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JCPR: WORKING PAPER ABSTRACT

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The Americans with Disabilities Act and the Labor Market Experience of Workers with Disabilities: Evidence from the SIPP
Marjorie Baldwin, Edward J. Schumacher

JCPR Working Paper 178
05-31-2000

Abstract:

This research will examine the labor market experiences of persons with disabilities utilizing data from the 1990 and 1993 panels of the Survey of Income and Program Participation (SIPP). The project has three objectives: (1) to analyze the wage differentials between disabled and nondisabled workers in a model that controls for the interaction between functional limitation and job demands; (2) to study the factors that affect job changes for workers with disabilities; and (3) to compare labor market outcomes for workers with disabilities before and after implementation of the ADA.

Previous research has identified a large wage disadvantage for persons with disabilities even after controlling for available characteristics. The interpretation of these differentials, however, is problematic because of potentially omitted differences in productivity between workers with and without disabilities. This study will incorporate information on the physical demands of jobs with information on workers' physical limitations, provide better controls for worker productivity, and better estimates of productivity standardized wage differentials than previous studies.

There has been little research examining job changes for workers with disabilities. The SIPP contains employment information for workers over a two-year period, allowing an examination of differences in job changes for workers with and without disabilities. This study will use a multinomial logit model to examine differences in the determinants of job changes and subsequent wage profiles for workers with and without disabilities.

Finally, the study will set a baseline for estimating the effects of the ADA. By examining the 1993 panels of the SIPP, the research will examine how the ADA and the associated changes in social attitudes have affected disabled/nondisabled wage differential and rates of job change.

Preliminary Draft - Final Draft Due August 31

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The Americans with Disabilities Act and the Labor Market Experience of Workers with Disabilities: Evidence from the SIPP

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Abstract

This paper uses data from the 1990 and 1993 SIPP to examine the labor market experience of workers with disabilities. We first examine wage differentials between workers with and without disabilities after providing detailed controls for job conditions. We next examine the relationship between wages and the disabled composition of jobs. The final section of the paper examines job mobility differences between workers with and without disabilities. We find that there is a relatively large wage differential between workers with and without disabilities that appears to have increased between 1990 and 1993 for males. This differential is relatively unaffected by the addition of detailed occupational characteristics. The paper also finds support for the quality sorting hypothesis, which suggests the proportion of workers with disabilities in an occupation is capturing unmeasured ability within occupations. Finally, we find that there are relatively few differences in mobility patterns across disability status. We do find, however, that workers with disabilities are more likely to make involuntary job changes than nondisabled workers suggesting there may be employer prejudice in terminations or that there is a higher likelihood of job mismatch among workers with disabilities. Overall, we find there are relatively few differences between 1990 and 1993 suggesting that either the ADA has not had a major impact on the labor market experience for workers with disabilities, or that these effects do not appear in the 1993 data.

May 2000 Preliminary Draft: Final Draft Due August 31, 2000

I. Introduction

The Americans with Disabilities Act (ADA) was passed in 1990 in response to the political activism of numerous individuals and organizations who lobbied for the rights of persons with disabilities to participate fully in society. The groups used the civil rights laws protecting African-Americans and women as prototypes for the new disability law. The goals of the ADA, as stated in its preamble, are to ensure equality of opportunity for persons with disabilities, promote their economic self-sufficiency, encourage independent living, and otherwise assure the full participation of persons with disabilities in society.

Title I of the Act is directed at the problems workers with disabilities encounter in the labor market. It prohibits employers from discriminating against “otherwise qualified” workers with disabilities, who are able to perform the essential functions of a job “with or without reasonable accommodation.” Title I took effect in 1992 for firms with 25 or more employees and in 1994 for firms with 15 to 25 employees.

The ADA was one of the major policy changes of the 1990s, but workers with disabilities have received relatively little attention in the labor market literature, and researchers have a limited understanding of wage and employment differences between disabled and nondisabled workers. There are a number of reasons for this void in the literature. First, data limitations have restricted researchers. Most data sets that include measures of employment, wages, and job characteristics do not contain information on disability status and functional limitations. Second, even with good information on the presence of a disability, productivity differences between disabled and nondisabled workers are often difficult to measure, making the interpretation of wage and employment differentials problematic. Finally, in addition to data problems, relatively little is known about workers with disabilities because labor market access for this group has only recently become a policy concern.

The purpose of this research is to compare labor market outcomes for disabled and nondisabled workers, laying the groundwork for using the Survey of Income and Program

Participation (SIPP) to study the impact of the ADA. The project uses data from the 1990 and 1993 panels of the SIPP, together with information on job characteristics from the Dictionary of Occupational Titles (DOT). We provide three sets of comparisons of the labor market experiences of disabled and nondisabled workers. First, we estimate productivity-standardized wage differentials in models that control for job demands and functional limitations. Second, we estimate the relationship between the proportion of disabled workers in an occupation and its mean wage. Finally, we examine differences in job mobility between workers with and without disabilities.

We find that there is a relatively large wage differential between workers with and without disabilities that appears to have increased between 1990 and 1993 for males. This differential is relatively unaffected by the addition of detailed occupational characteristics. Also support for the quality sorting hypothesis is found, which suggests that the proportion of workers with disabilities in an occupation is capturing unmeasured ability within occupations. Finally, we find there are relatively few differences in mobility patterns across disability status. We do find, however, that workers with disabilities are more likely to make involuntary job changes than nondisabled workers suggesting there may be employer prejudice in terminations or that there is a higher likelihood of job mismatch among workers with disabilities. Overall, we find that there are relatively few differences between 1990 and 1993 suggesting that either the ADA has not had a major impact on the labor market experience for workers with disabilities, or that these effects do not yet appear in the data.

The next section of the paper describes the SIPP data sets and the definition of disabled workers. The three sections that follow present models and estimation results for each of the three comparisons of labor market outcomes for disabled and nondisabled workers. The final section presents conclusions and implications of the research.

II. The SIPP Data

Construction of the 1990 and 1993 Datasets

The data come from Waves III-VIII of the 1990 and 1993 panels of the *Survey of Income and Program Participation (SIPP)*. The SIPP is a longitudinal survey designed to collect information on respondents' amounts and sources of income, and participation in various cash and in-kind benefit programs. Participants in both panels are interviewed nine times over a period of 36 months. Each interview, or wave, refers to a four-month reference period.

The SIPP is well-suited to this study because it combines detailed data on participants' health and functional limitations (unavailable in most income surveys, such as the CPS) with equally detailed data on employment status and incomes (unavailable in most health and disability surveys, such as the NHIS). We use Wave III as the reference point for the study because, in addition to the core questionnaire administered in each wave, Wave III includes supplemental questions on respondents' health and disability status.

Definition of Disability

Disability is a measure of limitations in activities, such as working or keeping house, rather than an attribute, such as gender or race. To understand the meaning of the term "disability" it is important to distinguish it from two other terms, "impairment" and "functional limitation," that are often used synonymously but have different meanings.

An *impairment* is a "physiological or anatomical loss or other abnormality" (Nagi, 1969). An impairment may or may not cause a *functional limitation*, that is, a restriction of sensory, mental or physical capacities. A *disability* occurs when a functional limitation restricts the ability to perform normal daily activities such as working or attending school.¹

¹The definitions combine concepts from Nagi (1969) and the World Health Organization (WHO, 1980). The ADA definition of disability is more comprehensive. It includes anyone with "a physical or mental impairment that substantially limits one or more of the major life activities," anyone with a record of

The supplementary questions that accompany Wave III of the SIPP survey ask respondents if a health condition limits their ability to perform a number of everyday tasks, including climbing stairs, answering the telephone, reading a newspaper, and walking a quarter mile. Persons who report such functional limitations, or who report that a health condition limits the amount or kind of work they can do, are then asked to identify the health condition that is the main source of their limitation. In this study, any respondent who identifies a limiting health condition is considered disabled.

The sample is restricted to persons age 16 to 65 who are employed during the final month of the reference period. We exclude persons who receive Social Security disability benefits because the program places severe restrictions on their labor market participation.² Our final samples include 1,455 disabled and 15,969 nondisabled persons in 1990, and 1,293 disabled and 12,739 nondisabled persons in 1993.

III. Productivity-Standardized Wage Differentials

Background

There is convincing evidence that workers with disabilities receive significantly lower wages than nondisabled workers, even after adjusting for human capital and job-related characteristics (Baldwin and Johnson, 1994, 1995, 2000; Haveman and Wolfe, 1990). The adjusted wage differentials are often interpreted as evidence that workers with disabilities are subject to discrimination in the labor market, consistent with the way wage discrimination against women and other minority groups has been measured. The interpretation may be more problematic for workers with disabilities than for other minority groups, however, because there

having such an impairment, or anyone who is perceived as having such an impairment. Any individual who satisfies one of the three criteria is protected from wage and employment discrimination by the Act.

² Excluding recipients of Social Security disability benefits means that our disabled sample underrepresents persons with the most severe functional limitations.

is good reason to believe there are large unmeasured productivity differences between disabled and nondisabled workers in the standard human capital wage equation. Typical right-hand-side variables, such as education, work experience, and union membership, are unlikely to capture the types of productivity differences that potentially exist between disabled and nondisabled workers.

