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Abstract

Using data from 2004 SIPP, matched to job demands from O*Net, we provide new estimates of disability-related wage discrimination. We apply state-of-the-art econometric methods to wage models which include job demands and interactions between demands and functional limitations. The interaction terms are interpreted as measures of how well disabled workers 'match' to jobs which minimize the effects of functional limitations. The results suggest traditional discrimination models underestimate potential effects of disability-related discrimination by penalizing workers for limitations which may not affect their job performance. The bias is greater for men, who generally appear to find better matches than do women.

Key words: Job demand, Disability, Wage Discrimination

JEL Classification: I10, J71

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1. Introduction

A number of researchers have struggled with the challenge of adapting empirical models of wage discrimination to workers with disabilities (e. g. Baldwin and Johnson 1994; 2000; DeLeire 2000; 2001; Kidd et. al. 2000; Jones et. al. 2006; Jones 2008). The main issue is that disabilities are associated with functional limitations which can affect productivity at work but which are not captured in the standard human capital wage equations on which measures of discrimination are based. Most studies on the topic address the issue by including additional controls for functional limitations in the wage equation, but this solution does not take account of the interface between functional limitations and job demands.

Workers with functional limitations may be more or less disabled at work depending on the nature of their limitations and the type of job they hold. Workers with mobility limitations, for example, may be equally as productive as non-disabled workers in completely sedentary jobs, but the same workers employed in jobs that require movement around the worksite may be considerably slower in accomplishing tasks (less productive) than their non-disabled counterparts. Wage models which rely solely on functional limitations to control for disability-related effects on productivity may, therefore, produce biased estimates of discrimination.

In this article we use data from the 2004 Survey of Income and Program Participation, matched to job demands from the O*Net database, to provide the first estimates of disability-related wage discrimination which include the skill requirements of different jobs. The job demands, matched to workers' five-digit occupation codes, provide more nuanced job descriptions than the broad occupational categories typically included in wage models. A series of interaction terms indicate how the 'match' (or 'mismatch') between a worker's functional capacities and job requirements affects wage outcomes.

Our study is also the first to apply state-of-the art econometric methods to estimate *disability-related* discrimination. Specifically: (1) We apply a more complete decomposition formula to selectivity-corrected wage equations so that we are able to decompose *observed* wage differentials into explained (endowment) and unexplained components. The unexplained component is an estimate of the potential impact of employer discrimination (Neumann and Oaxaca 2004a). (2) We disaggregate both explained and unexplained components into sub-parts attributed to specific explanatory variables in the wage model. The disaggregation of the unexplained component has not been reported in any prior studies of disability-related discrimination. (3) We calculate bootstrapped standard errors so we can attach significance levels to the explained and unexplained components of the wage differential and their sub-parts.

The results shed light on ways in which the labor market experiences of men and women with disabilities are affected by functional limitations, occupational differences, and potential discrimination. Including interaction terms in the wage model increases the estimated discrimination effect for both men and women, because workers with disabilities are no longer 'penalized' for functional limitations which do not affect their productivity. The effect is far greater for men, however, suggesting men with disabilities are better able than women to 'match' to jobs which minimize the effects of their functional limitations. Overall, we provide a far more detailed analysis of disability-related discrimination effects than has been available before.

2. Conceptual Framework

In Becker's (1973) classic model of labor market discrimination, the extent of discrimination against a group of workers who are subject to prejudice can be measured by the differential in mean wages between this 'disadvantaged' group and an equally productive group of workers not subject to prejudice. The wage differential measures the strength of employer 'tastes for discrimination', *d*, associated with a particular stigmatizing characteristic (e. g. race, gender, ethnicity), as shown by the downward shift in the demand curve in Figure 1a. Empirically, estimates of discrimination are obtained from multivariate regression models with controls for actual differences in productivity between the two groups of workers. Control variables typically include measures of human capital (e. g. education, work experience), job characteristics (e. g. occupation, hours worked), and socio-demographic characteristics (e. g. age, area of residence).

The estimation becomes more complicated when studying discrimination against workers with disabilities, because the stigmatizing characteristic, disability, is defined by limitations that can affect productivity at work. So, a wage differential measured with the usual control variables includes both an estimate of discrimination, d', and the 'legitimate' wage reduction associated with disability-related losses in productivity, p (Figure 1b). Without controls for functional limitations in the models, empirical estimates of disability-related discrimination ($p + d'$) are biased upwards. The obvious solution is to collect data on functional limitations (for all workers) and include these additional controls in the regression models used to estimate disability-related discrimination. National surveys, such as the SIPP and the MEPS, which include good measures of labor force participation (e. g. wages, hours, occupation) as well as measures of physical and cognitive limitations (e. g. ability to lift, walk, climb, see, manage finances), have provided a rich resource for understanding how discrimination affects the labor market for workers with disabilities. Still, all studies to date have ignored the important fact that functional limitations have different effects on the productivity of workers in different jobs.

Consider, for example, two groups of workers with identical disabilities, namely an amputated leg, which limits the ability to walk, run, or climb. The productivity of one group, working in an office setting, is barely affected by the disability; whereas the second group, working on a construction site, is significantly affected. Both groups exhibit a physical disorder and may be subject to considerable discrimination regardless of their productivity. Regression models *without* controls for functional limitations yield fairly accurate estimates of discrimination for office workers (because productivity effects, *p*, are small as shown in Figure 2a), but over-estimate discrimination for construction workers (because a significant part of the wage gap is associated with productivity losses as shown in Figure 2b). Regression models *with* controls for functional limitations may both under-estimate discrimination for office workers and over-estimate discrimination for workers in construction because coefficient estimates of the limitations variables are an average of the productivity effects for both groups.

The crux of the problem is that models of disability-related discrimination have not accounted for the *match* between a worker's functional limitations and demands of his or her job. The occupational controls typically included in discrimination studies are broad categories that contain jobs with a wide range of physical and cognitive demands, so workers with identical functional limitations within the same occupational category could experience smaller or larger productivity effects depending on their particular job. The broad category 'service occupations,' for example, includes firefighters and welfare service aides. A firefighter with chronic back pain that limits his ability to lift heavy objects will experience significant productivity losses, while his counterpart working for the welfare service may experience none. In this respect, the firefighter is more like a roofer, who is classified in the 'skilled labor' occupation. What is needed in studies of disability-related discrimination, therefore, is a different set of occupational controls that define the physical and cognitive demands of specific jobs, and a way to link those demands to workers' functional capacities.

In the estimating model described below, the 'job demands' variables describe the particular functional capacities required for successful job performance. The variables are derived from reported occupational data but define attributes of jobs more specifically than broad occupation categories. A set of interaction terms links job demands to workers' functional limitations. We argue that functional limitations only matter when they affect a worker's capacity to meet job demands so our preferred theoretical model is one in which limitations are included only as part of the interaction terms in the wage equation.

3. Data

We use two data sources for the study. The 2004 Survey of Income and Program Participation (SIPP) is a rotating panel of 12 waves of data collected every four months for approximately 56,500 U.S. households. Each data collection includes core questions common to every wave and topical module questions not updated in each wave. We use data from the core questionnaire and two topical modules (presented in Waves I and V). The core questionnaire and topical module accompanying Wave I gather data on employment, wages, work experience, and demographic characteristics included in the wage functions. The topical module accompanying Wave V collects data on health status, health conditions, disability, and 33 physical, sensory, or cognitive limitations.

