

## Work shifts and disability: a national view

*More than one-fifth of employed persons with disabilities work late or rotating shifts, about the same percentage as nondisabled workers; in general, day workers with disabilities receive lower hourly wages than nondisabled day workers, but, except for men with severe disabilities, nonday workers with disabilities receive wages similar to those of their nondisabled counterparts*

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The United States is moving toward a 24-hour economy, driven by economic, technological, and demographic changes. As of 1997, 1 out of 5 employed Americans worked nonstandard hours—evenings, nights, or rotating shifts. Moreover, job growth over the next decade is likely to be disproportionately in those occupations with a high prevalence of late and rotating hours of employment.<sup>1</sup>

Although sociologists and other labor force scholars have paid considerable attention to the employment status of Americans and the *number* of hours they work, those same researchers have generally ignored the issue of *which* hours they work. Furthermore, whereas scholars have examined extensively the work histories of certain disadvantaged groups, such as racial and ethnic minorities and women, far less attention has been paid to an important—and growing—subgroup: persons with disabilities.

This article explores the relationship between work shifts and disability among U.S. workers. The term “work shift” refers to employment in which *most* hours worked are during the day, evening, or night or on a rotating basis (for example, changing on a regular basis from day to evening or day to night). The article does not examine whether people do some of their work on shifts other than the one on which they are mostly engaged.

In general, late and rotating shifts are regarded as less desirable. While some people may prefer to work those shifts, most who work such schedules

give job-related requirements, rather than family or other personal considerations, as their main reason for doing so.<sup>2</sup> The literature indicates that there is an increased risk of various negative physiological, psychological, and social consequences for those who work late or rotating shifts rather than fixed days.<sup>3</sup>

Given the general undesirability of late and rotating shifts, one might expect employers to find it more difficult to hire employees to work those hours rather than fixed days; thus, the employers would have to pay, on average, relatively higher wages than they would for similar daytime jobs—especially in a tight labor market such as that experienced in the United States the past decade. In reality, however, pay differentials are rare, and even for men in manufacturing, shift premiums are generally less than 10 percent.<sup>4</sup> Accordingly, it may be those who are least marketable who are most likely to be employed at nonstandard hours—and having a disability often reduces one’s marketability.<sup>5</sup>

It may also be that a tight labor market increases the willingness of employers to hire persons with disabilities, especially for late-hour shifts for which it is hard to find other workers and, in particular, if the employers can pay low wages. To the extent that persons with disabilities may have more limited job opportunities than others, they may be more willing to accept such employment. In contrast, if they have sources of income related to their disability, they may be less inclined to do so.

Although, with the data available, it is not pos-

sible to disentangle the motives of employers and employees in offering and accepting jobs, respectively, the extent to which employed persons with and without disabilities differ in their work shifts can be assessed. Further, other factors associated with workers' shifts can be controlled for, and when they are, differences may subsequently appear in the analysis. In addition to exploring the extent of differences in work shifts by disability status, it is possible to assess whether persons with disabilities who work late or rotating hours are paid lower hourly wages relative to comparable daytime workers with disabilities and relative to those without disabilities who work nonstandard hours. In particular, such an analysis is made possible through the use of a recent wave of a national data source that uniquely includes both information on which hours people are employed and details on the extent of the functional disability of employed persons.

### Data source and sample

The data source for the study to be described is the Medical Expenditure Panel Survey (MEPS), specifically the 1996 household component. The sample for the MEPS survey is drawn from the participants in the 1995 National Health Interview Survey (NHIS). The NHIS is designed to allow for the drawing of subsamples that are themselves nationally representative of the United States. Approximately 10,500 households were recontacted in 1996. The 1995 NHIS response rate for 1996 MEPS-eligible households was 93.9 percent. Of these households, 99.6 percent were deemed eligible, and of these eligible households, 83.1 percent responded. Thus, the overall response rate for the 1996 MEPS sample was 77.7 percent ( $0.939 \times 0.996 \times 0.831$ ).<sup>6</sup> For each household, one person reported on all members of the household—a total of 21,500 individuals.

In this study, the sample is limited to employed individuals aged 18 and older, in order to exclude most part-time workers who attend high school. The sample also is restricted to only those with values for all the variables of interest in the regression analysis. The resulting sample size for the study is 9,023: 4,685 men and 4,338 women.<sup>7</sup>

The MEPS household component uses an overlapping panel design, with a new panel starting each year, beginning in 1996. Each panel consists of five rounds of interviews during a 2½-year period. The analysis presented here focuses on the first round of the 1996 panel data, conducted in March through May of that year. Like the NHIS, the MEPS oversamples Hispanics and blacks. Accordingly, weighting procedures are used for national estimates and for the regression analyses.

The article presents descriptive tables providing national parameters on disability status and nonstandard work schedules, with an additional breakdown on wages. Also presented are regression analyses that control for sources of variation other than disability status—namely, job and sociodemo-

graphic characteristics. The analyses throughout are done separately for men and women, given the sex-segregated nature of the labor force.<sup>8</sup>

### Definition of work shift

A *work shift* is based on a set of three questions in the MEPS, asking the respondent specifically about the time his or her work (or that of a family member) generally began and ended most days during the previous week (the reference week) and whether his or her work hours changed periodically, such as from daytime to evening or night. Work shifts are operationalized as follows:

*Fixed day shift:* At least half the hours worked during the reference week fall between 8:00 A.M. and 4:00 P.M.

*Fixed evening shift:* At least half the hours worked during the reference week fall between 4:00 P.M. and midnight.

*Fixed night shift:* At least half the hours worked during the reference week fall between midnight and 8 A.M.

*Rotating shift:* Work hours change periodically (for example, from daytime to evening or night).

In all of the preceding definitions, when the hours distribute exactly in half in two shifts, the coding is for the earlier shift.

Each of the preceding shifts is delineated for the descriptive analyses. For the regression analysis, the dependent variable is dichotomized as *day* and *nonday* (evening, night, and rotating shift grouped).

Table 1 shows that for this sample, 77.8 percent of em-

**Table 1.** Percent distribution of employed U.S. workers aged 18 years and older, by shift and by disability, Medical Expenditure Panel Survey, 1996

[In percent]		
Shift and disability status	Men	Women
Shift:		
Fixed day .....	77.8	78.6
Fixed evening .....	7.9	8.4
Fixed night .....	4.9	3.6
Rotating .....	9.4	9.5
	100.0	100.0
Disability status:		
None .....	93.0	91.2
Less severe .....	6.0	7.6
Severe .....	1.0	1.2
	100.0	100.0
Number of cases (N) .....	4,685	4,338

NOTE: Percentages are weighted. Also, sums of individual entries may not total exactly 100 percent, due to rounding.

ployed men and 78.6 percent of employed women work fixed day shifts. Hence, 22.2 percent of employed men and 21.4 percent of employed women have other work schedules. These findings are in line with national estimates on work shifts from the May 1997 Current Population Survey, although the response categories differ somewhat.<sup>9</sup>

## Definition of disability

The richness of the MEPS data permit *disability* to be operationalized in terms of the extent to which individuals are limited in their physical and social roles. Such a conceptualization is in line with that offered by S. Z. Nagi<sup>10</sup> and, more recently, the Institute of Medicine Committee of Assessing Rehabilitation Science and Engineering.<sup>11</sup> The survey presented in this article used questions about the receipt of help with activities of daily living and instrumental activities of daily living,<sup>12</sup> as well as questions about limitations in work and housework roles,<sup>13</sup> limitations in social roles,<sup>14</sup> and limitations in physical and cognitive functioning to determine the extent of an individual's disability.