Baldwin and Johnson (2000) provide better measures for productivity differences than previous research by including controls for functional limitations in their models. After adjusting for available measures of cognitive, mobility, and sensory limitation, they continue to find significantly lower wages for workers with disabilities. Baldwin and Johnson point out that their estimates of discrimination may still be biased because of unmeasured differences in productivity. Specifically, they state “the estimates of wage discrimination may... be too large or too small because the occupation variables do not control adequately for interactions between job demands and functional limitations” (Baldwin and Johnson, 2000, p. 555).

This study uses information from the Dictionary of Occupational Titles (DOT) to incorporate measures of job demands into the wage equations. The results are the first estimates of discrimination against workers with disabilities from models that explicitly control for the relationship between workers’ functional limitations and the physical and mental requirements of the workers’ jobs.

Model

We estimate productivity-adjusted wage differentials between disabled and nondisabled workers from the equation:

$$(1) \quad \ln W_i = \sum_k \beta_k X_{ik} + \delta \text{Disabled}_i + \Phi_j \text{Job}_{ij} + \varepsilon_i$$

where $\ln W_i$ is the natural log of the real hourly wage rate of the i th worker, X is a vector of variables measuring human capital characteristics and the demand for labor, Job is a vector of variables measuring job demands in the worker’s three-digit occupation, and β_k , Φ_j are

corresponding vectors of coefficients. Disabled is a binary variable identifying workers with disabilities, so the coefficient δ represents the residual wage differential, or a measure of discrimination against workers with disabilities.

Typically, studies of wage discrimination do not include controls for job demands in the wage model. If these omitted variables are correlated with disability status, then estimates of δ will be biased. Workers with disabilities may, for example, be found in jobs that require less strength, on average, than the jobs in which nondisabled workers are employed. If there is a positive wage premium associated with strength, but the strength requirements in different jobs are omitted from the wage equation, then part of the wage differential will be related to lower strength requirements in the jobs held by workers with disabilities, and not to disability per se. In this case, estimates of δ will be biased upward.

We use information from the DOT to incorporate seven scaled measures of job demands in the wage equation (refer to Table 1).³ We also incorporate two occupation-level measures of job skill constructed from special supplements to the Current Population Survey (CPS). These two variables measure the proportion of workers receiving formal or informal training in an occupation, and the proportion of workers using a computer.⁴

The effects of job demands on wages may differ for workers with different types of disabilities. The introduction of computer technology in a job could, for example, enhance the productivity of workers with mobility limitations, but decrease the productivity of workers with visual limitations. To control for these differences we construct five binary variables identifying

³ The DOT is a reference manual and data source providing a broad range of information on the content and characteristics of detailed occupations. The DOT contains information at highly disaggregated levels (12,099 occupational categories), while the Census occupational classification reported in the SIPP is more aggregated (about 500 occupations). England and Kilbourne (1988) provide a weighted mapping of variables from the 1977 4th edition of the DOT into the 1980 Census of Population (and SIPP) occupational categories.

⁴ The two variables, 'training' and 'computer,' were obtained from David MacPherson at Florida State University. Training is calculated from the January 1983 and 1991 CPS supplements. Computer is calculated from the October 1989, 1993, and 1997 CPS supplements.

the categories of functional limitations reported by each disabled worker. The disability categories identify workers with: cognitive or sensory limitations (limits on seeing, hearing, speaking, handling money), mobility limitations (limits on getting around inside or outside the house), strength limitations (limits on lifting, walking a short distance, climbing a flight of stairs), personal care limitations (limits on the ability to perform routine household tasks such as preparing meals), and work limitations (limits on the amount or kind of work one can do). We estimate versions of the wage model with the disability category variables substituted for the disability dummy, to identify differences in the wage differentials associated with different impairments.

Equation 1 is estimated separately for males and females. The vector X includes continuous variables measuring workers' education, job tenure, and years of work experience, and binary variables identifying union members, part-time workers (work less than 35 hours per week in each of the four months of the reference period for Wave III), and marital status.

Results

Table 1 defines the job demand variables constructed from the DOT and CPS, and reports means for disabled and nondisabled workers by gender. Workers with disabilities tend to be employed in occupations that provide less training, are less likely to require the use of a computer, require less education (GED), and take fewer years to become proficient (SVP), than nondisabled workers. The occupations where disabled workers are employed also tend to require lower levels of numerical, verbal, and spatial aptitudes than the occupations of nondisabled workers. On the other hand, workers with disabilities are employed in occupations with more environmental disamenities and more physical demands, on average, than nondisabled workers.

Table 2 reports descriptive statistics for other variables in the wage equation by gender and disability status. Separate results are reported for the 1990 and 1993 samples. The hourly

wage differential between disabled and nondisabled males increases from \$2.46 in 1990 to \$3.19 in 1993. Among females, the wage differential is approximately \$1.15 in both years. The wage differentials can be partly explained by lower levels of education and higher levels of part-time employment among disabled workers. On the other hand, disabled workers have higher levels of work experience and union membership, which should increase their wages relative to nondisabled workers.

Table 2 also reports the distributions of disabled workers across disability categories. Note that the categories are not mutually exclusive. Among employed males the most common types of disabilities are work limitations, cognitive/sensory limitations, limitations relating to strength and endurance. Among employed females work limitations and limitations on strength and endurance are by far the most common.

Table 3 reports adjusted wage differentials (estimates of δ) for four specifications of the wage equation.⁵ The basic model (column 1) has no controls for job tenure, occupational categories, or job demands. The estimated coefficients suggest that, in 1990, male workers with disabilities earned about 10 percent less than nondisabled males, while female workers with disabilities earned about 5.4 percent less than nondisabled females.⁶ When job tenure and its square are added to the equation (column 2) the adjusted wage differentials increase, because workers with disabilities, on average, have longer tenure than nondisabled workers and the returns to tenure are positive. The addition of a set of occupational dummies (column 3) decreases the adjusted wage differential for males from 12.5 to 10.8 percent, but has no effect on the differential for females. Thus, it is hard to make the argument that occupational differences explain a substantial part of the disabled/nondisabled wage differentials.

⁵ All of the regressions shown in Table 3 include years of education, general experience and its square, and dummies for marital status (2), union membership, race, part-time status, region (3), large metropolitan area, and industry (9). Appendix Table 1 displays full regression results for the specification in Column 4.

⁶ Log wage differentials are converted into percent differentials by the formula $(e^{\beta}-1)*100$, where β is the coefficient estimate.

In the last model (column 4), we substitute controls for job demands for the occupational dummies. If disability status is capturing differences in the types of jobs held by disabled and nondisabled workers, the coefficient estimate should decrease when these variables are added. Comparing the results in columns 2 and 4 indicates that the effect of disability declines slightly (from -.134 to -.116 for males, and from -.063 to -.051 for females, in 1990). Given the size of the remaining differential, however, it is clear that differences in job demands are *not* the main cause of the wage differentials.⁷

The results for 1993 suggest that the wage differential between disabled and nondisabled males increased over the period. After adjusting for job demands and worker characteristics (column 4), a male worker with a disability earns about 14.8 percent less in 1993, than a nondisabled male with the same characteristics in the same type of job, compared to an 11 percent adjusted wage gap in 1990. Among females the adjusted wage gap declined slightly, from 6.5 percent in 1990 to 5.0 percent in 1993.

Table 4 reports estimates of the adjusted wage differentials by disability category. The standard specification (columns 1 and 3) includes job tenure but no controls for occupation or job demands, while the expanded specification (columns 2 and 4) includes the measures of job demands. Among workers with cognitive and sensory limitations, a relatively large part of the wage differential is explained by differences in job demands, since the adjusted wage differential falls substantially when job demands are added to the model. The adjusted wage differentials for other disability categories do not appear to be affected by the inclusion of job demands. Even among workers with cognitive and sensory limitations, however, a rather large unexplained wage differential remains in the 1993 results.

⁷ In regressions not reported, we also interact the job demands with disability status to see if the wage differential is related to differences in the *returns* to job demands. In all cases, there is no statistical difference in the returns to job demands and the coefficient of the disability dummy is virtually unchanged.

Overall, the estimates of productivity-adjusted wage differentials suggest that differences in job demands explain surprisingly little of the wage differential between workers with and without disabilities. Even when controls for verbal, spatial, and numerical aptitudes, strength and physical demands of the job, are added to the standard wage equation, there are still rather substantial wage differences between workers with and without disabilities, especially for males. In addition, the results suggest that the wage differentials increased between 1990 and 1993. Our results provide further evidence that disabled workers are subject to wage discrimination in the labor market, and suggest that, as of 1993, the ADA had little or no impact on the unexplained wage differentials.

IV. The Disabled Composition of Jobs

Background

There is a considerable literature showing that relative wages are negatively correlated with the proportion of women or African-Americans employed in an occupation (see Gerhart and Cheikh, 1991, Hirsch and Schumacher, 1992, Macpherson and Hirsch, 1995, and the references therein). Hirsch and Macpherson (2000) find that as the proportion of black workers in a job increases the wages of both black and white workers decrease, even after adjusting for “standard” right-hand-side variables. When they include measures of job demands in the model, however, most of the effect of racial composition disappears. They conclude that the relationship between wages and racial composition is not causal, but that proportion black acts as an occupational skill index. Their results support a ‘quality sorting’ explanation of the relationship between wages and racial composition (Hirsch and Schumacher, 1992).