Information on job demands comes from the *O*NET* ability survey conducted by the U.S. Department of Labor.[2] The *O*NET* dataset assigns numerical values from 0 to 100 to describe

[2] The survey is publicly available at: http://www.onetcenter.org/

the importance of 52 distinct attributes (knowledge, skills, abilities) to the jobs within each five-digit standard occupation classification (SOC).[3] For example, the importance of 'dynamic flexibility' (described as "the ability to quickly and repeatedly bend, stretch, twist, or reach out with your body, arms, and/or legs") is rated 16 for cashiers, while the importance for economists is 0. Because our focus is on persons with physical disabilities, we use a subset of the O*Net abilities dataset, namely eight measures of the intensity of physical demands in different occupations.[4]

We merge these occupation-specific values to individuals in the 2004 SIPP by matching SOC codes.[5]

Variable Definitions

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[3] The ratings on importance are collected on a 1-5 scale. The original ratings are standardized (by the developers of O*Net) to a 0-100 scale using the formula: S = ((O - L) / (H - L)) * 100, where S is the standardized score, O is the original rating score of importance, and L (H) is the lowest (highest) possible score on the rating scale. For example, an original importance rating score of 3 is converted to a standardized score of 50 (50 = [[3 - 1] / [5 - 1]] * 100).

[4] Extent flexibility, "the ability to bend, stretch, twist, or reach with your body, arms, and/or legs is excluded because it is so highly correlated with dynamic flexibility in the mapping to functional limitations.

[5] Chiswick and Miller (2010) have previously used the O*NET database linked to 2000 census data to estimate the importance of English language skills on earnings of native and foreign-born workers. Working in an occupation that requires greater English language skills, whether measured by the level of these skills or the importance of English for performing the job, has a large effect on earnings among the native born, and an even larger effect among the foreign born. Earnings increase with the respondent's own proficiency in English, with the English proficiency required for the occupation, and when those with high levels of proficiency work in jobs requiring English language skills (interaction effect). There is, therefore, a strong economic incentive for the matching of worker's English skills and the occupation's requirements, and this matching does tend to occur in the labor market.

We define two study groups, namely persons with and without disabilities. Persons with disabilities are those who respond *yes* to the question "Do you have a long-lasting physical or mental condition that has made it difficult to remain employed or to find a job?" *and* who report

- one or more physical (as opposed to cognitive or sensory) limitations *or*
- for men, back or heart trouble as the main condition causing their work limitation; for women, back trouble only.[6]

The additional restrictions ensure we can map functional limitations to job demands for all persons with disabilities. Persons without disabilities are those who respond *no* to the work limitation question above (although they may still report some types of physical limitations). Persons who report any types of sensory or cognitive limitations are excluded from the samples.[7] Also excluded are persons who report work-limitations, but who do not report any types of physical limitations, or back/heart trouble.

Table 1 gives definitions of the covariates used in our models broadly grouped as demographic and work-related variables; functional limitations; job demands (mapped from the

[6] Initial data runs revealed a number of persons who report long-lasting health conditions that affect their ability to work but do not report any physical, sensory, or cognitive limitations. Back and heart trouble are among the most common health conditions reported by this group and are easily mapped to the O*Net job demands, so we include persons with these conditions in the disabled sample and treat the conditions as additional functional limitations. There are insufficient women with heart trouble in the samples to estimate our models so we include only women with back trouble. Sensitivity analyses are conducted to examine how the back/heart group affects the overall results.

[7] We focus on persons with physical limitations as a starting point for analyses that will eventually be extended to other disability categories.

O*Net database); and interactions between functional limitations and job demands. The models also include controls for 13 industry and 6 occupation categories not shown in the table.

In constructing interaction terms we map each of the eight types of job demands on the O*Net database to specific functional limitations that would restrict a worker's productivity in jobs that require those attributes (Table 2). For example, difficulty pushing heavy objects, or lifting items as heavy as 10-25 pounds, would likely restrict a worker's productivity in jobs that require dynamic strength (the ability to exert muscle force repeatedly or continuously over time). Any worker who reports limitations in pushing or lifting heavy objects is assigned a value of 1 for 'limitation' in the interaction term with dynamic strength, otherwise the value for 'limitation' equals zero in that term. Thus, the interaction terms take on the O*Net value of job demands in a worker's occupation, if and only if the worker's functional limitations affect those job demands. (Neither the interaction terms nor the limitations dummies account for the extent of workers' limitations. That is, we do not distinguish between workers who 'have difficulty' pushing a heavy object, etc. and those who 'cannot' do this at all.) The mapping of interactions is based on specific definitions of functional limitations in SIPP and ergonomic descriptions of job demands provided by O*Net (details available from the authors), but there is still considerable subjectivity in the choices. In sensitivity analyses below we report how our results are affected under an alternative mapping.

We construct separate samples of men and women with and without disabilities. The samples are limited to persons between age 18 and 65, who are not enrolled in school (because schooling limits time available for work). We exclude family workers and self-employed workers (because these workers are not likely subject to employer discrimination); and observations with missing data for any variables in the models (e. g. occupation codes which do not appear on O*Net).[8] After exclusions, there are 12,447 nondisabled men (86% employed) and 1,024 men with work-limiting physical disabilities (29% employed); 15,371 nondisabled women (72% employed) and 1,434 women with physical disabilities (23% employed) in the samples.

4. Econometric Methods

We estimate separate wage equations for disabled (*D*) and non-disabled *(ND)* workers as the basis for a Oaxaca-type (1973) decomposition with controls for sample selection (Reimers 1983). We then employ a recently developed decomposition formula for selectivity-corrected wage equations which makes significant improvements on the standard decomposition as detailed below.[9]

The preferred wage model based on theoretical arguments above is:

$$\ln w_i = \alpha_j + \beta_j X_i + \gamma_j Y_i + \delta_j (Y_i * F_i) + \theta_j \lambda_i + \varepsilon_i . \qquad (1)$$

where w_i is the wage of the ith worker; α_j is a constant term (j=D, ND); X_i is a vector of variables controlling for human capital, job-related, and socio-demographic characteristics, with associated coefficient vector β_j; λ_i is the sample selection variable, with coefficient θ_j, and ε_i

[8] Excluded cases are: 3,052 (2,044) men (women) who are family workers or self-employed; 1,041 (610) who report an occupation code for which the occupation-specific values from O*NET are not available; 98 (122) who report extreme hourly wage rates (either less than $2 or more than $300); 54 (36) who do not report information needed to create the experience variables; 1,508 (1,679) who report work limitations associated with cognitive or sensory limitations, and 357 men (334) who report work limitations but do not report any functional limitations, back or heart trouble.

[9] Neuman and Oaxaca (2004b) have previously applied the approach to estimate gender-related discrimination with Israeli data; Madden (2004) has used the approach to estimate health-related discrimination in the UK.

is an error term with standard normal distribution.[10] The job-related variables in X_i control for occupation and industry categories, part-time employment, and union membership but not job demands. Job demands are included as a separate vector, Y_i, with coefficient vector γ_j ; and interacted with functional limitations ($Y_i * F_i$), with coefficient vector δ_j .

The interaction terms ($Y_i * F_i$) reflect the 'mismatch' between a worker's functional limitations and demands of his or her job; hence the coefficients in vector δ_j are expected to be negative. That is, workers with disabilities whose functional limitations restrict their job performance experience a greater wage penalty than their counterparts with a better match, presumably giving workers who are mismatched an incentive to change employers, or change jobs with the same employer, to find a better match themselves.