It is important to note that the measurement of disability in national surveys is not standardized. Each survey has questions with somewhat different wording, and some surveys, including the MEPS, have a substantial number of questions designed to get at many of the components of the concept of disability, such as impairments, functional limitations, and limitations in participation in various activities or roles. In this article, we take advantage of the opportunity the MEPS presents us with in identifying these components. However, it may be that, in a survey context, no matter what the questions are, some respondents are reluctant to report their limitations, and thus differences by disability status may be minimized.<sup>15</sup>

The disability measure that follows identifies (1) the survey components used to construct it and (2) its interpretation in the subsequent analysis, noting possible limitations. The measure is based on actual reports of one or more limitations, in turn based on traditional measures of disability set forth in the MEPS. If an *employed* person indicated that he or she had a limitation in some physical function, such as walking, standing, or traversing steps, or a limitation in some cognitive function, such as memory loss or decisionmaking, that interfered with the person's daily activities, or if the person required supervision for reasons of safety, the measure classified the individual as functionally impaired. Also classified as functionally impaired was the person whose responses indicated that he or she received help or supervision with activities of daily living or instrumental activities of daily living.<sup>16</sup> Finally, a person was classified as disabled on the basis of whether his or her responses indicated any limitations in participating in social or work roles.<sup>17</sup>

The measure of disability also was created to represent three approximate levels of disability (including no disability)

and is an adaptation of work done by John N. McNeil that incorporates an indication of both the presence of a limitation and its severity.<sup>18</sup> The adaptation is that a severe limitation includes only indications of receiving help or supervision with activities of daily living or instrumental activities of daily living and is a more conservative measure than McNeil's. The measurement of the three categories of disability, listed in table 1, is as follows:<sup>19</sup>

*Severe disability:* Applicable to persons who reported that they received help or supervision with activities of daily living or instrumental activities of daily living, regardless of whether they also reported any limitations in their work or social roles, physical functioning, or cognitive functioning. These persons indicated that they received assistance from others to take care of at least one basic self-care need or one or more instrumental activities in order to maintain their lives. There is no overlap between this group and any of the others.

*Less severe disability:* Applicable to persons, other than those judged severely disabled, who reported any physical or cognitive impairments, along with indications that they were limited in some manner in their work or social roles. This classification signifies that a person's impairment or condition has a perceived impact on the roles the person plays or the way the person functions physically or cognitively. The category *excludes* those individuals with impairments or conditions that do *not* contribute to limitations in social, physical, or cognitive functioning. Consequently, it is a rather narrow measure that does not include all persons with what observers might consider serious limitations in sight, hearing, mental health, or some other health condition. The category is a measure of the person's (or their proxy respondent's) acknowledgment of one or more limitations based on an impairment or a physical or mental health problem *only*.

*No disability:* Applicable to persons who reported that they did not need any help with basic life activities and that they had no physical, cognitive, work, or social limitations. Persons included in this category may have health problems or impairments, but because they report that they do not have any of the foregoing limitations, they are classified as not disabled.

Table 1 shows that among employed men, 6.0 percent are classified as having a less severe disability and 1.0 percent are classified as having a severe disability; among employed women, the figures are 7.6 percent and 1.2 percent, respectively. Although persons with disabilities constitute a much larger percentage of the total U.S. population,<sup>20</sup> their percentage of employed persons is low because they are less likely to

be employed than persons without disabilities. This lesser likelihood may be due partly to a preference among some disabled persons not to work and partly to discrimination by employers. (For example, an employer may ignore the work capabilities of a person with a disability or may be unwilling to make the accommodations to the job or job site that would enable an employee with a disability to work.<sup>21</sup>) Also, the segment of the population with the highest rate of disability is those older than 65 years, most of whom have withdrawn from the labor force.

### Work shifts and disability

A simple cross-tabulation of work shift status by disability status for men and women, presented in table 2, shows that employed persons with disabilities are participating in the 24-hour economy to the same extent as are other employed persons. There is little difference in the percentages working fixed days by disability status, except that for women, those with a severe disability are more likely to work fixed days (86.6 percent) than those with no disability (78.5 percent) and those with a less severe disability (77.8 percent). (Given the small population of persons with disabilities, one should be cautious about interpreting the differences in percentages for the three non-day-shift categories.) It thus appears that if there are both factors that encourage and factors that discourage persons with disabilities from working nonstandard hours, they cancel each other out.

*Occupation.* A highly relevant consideration is the different occupational distributions of the employed with and without disabilities, because certain occupations are more likely

to require nonstandard hours of employment than others. As table 3 shows, men without disabilities are more likely than men with disabilities to be in the first four occupational groups listed (with the biggest difference being in the professional specialty category), and men with disabilities concentrate more in other occupational groups. Unfortunately, even with the MEPS, the sample is not large enough to examine the many detailed occupations within these broad groups separately by disability status and gender; such detail would surely make those with and those without disabilities look more different than the broad groupings do.

Among men in the same occupational group, do those with and those without disabilities have the same prevalence of nonday work? Some of the numbers of men with disabilities in certain occupations are small, so one should be cautious in interpreting them, but the findings indicate that occupation is an important control variable in the regressions that follow.

Among women, the occupational distributions by disability status do not differ as much as among men. As table 4 shows, the largest difference is in service occupations: 21.5 percent of those with disabilities are in such occupations, compared with 16.8 percent of those without disabilities, a 4.7-percentage-point difference.

Given that the occupational groupings do not differ very much by disability status for women, does being in a given occupational group mean that women without disabilities will have similar percentages in nonday employment as those with disabilities? As with men, one needs to be cautious in contrasting the percentages because of the small number of employed persons with disabilities relative to those without disabilities. Still, an examination of the larger occupational groups for women reveals little difference in the percentages of

**Table 2.** Work shift status by disability status, Medical Expenditure Panel Survey, 1996

Disability status	Shift status				
	Fixed day	Fixed evening	Fixed night	Rotating	Total
Men:					
No disability .....	77.9	7.9	4.9	9.3	100.0 (4,377)
Less severe disability .....	75.9	8.9	4.3	11.0	100.0 (266)
Severe disability .....	76.4	8.4	8.2	7.0	100.0 (42)
Women:					
No disability .....	78.5	8.4	3.6	9.5	100.0 (3,955)
Less severe disability .....	77.8	7.5	3.8	10.9	100.0 (330)
Severe disability .....	86.6	9.2	.0	4.2	100.0 (53)

NOTE: Percentages are weighted; "totals" column lists unweighted numbers in parentheses.

