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Discrimination by Gender and Disability Status: Do Worker Perceptions Match Statistical
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Abstract

We explore whether perceptions of discrimination are related to ordinary statistical measures. The majority of disabled respondents report feeling some discrimination due to their disability, the majority of women feel some discrimination because of their gender, and a surprising number of men also report some discrimination. We do not find a strong link between perceptions of discrimination and measured discrimination perhaps because those who perceive discrimination feel that it occurs along other dimensions than pay. However, we do find a connection between whether a person feels his or her income is inadequate and measured discrimination for all groups studied.

1. Introduction

This paper is motivated by the growing literature on measured gender discrimination and the study of persons with disabilities. We use a survey of university graduates to explore whether female (or male) perceptions of gender discrimination are related to ordinary statistical measures of discrimination, and whether persons with disabilities perceive disability discrimination as it is ordinarily measured.

Kuhn (1987, 1990) studies two data sets from Canada and the United States. He finds that there is a negative and insignificant overall correlation between reports and measures of discrimination, which is largely driven by the fact that young well-educated women are both more likely to report discrimination and face the smallest measured wage gaps.

Barbezat and Hughes (1990) study discrimination and perceptions of discrimination using a sample of university faculty. They find evidence consistent with Kuhn (1987) but suggest an interesting interpretation for the findings of a negative correlation between measured discrimination and the chances that women report being discriminated against. They write that "Employers are more likely to indulge in discrimination when there is a low probability that such action will be detected. Thus, a high level of measured discrimination will be accompanied, in equilibrium, by a small number of reports and vice versa." We suggest an additional that is also consistent. Perhaps those who perceive discrimination feel that it occurs along other dimensions than pay, such as promotion or training opportunities.¹

¹ Neumark and McLennan (1995) explore nonwage gender discrimination as part of a paper that studies the feedback hypothesis—they test whether "women experience labor market discrimination and respond with career interruptions, less investment, and lower wage growth." They find some evidence consistent with the feedback hypothesis.

Hampton and Heywood (1993) is similar to Kuhn (1987), but instead of studying the relationship between wage residuals and perceptions of discrimination, they study how much a woman feels underpaid. They estimate the relationship between perceived underpayment and measured discrimination. Somewhat contrary to Kuhn (1987), they find "a strong, positive correlation between women's perceptions of gender income differences they were experiencing and econometric estimates of those differences."

For part of this work, we will follow Kuhn (1987) and Hampton and Heywood (1993) and explore female perceptions of underpayment and discrimination and study the connection between these and measured discrimination. Our paper also adds the study of the disabled following Hendricks, Schrio-Geist, and Broadbent (1997) (hereafter HSB) who examine wage discrimination for a sample of disabled and nondisabled graduates from the University of Illinois. Below, we use some of the data from HSB to study the connection between perceptions of discrimination and measured discrimination for the disabled (and for nondisabled men and women).

Our paper is unique in at least three ways. First, it documents the frequencies of perceptions of discrimination for many types of workers. Second, it studies perceptions of "discrimination" and of underpayment on the same sample of workers. Finally, it studies these issues not only for nondisabled men and women but for the disabled as well. We have several findings. First, we report the frequency of perceptions of discrimination for several groups of workers. We find that the majority of the disabled respondents report feeling at least some discrimination due to their disability and that the majority of women report feeling at least some discrimination because of their gender. We also find that a surprising number of men report at least some gender discrimination (14%). However, we do not find a strong link between

perceptions of discrimination and measured discrimination (whether it be gender discrimination against women, gender discrimination against men, or disability discrimination against the disabled). The findings for gender are consistent with the findings of Kuhn (1987) reported above. One explanation for this result is that there is evidence consistent with the fact that those who perceive discrimination feel that it occurs along other dimensions than pay. Second, and consistent with Hampton and Heywood (1993), we find there is a connection between whether an individual feels his or her income is inadequate and measured discrimination.² This is true for each of our main groups: men, women, and the disabled.

In section 2 we describe the survey and explore the data. In section 3 we run a series of simple least-squares wage regressions by group (all, men, women, and disabled) to study wage determinants by demographic group. Section 4 more carefully describes what we mean by measured discrimination, outlines and implements the empirical strategy, and documents the link between perceptions of discrimination and measured discrimination. Section 5 studies issues of timing of discrimination. Section 6 examines sample selection and whether we have erroneous results due to studying only currently employed persons. Given that we and Kuhn (1987) find such a weak link between perceptions of discrimination and measured discrimination, we study nonwage types of discrimination in section 7. Section 8 concludes.

² This finding is also consistent with Hampton and Heywood (1996) who study the interesting case of physicians. See also Heywood (1992).

2. Data

The University of Illinois at Urbana-Champaign has had a Division of Rehabilitation Education Services since 1948. Since then, approximately 1200 students who used the have graduated from the University.³ The data for this study are from a seven-page conducted during the winter of 1993 that initially examined 865 of the 1200 graduates for whom addresses were located. Valid questionnaires were returned by 301 of the graduates program for a response rate of 35%. Because each disabled respondent was classified field of study, gender, and year of graduation, we created a stratified sample of nondisabled students using records from the alumni office. Five matches were drawn for each returned questionnaires from the disability group and 1505 questionnaires were sent abled graduates of the University. Valid questionnaires were returned from 339 of the abled sample for a response rate of 23%.

Table 1 outlines summary statistics for many of the variables we study. There are significant differences worthy of note. Women earn slightly more than 60% of what (\$39,074 vs. \$64,838) and, on average, the disabled earn significantly less than the (\$51,883 vs. \$60,772). Although men and women have similar years of experience prior current job, women have significantly less seniority in the current job.⁴ On the other disabled have significantly less

³ Kuhn (1987) and Neumark and McLennan (1995) find that better educated women, who earn higher wages, tend to report discrimination more frequently. Because of the way our sample was constructed, we obviously only have well- educated individuals. It would be interesting to study issues of perceptions about discrimination of the disabled on a group with a wider distribution of education levels.