The sample selection term, λ_i , is generated from a preliminary probit model of the decision to work, estimated separately for disabled and nondisabled men/women. The probit model includes the demographic, human capital, and functional limitations variables in the wage equation, as well as non-labor income and family characteristics (marital status, presence of children) which are excluded from the wage equation. It seems reasonable to assume the presence of children, or a spouse's earnings, will influence the employment decision through the

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10 The λ term, estimated from a preliminary probit employment function, controls for differences in the propensities of nondisabled/disabled workers to choose work over leisure time. There is a large gap in employment participation rates between disabled and nondisabled persons, possibly explained by higher reservation wages associated with disability income transfers or the extra demands on time and energy required of disabled persons to participate in the labor force.Low employment rates may also be due to low market wages offered to persons with disabilities as a consequence of lower levels of productivity and/or employer discrimination (Kruse and Schur, 2003).

reservation wage but will not affect an employer's offer wage. The exclusion restrictions identify the model and allow us to estimate unbiased estimates of the wage equations.[11]

Once we have estimated sample selection terms in the wage models, it becomes an issue how to include the difference in selection effects in the decomposition. Neuman and Oaxaca (2004a) suggest the following decomposition formula under specific assumptions:

$$\ln \overline{w}_{ND} - \ln \overline{w}_D = \underbrace{\hat{\beta}_{ND}(\overline{X}_{ND} - \overline{X}_D) + \hat{\gamma}_{ND}(\overline{Y}_{ND} - \overline{Y}_D) + \hat{\delta}_{ND}((\overline{Y}_{ND} * \overline{F}_{ND}) - (\overline{Y}_D * \overline{F}_D)) + \hat{\theta}_{ND}(\hat{\lambda}_{ND} - \widehat{\lambda}_D^0)}_{Explained}$$
$$\underbrace{+ (\hat{\alpha}_{ND} - \hat{\alpha}_D) + \overline{X}_D(\hat{\beta}_{ND} - \hat{\beta}_D) + \overline{Y}_D(\hat{\gamma}_{ND} - \hat{\gamma}_D) + (\overline{Y}_D * \overline{F}_D)(\hat{\delta}_{ND} - \hat{\delta}_D) + \hat{\theta}_{ND}\widehat{\lambda}_D^0 - \hat{\theta}_D\hat{\lambda}_D}_{Unexplained} \quad (2)$$

where

$$\widehat{\lambda}_D^0 = \sum_{i=1}^{N_D} \widehat{\lambda}_{iD}^0 / N_D \ ,$$

$$\widehat{\lambda}_{iD}^0 = \phi\left(H_{iD}\hat{\eta}_{ND}\right) \Big/ \Phi\left(H_{iD}\hat{\eta}_{ND}\right),$$

H is a vector of variables affecting the employment decision and η is the associated parameter vector.[12]

[11] The wage equation includes job characteristics, occupational and industry categories, and job demands not included in the employment function, because the variables are not observed for non-workers.

[12] Neuman and Oaxaca (2004a) suggest several methods to deal with the sample selection term in the wage decomposition. Among the alternatives, we prefer the method which assumes that (1) differences in estimated parameters from the probit employment equation (η) and (2) differences in the estimated parameters of the selectivity correction variable (θ) are potential manifestations of discrimination. Also, (3) Differences in the values of the independent variables (H) in the employment function are treated as nondiscriminatory endowment effects. The first assumption is consistent with previous research on the employment effects of wage discrimination (see

Equation (2) states that the observed log wage differential is the sum of an explained part, associated with between-group differences in characteristics (control variables, job demands, interaction terms, sample selection terms, respectively), and an unexplained part associated with differences in returns to those characteristics and residual effects $(\hat{\alpha}_{ND} - \hat{\alpha}_D)$. Some part of the unexplained differential is potentially attributed to discrimination. Of particular interest in the explained component is the term $\hat{\delta}_{ND}((\bar{Y}_{ND} * \bar{F}_{ND}) - (\bar{Y}_D * \bar{F}_D))$ which estimates the wage gap, *p* (Figures 2a & 2b), associated with the extent to which workers' functional limitations restrict their ability to perform essential job demands.

The terms $\left(\hat{\theta}_{ND}(\hat{\lambda}_{ND} - \widehat{\lambda}_D^0)\right)$ and $\left(\hat{\theta}_{ND}\widehat{\lambda}_D^0 - \hat{\theta}_D\hat{\lambda}_D\right)$ in the explained and unexplained parts respectively are the key terms that allow us to decompose the wage differential completely when a selectivity correction term is included in the wage equations.[13] The terms $\widehat{\lambda}_D, \hat{\lambda}_{ND}$ are mean values of inverse Mill's ratios estimated from the employment functions for workers with *(D)* and without *(ND)* disabilities. The term $\widehat{\lambda}_D^0$ is the mean value of the inverse Mill's ratio when characteristics of workers with disabilities are applied to the employment function for

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Baldwin and Johnson, 1992, 1994, and 2000 for details), and the second is consistent with usual assumptions in the discrimination literature. In regards to the last assumption, we assume that labor market discrimination does not affect the underlying characteristics that determine the employment decision. Refer to Neuman and Oaxaca (2004a) for the derivation of equation (6) and alternative decomposition methods.

[13] When the selectivity correction term is not handled appropriately, estimates of the wage decomposition would be biased. Since this new method has been suggested only recently, most previous studies of disability-related discrimination (Baldwin and Johnson, 1992, 1994 and 2000; Kidd et al., 2000; Jones et al., 2006) decompose offer wage differentials in lieu of the actual wage differentials. DeLeire (2001) applies a Tobit model to estimate the wage equations to avoid encountering the inverse Mills ratio.

nondisabled workers. Thus, the term $\left(\hat{\theta}_{ND}(\hat{\lambda}_{ND} - \widehat{\lambda}_{D}^{0})\right)$ represents *explained* differences in wages attributed to between-group differences in characteristics that determine the employment decision. The term $\left(\hat{\theta}_{ND}\widehat{\lambda}_{D}^{0} - \hat{\theta}_{D}\hat{\lambda}_{D}\right)$ represents *unexplained* differences in wages attributed to between-group differences in: estimated parameters of the employment function and estimated parameters of the inverse Mill's ratio in the wage equations.[14]

As in the application of the standard wage decomposition methodology of Oaxaca (1973) and Blinder (1973), estimates of the explained and unexplained components in this study are unbiased only if no important variables are omitted from the wage equations and all variables are accurately measured.[15] Our estimates must be interpreted with this constraint in mind.[16] All analyses are conducted in STATA, Version 11, using sample weights from the SIPP.

[14] The term $\left(\hat{\theta}_{ND}\widehat{\lambda}_{D}^{0} - \hat{\theta}_{D}\hat{\lambda}_{D}\right)$ is the sum of: $\left(\hat{\theta}_{ND}(\widehat{\lambda}_{D}^{0} - \hat{\lambda}_{D})\right)$, which represents unexplained differences associated with estimated parameters of the *employment* functions; and $\left(\hat{\theta}_{ND} - \hat{\theta}_{D}\right)\hat{\lambda}_{D}$, which represents unexplained differences associated with estimated parameters of the sample selection variable in the *wage* equations.

[15] Potential experience (age-years of education-6) is a commonly used proxy for work experience that is not free from measurement error. Regan and Oaxaca (2009) show that using potential experience biases estimated rates of return to schooling and experience in wage equations estimated for males and females. Furthermore, decompositions based on potential experience underestimate the explained portion of the male-female wage gap, because females are more likely to experience intermittent labor force participation than men. Workers with disabilities also have greater likelihood of intermittent participation than nondisabled workers, suggesting the measurement error in this study would be similar to what was found for women if we relied on potential experience. One great advantage of the SIPP data is that we are able to construct accurate measures of experience in current and former jobs, as well as time absent from the labor force (missing experience), thus avoiding this common source of measurement error.

5. Results

Descriptive Statistics

The mean hourly wage for men with disabilities in our sample is 80 percent of the mean wage for nondisabled men ($18.57 vs. $23.33); while women with disabilities earn 92 percent of the mean wage for nondisabled women ($17.02 vs. $18.53). As shown in Table 1, between-group differences in key productivity-related characteristics (education, work-related characteristics, functional limitations), explain part of the wage gap between disabled and non-disabled workers. Men and women with disabilities are more likely to work part-time and less likely to have a college degree than their nondisabled counterparts. Men and women with disabilities have more total years work experience, on average, than do nondisabled men and women, likely because the average disabled worker is older. However, workers with disabilities also have more time out of the labor force than nondisabled workers, although the differences are small (one year for women and less than six months for men).

Workers with disabilities are more likely to report any type of functional limitation than are nondisabled workers, and women with disabilities are more likely to report limitations than are men with disabilities. The most common limitations, reported by more than one-fourth (one-third) of men (women) with disabilities, relate to strength and stamina: difficulty stooping, lifting heavy objects, pushing or pulling heavy objects, standing one hour, and walking ¼ mile.[17]

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[16] Standard errors are obtained with 1,000 bootstrap replications that account for all estimation steps including the estimation of selection equations.