**Table 3.** Distribution of employed men by occupation, and percentage nonday by occupation, by disability status, Medical Expenditure Panel Survey, 1996

[In percent]

Occupation	Percent distribution		Percent nonday	
	With disability	Without disability	With disability	Without disability
Executive, administrative, and managerial .....	14.1	17.6	11.2	10.7
Professional specialty .....	7.2	13.3	17.4	12.9
Technical and related support .....	2.6	2.8	—	26.2
Sales:				
Supervisors and proprietors, sales .....	3.1	3.7	15.6	25.5
Other sales .....	5.1	6.6	38.1	25.9
Administrative support .....	7.7	6.4	23.7	23.9
Service:				
Janitors and cleaners .....	2.9	1.9	—	49.8
Other service .....	10.9	7.3	62.1	60.7
Agricultural .....	3.8	3.1	5.3	8.8
Precision craft and repair:				
Carpenters .....	2.5	1.5	—	3.0
Other precision craft and repair .....	16.8	17.3	14.0	13.6
Operators, fabricators, and laborers:				
Truckdrivers .....	4.0	4.0	31.5	22.5
Laborers, except construction .....	2.5	1.3	—	31.8
Other operators, fabricators, and laborers .....	17.0	13.1	24.7	31.7
Total .....	100.0	100.0	24.0	22.1
Number of cases (N) .....	308	4,377	308	4,377

NOTE: Percentages are weighted. Dash indicates that base is fewer than 10 cases.

women with and women without disabilities in the executive, administrative, and managerial professions, higher percentages of women with disabilities on nonday shifts in other professional specialties, and higher percentages of women *without* disabilities on nonday shifts in other service jobs and among operators, fabricators, and laborers. These differences again point to the importance of occupation as a control variable.

*Regression analyses.* What would the relationship between disability status and nonday work shifts be if not only differences in occupation, but other job characteristics—for example, the industry a person works in<sup>22</sup> and the hours of paid work—were taken into account? It would also be relevant to control for differences in sociodemographic characteristics—in particular, education, age, race, marital status, and number of children. An additional consideration is whether the respondent receives Social Security or Supplemental Security Income (SSI) benefits, because those with such benefits who are averse to working nonday shifts may be more willing to take a low-paying daytime job even if a better paying evening or night job were available.

Tables 5 and 6 report the odds ratios of working nonday shifts for men and women, respectively, that fall out of logistic

regressions performed on the data. The odds ratios are calculated from the regression coefficients. For categorical variables, a ratio of unity means a likelihood equal to the reference category, a ratio less than unity indicates less likelihood than the reference category, and a ratio greater than unity signifies a greater likelihood than the reference category. Three models are presented. The first is for the total sample, with disability status as an independent variable along with the control variables mentioned. This model addresses the central question of whether employed persons with disabilities differ in their likelihood of working nonday shifts, compared with other employed persons. The second and third models look at employed persons with and without disabilities, respectively, and consider whether the determinants of their nonday employment differ. (In both tables, the reference category for categorical variables is in *italics*.)

Model 1 of table 5 indicates that, among men, there is no significant relationship between disability status and nonday shifts. The control variables show both positive and negative effects, mostly in line with past research.<sup>23</sup> The variables that significantly *increase* the odds of working nonday shifts are being a janitor or holding another service occupation (relative to being in an administrative support occupation), being 18 to 29 years of age (relative to those aged 30 to 39), and

working part time (either less than 20 hours or 20 to 34 hours, compared with 35 or more hours). The variables that significantly *decrease* the odds of nonday employment are (1) being in an executive, administrative, or managerial position, engaging in agriculture, or working in precision craft and repair (relative to being in an administrative support occupation); (2) being in the extractive or transformative industry, producer services, or social services (relative to being in distributive services); (3) being a college graduate (relative to being a high school graduate); and (4) being age 40 or older (relative to being age 30 to 39).

Models 2 and 3 of table 5 indicate that, although disability status is not a significant factor in the prevalence of nonday employment, there are differences in the determinants of employment for those with and those without disabilities. (The dichotomy is used here because of the small number with severe disabilities.) Fewer of the variables are significant for men with disabilities than for those without disabilities. This may be due to the much smaller sample size for men with than without disabilities, making statistical significance more difficult to achieve.

With regard to women, table 6 shows that, as was the case for men, there is no significant relationship between disability status and the odds of working nonday shifts. Also as with men, many of the control variables in Model 1 are significant. For example, many of the occupations—most notably, registered nurses—significantly *increase* the odds of working nonday shifts relative to administrative support occupations; none lower the odds significantly. The variables that show significantly *lower* odds are the extractive and transformative, producer services, and social services industries, relative to distributive services; being 50 years or older, relative to being 30 to 39 years; being married; and working part time (either less than 20 hours or 20 to 34 hours, relative to 35 or more hours). Again, these findings are in line with other research on nonday employment.

The situation is similar for both women and men in a comparison of the regressions for those with and those without disabilities. The significant determinants of nonday shifts are fewer for disabled than nondisabled persons, but this may be due to the small sample size of the former.

**Table 4.** Distribution of employed women by occupation, and percentage nonday by occupation, by disability status, Medical Expenditure Panel Survey, 1996

[In percent]

Occupation	Percent distribution		Percent nonday	
	With disability	Without disability	With disability	Without disability
Executive, administrative, and managerial .....	11.5	15.3	10.1	9.3
Professional specialty:				
Registered nurses .....	2.5	3.0	—	41.0
Other professional specialty .....	13.1	13.3	15.4	10.1
Technical and related support .....	3.3	3.8	10.0	19.1
Sales:				
Supervisors and proprietors, sales .....	3.4	3.0	32.0	33.6
Salesworkers, retail and personal services .....	2.9	2.9	57.8	55.7
Cashiers .....	2.3	2.8	75.4	55.3
Other sales .....	4.6	3.1	18.7	15.2
Administrative support:				
Secretaries .....	4.4	4.6	.0	4.9
General clerks .....	3.1	2.1	.0	9.7
Teachers' aides .....	3.0	1.6	.0	.0
Other administrative support .....	14.1	17.3	28.4	14.5
Service:				
Health aides, except nurses .....	4.0	3.1	39.2	36.0
Janitors and cleaners .....	2.5	1.1	41.9	45.1
Other service .....	15.0	12.6	23.5	35.6
Agricultural .....	.7	.8	—	6.8
Precision craft and repair .....	1.3	2.4	—	26.4
Operators, fabricators, and laborers .....	8.3	7.2	12.0	32.4
Total .....	100.0	100.0	20.9	21.5
Number of cases (N) .....	383	3,955	383	3,955

NOTE: Percentages are weighted. Dash indicates that base is fewer than 10 cases.