⁴ Although men and women were equally likely to respond to the survey, we have a larger fraction of men than women in this sample for two reasons. First, men are 16% more likely to be working (as explored in the section on labor supply below). Second, because the fraction of graduates who are male is higher than the fraction who are female, men were initially more likely to be sent surveys.

precurrent-job experience than the nondisabled but have current seniority. Table 1 also documents that the disabled are more likely to report disability limits the amount of work they can do,⁵ are less likely to be married, and likely to work in the public sector than the nondisabled. Also, women are more likely part-time⁶ and in the public sector than men, but men are more likely to be married employed.

Insert Table 1 Here

3. Wage Determinants by Group

As a first step to studying the effects of measured discrimination on discrimination perceptions, we follow Kuhn (1987) by exploring the wage structure for each of the demographic groups. In our empirical of characteristics:

$$w_i = \sum_j \beta_j X_{ij} + \epsilon_i$$

Table 2 documents some of the results from this analysis. The table is arranged in eight columns, two each for all respondents, men, women, and the disabled. Within each of the four categories we present results from two regressions. In the odd-numbered columns the

⁵ A respondent is defined as disabled if he or she reports having one of the functional limitations (FLGS) listed at the end of Table 1. The variable for health limitation is equal to 1 if the respondent answered yes to the question "Does your health or condition limit the amount of work that you can do?" and is equal to 0 if the respondent answered no. He or she could have a disability but also not have a health limitation.

⁶ Respondents were asked if they worked full-time or part-time. Unfortunately, there were no specific instructions about how many hours per week or weeks per year this meant.

independent variables, X, include four indicator variables for educational attainment, M.A., Ph.D., J.D., M.D.; the number of years of experience on the current job; the numbers of years of seniority on the current job, and its square; an indicator for whether the person is white; variables indicating whether the individual is male, married, a public sector employee, self-employed, a part-time worker, or has a health limitation that limits the amount of work he or she can do; the months since graduation from college; and a disability indicator. The even-numbered columns include these variables (except for the disabled indicator) but also include indicator variables of the primary disability for all persons with a disability (their functional limitation groups FLGS).⁷

Insert Table 2 Here

Columns 1 and 2 present results for the full sample. Many of the results in Table 2 are consistent with those from HSB. Several of the advanced degree indicator variables are positive and significant as expected.⁸ The experience variables also yield expected signs. Those with more prejob experience earn more and those with longer current-job seniority earn more but at a declining rate. Women, part-time workers, the self-employed, and public employees all earn less than their respective counterparts. Finally, the point estimate on the indicator for disabled is -0.065 but is not significant. HSB find a point estimate of -0.087 on disabled in their baseline

⁷ See the notes to Table 1 for a description of the 12 FLGS indicator variables as well as a more detailed description of the other variables.

⁸ M.A. has a very small point estimate and is not significant. HSB find a significant effect of this variable and a much larger point estimate, but M.A. yields the smallest point estimate of all of their educational indicator

regression. Although we expect the results to be consistent with HSB, we should not expect the results to be identical for two reasons. The first is that HSB use several years of data on each individual. We, however, only study the most recent job for each respondent. The second difference is that we select individuals who have valid responses to many of the discrimination perception questions that are the focus of this paper and were not explored in HSB.⁹

Column 2 of Table 2 controls for the 12 FLGS. As in HSB, this does not change any of the estimates reported in column 1 in any meaningful way. All variables that were significant remain so after controlling for the FLGS. The remainder of Table 2 reports regression results for men, women, and the disabled separately. The results for these groups separately are largely the same as they were combined with a few exceptions. For example, the disabled do not have a significant return to earning an M.D., although the point estimate is still quite large. For the overall sample and for men, married workers earn higher incomes. However, women and the disabled who are married do not earn significantly more than the unmarried.

4. Effects of Measured Discrimination on Discrimination Perceptions

In this section we study the connection between perceptions of discrimination and measured discrimination. Table 3 reports some summary statistics for several questions asked in the questionnaire. Each survey participant was asked to rank from 1 = never through 5 = often answers to the following questions: "To what extent have you been discriminated against in any job¹⁰ because of..." your gender?, or your disability? Although the focus of this paper is on

⁹ The HSB sample size was 1071, whereas we have a sample size of 466. The R^2 s we report, from 0.309 to 0.413, are similar to those reported by HSB

¹⁰ The issue of timing is of potential importance and is discussed in section 5 below

gender and disability status, we also describe (but do not report in the tables) some information on discrimination based on age and race or ethnicity. The results for gender and disability are presented in Table 3 for all respondents, women, men, disabled, and nondisabled, respectively.

Insert Table 3 Here

For the entire sample (column 1), the majority of respondents report that they have never been discriminated against for any of the reasons. However, some groups do report some kinds of discrimination and some groups report certain kinds of discrimination more than others. For example, although 43% of women report that they have never been discriminated against because of their gender most report discrimination by gender to some extent, 4% report it often, and 16% report in the top two of five categories. Surprisingly, men also report gender discrimination. Fourteen percent report at least some gender discrimination.¹¹ The disabled also frequently feel discriminated against. An alarming 53% report at least some discrimination and 14% report discrimination in the top two of five categories, including 3.4% who report that they often feel discriminated against. The fraction of respondents who report at least some discrimination due to race/ethnicity is 12 percent.¹²

The fractions of respondents who report discrimination because of age and for other reasons are quite small. One possible explanation for why there seems to be very little reported

¹¹ This raises the issue of possible "reverse discrimination." We do not explore stating that our data suggest that much more of the discrimination that men promotion and in discrimination in finding a job (see Table 3 and the discussion below).

¹² There is no detailed analysis by race reported in this paper as the number more people report race discrimination than there are nonwhites in the sample.

age discrimination is that our sample could be relatively young. It may be the case that fewer people report age discrimination than racial, gender, and disability discrimination because one's race, gender, and disability (in some cases) are present over their entire lives.

Having documented that the disabled and women (as well as men) feel discriminated against, our next step is to test whether these perceptions of discrimination are associated with measured discrimination. We do this separately for women, men, and the disabled. Kuhn (1987) and Hampton and Heywood (1993) performed similar analyses for women. We will describe the techniques and results for women first and continue with men, and then the disabled, below.