[17] These common limitations can be caused by relatively low-severity impairments such as minor back pain. Less common limitations, such as difficulty dressing, getting out of bed, and bathing, are associated with more severe impairments and typically multiple physical limitations.

Turning to the job demands variables, differences in means between workers with and without disabilities are small and insignificant, so we find no evidence of workers with disabilities sorting themselves into less strenuous jobs. There are, however, substantial differences in the physical requirements of jobs held by men and women. On average, men's jobs require greater coordination, equilibrium, stamina, and trunk strength; while women's jobs require greater static and explosive strength.

Means of the interaction terms are generally greater for women with disabilities than for their male counterparts. If we interpret the interactions as measures of the 'mis-match' between a worker's functional limitations and demands of his/her job, then women with disabilities in general have poorer matches than men with disabilities, and the mis-match for women is most apparent in jobs that require static and explosive strength.

Wage Equations

Tables 3a (men) and 3b (women) report estimated coefficients for four specifications of the wage equation. Model 1, a basic specification representing the typical model used in studies of disability-related discrimination, controls for functional limitations, demographic and work-related characteristics, without detailed information on job demands. Model 2 adds job demands to the basic specification; Model 3 adds both job demands and interactions between job demands and functional limitations. Model 4, the 'preferred' model from our theoretical discussion, controls for demographic and work-related characteristics, job demands and interaction terms; but this model excludes the stand-alone limitations variables.

Overall, the models are an extremely good fit for cross-sectional wage equations, explaining 40-55 percent of the variation in wages among men, and 35-50 percent among women. In general, the fit improves as we add job demands and interaction terms to the model, supporting our conjecture that job demands provide more refined controls for occupational differences than the broad occupation/industry categories alone.

Of particular interest are the results for clusters of functional limitations variables, job demands, and interaction terms. Coefficient estimates for functional limitations are generally negative as expected and, when positive, almost always insignificant.[18]

Job demands are highly significant determinants of wages for both disabled and nondisabled workers, while the interaction terms between functional limitations and job demands have varying signs and are almost always insignificant. The job demands variables are also less often significant in models estimated for the smaller samples of workers with disabilities.

Returns are generally positive in jobs that require strength and stamina, negative in jobs that require flexibility and coordination. Two categories of job demands, explosive strength and gross body equilibrium, are associated with significant positive wage returns for men but significant negative returns for women, likely reflecting differences in the job distributions of men and women within broad occupational categories. A male firefighter and female housekeeper, for example, are both in service jobs that demand explosive strength but at opposite ends of the wage distribution. (According to O*Net, median annual wages for firefighters were $45,050 in 2009, compared to $19,250 for housekeepers.)

Results for the core variables (demographics and work-related characteristics), are remarkably robust across specifications of the wage model for the nondisabled groups (and particularly robust across models 2-4 which include controls for job demands). In the models for

[18] The sole exceptions are the positive, significant coefficients for 'difficulty stooping' in the models for men and for 'difficulty dressing' in the models for women.

workers with disabilities, however, coefficient estimates of the core variables are much more sensitive to changes in specification, which affects estimates of the unexplained components of the wage differentials.

Wage Decompositions

In presenting results of wage decompositions it is customary to disaggregate the endowment effect into sub-parts associated with each independent variable in the model, but disaggregating the unexplained differential is problematic and, as a rule, omitted. The problem is associated with categorical binary variables in the wage equation. Oaxaca and Ransom (1999) demonstrate that one obtains arbitrary results, depending on the choice of omitted categories, when attempting to identify the contribution of categorical variables to the unexplained component. However, the estimated contribution of a single binary variable is robust to changes in the omitted category (Blinder 1973), as is the contribution of any continuous variable. Therefore, we report disaggregated results for both components of the wage differential, collapsing the effects of categorical variables into the residual term of the unexplained component. Tables 4a (men) and 4b (women) report results from each of the four specifications of the wage equation.

Models 1-3 yield similar stories for men and women. More than 100 percent of the disability-related wage differential is explained by differences in educational attainments, occupational distributions, functional limitations, and work preferences (selection effects) of disabled and nondisabled workers. The explained component (Model 1) is larger than has been estimated in prior studies of disability-related discrimination, even those using SIPP data (e. g. Baldwin and Johnson 1994; 2000; DeLeire 2000; 2001), because we have selected a more seriously disabled group. One reason for the differences in severity is that the wording of the question identifying persons with disabilities on the SIPP questionnaire has changed over time, such that it now likely selects persons with more serious disabilities.[19]

More importantly, we have adjusted for an additional anomaly in the data, namely some respondents indicate they are disabled (i.e. have a long-lasting health condition that makes it difficult to hold a job) but do not report any of the physical, cognitive, or sensory limitations recorded on the SIPP. We exclude these persons from our samples (unless they report back or heart trouble) because we have no way of mapping their functional limitations to job demands. Other researchers using the SIPP could have included these persons, again suggesting we have a more seriously disabled group.

As job demands and interaction terms are added to the model (Models 2 and 3) the endowment effect for both men and women decreases, but never falls below 100 percent. In other words, we find no evidence of disability-related wage discrimination in these models.

The story changes dramatically, however, when stand-alone functional limitations variables are excluded from the model. In the decomposition for men (Table 4a, Model 4), only 61 percent of the wage differential is explained. That is, when men with disabilities are no longer penalized for functional limitations which do not affect their job demands, as much as 39 percent of the disabled-nondisabled wage differential is potentially attributed to discrimination. The contribution of interaction terms to the endowment effect in this model is small and insignificant, suggesting men with disabilities are either mitigating the effects of functional limitations by matching into jobs where their limitations have less impact on productivity (voluntary sorting in

[19] The wording changes from "Do you have a health condition that limits the kind or amount of work you can do?" in 1984/1996 to "Do you have a long-lasting physical or mental condition that has made it difficult to remain employed or to find a job?" in 2004.

the labor market); or those who have made poor matches are no longer employed (involuntary sorting).

Excluding stand-alone functional limitations variables has the same effect on the decomposition results for women as for men, albeit to a lesser degree. The endowment effect decreases and the unexplained component increases, so 7 percent of the wage differential is potentially attributed to discrimination (Table 4b, Model 4). The contribution of interaction terms to the endowment effect is larger and estimated more precisely in the models for women than for men, suggesting women with disabilities have greater difficulty matching to jobs where their functional limitations have little impact on productivity. This conclusion is consistent with our descriptive results showing the mismatch of women with disabilities particularly in jobs that require static or explosive strength.

One possible explanation for the larger unexplained wage differentials estimated in Model 4 is that employers are unable to observe the matching of job demands to functional limitations (which we quantify with interaction terms), and instead determine wages based on the more visible signal of disability. Traditional discrimination models without controls for job demands would miss this effect entirely and conclude men and women with disabilities are being paid on par with (or better than) their productivity relative to nondisabled men and women.

In general, sub-parts of the unexplained differential are measured much less precisely than sub-parts of the endowment effect, so it is difficult to analyze exactly how potential discrimination occurs. Estimates for both men and women, however, indicate differential returns to work experience between disabled and nondisabled workers contribute to the unexplained wage gap. Average returns to an additional year of work experience are three times greater for non-disabled men than for men with disabilities (Table 3a); and twice as great for non-disabled women as for women with disabilities (Table 3b). Interestingly, women with disabilities receive no positive returns for work experience outside the current employer, unlike the other three groups, providing a possible explanation why women with disabilities have more difficulty 'matching' functional limitations and job demands than do their male counterparts.

Sensitivity tests

We conduct sensitivity analyses to determine how our results are affected by: (1) an alternate mapping of functional limitations to job demands, and (2) a more exclusive definition of disability. The alternate mapping is based on a simpler, but also reasonable, rubric in which job demands related to flexibility, coordination, and equilibrium are mapped to limitations in activities of daily living or body movements such as walking; job demands related to strength are mapped to limitations in pushing/pulling/lifting; and job demands related to stamina are mapped to limitations in maintaining movements or positions for a duration of time or distance.