**Table 5. Odds ratios of nonday shifts among employed men with different disability status and for selected job and sociodemographic characteristics, Medical Expenditure Panel Survey, 1996**

Independent variable	All (model 1)	Disabled (model 2)	Not disabled (model 3)
<b>Disability status:</b>			
Severe disability .....	0.78	—	—
Less severe disability .....	.92	—	—
<i>No disability</i> .....	1.00	—	—
Social Security or Supplemental Security Income .....	1.24	1.08	1.41
Self-employed .....	1.71	1.30	1.75
<b>Occupation:</b>			
Executive, administrative, and managerial .....	1.61	.96	1.62
Professional specialty .....	.82	1.93	.80
Technical and related support .....	1.32	.60	1.39
Supervisors and proprietors, sales occupations .....	1.18	1.28	1.27
Other sales .....	1.02	1.59	.98
<i>Administrative support</i> .....	1.00	1.00	1.00
Janitors and cleaners .....	<sup>2</sup> 2.65	.39	<sup>3</sup> 3.28
Other service .....	<sup>3</sup> 4.53	<sup>1</sup> 7.51	<sup>3</sup> 4.43
Agricultural occupations .....	<sup>2</sup> .31	.36	<sup>2</sup> .31
Precision craft and repair .....	<sup>3</sup> .49	.57	<sup>2</sup> .49
Truckdrivers .....	.78	1.06	.78
Laborers, except construction .....	1.21	5.72	1.01
Other operators, fabricators, and laborers .....	1.34	1.40	1.37
<b>Industry:</b>			
Extractive or transformative .....	<sup>2</sup> .66	.39	1.70
Producer services .....	<sup>3</sup> .55	1.68	<sup>3</sup> .51
Social services .....	1.73	1.20	.80
Personal services .....	.89	.59	.92
<i>Distributive services</i> .....	1.00	1.00	1.00
<b>Hours of paid work per week:</b>			
Less than 20 hours .....	<sup>3</sup> 2.50	<sup>1</sup> 4.52	<sup>3</sup> 2.35
20–34 hours .....	<sup>3</sup> 2.38	1.15	<sup>3</sup> 2.63
35 or more hours .....	1.00	1.00	1.00
<b>Education:</b>			
Less than 12 years .....	.94	1.30	.90
12 years .....	1.00	1.00	1.00
13–15 years .....	.86	1.23	.84
16 or more years .....	<sup>3</sup> .50	.68	<sup>3</sup> .48
<b>Age:</b>			
18–29 .....	<sup>1</sup> 1.26	1.67	1.24
30–39 .....	1.00	1.00	1.00
40–49 .....	1.80	1.31	1.76
50–59 .....	1.75	1.10	1.70
60 or older .....	2.43	.30	2.43
<b>Race:</b>			
Nonwhite .....	1.16	.95	1.17
<i>White</i> .....	1.00	1.00	1.00
<b>Marital Status:</b>			
Married, spouse present .....	.98	1.54	.92
<i>All others</i> .....	1.00	1.00	1.00
<b>Number of children:</b>			
0 .....	1.00	1.00	1.00
1 .....	.87	.50	.90
2 .....	.94	.37	1.00
3 or more .....	.87	.60	.87
Number of cases ( <i>N</i> ) .....	4,685	308	4,377

<sup>1</sup>  $p < 0.05$ .

<sup>2</sup>  $p < 0.01$ .

<sup>3</sup>  $p < 0.001$ .

NOTE: *N*'s are unweighted. Reference categories are in italics. Dash indicates category not included in regression.

**Table 6.** Odds ratios of nonday shifts among employed women with different disability status and for selected job and sociodemographic characteristics, Medical Expenditure Panel Survey, 1996

Independent Variable	All (model 1)	Disabled (model 2)	Not disabled (model 3)
<b>Disability status:</b>			
Severe disability .....	0.51	—	—
Less severe disability .....	1.15	—	—
<i>No disability</i> .....	<i>1.00</i>		
Social Security or Supplemental Security Income .....	11.13	2.20	1.00
Self-employed .....	.73	.81	1.73
<b>Occupation:</b>			
Executive, administrative, and managerial .....	.90	.68	.91
Registered nurses .....	<sup>8</sup> 8.68	<sup>7</sup> 7.61	<sup>8</sup> 8.66
Other professional specialty .....	1.30	1.70	1.24
Technical and related support .....	<sup>2</sup> 2.21	.99	<sup>2</sup> 2.36
Supervisors and proprietors, sales occupations .....	<sup>2</sup> 2.36	1.53	<sup>2</sup> 2.49
Salesworkers, retail and personal services .....	<sup>3</sup> 3.93	2.69	<sup>3</sup> 4.03
Cashiers .....	<sup>3</sup> 3.87	<sup>7</sup> 7.14	<sup>3</sup> 3.83
Other sales .....	1.15	.74	1.15
<i>Administrative support</i> .....	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
Health aides, except nurses .....	<sup>5</sup> 5.59	<sup>5</sup> 5.54	<sup>5</sup> 5.65
Janitors and cleaners .....	<sup>7</sup> 7.27	<sup>5</sup> 5.03	<sup>7</sup> 7.70
Other service .....	<sup>2</sup> 2.26	1.30	<sup>2</sup> 2.39
All others (agricultural, precision craft and repair, and operators) .....	<sup>2</sup> 2.26	.38	<sup>2</sup> 2.56
<b>Industry:</b>			
Extractive or transformative .....	<sup>2</sup> 2.55	.50	<sup>2</sup> 2.55
Producer services .....	<sup>3</sup> 3.36	<sup>1</sup> 1.25	<sup>3</sup> 3.37
Social services .....	<sup>3</sup> 3.35	<sup>1</sup> 1.24	<sup>3</sup> 3.36
Personal services .....	1.07	.48	1.13
<i>Distributive services</i> .....	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
<b>Hours of paid work per week:</b>			
Less than 20 hours .....	<sup>2</sup> 1.64	1.56	<sup>2</sup> 1.68
20–34 hours .....	<sup>3</sup> 1.65	1.72	<sup>3</sup> 1.65
<i>35 or more hours</i> .....	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
<b>Education:</b>			
Less than 12 years .....	.93	.62	.98
<i>12 years</i> .....	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
13–15 years .....	1.01	1.18	1.01
16 or more years .....	<sup>1</sup> 1.74	.37	.77
<b>Age:</b>			
18–29 .....	<sup>1</sup> 11.32	1.22	<sup>1</sup> 11.31
30–39 .....	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
40–49 .....	.82	.69	.85
50–59 .....	<sup>1</sup> 1.63	.47	<sup>1</sup> 1.67
60 or older .....	<sup>2</sup> 2.43	.37	<sup>1</sup> 1.46
<b>Race:</b>			
Nonwhite .....	1.16	1.28	1.15
<i>White</i> .....	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
<b>Marital Status:</b>			
Married, spouse present .....	<sup>1</sup> 1.75	.86	<sup>2</sup> 1.73
<i>All others</i> .....	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
<b>Number of children:</b>			
0 .....	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
1 .....	<sup>1</sup> 1.69	1.16	<sup>1</sup> 1.68
2 .....	.85	1.96	.82
3 or more .....	1.08	<sup>1</sup> 4.42	.99
Number of cases (N) .....	4,338	383	3,955

<sup>1</sup>  $p < 0.05$ .

