the owner(s) and the person(s) most responsible for hiring. We collected the data by having two research assistants (a male and female couple) visit each restaurant, remaining for about an hour while having a drink or dessert, always visiting during dinnertime hours on weekdays. During this time, the research assistants obtained their best estimate of the proportion male among the waitstaff and the clientele by observation. They also informally interviewed one or more waitpersons, obtaining their estimates of these proportions, as well as information on the sex of the owner(s) and person(s) most responsible for hiring. Given the time and expense required to obtain this information, and given some restaurant closings and difficulties with getting these data from some restaurants, data were obtained from roughly one-half of the restaurants in the audit study (with a slightly higher proportion of high- and medium-price restaurants). Also, because we had two (presumably noisy) estimates of the proportions male among the waitstaff and the clientele, we averaged these estimates.[22]

Table IV reports information from these data. Panel A provides descriptive statistics. The figures show that the proportion of the waitstaff that is male rises monotonically with the price category, from 0.39 in the low-price restaurants to 0.72 in the high-price restaurants. The proportion of clients that is male is essentially the same in low- and medium-price restaurants, and

22. There was one case where the interviewee actually took the data from the payroll sheets; in this case we simply used this estimate of the proportion male among the waitstaff. Overall, the means of the alternative estimates were relatively close (within 0.04 for all but the proportion male among the waitstaff in the low-price restaurants). The correlation between the two measures for the waitstaff was 0.74. However, the correlation for the two measures for clients was lower, at 0.39; this was driven by significant clustering of interview responses for the proportion of clients male at 0.5 (16 of 33 observations). The results were qualitatively similar using data only based on observation, or only from the interviews.

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TABLE IV

INFORMATION ON SEX OF WAITSTAFF, CLIENTS, OWNERS, AND MANAGERS

A. Descriptive statistics	High-price (1)	Medium-price (2)	Low-price (3)
Proportion waitstaff male	.72 (.07)	.51 (.08)	.39 (.10)
Proportion adult clients male	.62 (.02)	.52 (.03)	.53 (.04)
Only males responsible for hiring	.83 (.12)	.50 (.16)	.67 (.18)
Only females responsible for hiring	.08 (.09)	.33 (.15)	.22 (.16)

B. Regression for proportion waitstaff male, across price categories	High-price (1)	Medium-price (2)	Percent clients male (3)	Only females hire (4)	R^2 (5)
	.28 (.11)	.10 (.10)	.94 (.43)	.26 (.10)	.44

C. Regressions for proportion waitstaff male, within price categories	Percent clients male (1)	Only females hire (2)	R^2 (3)
High-price	1.49 (.73)	. . .	.29
	1.58 (.69)	.30 (.20)	.44
Medium-price	1.63 (.79)	. . .	.30
	1.67 (.74)	.19 (.13)	.44
Low-price	−.33 (.87)	. . .	.02
	.03 (.98)	.30 (.24)	.23

There are data on twelve high-price, twelve medium-price, and nine low-price restaurants. Panel A reports means, and standard errors of means are in parentheses. Panels B and C report OLS regression coefficients, and standard errors in parentheses. The variable "only males responsible for hiring" indicates that the person(s) most directly responsible for hiring was (were) male, and the owners—if reported—was (were) male. The corresponding variable for females is defined in the same way. (The two variables are not exhaustive because there may have been more than one person "most directly responsible for hiring," or this person(s) and the other owner(s) may have been different sexes.) The estimated coefficients of the "only males" variable were never significant, so specifications are reported excluding this variable; this had no qualitative effect on the results.

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is about 0.1 higher in high-price restaurants (0.62). Finally, we coded two variables indicating whether the owner(s) and person(s) most responsible for hiring were either all male or all female. Panel A indicates that the relationship between these variables and the price category is not monotonic, although the proportion in which only males hire is highest in high-price restaurants.