As we would expect, the alternate mapping produces different results for the wage decompositions; however, our substantive conclusions are the same. Under the alternate mapping the potential effect of discrimination is smaller for both men (29% vs. 38%) and women (3% vs. 7%). The contribution of interaction terms to the endowment effect is larger under the alternate mapping for both men and women, but the estimate for men is still highly unstable whereas the estimate for women is marginally significant ($p>.10$). Thus, the results still suggest women with disabilities have greater difficulty finding good matches between functional limitations and job demands than do men.

In a second sensitivity test we exclude 76 disabled men (35 disabled women) who report back or heart trouble limits their ability to find or keep a job, but who report no specific functional limitations on the SIPP. Our primary analyses include these cases and define their functional limitations as back or heart trouble, a decision which affects the limitations and interaction terms in the wage models, and possibly the relative severity of disabilities represented in our samples.

Excluding these cases does, in fact, change the composition of the disabled groups such that the relative severity of disabilities is greater (as would be expected when we drop men and women who report work limitations but no specific functional limitations) and estimates of potential discrimination are smaller. In the more restricted sample the unexplained component of the wage gap decreases to 25 percent for men (compared to 39% in our main results), and becomes negative for women (compared to positive 7%). The contribution of interaction terms to the endowment effect is almost identical for men and women, but the estimate for men is still unstable, while the estimate for women increases in significance ($p<.05$), consistent with our finding that women with disabilities have poorer matches between functional limitations and job demands than do men.[20]

6. Discussion

The job demands variables from O*Net expand our ability to control for occupational differences and increase the explanatory power of the traditional human capital wage equation. Our empirical results focus on *disability-related* discrimination but one can imagine that controls for job demands would also be important in studies of labor market discrimination against women and other disadvantaged groups. In wage models for disabled workers the job demands

[20] Although the contribution of interaction terms to the endowment effect for males increases when back/heart cases are excluded, it is highly unstable, whereas the contribution for females is equally large and significant at the .05 level. Complete results for the sensitivity tests, and the alternate mapping of interaction terms, are available from the authors.

variables also allow us to quantify the degree to which a worker's functional limitations affect required functions in his/her job. Thus, we address the criticism that including functional limitations in the wage model penalizes workers with disabilities for limitations that may have no impact on their job performance. Our preferred specification of the wage function is one that includes job demands, interactions between job demands and functional limitations, but not functional limitations alone.

Comparing decomposition results for this specification (Model 4) to the traditional model estimated in studies of disability-related discrimination (Model 1) we find the explained component of the wage differential is smaller for both men and women. If, in fact, the preferred theoretical model provides the best estimates of the upper bound of discrimination effects, then other (mis-specified) models *underestimate* the potential effects of discrimination on the wages of workers with disabilities. For men, the results change from no evidence of wage discrimination to potentially 40 percent of the wage gap attributed to employer discrimination.

One possible interpretation of the interaction terms is that they measure how well workers with disabilities 'match' themselves into jobs where their functional limitations have little impact on productivity. If workers are well-matched, most of the interaction terms will be zero and their contribution to the endowment effect in the wage decompositions will be small, as we find for men. If workers are poorly-matched, many of the interaction terms will have positive values and their contribution to the endowment effect will be larger, as we find for women. One possible interpretation of our results, therefore, is that women with disabilities have greater difficulties sorting themselves into jobs that are a good match for their functional limitations. Alternatively, women with physical disabilities may have less incentive to leave a poor match because the productivity losses associated with their limitations, even in manual jobs, are not as great as the productivity losses for men with physical disabilities who are poorly matched.

We have no evidence regarding the extent to which 'job matching' of workers with disabilities is voluntary or involuntary. One possible story is workers with disabilities receive an array of job offers and select into jobs with smaller disability-related wage penalties (i. e. good matches). Another possibility is workers with disabilities who are in poorly matched jobs either quit or are fired. Why the matching might be more difficult for women, or how the matching occurs (whether by finding better matches or by selective withdrawal from the labor force) is beyond the scope of the current study.

One area in which employers are observed to treat workers with disabilities differently from nondisabled workers is in returns to work experience. Men and women with disabilities earn smaller returns to work experience than do non-disabled workers, particularly with respect to experience outside the current firm. One possible explanation relates to the theory of statistical discrimination, which posits that the productivity of workers from a disadvantaged group is evaluated on the basis of a group characteristic (e.g. gender, race, disability) rather than individual competencies (Aigner and Cain 1977). Most employers have little or no experience evaluating the productivity of workers with particular disabilities, so employers may rely on judgments based on disability status rather than on evidence specific to an individual worker (prior experience). Another possible story for the differential returns to general work experience is that workers with disabilities tend to change jobs to minimize the impact of functional limitations, and because of this sorting they end up in jobs less relevant to their previous experience.

We have restricted this study to workers with disabilities related to physical functions, and the corresponding O*Net results for physical job demands, to simplify the analyses. Given the differing average physical capacities of men and women, and the tendency to segregate women into less physically demanding jobs, it may not be surprising we obtain quite different estimates of potential discrimination for men and women with disabilities. Because women tend to be in less physically demanding jobs than men overall, the physical job demands we use may do a poorer job identifying occupational differences among women than among men.

Our models do not include controls for job accommodations because the information is not available on the SIPP. If workers with disabilities and/or their employers provide accommodations that enable workers to perform essential job functions despite their limitations, the interaction terms in our model may overstate the effects of functional limitations on productivity in the explained part of the decomposition. Nevertheless, the majority of accommodations (e. g. more frequent breaks, changes to schedules) impose costs, direct or indirect, on the employer, in which case it is appropriate to include those costs in the explained part of the wage differential, whether or not the costs are transferred to the disabled worker.

7. Conclusion

Workers with physical disabilities receive lower wages, on average, than non-disabled workers. The wage gap is explained, in part, by lower levels of education, greater functional limitations, differences in the labor-leisure trade-off, and differences in occupational distributions. Estimates of the unexplained wage gap vary depending on how functional limitations and job demands are entered in the model. In our preferred specification the potential effect of disability-related discrimination is approximately 40 percent of the log wage gap for men and 7 percent for women. However, the results suggest men with physical disabilities are able to match into jobs where their functional limitations have less effect on productivity than are women with physical disabilities.