<sup>2</sup>  $p < 0.01$ .

<sup>3</sup>  $p < 0.001$ .

NOTE: N's are unweighted. Reference categories are in italics. Dash indicates category not included in regression.

## Work shifts, disability, and hourly wage

According to economic theory, those who work the less desirable late hours will, in general, be paid more than those who work daytime hours, in order to compensate for the nature of their hours, all else (including seniority) being equal. Economic theory notwithstanding, for all wage and salary earners (excluding the self-employed), those who work nonday shifts in fact earn about \$3.00 *less* per hour than those who work day shifts. Table 7 indicates that the median hourly wage for men who work day shifts is \$13.00, compared with \$10.10 for men who work nonday shifts. Table 8 shows that, for women, the hourly wages are \$10.00 and \$7.20, respectively.

Both tables also show a difference in median hourly wage by disability status: men with severe disabilities earn \$4.40 less, and those with less severe disabilities earn \$2.20 less, than those with no disabilities. For women, the differences are smaller (but the wages much lower): \$1.50 and \$0.90, respectively. The lower hourly pay for persons with disabilities is consistent with findings by other researchers and has been attributed to discrimination by employers, as well as lower productivity due to poor health.<sup>24</sup> Some argue that wage discrimination on the basis of disability is aimed more at men than at women, although women experience considerable gender-related discrimination in their wages.<sup>25</sup> At issue here is whether the pay difference by disability status is reduced for both sexes working nonday hours—that is, at generally undesirable times—when it may be especially hard to employ persons and, therefore, less discrimination may be operative.

The findings in tables 7 and 8 indicate that the pay difference by disability status obtains within shifts for men only. Men without disabilities have an hourly wage of about \$2.10 more than men with less severe disabilities, whether the latter work the day or nonday shift, and substantially higher wages than those with severe disabilities. Women without disabilities who work during the day have an hourly wage of \$1.20 more than women with less severe disabilities who work during the day, but \$1.60 *less* than women with severe disabilities, although the latter group's numbers are small. Finally, for women on nonday shifts, the highest hourly wage is earned by those with less severe disabilities (\$8.10), compared with the wages of the other two groups. Again, the number of cases of women with disabilities (either severe or less severe) is small, but it is noteworthy that the expected pattern of highest wages for those with no disability is *not* evident for women.

As regards the distributions of hourly wages, those with disabilities are much more likely than those without disabilities to have hourly wages below or around the minimum wage (\$4.25 in early 1996, raised to \$4.75 on October 1, 1996, and \$5.15 as of September 1, 1997). Consistent with the results for median wages, pay less than \$5.00 an hour is more prevalent among men with disabilities for both day and nonday employment, but among women with disabilities, only for day employment.

*Regression analyses.* Clearly, one has to take into account the possibility that employed persons with disabilities have

**Table 7.** Percent distribution of male wage and salary earners, by hourly wage, according to shift and disability status, Medical Expenditure Panel Survey, 1996

[In percent]

Shift and disability status	Hourly Wage				Weighted median	N
	Total	Below \$5.00	\$5.00 to \$15.00	Above \$15.00		
<b>All shifts:</b>						
Total .....	100.0	4.1	59.5	36.4	\$12.00	4,012
Severe disability .....	100.0	15.9	68.2	15.9	\$7.80	36
Less severe disability .....	100.0	8.7	63.8	27.5	\$10.00	214
No disability .....	100.0	3.6	59.2	37.2	\$12.20	3,762
<b>Day Shift:</b>						
Total .....	100.0	2.7	57.0	40.3	\$13.00	3,024
Severe disability .....	100.0	12.1	69.7	18.2	\$8.00	28
Less severe disability .....	100.0	7.5	60.6	32.0	\$11.00	158
No disability .....	100.0	2.3	56.6	41.1	\$13.10	2,838
<b>Nonday Shift:</b>						
Total .....	100.0	8.4	67.5	24.2	\$10.10	988
Severe disability .....	100.0	27.2	63.6	9.2	\$6.00	8
Less severe disability .....	100.0	11.8	72.3	15.9	\$8.40	56
No disability .....	100.0	7.9	67.2	24.9	\$10.50	924
Number of cases (N) .....	...	182	2,476	1,354	...	4,012

NOTE: Condition codes of -1 (inapplicable) and -8 ("don't know") were coded as missing. Percentage are weighed.

**Table 8.** Percent distribution of female wage and salary earners, by hourly wage, according to shift and disability status, Medical Expenditure Panel Survey, 1996

[In percent]

Shift and disability status	Hourly Wage				Weighted median	N
	Total	Below \$5.00	\$5.00 to \$15.00	Above \$15.00		
All shifts:						
Total .....	100.0	9.2	68.2	22.6	\$9.50	3,969
Severe disability .....	100.0	15.1	52.2	32.7	\$8.00	44
Less severe disability .....	100.0	11.7	68.0	20.3	\$8.60	291
No disability .....	100.0	8.9	68.4	22.7	\$9.50	3,634
Day shift:						
Total .....	100.0	7.1	68.0	24.9	\$10.00	3,088
Severe disability .....	100.0	17.3	45.4	37.4	\$11.70	38
Less severe disability .....	100.0	10.6	68.0	21.3	\$8.90	225
No disability .....	100.0	6.7	68.3	25.0	\$10.10	2,825
Nonday shift:						
Total .....	100.0	16.7	68.9	14.4	\$7.20	881
Severe disability .....	100.0	.0	100.0	.0	\$6.70	6
Less severe disability .....	100.0	15.3	67.9	16.8	\$8.10	66
No disability .....	100.0	16.9	68.8	14.3	\$7.10	809
Number of cases (N) .....	...	385	2,776	818	...	3,969

NOTE: Condition codes of -1 (inapplicable) and -8 ("don't know") were coded as missing. Percentages are weighted.

occupational and industrial distributions different from those of other employed persons and that they are not as likely to be full-time employees (who generally receive higher hourly wages). In addition, as a group, these individuals may have other human-capital differences affecting their wages, such as differences in education, family status, and race. Regressions using the logarithm of earnings as the dependent variable (to reduce the effect of extreme values at both ends) were computed to assess the effect of disability and shift status on hourly wages. These variables were controlled for all employed persons, and the relationship between disability status and hourly wages was examined separately for those working day shifts and those working nonday shifts. The results are presented in tables 9 and 10, with the reference category for categorical variables in italics.

First, table 9 shows that, for men, shift status is not significantly related to hourly wage when the various job and demographic characteristics are controlled for. In other words, the theoretically expected higher wages for working generally undesirable hours do not materialize. Rather, having a disability significantly *reduces* the hourly wage, particularly for those with a severe disability. Further, having a disability (either severe or less severe) depresses wages for those working days, but only those with a severe disability who work nondays see their wages depressed. In other words, that one's employment is during generally undesirable hours may minimize the negative effect that having a disability has on men's wages, provided that the disability is not severe.