A quality sorting equilibrium implies that the proportion of black workers in a job is correlated with both measured and unmeasured differences in labor productivity. Lower skill white and black workers are sorted into jobs with a relatively high proportion of black workers, while higher skill white and black workers are sorted into jobs with a relatively small proportion of black workers.

We extend the literature on the minority composition of jobs to apply to disability status. Suppose that workers with disabilities, but not nondisabled workers, are crowded into low-paying occupations for both discriminatory and nondiscriminatory reasons. Then the disabled composition of jobs becomes an index of labor quality for nondisabled workers and, to a lesser extent, workers with disabilities. Quality sorting implies that the proportion of disabled workers in a job is correlated with measured and unmeasured labor productivity differences. Lower skill disabled and nondisabled workers are sorted into jobs with a relatively high proportion of disabled workers, while higher skill disabled and nondisabled workers sort into jobs with a small proportion of disabled workers.

The quality sorting hypothesis implies that workers of similar quality will be found in similar jobs, independent of employer discrimination. Quality sorting may be confused with discrimination, however, when some measures of quality are unobservable to the researcher. Suppose, for example, that workers with disabilities have a lower level of unmeasured skill than do nondisabled workers. If workers are sorted by both measured and unmeasured quality, then the researcher may estimate a negative wage differential for workers with disabilities that represents their lower unmeasured skill but not necessarily direct labor market discrimination.

If the correlation between the proportion of disabled workers in an occupation and its relative wage were determined to be causal, this would lend support to the argument that discrimination in access to good jobs contributes to the disabled/nondisabled wage differential. In this case, antidiscrimination policies designed to reduce the wage differential may be the appropriate policy response. On the other hand, if the correlation between disabled density and wages is not causal but explained by quality sorting, then public policy should focus on the skills that workers with and without disabilities bring to the labor market.

Model

Below we adapt the model of Hirsch and Macpherson (2000) to examine the relationship between quality sorting, wages and disabled composition. Assume workers are either high or low quality, and are paid wages (H and L) equal to their marginal revenue products. Let P_d , P_n be the proportion of high-quality disabled and nondisabled workers, and $(1-P_d)$, $(1-P_n)$ be the proportions of low-quality workers. Assuming individual productivities are independent of the place of work, the average wages of disabled and nondisabled workers, V_d and V_n , are:

$$(2) \quad V_d = P_d H + (1-P_d)L,$$

$$(3) \quad V_n = P_n H + (1-P_n)L,$$

and the wage differential between disabled and nondisabled workers is:

$$(4) \quad V_n - V_d = (P_n - P_d)(H - L).$$

The sign of the wage gap is determined by the sign of $(P_n - P_d)$. The size of the gap is a function of differences in the proportion of high and low productivity workers by disability status and the productivity difference between high and low productivity workers.

Let the proportion of disabled workers be D . Then the average wage, V , in an integrated workplace is:

$$\begin{aligned} (5) \quad V &= DV_d + (1-D)V_n \\ &= D[P_d H + (1-P_d)L] + (1-D)[P_n H + (1-P_n)L] \\ &= (P_d D - P_n D)(H - L) + P_n(H - L) + L. \end{aligned}$$

Taking the partial derivative of V with respect to D , we obtain:

$$(6) \quad \partial V / \partial D = P_d(H - L) - P_n(H - L).$$

If the proportions of disabled and nondisabled workers with high and low productivities are equal ($P_n = P_d$), then average wages in a workplace are independent of D . If the proportion of high-quality nondisabled workers is greater than the proportion of high-quality disabled workers ($P_n > P_d$), then average wages decrease as the proportion of disabled workers increases.

Suppose that employers observe individual productivities, but P_d and P_n increase across jobs as D decreases. In other words, the proportion of high-quality disabled and nondisabled workers in an occupation increases as the proportion of disabled workers decreases. An employer who can observe individual productivity and needs a high skill work force, selects both a relatively low proportion of disabled workers ($P_n - P_d > 0$), and a relatively high proportion of high quality disabled and nondisabled workers. Then we will observe both disabled and nondisabled wages decreasing as D increases, even with controls for *measurable* characteristics, because D captures unmeasured quality sorting in the labor market.

To the extent that standard controls for personal and job-related characteristics do not capture unmeasured worker ability fully, the inclusion of these variables in a wage equation will not eliminate the relationship between proportion disabled and wages. If quality sorting is important in the labor market for workers with disabilities, then the addition of measures of job demands to the standard wage equation should cause the coefficient of proportion disabled to go to zero. If the effect of the disabled composition of jobs is robust to the expanded specification, this suggests that the correlation between proportion disabled and wages is causal and does not support the quality sorting hypothesis.⁸

Results

To examine the relationship between wages and the proportion of disabled workers, we use CPS data to construct a variable measuring the proportion of workers with disabilities across a narrow set of occupations.⁹ We then include the natural log of this variable in the standard

⁸ An alternate approach to eliminate unmeasured skill differences is to estimate a longitudinal fixed effects model.

⁹ The SIPP only includes about 1400 workers with disabilities in each year, so we use data from the Current Population Surveys to obtain larger samples. The income supplement to the March CPS asks respondents if they have a disability or health problem that limits the amount or type of work they are able to perform. Using March CPS surveys for 1992-1995, we construct the proportion of workers with disabilities across 3-digit Census occupational codes.

wage model. If the quality sorting hypothesis is correct, the effect of proportion disabled on wages should decrease as additional controls for measurable skills are added to the model.

Table 5 reports mean wages by disability status and gender for the full sample and by quartile for the variable 'percent disabled' (D). For all four groups of workers, wages tend to decrease as the proportion of disabled workers in an occupation increases. Mean wages for nondisabled males range from \$17.43 in occupations with zero to 1.9 percent disabled, to \$9.65 in occupations with 3.8 percent disabled or greater. Mean wages for disabled males are approximately 85 percent of the nondisabled wage in each quartile. Mean wages for nondisabled females range from \$13.03 in occupations with zero to 1.9 percent disabled, to \$7.07 in occupations with 3.8 percent disabled or greater. Mean wages for disabled females are almost at parity with the nondisabled wage in occupations with relatively few disabled workers, but decline to 85 percent of the nondisabled wage as the proportion disabled increases.

Table 5 also reports means of the job demand variables for each quartile. The means show that occupations with a high proportion of disabled workers are associated with: lower levels of training, less frequent computer use, lower levels of aptitude (the aptitude variables are scaled so that 1 is high aptitude and 5 is low aptitude), greater physical demands, and more required strength. The results indicate that the proportion of disabled workers in an occupation is highly correlated with measured skill levels.

Table 6 reports regression results, by gender and disability status, for both years. If the quality sorting explanation is behind the relationship between wages and proportion disabled, the effect of this variable on wages should diminish as additional job characteristics are added to the

Restricting the sample to individuals participating in the labor force, age 18 or over, yields a sample size of 287,342. Within this sample, 3.4 percent indicate they have a disability. This proportion is substantially lower than the proportion disabled for the SIPP, in part because our definition of disability for the SIPP data includes persons who are limited in performing household tasks, or limited in daily activities, such as walking or climbing stairs. By restricting its definition to work limitations the CPS tends to underreport the total population of persons with disabilities.

In results not shown we used the SIPP data to calculate the proportion of disabled workers in a broader range of occupations (45 occupational categories). Results are similar to what is presented here

model. The table shows the coefficient of percent disabled from three specifications of the model. The 'simple' specification includes only the natural log of percent disabled and a binary variable identifying occupations with no disabled workers. The 'standard' specification adds human capital and job-related characteristics, including job tenure, to the model, and the 'expanded' adds to the standard specification the measures of job demands.

Within all four groups, in both years, the effect of proportion disabled diminishes substantially as more detailed controls are added to the model. For nondisabled males in 1990 the coefficient falls from $-.411$ in the simple specification, to $-.185$ in the standard specification, to $-.029$ in the expanded model. For all four groups, and especially for nondisabled workers, the effect of percent disabled is reduced substantially when the measures of job demands are included in the model. This is consistent with the quality sorting hypothesis. Workers of similar quality are likely to be found in similar jobs, but unmeasured quality differs between disabled and nondisabled workers.

The results suggest that workers with disabilities have a lower degree of unmeasured skill than do nondisabled workers and that workers are sorted by both measured and unmeasured quality. Therefore, both disabled and nondisabled workers receive lower wages in jobs with a higher proportion of disabled workers.¹⁰

using the CPS data and a much more detailed occupational classification (3-digit Census codes representing about 500 occupational categories).

¹⁰ In results not reported here, we estimated models relating the log wage to the log percent disabled in an occupation. The results show that there is a large wage disadvantage for both disabled and nondisabled workers who work in occupations with a larger proportion of disabled workers. One puzzling result is that the estimated wage penalty for disabled workers in 1990 increases when a control for the percent disabled in occupations is added to the model. If the proportion disabled in an occupation is capturing unmeasured differences in labor quality, and disabled workers tend to have lower unmeasured quality than nondisabled workers, we expect the wage penalty for disability to decrease when D is added to the model. This is what occurs in the results for 1993, although there is still a relatively large unexplained wage differential for males. That the coefficient on disabled workers does not fall noticeably (at least for males), suggests that wage differentials occur within or across occupations but independent of the proportion of workers with disabilities in an occupation.