Next, in Panel B we report the estimated regression of the proportion of the waitstaff that is male on dummy variables for price category and for whether females (only) are responsible for hiring, as well as the proportion of the clientele that is male. The estimated coefficients for the dummy variables indicating the sex of those responsible for hiring are not consistent with employer discrimination. The estimated coefficient (not reported) of the variable indicating that males only were responsible was small (−0.03) and insignificant, while the estimated coefficient for the corresponding variable for females is positive and significant.[23] On the other hand, the proportion of the clientele that is male is significantly positively related to the proportion of the waitstaff that is male, with an estimated coefficient near one. Thus, the results are consistent with customer discrimination, but not employer discrimination (unless, of course, female owners/managers prefer male employees).[24] Nonetheless, customer preferences do not explain a large part of the variation across price categories in the proportion of the waitstaff that is male. The estimated coefficient of the dummy variable for high-price restaurants shows that the estimated proportion of the waitstaff that is male is 0.28 higher in high-price than in low-price restaurants after introducing the control variables in Panel B, compared with the average difference in Panel A of 0.33.

Finally, Panel C reports estimated regressions within price categories. These estimates provide stronger evidence that the proportion male among the clientele is positively associated with the proportion male among the waitstaff, although this relationship appears only for high- and medium-price restaurants. Furthermore, the estimated coefficients of the dummy variables

23. The reported specification excludes the former variable.

24. Other research takes a more direct approach to testing for customer discrimination. For example, Nardinelli and Simon [1990] test for customer discrimination in sports markets by looking at race effects on the value of baseball cards. Consistent with the evidence presented here, they find evidence of customer discrimination.

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indicating the sex of those responsible for hiring are never significant in these regressions. These estimates suggest that customer discrimination may play somewhat more of a role in influencing whether men or women get hired than is indicated by the pooled regression in Panel B.

Overall, the results in Table IV indicate that customer discrimination may be partially responsible for discrimination against women in restaurant hiring. We tend to think that this customer discrimination is not a direct preference of male clients for male waitpersons, but rather a preference of male clients for the types of restaurants that hire male wait staff, perhaps because such hiring signals "traditional" or "prestigious" restaurants. Such restaurants may be particularly appealing to business clients, who are more likely to be male, and whose expense accounts may cushion them from the higher costs generated by discrimination.

VI. Conclusion

Our results for job offers and interviews provide statistically significant evidence of sex discrimination against women in high-price restaurants. In high-price restaurants, job applications from women had an estimated probability of receiving a job offer that was lower by about 0.4, and an estimated probability of receiving an interview that was lower by about 0.35.

As discussed in the Introduction, occupational segregation has alternatively been attributed to differences in human capital investment, preferences, and discrimination. The research design used in this audit study isolates the effect of discrimination. We control for the effects of self-selection based on preferences or anticipated human capital investments by sending male and female job applicants to all restaurants, and we control for past human capital investment (and any other past differences) by presenting equivalent resumes to potential employers. Thus, we are quite confident in interpreting our results as reflecting discrimination.

The audit study does not address the question of the nature of the discrimination. Two plausible candidates are taste discrimination on the part of employers and on the part of customers. Some relatively crude evidence suggests that customer discrimination—in the form of preferences of male clients for restaurants that tend to hire male waitstaff—partly underlies the discrimi-

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nation that we find, but does not appear to be the complete explanation.

Another candidate is statistical discrimination. If employers have to invest in their workers, and believe that women are likely to quit sooner than men, they may be reluctant to hire women. Conceivably, such investment could be more important in high-price restaurants, where service, knowledge, and formality may be more important. We speculate, however, that such considerations are relatively unimportant in explaining our results. First of all, some job history is provided on the resumes, and by design the applications from women show the same past persistence on the job, on average, as do the applications from men. Second, the relative ease with which job offers were obtained, and the near equality of job offer rates (for both sexes combined) in the high- and low-price restaurants, suggests that there is relatively high turnover in all price categories of restaurants, and that turnover is not lower in the high-price restaurants that tend to hire men.[25]

Our audit results indicate hiring discrimination against women in high-price restaurants. In addition, our less formal survey evidence suggests that wage and tip earnings are substantially higher in high-price restaurants. Therefore, the pattern of hiring discrimination that we have uncovered may go a long way toward explaining the sex gap in earnings among waiters and waitresses.

Finally, while our findings provide strong evidence of discrimination, we caution against drawing overly strong conclusions based solely on the findings of this study. Audit studies offer important advantages relative to other approaches to studying discrimination, and perhaps even provide the only way of drawing convincing inferences regarding discrimination. But they also suffer from the potential disadvantage that the data they use are generated by the researcher and influenced by the precise methods used, and hence are more idiosyncratic than studies using data from publicly available secondary data sources.[26] This is by

25. This also suggests that the earnings differentials in Table III do not reflect tenure effects. The similar offer rates for low- and high-price restaurants may also be attributable to the resumes being more appropriate for the latter.