Plainly, the control variables are highly relevant for the hourly wages of men. As indicated by the adjusted *R*-squared,

the models explain from 38 percent to 40 percent of the men's total variation in hourly wage.

Table 10 reports the regressions for women. As with men, there is no association between women's shift status and hourly wage, but their disability status is relevant: having a disability—especially a severe one—reduces a woman's wage. However, this is apparently the case only for women who work day shifts. Among women who work nonday shifts, whether they have a disability—severe or less severe—does not affect their hourly wage. Again, there is support for the notion that, in a tight labor market, working undesirable hours can reduce the effect that a disability has on one's wages. The full models for women explain from 35 percent to 37 percent of the total variation in hourly wage.<sup>26</sup>

SO, WHAT CAN BE CONCLUDED FROM THIS FIRST NATIONAL EXAMINATION of the relationship between work shifts and disability status? And what are the implications for future research? The analysis just presented shows that persons with disabilities are participating in the 24-hour economy to the same extent as those without disabilities, even when differences in job and demographic characteristics are controlled for. In the analysis, limitations on physical and social roles were used as the measure of disability, although other measures were explored as well, including the distinction between physical, cognitive, and other limitations. (See note 13.) The results pertaining to shift status were the same, although the small number of cases in some instances restricted their interpretation. Reasons were posed as to why employed persons with disabilities might have higher levels of nonday shifts than employed persons without disabili-

**Table 9. Ordinary-least-square coefficients for regression of logarithm of hourly wages on shift status and selected job and sociodemographic characteristics for male wage and salary earners, Medical Expenditure Panel Survey, 1996**

Independent variable	Coefficient		
	All (model 1)	Day shift (model 2)	Nonday shift (model 3)
Shift status:			
<i>Day shift</i> .....	...	—	—
Nonday shift .....	−0.03	—	—
Disability status:			
Severe disability .....	<sup>3</sup> −.57	<sup>1</sup> −.24	<sup>3</sup> −1.45
Less severe disability .....	<sup>3</sup> −.14	<sup>3</sup> −.16	−.03
<i>No disability</i> .....	...	...	...
Social Security or Supplemental Security Income .....	<sup>3</sup> −.17	<sup>3</sup> −.19	−.14
Occupation:			
Executive, administrative, and managerial .....	<sup>3</sup> .34	<sup>3</sup> .36	<sup>1</sup> .22
Professional specialty .....	<sup>3</sup> .36	<sup>3</sup> .37	<sup>3</sup> .40
Technical and related support .....	<sup>3</sup> .27	<sup>3</sup> .23	<sup>2</sup> .40
Supervisors and proprietors, sales occupations .....	<sup>1</sup> .15	<sup>1</sup> .20	.05
Other sales .....	.06	<sup>1</sup> .16	<sup>1</sup> −.20
<i>Administrative support</i> .....	...	...	...
Janitors and cleaners .....	<sup>1</sup> −.13	−.08	<sup>1</sup> −.23
Other service .....	.04	.09	−.04
Agricultural occupations .....	<sup>1</sup> −.20	<sup>1</sup> −.16	<sup>1</sup> −.49
Precision craft and repair .....	<sup>3</sup> .17	<sup>3</sup> .19	.05
Truckdrivers .....	.07	.07	.06
Laborers, except construction .....	−.01	−.08	.08
Other operators, fabricators, and laborers .....	−.01	−.01	−.06
Industry:			
Extractive or transformative .....	.02	.02	.07
Producer services .....	−.04	−.01	<sup>1</sup> −.17
Social services .....	−.04	−.06	−.00
Personal services .....	<sup>3</sup> −.26	<sup>3</sup> −.19	<sup>3</sup> −.38
<i>Distributive services</i> .....	...	...	...
Hours of paid work per week:			
Less than 20 hours .....	<sup>3</sup> −.32	<sup>3</sup> −.26	<sup>3</sup> −.31
20–34 hours .....	−.25	−.27	<sup>1</sup> −.15
<i>35 or more hours</i> .....	...	...	...
Education:			
Less than 12 years .....	<sup>3</sup> −.18	<sup>3</sup> −.20	<sup>1</sup> −.12
<i>12 years</i> .....	...	...	...
13–15 years .....	<sup>3</sup> .10	<sup>3</sup> .10	.08
16 or more years .....	<sup>3</sup> .32	<sup>3</sup> .33	<sup>3</sup> .28
Age:			
18–29 .....	<sup>3</sup> −.23	<sup>3</sup> −.22	<sup>3</sup> −.24
30–39 .....	...	...	...
40–49 .....	<sup>3</sup> .11	<sup>3</sup> .12	.08
50–59 .....	<sup>2</sup> .10	<sup>2</sup> .11	.06
60 or older .....	.08	<sup>1</sup> .10	−.03
Nonwhite .....	−.03	<sup>1</sup> −.05	.01
Married, spouse present .....	<sup>3</sup> .10	<sup>3</sup> .09	<sup>1</sup> .13
Number of children:			
<i>0</i> .....	...	...	...
1 .....	−.01	−.02	.02
2 .....	.01	−.02	.06
3 or more .....	.00	−.05	<sup>1</sup> .18
Number of cases (N) .....	4,012	3,024	988
Adjusted R-squared .....	.39	.38	.40

<sup>1</sup>  $p < 0.05$ .  
<sup>2</sup>  $p < 0.01$ .  
<sup>3</sup>  $p < 0.001$ .

NOTE: N's are unweighted. Reference categories are in italics. Dash indicates category not included in regression.

**Table 10** Ordinary-least-square coefficients for regression of logarithm of hourly wages on shift status and selected job and sociodemographic characteristics for female wage and salary earners, Medical Expenditure Panel Survey, 1996