V. Job Mobility

Background

In the years following passage of the ADA, complaints of employment and wage discrimination against workers with disabilities have grown rapidly. By March 31, 1998, the Equal Employment Opportunities Commission (EEOC), charged with enforcement of the employment provisions of the Act, had received more than 175,000 disability-related complaints (Moss, et. al., 1999). Over half the ADA-related charges filed with the EEOC are for wrongful discharge, suggesting that the Act may have its greatest impact in reducing the number of involuntary separations between disabled workers and their current employers.

Baldwin and Schumacher (1999) use data from the 1990 SIPP to compare the rates of voluntary and involuntary job changes of disabled and nondisabled workers. The results show relatively small differences in overall job change rates for disabled and nondisabled workers, but disabled workers are more likely to experience an involuntary job change than nondisabled workers. There is little or no evidence that the wage effects associated with job changes differ for workers with and without disabilities, but wage growth for workers with disabilities is slower than for nondisabled workers.

Acemoglu and Angrist (1998) examine the employment and wages of disabled and nondisabled workers using data from the 1998-1997 March CPS, and find that the ADA had a negative impact on the employment of disabled men, while the effect for women appears to be concentrated on younger workers. The CPS data used in their analysis, however, does not have reliable information on job changes and reasons for job change. Thus, they are unable to examine the effects of the ADA on separations.

We use data from the 1990 and 1993 SIPP to extend our previous work on job mobility and test the following predictions regarding the relationships between disability status, job changes and wages:

- 1) *Workers with disabilities are expected to have a higher rate of involuntary job changes than are nondisabled workers. In response to decreases in labor demand, employers lay off or*

discharge their marginal workers first. Discriminatory employers may consider workers with disabilities to be 'marginal workers.' In addition, workers with disabilities may face involuntary discharges in cases where employers have under-estimated the effect of functional limitations on worker productivity.

2) *The effect of disability on voluntary job changes is ambiguous.* Disabled workers may make fewer voluntary job changes than nondisabled workers because functional limitations make it difficult to search for a new job or to signal productivity to new employers, and because of the risk of losing their health insurance. On the other hand, disabled workers may experience relatively more voluntary job changes because of the uncertainties associated with chronic health conditions, and the likelihood of over-estimating productivity given their functional limitations.

3) *The relative wage increase following a voluntary job change is expected to be smaller for workers with disabilities than for nondisabled workers.* Disabled workers are less likely than nondisabled workers to receive wage offers that dominate their current wage (because of discrimination, limitations on job search, and difficulties in measuring productivity) and more likely to leave their new job because they have overestimated their productivity.

4) *The effect of disability on wages following an involuntary job change is ambiguous.* Because disabled workers have a lower probability of receiving wage offers than nondisabled worker, their post-displacement wage losses are likely to be greater. On the other hand, disabled workers have alternate sources of income unavailable to nondisabled workers (disability pensions, SSDI, SSI) so those who remain in the labor market may be a selected sample with the highest wage offers.

Model.

The SIPP data are structured so that we observe workers' employment and wages at the start date (the final month of Wave III), their employment status for five consecutive waves (each consisting of a four-month reference period), and their wage at the end of Wave VIII. Thus, we have an initial measure of earnings and employment status, an employment history for 20 months, and a measure of final earnings. This allows us to measure job mobility and the impact of job

changes on earnings.¹¹ The SIPP data also contain information on the reasons for job changes, and our analysis distinguishes among the various causes of job mobility.

Job changes. We estimate a multinomial logit model of the decision to change jobs to test our predictions regarding the relative job mobility of disabled and nondisabled workers. The dependent variable takes on three values classifying workers as ‘external job changers,’ ‘internal job changers,’ or ‘job stayers.’ A question on job changes in the core questionnaire allows us to track job mobility for each respondent over the 20-month period (five waves) after the reference point.¹² At each interview, respondents are asked to indicate whether they experienced a job change in any of the months of the reference period. If they answer affirmatively, they are asked if they “stopped working for this employer during the four-month reference period.” Based on their responses to these two questions, we define an ‘external job changer’ as a worker who changes jobs and stops working for his current employer in at least one of the 20 months following the initial interview. We define an ‘internal job changer’ as a worker who changes jobs but does not change employers during the reference period and a ‘job stayer’ as a worker who does not experience a job change in the 20-month period.

We further divide external changers into ‘voluntary,’ ‘involuntary’ and ‘other’ job changers. If a respondent indicates that he or she has changed employers, the survey then asks the reason for the job change. The following choices are included: laid off, retired, discharged, temporary job ended, quit to take another job, or quit for another reason.¹³ Voluntary changers are those who indicate they left their current job to accept a new job or to retire. Involuntary

¹¹ Previous research has utilized data that contain a longer time period than available in the SIPP: up to five years prior to displacement and six years after displacement (Jacobson, et al., 1993). While the SIPP data do not allow us to examine such a long time period, our results are consistent with previous studies.

¹² We exclude persons who are in the armed forces or employed in construction occupations, because job changes are difficult to define in these occupations.

¹³ For those workers with more than one job change within the 20 month period, we look only at the reason for the first job change. Among workers with disabilities 13.5 percent had 2 or more job changes (49.1 percent of external changers had multiple changes). Among nondisabled workers 13.3 percent had more than 1 job change (59.1 percent of external changers had multiple changes over the 20 month period).

changers are those who were laid off, discharged, or in a temporary job that ended. Other changers are those who changed jobs for unspecified reasons.

Independent variables in the job change model include the human capital and job-related characteristics defined above, continuous measures of the worker's age and non-wage income (total family non-wage income in the four-month reference period preceding the start date), and binary variables identifying workers who are male or African-American. Age is included as a square term to control for declining net human capital investments over the life cycle. The model also includes binary variables to identify workers whose fringe benefits include employer-provided health insurance and pension coverage (defined benefit, defined contribution, and 'other' type of pension).

We estimate one version of the model for the full sample including a binary variable identifying disabled workers, and a second version separately for disabled and nondisabled workers. We also estimate a specification of the job change model separating workers into voluntary and involuntary job changers.

Wage Changes. We estimate a variation of the model studied by Ruhm (1991) who examined the effects of job displacement on the earnings and employment of all workers.¹⁴ We begin with the equation:

$$(7) \quad W_{i,20} = Y_i\alpha + \gamma_1\text{CHANGE}_i + \gamma_2\text{DISABLED} + \gamma_3W_{i,1} + e_i$$

where $W_{i,20}$ is the natural log of the i th worker's wage in month 20; Y is a vector of observable characteristics, with coefficient vector α ; and CHANGE_i is a binary variable identifying job changers, with coefficient γ_1 . The remaining variables in the wage equation are the disabled dummy and the natural log of the worker's wage at the start date ($W_{i,1}$). The pre-displacement wage controls for individual heterogeneity not captured elsewhere in the model. We also

¹⁴ Ruhm only includes displaced (or involuntary) job changes, whereas we include both voluntary and involuntary changes.

estimate models with interaction terms between disability and job change status to measure how the wage effects of job changes differ for disabled and nondisabled workers.

Results.

Table 7 shows the distributions of the samples by disability and job change status for 1990 and 1993. There are similar proportions of job stayers, internal job changers, and external job changers for both disabled and nondisabled workers over the two years with only a slight decline in the proportion of external job changers between 1990 and 1993. In both years, workers with disabilities are slightly more likely to make external job changes than are nondisabled workers.

The data show that, between 1990 and 1993, the proportion of external job changes for voluntary reasons increased for both disabled and nondisabled workers. In 1990, 20 percent of the disabled workers who make external job changes report that the changes are voluntary, compared to 32 percent in 1993. Among nondisabled workers, the proportion of voluntary external job changes increases from 22 to 32 percent.

Descriptive statistics by job change and disability status are reported in the Appendix. On average, job changers are younger, have less experience in their current job, are less likely to be union members or public sector employees, and more likely to be part-time workers, than job stayers. Job stayers are substantially more likely to have employer-provided health insurance and pension coverage in their initial (and subsequent) jobs than job changers.

The descriptive statistics show important differences between workers with disabilities and nondisabled workers that may influence their propensity to change jobs. On average, workers with disabilities are older than nondisabled workers, have more work experience and lower wages, and are more likely to work part-time. Workers with disabilities are less likely to have employer-provided health insurance or pension coverage than nondisabled workers, except among those workers who move to a new employer.

The descriptive statistics in Table 7 show that disabled workers are more likely to make external job changes than are nondisabled workers, but there does not appear to be a large difference in the internal mobility rate. To control for the effects of other variables on the decision to change jobs, we turn to the results of the multivariate analyses.

Table 8 reports multinomial logit estimates of the determinants of job changes from the 1993 data (similar results for 1990 are reported in Baldwin and Schumacher, 1999). Listed in the table are the coefficient estimates, standard errors (in parentheses), and marginal effects (in brackets) evaluated at the means of the other right-hand-side variables. The results indicate that disabled workers are significantly more likely to make external job changes than are nondisabled workers. In 1993, workers with disabilities were 2.9 percent more likely to make an external job change than were nondisabled workers, in 1990 they were 3.5 percent more likely to make an external change (Baldwin and Schumacher, 1999). While the difference between disabled and nondisabled workers for 1993 is slightly higher than the difference in 1990 results pooling the years reveal that this change is not statistically significant.