To help motivate our empirical strategy we closely follow Kuhn (1987). We begin by specifying Equation 1 separately for men and women:

$$w_i^f = \sum_j \hat{\beta}_j^{fa} X_{ij}^{fa} + \epsilon_i^{fa}$$

$$w_i^m = \sum_j \hat{\beta}_j^{ma} X_{ij}^{ma} + \epsilon_i^{ma},$$

where f represents female and m represents male. The a refers to a set of covariates as discussed below. These are OLS regressions for women and men separately and lead to the well-known discrimination estimate of Oaxaca (1973).

$$\bar{d} = \sum_j \hat{\beta}_j^{ma} \bar{X}_j^{fa} - \sum_j \hat{\beta}_j^{fa} \bar{X}_j^{fa} = \sum_j \hat{\beta}_j^{ma} \bar{X}_j^{fa} - \bar{w}^{fa}.$$

where $\hat{\beta}_j^{ma}$ are the regression coefficients from Equation 2 and $\hat{\beta}_j^{fa}$ are the regression coefficients from Equation 3, and \bar{X}_j^{fa} and X_{ij}^{ma} are the average characteristics of men and women, respectively. Equation 4 represents an estimate of measured discrimination as it is the difference between what a woman would have been paid (based on her average characteristics)

while being compensated as a man ($\hat{\beta}_j^{ma}$ represents economic “returns” to being male), minus the actual female wage.

The important extension by Kuhn (1987), which we again show here, is that in this instance we are concerned with individual measures of discrimination, not averages as focused on by Oaxaca (1973). Kuhn (1987) suggests two individual measures of discrimination that we tailor to our examples. First, two statistical measures of discrimination are created for each woman. The first, \hat{d}_i^{1fa} , is estimated as

$$\hat{d}_i^{1fa} = \sum_j \hat{\beta}_j^{ma} X_{ij}^{fa} - w_i.$$

This takes the coefficients from an earnings equation for *men only*,¹³ $\hat{\beta}^{ma}$, and multiplies them by female individual characteristics, X_i^{fa} , and finally subtracts the actual female wage. This can be thought of as the difference between her actual wage and the amount she would be paid, given her characteristics, if she were compensated as if she were a man. The mean for \hat{d}_i^{1fa} as reported in panel A of Table 4 is 0.174.

An alternative measure of discrimination, \hat{d}_i^{2fa} , is computed by subtracting the women’s predicted wage, $\hat{\beta}^{fa} X_i^{fa}$ ($\hat{\beta}^{fa}$ are the coefficients from the regression reported in Table 2, column 5 on women only) instead of her actual wage,

¹³ The earnings equation that is used to compute $\hat{\beta}^{ma}$ is a regression of the log of annual covariates listed in Table 2, column 3. In fact, $\hat{\beta}^{ma}$ is the vector of coefficients in that column. $\hat{\beta}^{fa}$ for women only (this is the vector of coefficients reported in Table 2, column 5). $\hat{\beta}^{mb}$ and $\hat{\beta}^{fb}$ are computed on regressions for men and women, respectively, but they exclude the disability indicator and include the 12 functional limitation group dummies: semiambulatory; wheelchair, lower limbs; wheelchair, lower/upper; motor control deficit; motor control deficit, both; visual deficit; blind; hearing deficit; deaf; learning disability; pain limitation and endurance limitation. The vectors of these coefficients are included in Table 2, columns 4 and 6, respectively. We also included indicators for six one-digit occupations and ten one-digit industry categories (which we do not report). These do not influence the main conclusions of the paper.

$$\hat{d}_i^{2fa} = \sum_j (\hat{\beta}^{ma} X_{ij}^{fa} - \hat{\beta}^{fa} X_{ij}^{fa}).$$

Of course, the mean of \hat{d}_i^{2fa} is also 0.174. The simple correlation between \hat{d}_i^{1fa} and \hat{d}_i^{2fa} is 0.403.

Both \hat{d}_i^{1fa} and \hat{d}_i^{2fa} are measures of discrimination in that they represent the difference between what women earn and what they would earn if they had the economic “returns” to male characteristics (Kuhn 1987). There is no *a priori* reason to prefer one measure over the other. To understand the technical difference between \hat{d}_i^{1fa} and \hat{d}_i^{2fa} , it is important to see how they are related. This is easily done by substituting Equation 2 into Equation 5, which yields

$$\hat{d}_i^{1fa} = \sum_j \hat{\beta}^{ma} X_{ij}^{fa} - \left(\sum_j \hat{\beta}^{fa} X_{ij}^{fa} + \epsilon_i^{fa} \right) = \hat{d}_i^{2fa} - \epsilon_i^{fa}.$$

Insert Table 4 Here

As Kuhn (1987) suggests, the essential difference between the measures, therefore, is what they assume about ϵ_i^{fa} (female unobservables). He describes two cases. If female unobserved characteristics are sector-specific then \hat{d}_i^{1fa} is the correct measure. A woman would earn $\sum_j \hat{\beta}_j^{ma} X_{ij}^{fa}$ as a man. If female unobserved characteristics are instead general, then \hat{d}_i^{2fa} is the correct measure. In this case a woman would earn $\sum_j \hat{\beta}_j^{ma} X_{ij}^{fa} + \epsilon_i^{fa}$. See Kuhn (1987, p. 569) for more details.

The second stage of the analysis is to run probit models with the dependent variable equal to one if an individual has ever felt discrimination of a particular kind (and equal to zero

otherwise) on a constant and a measure of statistical discrimination, for example, \hat{d}_i^{1fa} or \hat{d}_i^{2fa} .

We use three dependent variables (all created as indicators) in the analysis of women reported in panel A of Table 4. The first is ever felt gender discrimination? (equal to 1 if the respondent answered 2, 3, 4, or 5 in response to “To what extent have you been discriminated against because of your gender [with 1 = never and 5 = often] and 0 otherwise). The second is ever felt *any* discrimination? (constructed exactly like the previous one except that if the respondent felt discrimination of any kind, then she received a 1). The third measure asks whether income is inadequate. One is defined to have inadequate income if he or she responded 1 or 2 to the question “How adequate is your income?” with 1 = not at all and 5 = very.¹⁴ We are assuming that the respondents interpret this question to be referring to their income from work. To the extent that it is not, we could have some error in our estimates.