Independent variable	Coefficient		
	All (model 1)	Day shift (model 2)	Nonday shift (model 3)
<b>Shift Status:</b>			
<i>Day shift</i> .....	...	—	—
Nonday shift .....	0.00	—	—
<b>Disability Status:</b>			
Severe disability .....	<sup>2</sup> -.25	<sup>1</sup> -.26	-.20
Less severe disability .....	<sup>1</sup> -.07	<sup>1</sup> -.08	-.03
<i>No disability</i> .....	...	...	...
Social Security or Supplemental Security Income .....	<sup>1</sup> -.11	<sup>1</sup> -.09	<sup>1</sup> -.20
<b>Occupation:</b>			
Executive, administrative, and managerial .....	<sup>3</sup> .20	<sup>3</sup> .20	.13
Registered nurses .....	<sup>3</sup> .46	<sup>3</sup> .52	<sup>3</sup> .36
Other professional specialty .....	<sup>3</sup> .23	<sup>3</sup> .25	.05
Technical and related support .....	<sup>2</sup> .16	<sup>1</sup> .15	.18
Supervisors and proprietors, sales occupations .....	-.10	<sup>1</sup> -.17	.03
Sales workers, retail and personal services .....	<sup>3</sup> -.24	<sup>2</sup> -.29	<sup>1</sup> -.20
Cashiers .....	<sup>2</sup> -.20	<sup>1</sup> -.19	<sup>1</sup> -.17
Other sales .....	.01	.03	-.12
<i>Administrative support</i> .....	...	...	...
Health aides, except nurses .....	-.08	-.05	<sup>1</sup> -.20
Janitors and cleaners .....	<sup>1</sup> -.19	-.18	<sup>1</sup> -.31
Other service .....	<sup>3</sup> -.14	<sup>2</sup> -.15	<sup>1</sup> -.13
All others (agricultural, precision craft and repair, and operators) ...	<sup>3</sup> -.14	<sup>3</sup> -.18	-.04
<b>Industry:</b>			
Extractive or transformative .....	.02	.01	.11
Producer services .....	.02	.01	.15
Social services .....	-.04	-.05	.08
Personal services .....	<sup>3</sup> -.26	<sup>3</sup> -.19	<sup>3</sup> -.32
<i>Distributive services</i> .....	...	...	...
<b>Hours of paid work per week:</b>			
Less than 20 hours .....	<sup>3</sup> -.22	<sup>3</sup> -.25	<sup>1</sup> -.14
20–34 hours .....	<sup>3</sup> -.19	<sup>3</sup> -.21	<sup>2</sup> -.14
35 or more hours .....	...	...	...
<b>Education:</b>			
Less than 12 years .....	<sup>3</sup> -.18	<sup>3</sup> -.19	<sup>1</sup> -.14
12 years .....	...	...	...
13–15 years .....	<sup>3</sup> .11	<sup>3</sup> .11	<sup>1</sup> .10
16 or more years .....	<sup>3</sup> .35	<sup>3</sup> .37	<sup>2</sup> .22
<b>Age:</b>			
18–29 .....	<sup>3</sup> -.16	<sup>3</sup> -.15	<sup>3</sup> -.22
30–39 .....	...	...	...
40–49 .....	<sup>3</sup> .09	<sup>3</sup> .12	-.05
50–59 .....	<sup>2</sup> .11	.15	-.01
60 or older .....	<sup>1</sup> .10	.09	.19
Nonwhite .....	-.00	-.01	.01
Married, spouse present .....	<sup>3</sup> .08	<sup>3</sup> .08	<sup>1</sup> .10
<b>Number of children:</b>			
0 .....	...	...	...
1 .....	-.03	-.01	<sup>1</sup> -.12
2 .....	-.04	-.04	-.09
3 or more .....	-.04	-.02	-.12
Number of cases ( <i>N</i> ) .....	3,969	3,088	881
Adjusted <i>R</i> -Squared .....	.37	.35	.36

<sup>1</sup> *p* < 0.05.  
<sup>2</sup> *p* < 0.01.  
<sup>3</sup> *p* < 0.001.

NOTE: *N*'s are unweighted. Reference categories are in italics. Dash indicates category not included in regression.

ties, as were reasons as to why the reverse might be true. It appears that however relevant the operative influences may be, they cancel one another out.

The similarity in work schedules between employed persons with disabilities and those without disabilities appears to be very important. It means that more than one-fifth of employed persons with disabilities are working evenings, nights, or on rotating shifts. Despite this widespread incidence, empirical analyses concerning such employment seem to be absent from the disability literature. Yet working late and working on a rotating shift may have a bearing on issues of job placement and retention, raising such questions as “Are persons with disabilities easier to place in jobs requiring nonday or rotating hours than in jobs requiring daytime hours?” “Are persons with disabilities more likely to prefer working with less supervision, which may be more characteristic of night work than daytime work?” and “Do those with disabilities who work nonday shifts find it helpful not having to cope with rush-hour transportation?” In a contrasting vein are questions such as “Are the preceding potential benefits offset by any difficulties persons with disabilities may have in obtaining public transportation at late hours?” and “Might those individuals especially not like being relatively isolated, with fewer coworkers on the job?” Also worthy of investigation are the special problems that juggling work and family may have for those with disabilities who work late or on rotating shifts. It is known, for example, that marriages are highly likely to be unstable when either partner works the night shift.<sup>27</sup> Among disabled persons, this may be a risk with especially complex ramifications. Finally, as previously noted, there are negative physiological, as well as psychological and social, consequences of working late or on a rotating shift, so it is apropos to ask, “Are these consequences intensified for persons with certain disabilities?”

In addition to considering the relationship between work shifts and disability status, the hourly wages of persons with

and persons without disabilities (excluding the self-employed) were examined, as was the relationship between a person’s work shift and his or her wages. The descriptive data show that persons with disabilities—particularly those with severe disabilities—earn substantially lower hourly wages than those without disabilities. This negative relationship obtains in the regression analyses, which control for many relevant job and demographic variables. However, the relationship is contingent upon whether people are employed on day or nonday shifts. Lower wages for disabled persons remains the case for both men and women who work days. But among those who work nondays, wages for less severely disabled men are not significantly different from wages for men without disabilities, and wages for both severely and less severely disabled women are not significantly different from wages for women without disabilities. These findings suggest that, when pay is generally low anyway (as it is for many on nonday shifts) and the labor supply is fairly tight, employers may be more willing to pay persons with disabilities wages similar to the wages of persons without disabilities—particularly if the workers are women (who, on the whole, have lower wages than men) or if they are men with less severe disabilities.

This hypothesis is tentative, given the small numbers of persons with disabilities in the sample used for the analysis just presented. To pursue the issue further, as well as address some of the questions raised, surveys even larger than the MEPS are needed—or else surveys that disproportionately sample persons with disabilities. Indeed, the study of work shifts among employed Americans needs more attention in general, given the widespread prevalence of nonstandard hours of employment. Moreover, because, as the foregoing analysis has shown, persons with disabilities are working nonstandard hours to the same extent as other employed persons are, special attention must be given to that important—and growing—segment of the labor force. □

## Notes

ACKNOWLEDGMENT: This research was supported by a grant from the National Science Foundation. The authors gratefully acknowledge the research assistance of Lekha Subaiya, funded by a traineeship from the William and Flora Hewlett Foundation.

<sup>1</sup> Harriet B. Presser, “Toward a 24-Hour Economy,” *Science*, June 11, 1999, pp. 1778–79.

<sup>2</sup> Harriet B. Presser, “Job, Family, and Gender: Determinants of Nonstandard Work Schedules among Employed Americans in 1991,” *Demography*, November 1995, pp. 577–98.

<sup>3</sup> See, for example, *Biological Rhythms: Implications for the Worker*, OTA-BA-463 (Office of Technology Assessment, 1991); and Harriet B. Presser, “Nonstandard Work Schedules and Marital Instability,” *Journal of Marriage and the Family*, February 2000, pp. 93–110.

<sup>4</sup> Peter Kostiuk, “Compensating Differentials for Shift Work,” *Journal of Political Economy*, October 1990, pp. 1054–75.