Pension coverage has by far the largest effect on the probability of job changes of any of the covariates. Workers with defined benefit pension plans are about 17 percent less likely to change employers than workers without pension plans, while workers with defined contribution plans are about 14 percent less likely to change employers. Employer-provided health insurance is also associated with lower probabilities of job changes but, surprisingly, the effect is smaller for disabled workers than for nondisabled workers.¹⁵ Age has a negative effect on the probability of job changes which is stronger for workers with disabilities than for nondisabled workers..

Table 9 reports multinomial logit estimates of the probability of job change status for models that differentiate between voluntary and involuntary job changes. Workers with disabilities are significantly more likely to make both voluntary (quit for a new job or retired) and

¹⁵ Note that this effect potentially has any “job lock” component as well as an unmeasured ability component associated with it. For discussion see Buchin Mueller and Valetta (1996).

involuntary (laid off, discharged, or temporary job ended) job changes. Disability is associated with a 1.1 percent higher probability of both voluntary and involuntary job changes. The effect for involuntary changes is virtually identical to the estimate reported by Baldwin and Schumacher (1999) using the 1990 SIPP data (0.9 percent), but they do not find a significant effect on voluntary changes.

Together, the results suggest that workers with disabilities are more likely to make voluntary job changes than are nondisabled workers in 1993, but equally likely in 1990. One possible explanation is that the ADA has increased access to jobs for disabled workers, making it easier for those who are already employed to to change jobs. The effects, however, are small and it is probably premature to try to make precise explanations.¹⁶

Wage Change Effects. Table 10 reports estimates of the effects of job changes on wages from the 1993 sample. These results are similar to those reported by Baldwin and Schumacher (1999) for 1990.

The first column reports results from the model specified in equation (7), in which we distinguish between internal and external job changes. Holding constant the initial wage rate (4th month of Wave III), the end wage (4th month of Wave VIII) for workers with disabilities is about 3.9 percent lower than the end wage for nondisabled workers, indicating that workers with disabilities experience slower wage growth than nondisabled workers.

Column 2 reports results from a model that includes interaction effects between job change and disability status. The results indicate that the wage change following an internal job change is smaller for workers with disabilities than for nondisabled workers, although the effect is only marginally significant. External job changes are associated with about a nine percent decrease in wages, with no significant difference in this effect for disabled and nondisabled workers.

¹⁶ Again, results pooling the 1990 and 1993 SIPP reveal that this difference is not statistically significant.

The model reported in the final column distinguishes among external job changes that are for voluntary, involuntary, or ‘other’ reasons. Consistent with our expectations, the wage effects of involuntary job changes are greater than the wage effects of voluntary job changes. Voluntary job changes are associated with a 2.5 percent lower end wage for nondisabled workers but 14.4 percent lower wages for workers with disabilities. Involuntary job changes are associated with a 9.3 percent wage increase for nondisabled workers. The interaction between disabled and involuntary change is positive but not significant suggesting that there is not a significant difference here. This voluntary job change effect is consistent with the idea that workers with disabilities are more likely to leave their current job due to the uncertainties associated with chronic health conditions and the interactions of functional limitations with job demands. The effect of job changes on wages suggests that there is a relatively large wage loss for voluntary job changes among workers with disabilities, which supports this interpretation.

VI. Conclusions

This article examines the labor market experience of workers with disabilities in the years in which the ADA was being implemented. Title I of the ADA, which addresses employment and wage discrimination, became effective in 1992 for firms with a minimum of 25 employees, and in 1994 for firms with 15 to 24 employees. Thus, in 1993, when our most recent panel of SIPP data began, the law applied only to large employers.

Throughout the 1990’s, employers, disability advocates, and the Equal Employment Opportunity Commission struggled to determine how the employment provisions of the ADA would be interpreted and enforced. Their uncertainties were magnified because the language of the law was deliberately kept ambiguous. Congress left it to the courts to determine how phrases such as “reasonable accommodation,” “essential functions of a job,” and “undue hardship” should be interpreted. It is impossible, therefore, to measure the potential effects of the ADA with the 1993 SIPP data that is currently available. Rather, this study lays the groundwork for

comparisons with the 1996 panel, when it is more likely we may begin to measure the effects of Title I.

Overall, the results show that workers with disabilities earn significantly lower wages than do nondisabled workers and the differential appears to have increased for males over the period from 1990 to 1993. Attempts to explain the wage differential using detailed occupation-specific characteristics are largely unsuccessful. This suggests that much of the differential is a “true” residual, unrelated to unmeasured occupational characteristics.

We find that occupations with a higher proportion of disabled workers are associated with relatively low average wages for both disabled and nondisabled workers. Consistent with the theory of quality sorting, the size of the relationship decreases substantially when measures of job demands are included in the model. The percent disabled in an occupation appears to proxy for the relative quality of workers in the occupation, particularly among nondisabled workers. The estimated disabled-nondisabled wage differential, however, does not decrease when the proportion disabled is included in the wage models, suggesting that the wage differential is occurring within or across occupations in ways not correlated with disability density. The results, therefore, are consistent with the idea that disabled workers are subject to discrimination in the labor market.

Finally, examining job changes by disability status reveals relatively few differences in mobility patterns. Workers with disabilities are more likely to make both voluntary and involuntary job changes than nondisabled workers. The involuntary job change effect supports the idea that there is employer prejudice against workers with disabilities in termination decisions, and is consistent with the large proportion of charges filed with the ADA for wrongful discharge. The results are also consistent with the idea that there is a higher probability of mistakes in evaluating a disabled worker’s productivity.

The voluntary job change effect is consistent with the idea that workers with disabilities are more likely to leave their current job because of uncertainties about chronic health conditions

or the interactions of functional limitations with job demands. The effect of job changes on wages suggests that there is a relatively large wage loss for voluntary job changes among workers with disabilities, which supports this interpretation.

Table 1
Description and Means (Standard Deviation) of Occupational Variables

Variable	Description	Disabled Mean		Nondisabled Mean	
		Male	Female	Male	Female
Training	Proportion of workers receiving formal or informal training on the current job	.374 (.196)	.380 (.193)	.410 (.199)	.414 (.194)
Computer	Proportion of workers using computers at their job	.378 (.299)	.476 (.321)	.443 (.303)	.530 (.300)
GED	(1-6 point scale) General Educational development, includes formal and informal education required for occupation in areas of reasoning, math and language	3.558 (.907)	3.652 (.847)	3.756 (.902)	3.813 (.815)
SVP	Years required for occupational proficiency or specific vocational reparation	5.094 (1.588)	4.916 (1.474)	5.428 (1.577)	5.192 (1.436)
Numerical	1-5 point index of required numerical aptitude for the occupation (from high to low)	3.278 (.593)	3.249 (.569)	3.147 (.640)	3.152 (.561)
Verbal	1-5 point index of required verbal aptitude for the occupation (from high to low)	3.042 (.700)	2.873 (.680)	3.445 (.708)	2.735 (.644)
Spatial	1-5 point index of required spatial aptitude for the occupation (from high to low)	3.325 (.550)	3.693 (.395)	3.493 (.581)	3.671 (.429)
Environment	The number of work environment disamenities from 0 to 6	.623 (.668)	.302 (.456)	.593 (.711)	.243 (.412)
Physical Demands	The number of physical demands (climbing, stooping, reaching, seeing, etc.) required on the job	1.861 (.814)	1.587 (.674)	1.714 (.854)	1.486 (.687)
Strength	1-5 index from low to high of required strength for the job.	2.512 (.725)	2.056 (.694)	2.398 (.741)	1.962 (.661)

Source: Training is from the January 1993 and 1991 CPS Supplements, Computer is from the October 1989, 1993 and 1997 CPS Supplements. The other variables are from the Dictionary of Occupational Titles.