Within panel A of Table 4 there are two parts. The parts differ by which independent variables are included in the first stage of the analysis. In the first part the first-stage regression controls for M.A., Ph.D., M.D., other experience, tenure, tenure,² white, whether health limits the amount of work you can do, marital status, public sector membership, self employment, months

¹⁴ The percentages in each of these categories on inadequate income from 1 through 5 were 1.94, 9.91, 25.43, 42.03, and 20.69, respectively. In order to explore the robustness of our findings, we tried three other specifications. First, we redefined gender discrimination and any discrimination = 1 if the respondent answered only 3, 4, or 5 in response to “To what extent have you been discriminated against?” (with 1 = never and 5 = often) and 0 otherwise. Second, we redefined gender discrimination, any discrimination, and income inadequate = 1 if the respondent answered only 4 or 5 in response to “To what extent have you been discriminated against?” (with 1 = never and 5 = often) and 0 otherwise. Our third specification was to estimate these using ordered probit models as our data are in a 1-5 format. Therefore, we created three new tables (not reported) that mimic Table 4. Our results using each of these additional specifications are consistent with those reported in Table 4. We also redefined income inadequate in the same ways we redefined gender and any discrimination and performed ordered probit models to check for robustness. Our results using these new specifications for income inadequate are also consistent with those reported in Table 4.

since graduation from the University, an indicator for disabled, and a constant.¹⁵ The measures of discrimination used in this panel are \hat{d}_i^{1fa} and \hat{d}_i^{2fa} , which were described above. In the second part of this panel, the first stage regression includes the same independent variables (except for disabled) but also controls for the functional limitation groups: semiambulatory; wheelchair, lower limbs; wheelchair, lower/upper; motor control deficit; motor control deficit, both; visual deficit; blind; hearing deficit; deaf; learning disability; pain limitation and endurance limitation.¹⁶ We label the measures of discrimination using this independent variable specification corresponding to panel B as \hat{d}_i^{1fb} and \hat{d}_i^{2fb} . The simple correlation between \hat{d}_i^{1fb} and \hat{d}_i^{2fb} is 0.551.

Although the point estimates in columns 2 and 3 of Table 4, panel A are negative (the higher the measured levels of discrimination, the lower the perception of gender discrimination), the estimates are not statistically significant. They are consistent with Kuhn (1987), however, who found an insignificant, negative effect using data from the U.S. and Canada. A similar negative, insignificant effect is estimated for the relationship between measured discrimination and perception of discrimination of any type (columns 4 and 5). Sixty-six percent of women feel that they have been discriminated against in some way.

Columns 6 and 7 report the results where the dependent variable is whether the respondent feels that her income is inadequate. Interpretation of this variable is very difficult, however, as workers may answer in the affirmative if, for example, they have high living

¹⁵ None of the results reported in Table 4 are influenced by whether we control for membership in selfemployment or in the public sector, nor whether we remove these people from the data entirely.

¹⁶ “Disabled” is not included in the first step in panel B because it is a linear combination of the FLGS indicator variables.

expenses or they feel they are not paid what they deserve. Nevertheless, we follow Hampton and Hey wood (1993) and explore this variable. Twelve percent of women feel that their income is inadequate. We might expect that those with higher measured levels of discrimination, \hat{d}_i^{1fa} and \hat{d}_i^{2fa} , would be more likely to report that their income is inadequate. This is the case for \hat{d}_i^{1fa} but not for \hat{d}_i^{2fa} . Hampton and Hey wood (1993) find a link between measured discrimination and the amount by which an individual feels underpaid, which is consistent with our finding for \hat{d}_i^{1fa} .

Table 4, panel B reports the results of similar analyses for men. In this case, there is only one measure of discrimination for each independent variable specification, \hat{d}_i^{1ma} and \hat{d}_i^{1mb} ,

$$\hat{d}_i^{1ma} = \sum_j \hat{\beta}^{ma} X_{ij}^{ma} - w_i$$

$$\hat{d}_i^{1mb} = \sum_j \hat{\beta}^{mb} X_{ij}^{mb} - w_i,$$

because we are using the “returns” to male characteristics as the standard ($\hat{\beta}^{ma}$ and $\hat{\beta}^{mb}$ are the coefficients from the wage regressions reported in columns 3 and 4 of Table 2). Therefore, \hat{d}_i^{1ma} is the predicted wage for the individual minus his actual wage (this is simply his wage residual).¹⁷ Fourteen percent of men report gender discrimination.

The results for gender discrimination (reported in column 2 of panel B of Table 4) are different from those reported for women in panel A. That is, men with higher measured discrimination are more likely to report gender discrimination, although this effect is only

¹⁷ Both \hat{d}_i^{1ma} and \hat{d}_i^{1mb} measure the difference between what a male with a given set of characteristics should be paid and his actual wage. The unexplained difference between what a man is paid and his actual wage could be due to a number of factors including gender discrimination.

significant at the 0.10 level when the FLGS are controlled for in the second part of panel B and is not significant if FLGS are not included. A similar result holds when we use “ever felt any discrimination” as the dependent variable. In this case, the point estimates are also positive, but neither is statistically significant. Finally, the last column reports the results when “income inadequate” is the dependent variable. Here, as with women, there is a positive correlation between statistically measured discrimination and men’s perceptions that their income was inadequate.

The last part of this section performs a similar analysis for the disabled. In this case we use \hat{d}_i^{1da} and \hat{d}_i^{2da} ,

$$\hat{d}_i^{1da} = \sum_j \hat{\beta}^{na} X_{ij}^{da} - w_i$$

$$\hat{d}_i^{2da} = \sum_j (\hat{\beta}^{na} X_{ij}^{da} - \hat{\beta}_j^{da} X_{ij}^{da})$$

as independent variables in the second stage.¹⁸ $\hat{\beta}^{na}$ is the vector of estimated coefficients from a regression of log annual compensation for the nondisabled respondents. This case is exactly the same as the female case except that we use nondisabled (instead of male) as the base group. Panel C of Table 4 reports the results. Fifty-three percent of the disabled respondents reported at least some disability discrimination, 59% reported that they felt discrimination of any kind, and 11% felt their income was inadequate. The results of the probit analysis are mixed. As in the female case, neither \hat{d}_i^{1da} or \hat{d}_i^{2da} has a significant effect on perceptions of disability discrimination or any discrimination. The effect on “income inadequate” is strong and significant for \hat{d}_i^{1da} but not significant for \hat{d}_i^{2da} .