<sup>5</sup> David Braddock and Lynn Bachelder, *The Glass Ceiling and Persons with Disabilities*, Public Policy Monograph Series No. 56 (Chicago: Institute on Disability and Human Development, 1994); and William G. Johnson and James Lambrinos, “Wage Discrimination against Handicapped Men and Women,” *Journal of Human Resources*, spring 1985, pp. 264–77.

<sup>6</sup> Further details on the sample design of the 1996 MEPS Household Component are available in J. Cohen, “Design and Methods of the Medical Expenditure Panel Survey Household Component,” *MEPS Monthly Report No. 1*, AHCPR Pub. No. 97-0026 (Rockville, MD, Agency for Health Care Policy and Research, 1997), and “Sample Design of the 1996 Medical Expenditure Panel Survey Household Component,” *MEPS*

*Monthly Report No. 2*, AHCPH Pub. No. 97-0027 (Rockville, MD, Agency for Health Care Policy and Research, 1997).

<sup>7</sup> This is the sample size for the regressions on nonday workers, including the self-employed. The sample is further reduced to 4,012 men and 3,969 women for the regression analyses of hourly wages of wage and salary workers only (and is limited to those with data on wages).

<sup>8</sup> Barbara Reskin and Patricia A. Roos, *Job Queues, Gender Queues* (Philadelphia, Temple University Press, 1990).

<sup>9</sup> Presser, "Toward a 24-Hour Economy." See also Thomas M. Beers, "Flexible schedules and shift work: replacing the '9 to 5' workday?" *Monthly Labor Review*, June 2000, pp. 33-40.

<sup>10</sup> S. Z. Nagi, "Some Conceptual Issues in Disability and Rehabilitation," in M. B. Sussman (ed.), *Sociology and Rehabilitation* (Washington, DC, American Sociological Association, 1965).

<sup>11</sup> E. N. Brandt and A. M. Pope, *Enabling America: Assessing the Role of Rehabilitation Science and Engineering* (Washington, DC, National Academy Press, 1997).

<sup>12</sup> Activities of daily living were identified by a question asking, "Does [person] receive help or supervision with personal care such as bathing, dressing, or getting around the house because of an impairment or a physical or mental health problem?" Instrumental activities of daily living were identified by a question asking, "Does [person] receive help or supervision using the telephone, paying bills, taking medications, preparing light meals, doing laundry, or going shopping because of an impairment or a physical or mental health problem?"

<sup>13</sup> Note that, because the sample is limited to those who are employed, questions about work limitations or housework serve to identify only *employed* persons who experience limitations in those roles. The question does not identify those who cannot work and who have the stated limitations.

<sup>14</sup> One question in the MEPS data asks specifically about social roles: "Is anyone in the family limited in participating in social, recreational, or family activities because of an impairment or a physical or mental health problem?"

<sup>15</sup> All large national surveys used in this article are limited by whether the respondent him- or herself answers the questions or whether a family member does so. The surveys also are limited by whether the respondent understands the questions posed and is truthful in responding to them. These limitations account for some of the differences that arise in various surveys' estimates of the size of the disabled population in the United States.

<sup>16</sup> See note 12.

<sup>17</sup> A survey question about work and housework limitations asked, "Is anyone in the family limited in any way in the ability to work at a job, do housework, or go to school because of an impairment [or a] physical or mental health problem?" Another question, which identified other social role limitations, asked, "Is anyone in the family limited in participation in social, recreational, or family activities because of an impairment or a physical or mental health problem?"

<sup>18</sup> John N. McNeil, *Americans with Disabilities: 1991-92, Data from the Survey of Income and Program Participation*, Current Population Reports, P70-33 (U.S. Bureau of the Census, 1993).

<sup>19</sup> Two other measures were developed to differentiate limitations that were caused by physical, as opposed to cognitive, impairments and

to differentiate limitations in major activities such as work and housework from those in social activities other than work. In the first instance, a variable was created to identify persons with limitations in physical functioning, such as walking, standing, climbing steps, bending or stooping, and using one's arms and hands, or cognitive functioning, such as experiencing memory loss or confusion, being unable to make decisions, and needing supervision in order to ensure one's safety. The variable consists of four categories: persons with physical limitations only, persons with cognitive limitations only, persons with both cognitive and physical limitations, and persons with neither cognitive nor physical limitations. The second variable was created to measure limitations in role functioning and also consists of four categories, this time identifying persons who are limited in their work or housework role only, those who are limited only in their social roles in the family and community, persons who are limited in both roles, and persons with no limitations in their work or social roles. Both measures showed no significant relationship to a worker's shift, and thus these findings are not presented in this article. None of the measures specifically included persons with mental illness, unless they were captured by one or more of the physical, cognitive, social, or work limitation measures.

<sup>20</sup> Estimates of the percentage of all Americans with a disability in 1997 range from 13 percent to 20 percent, depending on the definition of *disability*. (See Glenn T. Fujiura, "Emerging Trends in Disability," *Population Today*, August-September 2001, pp. 9-10.

<sup>21</sup> Edward Yelin, *Disability and the Displaced Worker* (New Brunswick, NJ, Rutgers University Press, 1992).

<sup>22</sup> Industry codes are based on the six major categories derived by J. Singlemann and M. Tienda, "The Process of Occupational Change in a Service Society: The Case of the United States, 1960-1980," in B. Roberts, R. Finnegan, and D. Gallie (eds.), *New Approaches to Economic Life* (Manchester, U.K., Manchester University Press, 1985). Note that, in the analysis that follows, because the extractive industry is small, it is combined with the transformative industry.

<sup>23</sup> Presser, "Job, Family, and Gender."

<sup>24</sup> See Marjorie L. Baldwin and William G. Johnson, "Labor Market Discrimination against Men with Disabilities in the Year of the ADA," *Southern Economic Journal*, January 2000, pp. 548-66; and Thomas DeLeire, "Changes in Wage Discrimination against People with Disabilities," *Journal of Human Resources*, winter 2001, pp. 144-58.

<sup>25</sup> Marjorie L. Baldwin and William G. Johnson, "Labor Market Discrimination against Women with Disabilities," *Industrial Relations*, October 1995, pp. 555-77. The body of research arguing for this view also has shown that functional limitations affect the employment of disabled persons more than their wages do. See Richard V. Burkhauser and Mary C. Daly, "Employment and Economic Well-Being Following the Onset of Disability," in J. L. Mashaw, V. Reno, R. V. Burkhauser, and M. Berkowitz (eds.), *Disability, Work and Cash Benefits* (Kalamazoo, MI, W. E. Upjohn Institute for Employment Research, 1996), for a longitudinal perspective on the onset of disability in relation to employment.

<sup>26</sup> The regressions on hourly wages also were computed excluding Social Security or Supplemental Social Insurance income and hours of work, given the debate in the economics literature as to whether these are appropriate control variables in assessing wages. The significant relationships between disability status and hourly wages obtained for both men and women.

<sup>27</sup> Presser, "Nonstandard Work Schedules."