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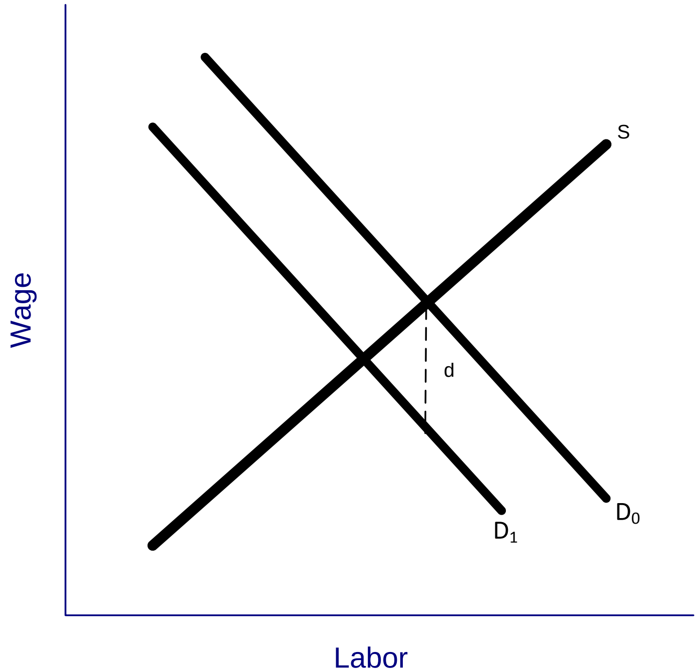
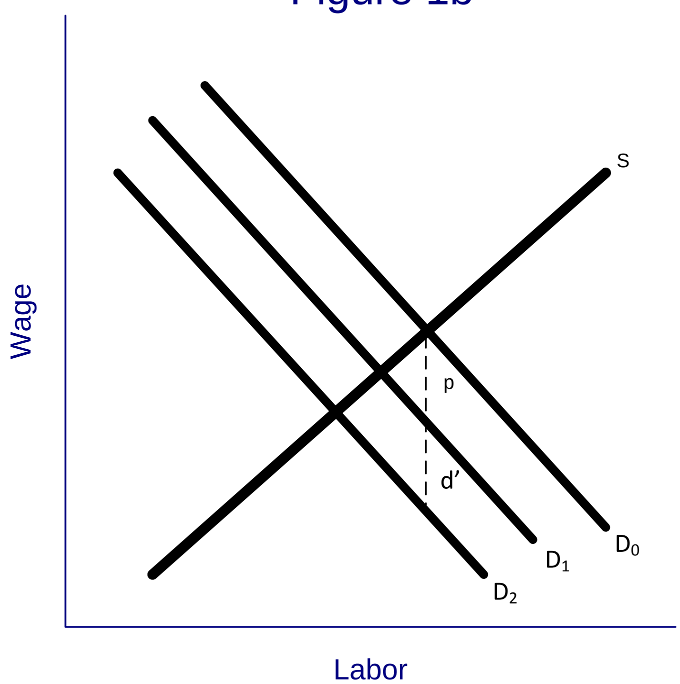
Figure 1a



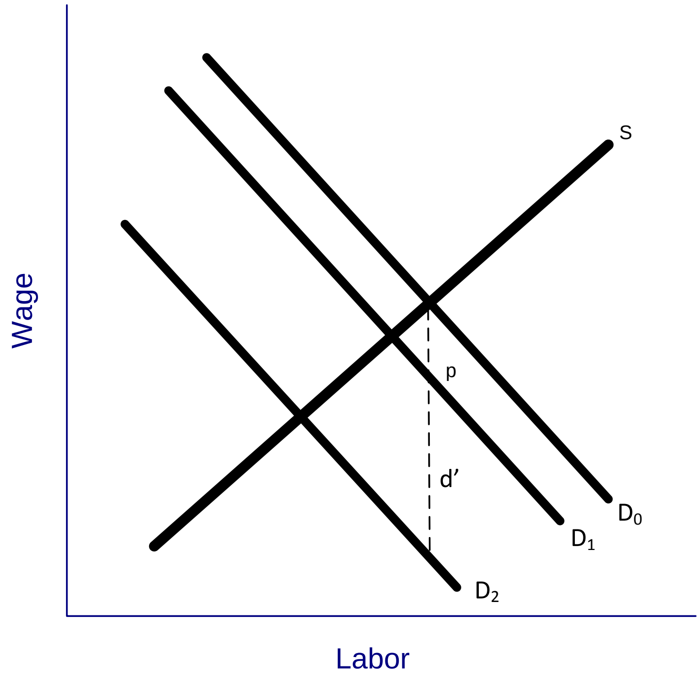
Other Disadvantaged Groups

Figure 1b



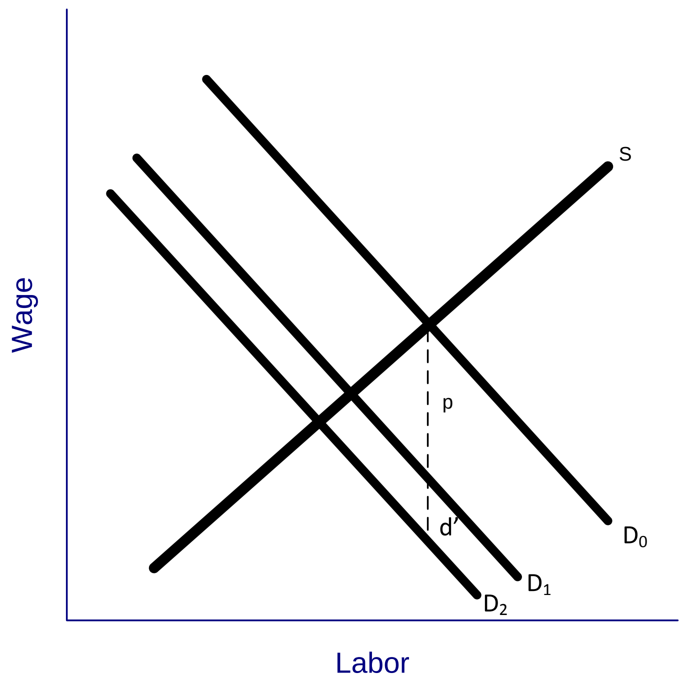
Workers with Disabilities

Figure 2a



Workers with amputated leg - Office

Figure 2b



Workers with amputated leg - Construction

Table 1. Variable Definitions and Means (Standard Deviations)

	Variable definition	Men		Women	
		Nondisabled	Disabled	Nondisabled	Disabled
Wage	Hourly wage rate	23.33 (21.67)	18.57 (14.53)	18.53 (16.00)	17.02 (16.41)
Demographic and work-related variables					
White	Binary for race, equals 1 if white	0.83 (0.37)	0.83 (0.37)	0.81 (.40)	0.85 (.36)
Part-time	Binary equals 1 if works < 35 hours/ week	0.16 (0.37)	0. 34 (0.48)	0.30 (.46)	0.57 (.50)
Union	Binary equals 1 if union member	0.16 (0.37)	0.14 (0.35)	0.14 (.34)	0.17 (.37)
< High school	No high school diploma	0.07 (0.25)	0.05 (0.22)	0.04 (.19)	0.05 (.22)
Some college	High school grad, < 4 year college degree	0.36 (0.48)	0.48 (0.50)	0.40 (.49)	0.49 (.50)
College grad	4 year college degree or above	0.28 (0.45)	0.16 (0.36)	0.30 (.46)	0.20 (.40)
Job exp	Years worked for present employer	8.11 (8.56)	8.12 (8.89)	7.63 (7.93)	7.58 (8.27)
General exp	Years worked for other employers	12.74 (10.49)	18.66 (11.38)	12.82 (10.13)	17.59 (10.76)
Missing exp	Years not working and not in school	0.45 (1.29)	1.10 (2.62)	1.73 (3.78)	2.88 (4.80)
Functional limitations					
Diff inside	Difficulty getting around inside by oneself	0.00 (0.02)	0.01 (0.10)	0.00 (.02)	0.02 (.14)

Diff outside	Difficulty going out by oneself, e.g. to shop	0.00 (0.03)	0.03 (0.16)	0.00 (.03)	0.05 (.21)
Diff dressing	Difficulty getting dressed by oneself	0.00 (0.01)	0.02 (0.13)	0.00 (.02)	0.04 (.20)
Diff bed	Difficulty get in/out of bed/chair by oneself	0.00 (0.02)	0.03 (0.16)	0.00 (.04)	0.04 (.19)
Diff bathing	Difficulty taking a bath or shower by oneself	0.00 (0.01)	0.02 (0.15)	0.00 (.02)	0.03 (.18)
Diff housewrk	Difficulty doing light housework by oneself	0.00 (0.02)	0.03 (0.18)	0.00 (.03)	0.05 (.22)
Diff meals	Difficulty preparing meals by oneself	0.00 (0.01)	0.01 (0.10)	0.00 (.02)	0.01 (.11)
Diff grasping	Difficulty use hand/fingers to grasp pencil etc.	0.00 (0.05)	0.08 (0.26)	0.01 (.08)	0.15 (.36)
Diff lift 10 lbs	Difficulty lifting & carrying ≥ 10 lbs	0.00 (0.05)	0.11 (0.32)	0.01 (.10)	0.26 (.44)
Diff lift 25 lbs	Difficulty lifting & carrying ≥ 25lbs.	0.01 (0.10)	0.36 (0.48)	0.05 (.21)	0.62 (.49)
Diff pushing	Difficulty push/pull lg objects, armchair etc.	0.01 (0.07)	0.32 (0.47)	0.02 (.15)	0.48 (.50)
Diff reaching	Difficulty reaching over ones head	0.00 (0.06)	0.16 (0.37)	0.01 (.09)	0.15 (.36)
Diff sitting	Difficulty sitting for one hour	0.00 (0.06)	0.13 (0.34)	0.01 (.09)	0.22 (.41)
Diff standing	Difficulty standing for one hour	0.01 (0.09)	0.27 (0.44)	0.02 (.14)	0.40 (.49)
Diff stooping	Difficulty stooping, crouching, or kneeling	0.02 (0.12)	0.41 (0.49)	0.03 (.18)	0.51 (.50)
Diff walking	Difficulty walking by oneself	0.00 (0.04)	0.06 (0.23)	0.00 (.05)	0.10 (.30)
Diff ¼ mile	Difficulty walking 1/4 mile, 3 city blocks	0.01 (0.08)	0.25 (0.43)	0.02 (.13)	0.34 (.48)