Table 2 Descriptive Statistics

	Workers With Disabilities			
	Males		Females	
	1990	1993	1990	1993
Wage	11.42	12.72	8.58	10.06
Tenure	8.73	8.90	6.99	6.88
Experience	12.25	14.21	11.50	12.66
Education	12.68	12.85	12.81	13.21
Union Membership	0.233	0.237	0.172	0.187
Public Employment	0.174	0.223	0.204	0.238
Part-Time	0.145	0.139	0.287	0.307
Married	0.669	0.662	0.507	0.504
Previously Married	0.113	0.140	0.321	0.340
<u>Type of Disability</u>				
Cognitive Sensory	0.268	0.316	0.194	0.200
Mobility	0.097	0.122	0.121	0.128
Strength/Endurance	0.355	0.378	0.617	0.616
Personal Care	0.066	0.062	0.092	0.101
Work Related	0.684	0.790	0.627	0.676
Sample Size	682	613	763	680
	Non-Disabled Workers			
	Males		Females	
	1990	1993	1990	1993
Wage	13.88	15.91	9.74	11.21
Tenure	7.59	7.86	5.71	6.12
Experience	9.08	10.06	8.54	6.67
Education	13.53	13.80	13.46	13.75
Union Membership	0.220	0.214	0.153	0.158
Public Employment	0.153	0.170	0.201	0.224
Part-Time	0.073	0.077	0.236	0.241
Married	0.645	0.687	0.553	0.615
Previously Married	0.098	0.096	0.206	0.186
Sample Size	7,905	6,460	8,064	6,279

Source: 1990 and 1993 SIPP

Table 3 Adjusted Wage Differentials for Workers With Disabilities

	1	2	3	4
Males 1990	-.107 (.020)	-.134 (.019)	-.114 (.018)	-.116 (.018)
Males 1993	-.143 (.022)	-.175 (.021)	-.159 (.029)	-.160 (.020)
Females 1990	-.056 (.017)	-.078 (.017)	-.075 (.016)	-.067 (.016)
Females 1993	-.051 (.019)	-.063 (.018)	-.065 (.018)	-.051 (.017)
DOT Controls	no	no	no	yes
Tenure	no	yes	yes	yes
Occupation	no	no	yes	no

Source: the 1990 and 1993 SIPP. DOT controls are from the dictionary of occupational titles (see Table 1 for details). The coefficients reported in the table are those on a dummy variable for workers with disabilities. Each row represents a separate regression. Other than those variables included above, all the models included years of education, general experience and its square, and dummies for marital status (2), union membership, race, part-time status, region (3), large metropolitan area, and industry (9).

Table 4
Wage Differentials by Type of Disability

	1990			
	Male		Female	
	Standard	Expanded	Standard	Expanded
Disabled	-.134 (.018)	-.116 (.018)	-.078 (.017)	-.067 (.016)
<u>Type of Disability</u>				
Cognitive/Sensory	-.080 (.038)	-.042 (.036)	-.057 (.039)	-.036 (.037)
Mobility	-.068 (.068)	-.064 (.064)	-.014 (.053)	.011 (.049)
Strength/Endurance	-.087 (.035)	-.089 (.033)	-.063 (.023)	-.055 (.022)
Personal Care	-.127 (.077)	-.133 (.073)	-.063 (.058)	-.069 (.054)
Work Related	-.116 (.028)	-.098 (.026)	-.076 (.032)	-.075 (.030)
	1993			
	Male		Female	
	Standard	Expanded	Standard	Expanded
Disabled	-.175 (.021)	-.160 (.020)	-.063 (.018)	-.051 (.017)
<u>Type of Disability</u>				
Cognitive/Sensory	-.112 (.042)	-.085 (.039)	-.060 (.043)	-.044 (.040)
Mobility	-.107 (.068)	-.166 (.064)	.036 (.061)	.017 (.057)
Strength/Endurance	-.066 (.039)	-.054 (.037)	-.005 (.028)	-.011 (.026)
Personal Care	.030 (.092)	.025 (.086)	-.089 (.067)	-.070 (.063)
Work Related	-.113 (.027)	-.108 (.025)	-.041 (.025)	-.026 (.024)

Source: 1990 and 1993 SIPP. See text for an explanation of disability types.

Table 5
Means by Disabled Composition—March CPS %Disabled Specification

	Disabled Males					NonDisabled Males				
	0-1.9	1.9-2.8	2.8-3.8	3.8+	All	0-1.9	1.9-2.8	2.8-3.8	3.8+	All
Wage	14.894	13.106	11.868	7.962	11.425	17.434	15.135	13.566	9.647	13.885
%Disabled	.013	.023	.033	.053	.090	.013	.023	.032	.052	.082
GED	4.301	3.890	3.615	2.921	3.558	4.420	4.071	3.638	3.004	3.756
SVP	6.367	5.547	5.345	3.934	5.094	6.492	5.825	5.437	4.064	5.428
Training	.573	.421	.382	.232	.374	.583	.451	.385	.240	.410
Computer	.629	.519	.369	.172	.378	.647	.572	.400	.195	.443
Numerical	2.827	3.020	3.335	3.616	3.278	2.690	2.934	3.307	3.564	3.147
Verbal	2.509	2.740	3.049	3.490	3.042	2.391	2.606	3.009	3.434	3.445
Spatial	3.067	3.518	3.248	3.436	3.325	3.050	3.426	3.294	3.456	3.493
Environment	.454	.404	.921	.582	.623	.414	.410	.883	.559	.593
Physical	1.616	1.401	2.034	2.087	1.861	1.470	1.254	1.951	2.121	1.714
Strength	2.066	2.089	2.667	2.849	2.512	2.035	2.037	2.606	2.786	2.398
N	129	116	191	228	664	1,895	1,566	2,394	1,952	7,807

	Disabled Females					NonDisabled Females				
	0-1.9	1.9-2.8	2.8-3.8	3.8+	all	0-1.9	1.9-2.8	2.8-3.8	3.8+	all
Wage	12.251	9.305	8.587	6.025	8.578	13.032	9.405	9.624	7.065	9.742
%Disabled	.014	.023	.032	.054	.089	.015	.022	.032	.053	.030
GED	4.525	3.975	3.593	2.967	6.652	4.572	3.929	3.635	3.074	3.813
SVP	6.254	5.513	4.881	3.739	4.916	6.299	5.485	4.939	3.930	5.192
Training	.591	.416	.365	.255	.380	.624	.395	.372	.277	.414
Computer	.658	.672	.528	.172	.476	.665	.656	.542	.205	.530
Numerical	2.855	2.997	3.241	3.677	3.249	2.796	3.031	3.206	3.623	3.152
Verbal	2.262	2.527	2.934	3.446	2.873	2.259	2.530	3.876	3.361	2.735
Spatial	3.438	3.811	3.592	3.786	3.693	3.462	3.799	3.627	3.737	3.671
Environment	.144	.102	.270	.583	.302	.123	.107	.265	.536	.243
Physical	1.278	1.334	1.496	2.030	1.587	1.162	1.367	1.472	1.993	1.486
Strength	2.016	1.488	2.015	2.613	2.056	1.982	1.527	1.974	2.557	1.962
N	123	220	170	246	759	1,800	2,615	1,834	1,815	8,064

Table 6
Wage Effects of Disabled Composition: Simple vs. Expanded Models

Coefficient on Ln(%Disabled)				
1990				
	Males		Females	
	Disabled	NonDisabled	Disabled	NonDisabled
Simple	-.520 (.042)	-.411 (.012)	-.513 (.037)	-.386 (.012)
Standard	-.248 (.038)	-.185 (.011)	-.277 (.035)	-.171 (.011)
Expanded	-.101 (.045)	-.029 (.012)	-.162 (.046)	-.033 (.014)
1993				
	Males		Females	
	Disabled	NonDisabled	Disabled	NonDisabled
Simple	-.406 (.044)	-.410 (.013)	-.409 (.041)	-.419 (.014)
Standard	-.207 (.043)	-.208 (.012)	-.134 (.039)	-.187 (.013)
Expanded	-.082 (.053)	-.060 (.014)	-.028 (.049)	.013 (.016)

Shown is the coefficient on the natural log of the percent of workers with disabilities in the worker's occupation (lnD), calculated from the 1992-1995 March CPS.

Table 7
Distribution of Sample by Disability and Job Change Status

	Disabled 1990	Disabled 1993	NonDisabled 1990	NonDisabled 1993
Job stayers	975 (68%)	887 (69%)	11,104 (70%)	9,264 (73%)
Internal changers	151 (10%)	148 (11%)	1,959 (12%)	1,481 (12%)
External changers	319 (22%)	258 (20%)	2,919 (18%)	1,989 (16%)
Voluntary	66 (20%)	82 (32%)	648 (22%)	640 (32%)
Involuntary	133 (42%)	103 (40%)	1,294 (44%)	692 (35%)
Other	120 (38%)	73 (28%)	977 (34%)	657 (33%)

“Stayers” are individuals who do not change jobs over the 20-month period. “Internal Changers” are individuals change jobs but not employers, and External Changers are individuals who change jobs and employers. Voluntary changers are those who left to accept a new job or retire, involuntary changers are those who were discharged, laid off or were in a temporary job that ended. Others are those who left for other reasons.

SOURCE: SIPP, 1990 and 1993 (Waves III-VIII).