¹⁸ The simple correlation between \hat{d}_i^{1da} and \hat{d}_i^{2da} is 0.410.

5. Timing

The discussion in section 4 is fundamentally about the link between whether the respondent felt discriminated against in any job and his or her current compensation. However, one of the main survey questions used was “To what extent have you been discriminated against in any job?” We explore several implications of the timing of this question below and conclude that the results are not significantly influenced by this timing issue.¹⁹

Antecol and Kuhn (1997) suggest that the level of discrimination faced by workers of a particular group is likely to be a “relatively permanent characteristic” for workers of that group. They find, in fact, very similar patterns of reported discrimination across groups of workers, when using wages reported for different time periods.²⁰

In order to study timing more carefully in this regard, we complete a reanalysis of Table 4, from a slightly different perspective. Recall that the question asked of the workers was “To what extent have you been discriminated against in any job?” We have been able to classify when the discrimination occurred into four groups: (i) on the current job (88 cases), (ii) on either the current job or previous jobs (160 cases), (iii) on previous jobs (68 cases), or (iv) not determined (68 cases). We then created a set of new tables that exactly mimic Table 4 except that they were based on appropriate subsamples of the data i, ii, and iii above. In the case of the

¹⁹ Note that the timing of the survey question is not an issue in other parts of the paper such as when we document how often different groups perceive discrimination and when we study nonwage discrimination below.

²⁰ Note, however, that Neumark and McLennan (1995) report that women are more likely to change jobs if they report discrimination. This suggests that respondents themselves may think that levels of discrimination differ across employment situations.

individuals for whom we know that the discrimination occurred on the current job, the point estimates are generally larger (in absolute value) and more significant but are certainly all in the same direction as the full sample analysis reported in Table 4. In no case, when reanalyzing the data by when the discrimination occurred are any of the conclusions drawn from Table 4 (and section 4) changed in any meaningful way. For these reasons, we are reasonably well convinced that the timing of the questions is not an issue of importance in this paper.

Insert Table 5 Here

6. Is there a Labor Supply Effect?

Because all of the results and discussion thus far have been for respondents with valid wage data, we were concerned that our results might be clouded by selection. Those most severely discriminated against may drop out of the labor force or may be disproportionately unemployed. In Table 5 we have reported means for the three dependent variables from Table 4 but have also included those respondents who were not working or had missing wages for any other reason. The odd-numbered columns report summary statistics for the workers and the even-numbered columns for the nonworkers. We have indicated statistically significant differences between means for workers and nonworkers for each of the three variables by nine person types (down the rows): all, men, women, disabled, nondisabled, male/disabled, male/nondisabled, female/disabled, and female/nondisabled. There are a few examples worth noting. For women, those working were significantly more likely to report having ever felt gender discrimination

than those not working (56% to 40%). For men (25% to 42%) and for all respondents (24% to 35%) those working were significantly less likely to have ever felt disability discrimination. Finally, several groups had a significantly larger fraction of nonworkers report that they ever felt their income was inadequate relative to workers: all (22% to 12%), women (30% to 12%), disabled (28% to 11%), and female/disabled (44% to 13%).

Although there seem to be several differences in the ways respondents answer discrimination questions based on their working or not working status, our analysis suggests that correcting for selection does not alter any of the conclusions drawn from Table 4. We perform the sample selection corrections using techniques described in Heckman (1979). We do this by performing the same analyses as reported above (in creating Table 4) with the additional step of adjusting the $\hat{\beta}$ s in Table 2 for the fact that some individuals were more or less likely to be working than others.

In this additional step, we estimate the probability that one is working using all of the covariates reported in Table 2 plus two additional types of variables, each of which may have some potential problems. The first is based on the number of children in each of four categories: (i) the number between ages 0 and 6, (ii) the number between ages 7 and 12, (iii) the number between the ages of 13 and 18, and (iv) the number over 18. We make this correction for all groups studied and generally find that the presence of very young children (those ages 0-6) reduces the probability that one works in the labor market, although not always significantly so. The effect is much smaller for men than for women.

Although using the presence of children is somewhat common as an exclusion restriction, one might argue that children are endogenous to the employment decision. We, therefore, use a second method to control for selection by including a measure of household income that is not

attributed to the observation's labor income. This variable is created by taking the midpoint of a variable on gross income of the entire household and subtracting the respondent's own income from work. For this sample, the probability that one works in the labor market does not seem to be influenced by household income (the standard errors are very large relative to the point estimates for this variable in a probit to determine work status). Perhaps the reason for this finding is that nonrespondent wage household income is measured in categories and probably with considerable error.

It is reasonable to expect that the results in Table 4 may depend on who in the sample works. However, redoing the analyses of Table 4 by correcting the β s from Table 2 using these standard techniques and common exclusion restrictions (described above) has no influence on the main results.

7. Nonwage Discrimination

The evidence that perceptions of discrimination can be adequately estimated using statistical measures based on wage residuals is, at best, mixed. These statistical measures of discrimination (\hat{d}^1 and \hat{d}^2) are only measures of statistical discrimination in pay. There are, however, other ways discrimination can occur, such as discrimination in promotion or discrimination in getting a job. These distinctions are important and could be potential explanations for our results.

Table 6 reports that overall only 3% of working respondents in our sample reported discrimination in pay, whereas 7% reported discrimination in promotion and 8% reported discrimination in getting a job. This table additionally reports results for men, women, disabled,

and nondisabled separately. Note, for example, that although 6% of women reported that they felt discrimination in pay, 9% felt discrimination in promotion and 12% felt discrimination in getting a job. The fraction of men who report discrimination in pay (1%) relative to the other two categories (5% for promotion and 7% for getting a job) is even more striking.

Insert Table 6 Here

Several other authors have examined reasons certain groups feel discriminated against. For example, Kuhn (1985, Table 5) reported the reasons U.S. women mentioned as the cause of sex discrimination on their job. He found that 32.7% of women surveyed reported “salary inequities” as the source of discrimination, but 30.8% said that they felt “low performance potential,” and 26.9% said they felt they were “not given respect.”