26. As an example, Heckman and Siegelman [1993] compare the Urban Institute studies and a study of the Denver labor market by James and DelCastillo [1991]. They conclude that despite following quite similar procedures, the studies appear to lead to different conclusions.

Along the same lines, a referee was concerned that the resumes we used were

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no means a fatal flaw of such studies, but it does imply that findings from audit studies should be interpreted cautiously until similar results emerge from related audit studies that address similar questions, but that vary in the methods of implementation. In other words, like other empirical studies, the findings of audit studies should be assessed in terms of their robustness across replication studies that vary the precise design of the experiment.

APPENDIX: RESUMES[27]

Resume #1

Employment Objective

A full or part-time position as a food server.

Education

Lebanon High School, Lebanon, PA 17104.

Activities: Active in Lebanon YMCA youth outreach program. Mt. Hope Wine Group—a group organized to sample and critique the world's wines.

Experience

Stallions Bar and Grill: Front waiting in moderate to upscale dining institution. Responsible for food prep, dining room setup, and late night cocktail waiting, May 1993–February 1994. 1290 Front End Blvd., Harrisburg, PA.

Cesare Place: Front and back waiting in fine dining institution with a continental menu. Occasional work for Cesare Catering. Experience includes buffet service. Headwaiter for last three months of employment and weekly hosting shift, January 1991–May 1993. 509 Washington Rd., Harrisburg, PA.

Red Lobster: Busperson and waitperson, June 1990–May 1991. West Valley Shopping Plaza, Harrisburg, PA.

more appropriate for high-price than low-price restaurants. We have no way of assessing whether this affected the outcome, but the concern helps emphasize the issue that a variety of idiosyncracies of audit studies may influence the results.

27. In the study, each of the three different resumes was produced with a different font and presentation style. Also, each resume included a name, telephone number, and address.

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Boscov's Department Store: Worked summers and Christmas as extra sales staff and cashier. Worked primarily in toys and sporting goods, June 1989–December 1990.

Personal

Basic understanding of retail computing systems and IBMs. Personal hobbies include exercise, reading, and piano playing.

Resume #2

Employment Objective

A full or part-time position as a food server/waitperson.

Education

Kennedy High School, Chicago, IL.

Activities: Volunteer for the Urban Adult Literacy Program for the homeless. Big Brother/Big Sister program of Chicago.

Experience

Cafe Carlos: Wait position in fine dining institution (front waiting only). Via catering also had experience in bartending, buffet setup, interior design and food preparation, August 1992–February 1994. 1245 Front St., Chicago, IL.

Connections Restaurant and Bar: Lunch waitperson (back and front waiting), host and food prep. Summer only 1991–1993. 19 Broadway, Chicago, IL.

Ground Round: Wait position and busperson, February 1990–August 1991. Cherry Creek Mall, Chicago, IL.

Ritz Camera: Retail sales of photography equipment and photo developing. Experience with darkroom equipment and 1-Hour photo developing machinery. Cherry Creek Mall, Chicago, IL.

Personal

Basic use of Macintosh and IBM personal computing systems. Personal interests include photography, DJ'ing, and current affairs.

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Resume #3

Employment Objective

A full or part-time position as a waitperson.

Education

Cedar Crest High School, Denver, CO.

Activities: Volunteer as senior companion in Silver Springs nursing home. Active in Denver's restaurant review guild.

Experience

Fleur: Waitperson in fine dining. Began as a busperson but worked up the ranks to headwaiter within 2 years. In addition to fine dining wait skills and extensive wine knowledge, also had experience with scheduling, data analysis and catering, July 1991–February 1994. Westpoint Mall, Denver CO.

Jody's Grill and Bar: Front and back waiting with food prep. Also did cocktail waiting on an outdoor deck, March 1991–July 1991. Englewood, CO.

Perkins Restaurant: Busperson for fast paced family restaurant, summers and weekends, June 1989–July 1990. 578 Bridgeport Rd., Englewood, CO.

Safeway Supermarkets: Checkout teller in supermarket. Extensive customer service skills and computerized checkout system, January 1989–June 1989. Walnut Hill Rd., Englewood, CO.

Personal

Excellent in use of data systems, computers, and registers. I enjoy reading, exercising, and fishing.

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