Table 8
Multinomial Logit Analysis of Job Change Status

	All Workers		Disabled Only		Non-Disabled	
	Internal	External	Internal	External	Internal	External
Disabled	.138 (.099) [.009]	.276 (.083) [.029]	--	--	--	--
Health Insurance	-.714 (.065) [-.060]	-.596 (.058) [-.056]	-.460 (.219) [-.035]	-.340 (.180) [-.039]	-.736 (.068) [-.061]	-.628 (.062) [-.058]
Pension DB	-.586 (.072) [-.034]	-1.585 (.077) [-.167]	-.504 (.261) [-.023]	-0.372 (.239) [-.179]	-.596 (.075) [-.035]	-1.608 (.082) [-.166]
Pension DC	-.585 (.091) [-.036]	-1.327 (.093) [-.139]	-.377 (.297) [-.010]	-1.474 (.315) [-.195]	-.613 (.096) [-.041]	-1.315 (.098) [-.134]
Pension Other	-.877 (.274) [-.066]	-1.242 (.240) [-.125]	-.778 (1.053) [-.050]	-1.187 (.772) [-.149]	-.869 (.284) [-.066]	-1.241 (.252) [-.123]
Job Experience	-.036 (.006) [-.003]	-.026 (.004) [-.002]	-.019 (.017) [-.001]	-.048 (.014) [-.006]	-.038 (.006) [-.003]	-.024 (.005) [-.002]
Age	-.126 (.017) [-.010]	-.162 (.015) [-.016]	-.133 (.058) [.009]	-.190 (.047) [-.024]	-.133 (.018) [-.010]	-.163 (.016) [-.016]
Age Squared/100	.123 (.022) [.009]	.182 (.018) [.018]	.104 (.069) [.006]	.200 (.054) [.026]	.136 (.023) [.010]	.184 (.019) [.018]
Male	.124 (.052) [.018]	.124 (.052) [.011]	-.172 (.199) [-.017]	.102 (.163) [.017]	.243 (.061) [.021]	.122 (.055) [.010]
Education	.028 (.012) [.002]	.028 (.011) [.003]	-.063 (.040) [-.005]	-.025 (.033) [-.002]	.028 (.012) [.002]	.033 (.011) [.003]
Black	.060 (.112) [.008]	-.200 (.108) [-.042]	.194 (.353) [.024]	-.432 (.350) [-.062]	.045 (.119) [.007]	-.184 (.113) [-.021]
Union Member	-.196 (.090) [-.020]	.091 (.079) [-.013]	-1.006 (.357) [-.088]	-.090 (.233) [-.004]	-.124 (.094) [-.013]	.105 (.084) [.013]
Married	-.231 (.065) [-.019]	-.227 (.058) [-.022]	-.114 (.213) [-.014]	.230 (.177) [.033]	-.235 (.068) [-.018]	-.285 (.061) [-.028]

Source: 1993 SIPP. The first number in each cell is the coefficient estimate from a multinomial logit equation. Standard errors in parentheses, marginal effects in brackets. Pension DB are employee sponsored defined benefit pension plans, Pension DC are defined contribution plans, and pension Other, are other types of pensions. Other variables included in the equation are regional dummies (3 representing four regions), part-time employment, a dummy for MSA>100,000, and family income.

Table 9
Multinomial Logit Analysis of Reasons for Job Changes

	Job Change Reason		
	Voluntary	Involuntary	Other
Disabled	.277 (.129) [.011]	.295 (.118) [.011]	.167 (.137) [.004]
Health Insurance	-.228 (.091) [-.008]	-.573 (.087) [-.021]	-.481 (.094) [-.013]
Pension DB	-1.474 (.122) [-.055]	-1.443 (.126) [-.052]	-1.534 (.144) [-.040]
Pension DC	-1.018 (.139) [-.037]	-1.342 (.160) [-.049]	-1.348 (.174) [-.035]
Pension Other	-.632 (.304) [-.020]	-1.056 (.391) [-.037]	-2.828 (1.005) [-.077]
Job Experience	-.003 (.006) [-.000]	-.044 (.008) [-.002]	-.058 (.010) [-.002]
Male	.168 (.081) [.007]	.399 (.079) [.015]	-.439 (.085) [-.013]
Education	.082 (.017) [.003]	-.013 (.015) [-.001]	-.014 (.018) [-.000]
Black	-.275 (.176) [-.011]	-.125 (.160) [-.004]	-.184 (.174) [-.005]
Union	.125 (.123) [.005]	.249 (.124) [.009]	-.012 (.154) [-.001]
Part-Time	-.419 (.116) [-.017]	-.045 (.100) [-.001]	.276 (.096) [.008]
Married	-.007 (.092) [-.000]	-.296 (.086) [-.011]	-.174 (.093) [-.005]

Other right-hand-side variables included in the model are: age and age squared, family income, dummies for residence in a large MSA, public employment, and region (3). The omitted group is job stayers/internal changers. Standard errors in parentheses, marginal effects in brackets. SOURCE: SIPP, 1993 (Waves III-VIII).

Table 10
Wage Effects of Job Change and Disability Status
1993 SIPP

	(Dependent variable: ln End Wage)		
	(1)	(2)	(3)
InWage	.544 (.007)	.544 (.007)	.543 (.007)
Disabled	-.039 (.012)	-.029 (.014)	-.038 (.013)
Internal Change	-.018 (.011)	-.013 (.011)	-.019 (.011)
External Change	-.090 (.011)	-.089 (.011)	--
Internal*Disabled	--	-.064 (.038)	-.044 (.037)
External*Disabled	--	-.018 (.034)	--
Voluntary	--	--	-.025 (.018)
Voluntary*Disabled	--	--	-.130 (.059)
Involuntary	--	--	-.098 (.017)
Involuntary*Disabled	--	--	.075 (.050)
Other	--	--	-.143 (.018)
Other*Disabled	--	--	-.014 (.061)

The dependent variable in the regressions is the log of the wage in the last month of the survey, which is 20 months after the first interview. Other right-hand-side variables included in the model are education, experience and its square, and dummy variables for union membership, gender, race, part-time, region, metropolitan statistical area, and marital status.

Appendix Table 1
Regression Results

	Males		Females	
	1990	1993	1990	1993
Disabled	-.116 (.018)	-.160 (.020)	-.067 (.016)	-.051 (.017)
Schooling	.048 (.002)	.050 (.003)	.046 (.002)	.050 (.003)
Job Experience	.028 (.002)	.029 (.002)	.030 (.002)	.028 (.002)
Job Experience ² /100	-.047 (.006)	-.054 (.008)	-.064 (.007)	-.058 (.008)
General Experience	.011 (.001)	.016 (.002)	.011 (.001)	.010 (.002)
General Experience ² /100	-.017 (.004)	-.033 (.005)	-.027 (.004)	-.026 (.005)
Married Spouse Present	.188 (.013)	.176 (.016)	.047 (.012)	.099 (.014)
Separated, Divorced, Widowed	.146 (.019)	.124 (.023)	.060 (.014)	.078 (.017)
Union Member	.130 (.013)	.110 (.016)	.141 (.014)	.149 (.016)
Public Employment	-.077 (.016)	-.038 (.019)	-.038 (.013)	-.012 (.015)
Black	-.162 (.019)	-.140 (.025)	-.055 (.015)	-.026 (.019)
Part-Time	-.251 (.019)	-.204 (.021)	-.111 (.011)	-.121 (.013)
North East	-.016 (.015)	-.010 (.018)	-.049 (.014)	-.012 (.017)
South	-.087 (.014)	-.064 (.017)	-.133 (.013)	-.092 (.015)
Mid West	-.052 (.014)	-.064 (.017)	-.116 (.013)	-.068 (.015)
Metropolitan Statistical Area	.139 (.010)	.113 (.012)	.138 (.009)	.152 (.108)
<u>Industry Categories</u>				
Mining	.130 (.053)	.123 (.065)	.087 (.106)	-.037 (.115)
Construction	.183 (.023)	.106 (.029)	-.062 (.044)	.104 (.058)

Appendix Table 1 (continued)
Regression Results

	Males		Females	
	1990	1993	1990	1993
Manu Durable Goods	.126 (.019)	.121 (.024)	.105 (.018)	.134 (.023)
Manu Non Durable	.126 (.019)	.121 (.024)	.052 (.020)	.065 (.024)
Wholesale Trade	.072 (.024)	.078 (.027)	.012 (.029)	.059 (.036)
Retail Trade	-.058 (.017)	-.066 (.020)	-.146 (.015)	-.125 (.018)
F.I.R.E.	.105 (.025)	.062 (.031)	-.028 (.018)	.026 (.020)
Public Utilities	.133 (.027)	.166 (.034)	.159 (.031)	.137 (.039)
Transportation	.131 (.021)	.150 (.025)	.104 (.028)	.163 (.033)
<u>JOB Characteristics</u>				
Training	.209 (.050)	.298 (.055)	.349 (.047)	.317 (.052)
Computer	.251 (.037)	.117 (.042)	.314 (.030)	.206 (.034)
Numerical Aptitude	-.087 (.018)	-.150 (.022)	-.131 (.013)	-.138 (.018)
Verbal Aptitude	-.058 (.019)	-.013 (.030)	-.042 (.014)	-.093 (.022)
Spatial Aptitude	-.042 (.014)	-.050 (.016)	-.060 (.013)	-.111 (.015)
Environment	.051 (.011)	.024 (.014)	.058 (.014)	.002 (.017)
Physical Demands	-.033 (.014)	-.062 (.016)	.010 (.009)	.015 (.011)
Strength	.005 (.017)	.032 (.020)	.088 (.013)	.097 (.018)

Source: 1990 and 1993 SIPP. Coefficient estimates are from regressions that are identical to those presented in column 4 of Table 3 above. Table 1 shows descriptions and means of the job characteristic variables.