We also gathered additional data from the National Longitudinal Survey of Young Women (NLS-YW) (also see Neumark and McLennan [1995] for a similar analysis). Many women who report sex discrimination in this survey report it for reasons other than disparities in pay. We first studied data for a sample of women who were aged 14-24 in 1968. In 1972 they were asked whether they were ever discriminated against due to sex. Of this young group, 6.02% reported discrimination. Many of the reasons for the reported discrimination were not pay. For example, 30.1% reported that they were “not promoted or assigned to certain jobs,” and 12.3% reported that they were “not hired or interviewed.” However, these data are considerably older

than the data described in the rest of this paper and “paid less than men” was not an option to choose from in the questionnaire.²¹

In 1988, the NLS-YW asked whether respondents had “experienced sex discrimination between 1983 and 1988.” About 11% answered yes. Of those 34-44-year-old women in 1988 who said yes, only 20.8% reported the most recent way they experienced sex discrimination was that they were “paid less for same work.”²² This is consistent with Kuhn’s (1985) finding. Perhaps one reason authors have been having difficulty linking perceptions of discrimination to actual measured (statistical) discrimination is that discrimination manifests itself in many forms other than pay.

8. Concluding Comments

We have studied discrimination by gender and disability status using data from an earlier survey by Hendricks, Schriro-Geist, and Broadbent (1997). We have specifically tried to examine issues of gender discrimination as in Kuhn (1987) and Hampton and Hey wood (1993) by studying the link between perceptions of gender discrimination and statistical measures of discrimination. We have broadened the analysis by considering whether men experience perceptions of gender discrimination, by examining issues of disability discrimination and the

²¹ However, “just feel the company discriminated” (19.2%) and “feels there is general discrimination” (13.7%) were options. We also performed a similar analysis using the National Longitudinal Survey of Older Men. In 1971 many black men who reported race discrimination between 1966 and 1971 reported it for similar reasons. Unfortunately, for this group as well, “paid less than others” was not an option. There also are no satisfactory questions asked of the “young men” cohort.

²² Other reasons for reporting discrimination in this sample included “not promoted or assigned to certain jobs” (25.6%) and “not hired or interviewed” (5.4%).

perceptions of the disabled, and by examining perceptions of underpayment and discrimination using the same data.

Although women perceive a great deal of gender discrimination, there is not a strong link between perceived gender discrimination and statistically measured wage discrimination for women. In fact, the point estimates are insignificantly *negative*. There is evidence, however, of a link between whether women feel that their income is inadequate and statistical measures of wage discrimination. These results are consistent with Kuhn (1987) and Hampton and Heywood (1993), respectively. For men, we find some evidence of a positive link between perceived discrimination and statistical measures, although the significance levels are weak at best. Although certainly not conclusive, this suggests that perceptions of discrimination may be different across gender. We also find a link between whether they feel their income is inadequate and statistical measures of wage discrimination for all groups.

The results for the disabled are mixed. However, there is a connection between perceptions that income is inadequate and statistical measures of wage discrimination for the disabled (as well as for men and women). The fact that there is a significant, positive correlation between perception of income inadequacy and relative wages (measures of discrimination) for all groups suggests that most people can judge their relative wages within their gender or disability group fairly accurately. If this result also implies that workers can judge relative wages with respect to workers in other groups, one hypothesis that has been advanced to explain Kuhn's original results, lack of information about alternatives, does not appear to explain the insignificant, negative correlation of perceived discrimination and relative wages for women. If it does not imply that people can judge wages in other groups accurately, then the use of inadequate income as a measure of wage discrimination is brought into question. These results

suggest women and men perceive discrimination in different ways. That is, there is a negative yet insignificant link between perceptions of wage discrimination and measured discrimination for women and a positive and weakly significant link for men.

The measures of discrimination that we have studied are related to discrimination in pay but often when an individual reports discrimination, it is for noncompensation related reasons. Given our results for men and for the disabled, a research strategy that focuses on wage residuals as measures of discrimination may be appropriate for studying discrimination among men or for studying discrimination against persons with disabilities. There is some evidence in both cases that those persons who feel that they are discriminated against tend to have negative wage residuals. However, it appears that focusing research on equal pay for equal work when studying gender discrimination may miss the bulk of the discrimination that women perceive.

Data Appendix

Since 1948 when the University of Illinois opened its Division of Rehabilitation Education Services approximately 1200 students who used the Division have graduated from the University. The data for this study are from a seven-page survey conducted during the winter of 1993. The survey contained a large number of questions on a host of topics including salary, detailed questions about levels of education, work experience, tenure on the job, gender, types of disability, perceptions about discrimination, whether income was inadequate, and whether the respondent felt discrimination in terms of pay, promotion, or in getting a job. (Descriptions of these variables and summary statistics are included in the text and tables.) The original survey examined 865 of the 1200 graduates of the Division for whom addresses were located. Valid questionnaires were returned by 301 graduates of the program for a response rate of 35%. We were able to classify each of the disabled respondents by primary field of study, gender, and year of graduation. Next, we created a stratified sample of nondisabled students using records from the alumni office. We created five matches for each of the 301 returned questionnaires from the disability group, and 1505 questionnaires were returned from the nondisabled sample for a response rate of 23%.