Diffstairs	Difficulty walking up a flight of 10 stairs	0.01 (0.08)	0.22 (0.41)	0.02 (.13)	0.29 (.46)
Wheelchair	Uses wheelchair/electric scooter to get around	0.00 (0.02)	0.02 (0.14)	0.00 (.03)	0.02 (.14)
Cane	Uses cane/crutches/walker to get around	0.00 (0.06)	0.04 (0.19)	0.00 (.05)	0.09 (.29)
Back trouble	Work limited from back trouble/no func lims	0.00 (0.01)	0.16 (0.36)	0.00 (.02)	0.12 (.33)
Heart trouble	Work limited from heart trouble/no func lims	0.00 (0.02)	0.11 (0.31)	--	--
Job demands					
Dyn flexibility	Can bend/stretch/ twist/ with body/arms/ legs	41.56 (9.42)	41.83 (9.05)	42.65 (7.97)	42.27 (8.30)
Dyn strength	Can exert muscle force repeatedly over time	34.92 (10.04)	34.47 (10.51)	35.92 (10.31)	34.72 (10.02)
Exp strength	Can use bursts of force to propel/throw	60.30 (9.25)	59.72 (9.18)	65.72 (8.14)	64.42 (8.30)
Body coord	Can coordinate motions of arms/legs/ torso	36.04 (18.94)	36.50 (18.79)	30.01 (17.86)	32.54 (17.50)
Body equilib	Can keep/regain balance in unstable position	36.36 (11.92)	34.98 (12.10)	29.71 (13.25)	29.64 (12.91)
Stamina	Can exert oneself physically for long periods	26.14 (17.20)	27.11 (16.80)	20.76 (17.47)	22.79 (17.45)
Static strength	Can exert max muscle force to lift/push/pull	61.71 (10.47)	60.96 (10.56)	67.59 (8.95)	66.36 (9.06)
Trunk strength	Can use abs/back to support body repeatedly	20.85 (14.42)	21.63 (14.74)	14.29 (13.03)	15.21 (12.62)

Note: N=10,683 (292) nondisabled (disabled) men; 11,110 (335) nondisabled (disabled) women. Models also include 13 industry and 6 occupation categories, and 8 interaction terms as defined in Table 2. Complete results available from authors.

Table 2. Construction of Interaction Terms between Functional Limitations and Job Demands

Limitations	Job demands							
	Dynamic flexibility ^lim	Dynamic strength ^lim	Explosive strength ^lim	Gross body coordination ^lim	Gross body equilibrium ^lim	Stamina ^lim	Static strength ^lim	Trunk strength ^lim
Difficulty inside	x			x	x			x
Difficulty outside	x			x	x			x
Difficulty dressing	x			x	x		x	x
Difficulty bed	x			x	x			x
Difficulty bathing	x			x	x			x
Difficulty housework	x						x	
Difficulty meals	x						x	
Difficulty grasping	x						x	
Difficulty reaching	x							

Difficulty sitting						x		x
Difficulty stooping	x			x	x			x
Difficulty pushing	x	x	x	x			x	
Difficulty lifting 10 lbs		x	x				x	
Difficulty lifting 25 lbs		x	x				x	
Difficulty standing					x	x		x
Difficulty walking	x			x	x			x
Diff walking ¼ mile						x		
Difficulty stairs						x		
Wheelchair	x			x	x			x
Cane	x			x	x			x
Back trouble	x	x	x					x
Heart trouble		x	x			x		

Note: Interaction terms are constructed such that, for each (job demand^lim) lim=1 if a worker reports any limitation marked x, otherwise lim=0.

Table 3a. Coefficient Estimates for Wage Equations - Men

	Model 1[a]		Model 2[b]		Model 3[c]		Model 4[d]	
	Nondisable	Disabled	Nondisable	Disabled	Nondisable	Disabled	Nondisable	Disabled
White	0.065***	-0.118	0.059***	-0.107	0.057***	-0.106	0.058***	-0.104
Part-time	-0.029*	-0.097	-0.026	-0.084	-0.026	-0.091	-0.025	-0.093
Union	0.154***	0.218*	0.172***	0.174	0.173***	0.180	0.172***	0.151
Less than high school	-0.133***	-0.119	-0.112***	-0.132	-0.111***	-0.079	-0.113***	-0.058
Some college	0.140***	0.119	0.121***	0.107	0.121***	0.115	0.121***	0.114
College graduate	0.432***	0.563***	0.3841***	0.541***	0.384***	0.544***	0.383***	0.568***
Job experience	0.016***	0.010**	0.015***	0.008*	0.015***	0.008*	0.015***	0.007*
General experience	0.006***	0.002	0.006***	0.001	0.006***	0.001	0.006***	0.002
Missing experience	-0.001	-0.012	0.001	-0.007	0.001	-0.009	0.001	-0.008
Functional limitations	*yes*		*yes*		*yes*		*no*	
Dynamic flexibility			-0.002*	-0.015**	-0.002*	-0.014**	-0.002*	-0.013**
Dynamic strength			0.003***	0.001	0.0033***	0.007	0.003***	0.003
Explosive strength			0.002	0.017*	0.001	0.017	0.002	0.018*
Gross coordination			-0.004***	-0.008*	-0.004***	-0.008*	-0.004***	-0.010**

Gross equilibrium			0.002**	0.011***	0.002**	0.011**	0.002**	0.010**
Stamina			0.004***	0.005	0.004***	0.006	0.004***	0.0086
Static strength			0.006***	-0.005	0.006***	-0.006	0.006***	-0.007
Trunk strength			-0.005***	0.004	-0.005***	0.006	-0.005***	0.004
Dyn flexibility^lim					-0.005*	-0.002	-0.002	-0.001
Dyn strength^lim					-0.002	-0.009	0.001	-0.008
Explosive strength^lim					0.013*	-0.000	0.002	0.004
Gross coordinate^lim					-0.001	0.002	0.002	0.001
Gross equilibrium^lim					-0.003	-0.000	-0.003	0.002
Stamina^lim					0.004	-0.002	-0.002	0.001
Static strength^lim					-0.002	0.004	-0.002	-0.001
Trunk strength^lim					0.000	-0.003	0.002	0.000
Inverse Mills ratio	-0.367***	0.021	-0.348***	0.047	-0.349***	0.043	-0.353***	0.006
R^2	0.39	0.52	0.41	0.55	0.41	0.56	0.41	0.51

Note: *** p<0.01, ** p<0.05, * p<0.1. All models also include 13 industry and 6 occupation categories; models 1-3 also include 22 functional limitations dummies. Complete results available from the authors. *N*=10,683 (292) nondisabled (disabled) men.