Appendix Table 2
Descriptive Statistics by Disability and Job Change Status 1993

	Disabled			Non-Disabled		
	Stayers	Internal Changers	External Changers	Stayers	Internal Changers	External Changers
Health Ins.	0.679	0.405	0.415	0.737	0.477	0.470
Pension DB	0.383	0.176	0.105	0.397	0.217	0.107
Pension DC	0.151	.122	.050	0.171	0.106	0.067
Pension Other	0.020	.007	.008	0.021	0.009	0.009
Wage	12.17	8.45	10.05	14.53	11.35	10.92
Education	13.21	12.62	12.71	13.83	13.73	13.55
Age	45.16	38.80	41.63	39.87	34.22	35.34
Job Experience	9.25	4.90	4.65	7.98	4.22	4.53
General Experience	13.78	11.15	13.33	10.18	8.77	9.25
Union Member	0.257	0.068	0.132	0.213	0.113	0.117
Public Employment	0.285	0.081	0.132	0.226	0.111	0.123
Part-Time	0.183	0.324	0.326	0.127	0.240	0.242
Male	0.484	0.412	0.477	0.511	0.512	0.484
Black	0.074	0.081	0.047	0.072	0.070	0.059
Large MSA	0.565	0.500	0.554	0.620	0.640	0.609
Married	0.607	0.473	0.547	0.693	0.550	0.534
Divorced, Separated, or Widowed	0.246	0.236	0.248	0.140	0.120	0.158
Family Income	44,823	36,824	37,575	53,211	48,097	45,255
Sample Size	887	148	258	9,264	1,481	1,989
Percent of Sample	0.686	0.114	0.200	0.728	0.116	0.156

“Stayers” are individuals who do not change jobs over the 20-month period. “Internal Changers” are individuals change jobs but not employers, and External Changers are individuals who change jobs and employers.

SOURCE: SIPP, 1993 (Waves III-VIII).

Appendix Table 3
Descriptive Statistics by Disability and Job Change Status -- 1990

	Disabled			Non-Disabled		
	Stayers	Internal Changers	External Changers	Stayers	Internal Changers	External Changers
Health Ins.	0.688	0.450	0.480	0.747	0.479	0.453
Pension Coverage	0.567	0.272	0.320	0.601	0.274	0.279
Wage	10.68	8.55	8.59	12.75	9.88	9.64
Education	12.88	12.73	12.37	13.61	13.42	13.14
Age	43.46	38.34	39.88	38.58	32.89	33.92
Job Experience	9.30	4.26	4.92	7.81	3.88	4.05
General Experience	12.01	10.20	12.27	9.15	7.88	8.40
Union Member	0.239	0.106	0.129	0.217	0.125	0.111
Public Employment	0.221	0.113	0.135	0.206	0.101	0.119
Part-Time	0.186	0.278	0.298	0.126	0.229	0.224
Male	0.467	0.457	0.495	0.501	0.498	0.469
Black	0.114	0.093	0.066	0.089	0.102	0.073
Large MSA	0.604	0.616	0.602	0.653	0.661	0.622
Married	0.607	0.530	0.536	0.642	0.498	0.501
Divorced, Separated, or Widowed	0.228	0.221	0.210	0.155	0.138	0.148
Family Income	41,253	36,8640	34,584	48,159	41,772	42,591
Sample Size	975	151	319	11,104	1,959	2,919
Percent of Sample	0.675	0.104	0.221	0.695	0.123	0.183

"Stayers" are individuals who do not change jobs over the 20-month period. "Internal Changers" are individuals change jobs but not employers, and External Changers are individuals who change jobs and employers.

SOURCE: SIPP, 1990 (Waves III-VIII).

Bibliography

- Acemoglu, Daron and Joshua Angrist. 1998. "Consequences of Employment Protection? The Case of the Americans with Disabilities Act," NBER Working Paper # 6670, July 1998. National Bureau of Economic Research.
- Baldwin, Marjorie and William G. Johnson. 2000. "Labor Market Discrimination Against Men with Disabilities in the Year of the ADA," *Southern Economic Journal*, Vol. 66, No. 3 (January), pp. 548-66.
- _____. 1995. "Labor Market Discrimination Against Women with Disabilities," *Industrial Relations*, Vol. 34, No. 4 (October), pp. 55-77.
- _____. 1994. "Labor Market Discrimination Against Men With Disabilities," *The Journal of Human Resources*, Vol. 29, No. 1 (Winter), pp1-19.
- Baldwin, Marjorie and Edward J. Schumacher. 1999. "Job Mobility among Workers With Disabilities," ECU Department of Economics, Working Paper (October).
- Becker, Gary. 1971. *The Economics of Discrimination*. Chicago: University of Chicago Press.
- Buchmueller, T. C., and R. G. Valletta. 1996. "The Effects of Employer-Provided Health Insurance on Worker Mobility," *Industrial and Labor Relations Review*, Vol. 49, No. 3 (April), pp. 439-55.
- Burkhauser, Richard V. 1990. "Morality on the Cheap: The Americans with Disabilities Act." *Regulation* Vol. 13, No. 2 (Summer), pp. 47-56.
- Clogston, J.S. 1990. *Disability Coverage in 16 Newspapers*. Louisville, KY: Avocado Press.
- Cooper, P. F., and A. C. Monheit. 1994. "Does Employment-Related Health Insurance Inhibit Job Mobility?" *Inquiry*, Vol. 30, No. 4, pp. 400-16.
- England, Paula and Brenda Kilborne. 1988. *Occupational Measures from the Dictionary of Occupational Titles for 1980 Census Detailed Occupations*. Inter-University Consortium for Political and Social Research, ICPSR #8942, Ann Arbor, MI.
- Gerhart, Barry, and Nabil El Cheikh. 1991. "Earnings and Percentage Female: A Longitudinal Study," *Industrial Relations*, Vol. 30, No. 1, pp. 62-78.
- Hahn, Harlan. 1987. "Advertising the Acceptable Employable Image: Disability and Capitalism." *Policy Studies Journal*, Vol. 15, No. 3 (March), pp. 551-570.
- Haller, Beth. 1995. "Rethinking Models of Media Representations of Disability." *Disability Studies Quarterly*, Vol. 15, No. 2 (Spring), pp. 26-30.
- Haveman Robert, and Barbara Wolfe. 1990. "The Economic Well-Being of the Disabled: 1962-84," *The Journal of Human Resources*, Vol. 25, No. 1 (Winter), pp. 32-54.

- Hirsch, Barry T. and David A. Macpherson. 2000. "Wages, Racial Composition, and Quality Sorting Across Labor Markets," Florida State University, Department of Economics Working Paper, (January).
- Hirsch, Barry T. and Edward J. Schumacher. 1992. "Labor Earnings, Discrimination, and the Racial Composition of Jobs," *The Journal of Human Resources*, Vol. 27, No. 4 (Fall), pp. 602-28.
- Jacobson, Louis S., Robert J. LaLonde, and Daniel G. Sullivan. 1993. "Earnings Losses of Displaced Workers," *The American Economic Review*, Vol. 83, No. 4 (September), pp. 685-709.
- Kapur, Kanika. 1998. "The Impact of Health on Job Mobility: A Measure of Job Lock," *Industrial and Labor Relations Review*, Vol. 51, No. 2 (January), pp. 282-98.
- Macpherson, David A. and Barry T. Hirsch. 1995. "Wages and Gender Composition: Why Do Women's Jobs Pay Less?" *Journal of Labor Economics*, Vol. 13, No. 3, pp. 426-71.
- Madrian, B. C. 1994. "Employment-Based Health Insurance and Job Mobility: Is There Evidence of Job-Lock?" *Quarterly Journal of Economics*, Vol. 109, No. 1, pp. 27-54.
- Martini, Alberto. 1990. *A Labor Force Profile of Persons with Disabilities*. Report prepared for Department of Health and Human Services by Mathematica Policy Research, Inc. and Systemetircs/McGraw Hill.
- Monks, James, and Steven D. Pizer. 1998. "Trends in Voluntary and Involuntary Job Turnover," *Industrial Relations*, Vol. 37, No. 4 (October), pp. 440-59.
- Moss, Kathryn, Michael Ullman, Mathew C. Johnsen, Barbara E. Starrett, and Scott Burris. 1999. "Different Paths to Justice: The ADA, Employment, and Administrative Enforcement by the EEOC and FEPAs," *Behavioral Sciences and the Law*, Vol. 17, pp. 29-46.
- Nagi, Saad Z. 1969. *Disability and Rehabilitation*. Columbus, Ohio: Ohio State University.
- Penrod, John R. 1995. "Health Care Costs, Health Insurance and Job Mobility," University of Michigan, School of Public Health, Working Paper.
- Ruhm, Christopher J. 1991. "Are Workers Permanently Scarred by Job Displacements?" *The American Economic Review*, Vol. 81, No. 1 (March), pp. 319-23.
- Royal, George P., and Michael C. Roberts 1987. "Students' Perceptions of and Attitude Toward Disabilities: A Comparison of Twenty Conditions," *Journal of Clinical Psychology*, Vol. 16, pp. 122-32.
- Westbrook, Mary T., Varoe Legge, and Mark Pennay. 1993. "Attitudes Towards Disabilities in a Multicultural Society," *Social Science and Medicine*, Vol. 36, pp. 615-24.
- World Health Organization. 1980. *International Classification of Impairments, Disabilities and Handicaps*. Geneva: World Health Organization.

Yuker, Harold E. 1987. "The Disability hierarchies: Comparative Reactions to Various Types of Physical and Mental Disabilities," Hofstra University, Working Paper (October).