Table 1

Table 1. Summary Statistics by Group

	(1) All	(2) Men	(3) Women	(4) Disabled	(5) Nondisabled
Salary	56,766 (43,922)	64,838*** (49,752)	39,074*** (16,790)	51,883** (39,561)	60,772** (46,896)
M.A. ^a	0.40 (0.49)	0.34*** (0.47)	0.53*** (0.50)	0.44 (0.50)	0.37 (0.48)
Ph.D. ^a	0.14 (0.35)	0.16 (0.36)	0.12 (0.32)	0.11* (0.32)	0.17* (0.37)
J.D. ^a	0.06 (0.24)	0.08*** (0.27)	0.02*** (0.14)	0.04 (0.20)	0.07 (0.26)
M.D. ^a	0.02 (0.12)	0.02 (0.15)	0.00 (0.00)	0.02 (0.15)	0.01 (0.09)
Age	43.07 (11.93)	43.34 (12.27)	42.46 (11.16)	43.77 (11.75)	42.49 (12.07)
White	0.97 (0.17)	0.98 (0.15)	0.95 (0.21)	0.96 (0.19)	0.98 (0.15)
Other experience ^b	79.79 (94.30)	81.11 (99.35)	76.90 (82.35)	69.31** (81.87)	88.38** (102.73)
Tenure on job ^c	142.28 (111.30)	156.02*** (111.69)	112.15*** (104.65)	146.71 (107.10)	138.63 (114.71)
Tenure ²	32,603 (39,568)	36,777*** (41,253)	23,454*** (33,972)	32,940 (37,559)	32,327 (14,214)
Male ^d	0.69 (0.46)	1.00 (0.00)	0.00 (0.00)	0.70 (0.46)	0.68 (0.47)
Health limitation ^e	0.29 (0.46)	0.29 (0.45)	0.30 (0.46)	0.58*** (0.49)	0.06*** (0.24)
Married ^f	0.66 (0.48)	0.73*** (0.44)	0.49*** (0.50)	0.53*** (0.50)	0.76*** (0.43)
Public ^g	0.36 (0.48)	0.32*** (0.47)	0.47*** (0.50)	0.41** (0.49)	0.32** (0.47)
Self employ ^h	0.06 (0.24)	0.08*** (0.28)	0.01*** (0.12)	0.04 (0.20)	0.08 (0.27)
Since graduation ⁱ	196.41 (116.27)	213.46*** (111.41)	159.03*** (118.30)	195.28 (113.59)	197.33 (118.63)
Part-time ^j	0.03 (0.16)	0.02* (0.12)	0.05* (0.21)	0.01 (0.12)	0.04 (0.18)
Disabled ^k	0.45 (0.50)	0.46 (0.50)	0.44 (0.50)	1.00 (0.00)	0.00 (0.00)
Semiambulatory ^l	0.08 (0.27)	0.08 (0.28)	0.08 (0.26)	0.18 (0.39)	0.00 (0.00)
Wheelchair, lower limbs ^l	0.17 (0.38)	0.18 (0.39)	0.15 (0.36)	0.38 (0.49)	0.00 (0.00)
Wheelchair, lower/upper ^l	0.08 (0.27)	0.08 (0.27)	0.08 (0.28)	0.18 (0.39)	0.00 (0.00)
Motor control deficit ^l	0.07 (0.25)	0.07 (0.26)	0.05 (0.29)	0.15 (0.36)	0.00 (0.00)
Motor control deficit, both ^l	0.07 (0.25)	0.08* (0.27)	0.04* (0.20)	0.15 (0.36)	0.00 (0.00)

Table 2

Table 2. Determinants of Individual Wages by Group

	All		Men		Women		Disabled	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M.A.	0.018 (0.059)	0.030 (0.060)	-0.005 (0.080)	-0.015 (0.081)	0.071 (0.078)	0.096 (0.081)	0.001 (0.086)	0.028 (0.088)
Ph.D.	0.254*** (0.079)	0.234*** (0.080)	0.179* (0.103)	0.164 (0.104)	0.493*** (0.117)	0.442*** (0.123)	0.292** (0.131)	0.255* (0.135)
J.D.	0.581*** (0.105)	0.590*** (0.104)	0.533*** (0.125)	0.541*** (0.125)	0.720*** (0.230)	0.745*** (0.237)	0.687*** (0.185)	0.712*** (0.182)
M.D.	0.504** (0.200)	0.454** (0.204)	0.470** (0.224)	0.376 (0.232)			0.363 (0.244)	0.341 (0.245)
Other experience	0.002*** (0.0004)	0.002*** (0.0004)	0.002** (0.001)	0.002** (0.001)	0.001** (0.0005)	0.001*** (0.0005)	0.002** (0.0007)	0.002*** (0.001)
Tenure	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.002* (0.001)	0.002** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Tenure ²	-4.3e-6** (2.1e-6)	-4.1e-6** (2.1e-6)	-5.4e-6** (2.7e-6)	-4e-8* (2.7e-6)	-9.6e-7 (3.2e-6)	-1.5e-6 (3.3e-6)	-5.4e-6 (3.7e-6)	-5.3e-6 (3.7e-6)
Male	0.193*** (0.055)	0.207*** (0.056)					0.211** (0.085)	0.239*** (0.087)
White	0.062 (0.140)	-0.008 (0.142)	0.090 (0.219)	-0.010 (0.220)	0.096 (0.151)	0.075 (0.167)	0.053 (0.188)	-0.078 (0.192)
Health limitation	-0.101 (0.064)	-0.131** (0.066)	-0.109 (0.088)	-0.173* (0.092)	-0.085 (0.083)	-0.050 (0.089)	-0.097 (0.074)	-0.121 (0.076)
Married	0.151*** (0.054)	0.151*** (0.054)	0.224*** (0.076)	0.210*** (0.078)	-0.007 (0.069)	0.029 (0.072)	0.105 (0.078)	0.077 (0.079)
Public	-0.160*** (0.053)	-0.144*** (0.053)	-0.179** (0.073)	-0.131* (0.074)	-0.090 (0.070)	-0.116 (0.073)	-0.163** (0.077)	-0.134* (0.077)
Self employ	-0.608*** (0.101)	-0.607*** (0.101)	-0.640*** (0.118)	-0.634*** (0.118)	-0.188 (0.288)	-0.252 (0.293)	-1.123*** (0.182)	-1.162*** (0.179)
Since graduation	-0.0001 (0.0004)	-0.00004 (0.0004)	-0.0002 (0.0007)	-0.0001 (0.0006)	0.0003 (0.0005)	0.0003 (0.0005)	-0.00004 (0.0007)	0.00004 (0.0007)

Table 3

Table 3. Frequencies in Answer to “The Extent You Have Been Discriminated Against in Any Job” Because of Gender, Disability, Age, Ethnicity/Race, or Other by Group

	All groups	Women	Men	Disabled	Nondisabled
<i>A: To What Extent Have You Been Discriminated Against Because of Your Gender?</i>					
1 = never	332 (73.49)	63 (43.45)	269 (85.94)	165 (80.49)	167 (66.01)
2	62 (13.54)	30 (20.69)	32 (10.22)	20 (9.76)	42 (16.60)
3	38 (8.30)	29 (20.00)	9 (2.88)	13 (6.34)	25 (9.88)
4	20 (4.73)	17 (11.72)	3 (0.96)	7 (3.41)	13 (5.14)
5 = often	6 (1.31)	6 (4.14)	0 (0.00)	0 (0.00)	6 (2.37)
	458	145	313	205	253
<i>B: To What Extent Have You Been Discriminated Against Because of Disability?</i>					
1 = never	344 (75.44)	109 (76.22)	235 (75.08)	97 (47.09)	247 (98.80)
2	47 (10.31)	18 (12.59)	29 (9.27)	46 (22.33)	1 (0.40)
3	37 (8.11)	9 (6.29)	28 (8.95)	35 (16.99)	2 (0.80)
4	21 (4.61)	5 (3.50)	16 (5.11)	21 (10.19)	0 (0.00)
5 = often	7 (1.54)	2 (1.40)	5 (1.60)	7 (3.40)	0 (0.00)
	456	143	313	206	250

Numbers to the left are frequencies. Column percentages are in parentheses.