Table 3b. Coefficient Estimates for Wage Equations - Women

	Model 1[a]		Model 2[b]		Model 3[c]		Model 4[d]	
	Nondisable	Disabled	Nondisable	Disabled	Nondisable	Disabled	Nondisable	Disabled
White	0.050***	0.032	0.054***	0.032	0.054***	0.054	0.054***	0.050
Part-time	-0.018	-0.022	-0.014	-0.0220	-0.014	-0.030	-0.013	-0.008
Union	0.080***	0.202**	0.091***	0.251***	0.091***	0.222**	0.091***	0.263***
Less than high school	-0.151***	0.003	-0.143***	0.040	-0.142***	-0.042	-0.142***	0.105
Some college	0.099***	0.144	0.093***	0.126	0.093***	0.111	0.093***	0.061
College graduate	0.406***	0.362**	0.399***	0.358**	0.399***	0.334**	0.399***	0.270*
Job experience	0.016***	0.011**	0.016***	0.012**	0.016***	0.010**	0.016***	0.011**
General experience	0.005***	-0.002	0.005***	-0.001	0.005***	-0.002	0.005***	-0.000
Missing experience	-0.004**	-0.006	-0.004**	-0.007	-0.004**	-0.007	-0.004**	-0.005
Functional limitations	*yes*		*yes*		*yes*		*no*	
Dynamic flexibility			0.001	0.007	0.001	0.002	0.001	0.006
Dynamic strength			0.006***	0.011*	0.006***	-0.020	0.006***	-0.015
Explosive strength			-0.009***	-0.029*	-0.009***	-0.012	-0.009***	-0.012
Gross coordination			-0.003***	0.001	-0.003***	0.004	-0.003***	0.002

Gross equilibrium			-0.002**	-0.009*	-0.002**	-0.011*	-0.002**	-0.006
Stamina			0.004***	0.006	0.004***	0.002	0.004***	0.009
Static strength			0.005***	0.018	0.005***	0.018	0.005***	0.014
Trunk strength			-0.004***	-0.009	-0.004***	-0.013	-0.004***	-0.019**
Dyn flexibility^lim					-0.001	0.005	-0.001	0.001
Dyn strength^lim					-0.001	0.031	-0.001	0.030
Explosive strength^lim					0.003	-0.015	0.001	-0.019*
Gross coordinate^lim					-0.001	-0.003	0.000	-0.002
Gross equilibrium^lim					0.000	0.008	-0.000	-0.000
Stamina^lim					-0.002	0.002	-0.003**	-0.002
Static strength^lim					-0.002	0.001	-0.001	0.003
Trunk strength^lim					0.004	0.008	0.003	0.010*
Inverse Mills ratio	-0.152***	0.064	-0.147***	0.056	-0.146***	0.090	-0.144***	-0.039
R^2	0.34	0.42	0.35	0.45	0.35	0.50	0.35	0.43

Note: *** p<0.01, ** p<0.05, * p<0.1; All models also include 13 industry and 6 occupation categories; models 1-3 also include 22 functional limitations dummies. Complete results available from the authors. *N*=11,110 (335) nondisabled (disabled) women.

Table 4a. Decomposition of Disabled/Non-disabled Wage Differential - Men

	Model 1[a]		Model 2[b]		Model 3[c]		Model 4[d]	
	Explain	Unexplain	Explain	Unexplain	Explain	Unexplain	Explain	Unexplain
Demographics	0.009* (0.005)	0.166* (0.089)	0.009 (0.006)	0.158* (0.089)	0.09 (0.006)	0.157* (0.091)	0.008 (0.006)	0.161* (0.083)
Work experience	-0.034*** (0.009)	0.127 (0.099)	-0.035*** (0.009)	0.153 (0.099)	-0.035*** (0.009)	0.163 (0.101)	-0.035*** (0.009)	0.151* (0.085)
Education	0.033*** (0.011)	--	0.030*** (0.010)	--	0.029*** (0.010)	--	0.029*** (0.009)	--
Industry	-0.005 (0.007)	--	-0.001 (0.006)	--	-0.001 (0.006)	--	-0.001 (0.006)	--
Occupation	0.028** (0.011)	--	0.013* (0.007)	--	0.013* (0.007)	--	0.013* (0.007)	--
Limitations	0.166** (0.069)	-0.212** (0.098)	0.165** (0.067)	-0.218** (0.098)	0.425** (0.169)	-0.647*** (0.231)	--	--
Skill-demands	--	--	0.012	-0.049	0.012	-0.261	0.012	-0.109

			(0.011)	(0.409)	(0.011)	(0.453)	(0.011)	(0.353)
Skill ^ limitations	--	--	--	--	-0.301* (0.174)	0.522* (0.268)	0.015 (0.062)	-0.039 (0.113)
Inverse Mills	0.077** (0.032)	-0.165** (0.070)	0.073** (0.030)	-0.177** (0.071)	0.074** (0.030)	-0.174** (0.076)	0.074** (0.029)	-0.147** (0.059)
Intercept[e]	--	0.001 (0.143)	--	0.059 (0.418)	--	0.206 (0.446)	--	0.057 (0.371)
Total	0.274*** (0.075)	-0.083 (0.077)	0.265*** (0.074)	-0.074 (0.076)	0.225** (0.112)	-0.034 (0.114)	0.117* (0.069)	0.074 (0.074)
Percent of differential	143%	-43%	139%	-39%	118%	-18%	61%	39%

Notes: [a]Excludes skill demands and interaction terms. [b]Excludes interaction terms. [c]All variables included. [d]Excludes limitations variables, except as interaction terms. [e]For the unexplained component, the intercept also includes the effect of education, industry, occupation.

Table 4b. Decomposition of Disabled/Non-disabled Wage Differential - Women

	Model 1[a]		Model 2[b]		Model 3[c]		Model 4[d]	
	Explain	Unexplain	Explain	Unexplain	Explain	Unexplain	Explain	Unexplain
Demographics	0.000 (0.004)	-0.003 (0.091)	-0.001 (0.004)	-0.004 (0.091)	-0.001 (0.004)	-0.013 (0.091)	-0.001 (0.004)	-0.028 (0.097)
Work experience	-0.016** (0.008)	0.152 (0.098)	-0.017** (0.008)	0.130 (0.104)	-0.017** (0.008)	0.168 (0.109)	-0.017** (0.008)	0.130 (0.107)
Education	0.037*** (0.010)	--	0.036*** (0.010)	--	0.036*** (0.010)	--	0.036*** (0.010)	--
Industry	0.005 (0.006)	--	0.005 (0.006)	--	0.005 (0.006)	--	0.005 (0.005)	--
Occupation	0.031*** (0.009)	--	0.026*** (0.008)	--	0.026*** (0.008)	--	0.026*** (0.008)	--
Limitations	0.064* (0.038)	0.069 (0.096)	0.066* (0.037)	0.044 (0.095)	0.056 (0.079)	0.343 (0.185)	--	--
Skill-demands	--	--	0.005	0.184	0.005	0.437	0.005	0.211

			(0.004)	(0.412)	(0.005)	(0.431)	(0.005)	(0.433)
Skill ^ Limitations	--	--	--	--	-0.002 (0.068)	-0.495** (0.242)	0.037 (0.025)	-0.121 (0.114)
Inverse Mills	0.024** (0.010)	-0.145 (0.101)	0.023** (0.010)	-0.134 (0.105)	0.023** (0.010)	-0.166 (0.107)	0.023** (0.009)	-0.046 (0.089)
Intercept[e]	--	-0.095 (0.153)	--	-0.242 (0.451)	--	-0.284 (0.459)	--	-0.137 (0.472)
Total	0.144*** (0.033)	-0.022 (0.050)	0.143*** (0.042)	-0.021 (0.048)	0.132*** (0.046)	-0.009 (0.053)	0.114*** (0.032)	0.009 (0.042)
Percent of differential	118%	-18%	117%	-17%	107%	-7%	93%	7%

Notes: [a]Excludes skill demands and interaction terms. [b]Excludes interaction terms. [c]All variables included. [d]Excludes limitations variables, except as interaction terms. [e]For the unexplained component, the intercept also includes the effect of education, industry, occupation.

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