Table 4

Table 4. Effects of Measured Discrimination on Discrimination Perceptions: Probit Estimates

Coefficient on	Mean [SD]	Dependent Variable: Ever Felt Gender Discrimination		Dependent Variable: Ever Felt Any Discrimination		Dependent Variable: Income Inadequate	
<i>Panel A: Women Only</i>							
		$\bar{x} = 0.57$		$\bar{x} = 0.66$		$\bar{x} = 0.12$	
\hat{d}_i^{fb} : predicted as male—actual wage	0.174 [0.387]	-0.358 (0.272)		-0.298 (0.279)		1.396*** (0.377)	
\hat{d}_i^{fa} : predicted as male—predicted as female	0.174 [0.157]		-0.048 (0.671)		-0.654 (0.699)		0.470 (0.838)
Log-likelihood		-98.389	-99.255	-92.187	-92.307	-44.458	-52.244
\hat{d}_i^{fb} : predicted as male—actual wage	0.188 [0.404]	-0.373 (0.261)		-0.321 (0.269)		1.323*** (0.373)	
\hat{d}_i^{fa} : predicted as male—predicted as female	0.188 [0.217]		-0.208 (0.487)		-0.199 (0.509)		0.305 (0.658)
Log-likelihood		-98.245	-99.167	-92.043	-92.673	-45.042	-52.291
N		145	145	145	145	145	145
<i>Panel B: Men Only</i>							
		$\bar{x} = 0.14$		$\bar{x} = 0.42$		$\bar{x} = 0.12$	
\hat{d}_i^{mb} : predicted as male—actual wage	3.6e-11 [0.546]		0.210 (0.162)		0.127 (0.132)		0.873*** (0.189)
Log-likelihood			-126.241		-211.979		-104.060
\hat{d}_i^{mb} : predicted as male—actual wage	-1.3e-8 [0.529]		0.268* (0.168)		0.084 (0.135)		0.850*** (0.192)
Log-likelihood			-125.809		-212.251		-105.304
N			313		313		319
<i>Panel C: Disabled Only</i>							
		$\bar{x} = 0.53$		$\bar{x} = 0.59$		$\bar{x} = 0.11$	
\hat{d}_i^{da} : predicted as not disabled—actual wage	-0.015 [0.543]	0.039 (0.161)		-0.002 (0.161)		0.598** (0.208)	
\hat{d}_i^{db} : predicted as not disabled—predicted as disabled	-0.015 [0.229]		-0.517 (0.389)		-0.432 (0.388)		0.053 (0.461)
Log-likelihood		-142.410	-141.538	-138.738	-138.108	-67.828	-72.319
N		206	206	205	205	208	208

Notes: *** significant at 0.01; ** significant at 0.05; * significant at 0.10. Standard errors are in parentheses.

Table 5

Table 5. What Fraction Feel Discriminated Against or Feel Their Income is Inadequate by Earnings Status (Working vs. Nonworking)

	What Fraction Felt Gender Discrimination		What Fraction Felt Disability Discrimination		What Fraction Felt Income Inadequate	
	(1) If Working	(2) If Not Working	(3) If Working	(4) If Not Working	(5) If Working	(6) If Not Working
All	0.27 (461)	0.24 (146)	0.24** (459)	0.35** (142)	0.12*** (467)	0.22*** (150)
Men	0.14 (314)	0.08 (73)	0.25*** (314)	0.42*** (71)	0.12 (320)	0.14 (76)
Women	0.56** (147)	0.40** (73)	0.23 (145)	0.28 (71)	0.12*** (147)	0.30*** (74)
Disabled	0.19 (206)	0.16 (81)	0.53 (207)	0.61 (79)	0.11*** (209)	0.28*** (83)
Not disabled	0.34 (255)	0.34 (65)	0.01 (252)	0.03 (63)	0.12 (258)	0.15 (67)
Male and disabled	0.08 (142)	0.07 (46)	0.53 (143)	0.65 (46)	0.10 (145)	0.16 (49)
Male and not disabled	0.19 (172)	0.11 (27)	0.01 (171)	0.00 (25)	0.13 (175)	0.11 (27)
Female and disabled	0.44 (64)	0.29 (35)	0.52 (64)	0.55 (33)	0.13*** (64)	0.44*** (34)
Female and not disabled	0.66* (83)	0.50* (38)	0.01 (81)	0.05 (38)	0.11 (83)	0.18 (40)

Note: ***, **, and * represent statistically significant differences between working group and nonworking group at the 0.01, 0.05, and 0.10 levels of significance, respectively. Numbers in parentheses are total number of individuals in cell.

Table 6

Table 6. Reasons Persons Claim for Discrimination by Characteristic

Fraction That Felt Discrimination in	Promotion (1)	Pay (2)	Getting a Job (3)
All	0.07 (469)	0.03 (469)	0.08 (469)
Men	0.05 (321)	0.01 (321)	0.07 (321)
Women	0.09 (148)	0.06 (148)	0.12 (148)
Disabled	0.09 (211)	0.02 (211)	0.14 (211)
Not disabled	0.05 (258)	0.03 (258)	0.04 (258)
Male/disabled	0.09 (146)	0.02 (146)	0.12 (146)
Male/not disabled	0.02 (175)	0.00 (175)	0.02 (175)
Female/disabled	0.08 (65)	0.02 (65)	0.18 (65)
Female/not disabled	0.10 (83)	0.10 (83)	0.07 (83)

Numbers in parentheses are total number of individuals in the cell.

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