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# 10      Income, Inequality, and Uncertainty: Differences between the Disabled and Nondisabled

Robert H. Haveman  
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It is no surprise that disabled individuals of working age fare poorly in the labor market relative to individuals without impairments. The earnings of the disabled will tend to be lower not only because of their impairments, but also because, as a group, they tend to have a higher incidence of older people, minorities, and those with low levels of education. Individuals with long-standing impairments may also receive smaller amounts of non-earned income, due to relatively constrained opportunities for asset accumulation. While average income levels of the disabled are likely to be below those of the nondisabled population, it is not known whether the variation in expected income within the groups at a point in time and in actual income over time will be greater for the disabled than the nondisabled.

To the extent that the health status of the disabled is likely to fluctuate over time more than that of the nondisabled, there is reason to believe that the level of intertemporal variation in the income of a disabled person will exceed that of a nondisabled person with the same nonhealth personal characteristics. Moreover, the effect of disability—i.e., deviations from an unimpaired state of physical and mental health—on earnings capacity

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would seem to be highly variable, depending on the nature of specific job skills and the effect of impairments on them. Some people with severe impairments (e.g., Itzak Perlman) seem to experience little if any loss of earnings capacity; others who share a particular physical or mental problem (and identical other relevant characteristics) seem to be unable to work at all. Still further, there is evidence of substantial variability in the attitudes toward and response to the disabled by potential employers. The economic discrimination faced by the disabled is not of a radically different sort than that facing racial and sexual minorities; conversely, some with physical and mental impairments are favored in the labor market precisely because of their handicap. On the other hand, given the truncation of earned income at zero, the lower mean income of the disabled might suggest a concomitant lower variation about that mean.

Interpreting the degree of variation in the income of an individual over time or in the incomes of a group of individuals at a point in time is not straightforward. Some of the variation may reflect uncertainty facing an individual. On the other hand, much of it might simply reflect inequality in outcomes among people. Indicators of both uncertainty and inequality are of interest. Because the bearing of uncertainty entails real economic losses, differences in the uncertainty facing disabled relative to nondisabled individuals is relevant to appraising the differences in economic status between the two groups. Similarly, public decision-makers may well respond if the level of income inequality among a fairly homogeneous group of the disabled (and, hence, the level of relative income poverty) is substantially greater than that for a similarly defined group of the nondisabled.

Our focus in this chapter is on the differences between the disabled and nondisabled populations both in expected income and the variation in income. We take two approaches to investigating these differences. In section 10.1 we employ longitudinal data and investigate how the *mean income* of the disabled and nondisabled groups in a particular age cohort differs through time. We also analyze the extent of *inequality in incomes* between the two groups over time. Finally, we decompose the variation in income, defining uncertainty to be the variation in income remaining after accounting for differences between individuals in relevant permanent characteristics. We then compare the average level of *uncertainty in income* faced by individuals in the disabled group through time relative to that faced by the nondisabled. Two income definitions are employed—pretax, pretransfer income (PTY) and posttax, posttransfer (or disposable) income (DY)—so that the differential effects of the tax and cash transfer systems on income levels, income inequality, and income uncertainty in the two groups can be investigated. In section 10.2 a cross-sectional analysis is presented for both 1968 and 1980. For each of these years, the differences between the two groups in mean incomes, income

inequality, and income uncertainty are again investigated. Again, two income measures are employed—PTY and DY. Section 10.3 concludes.

### **10.1 Mean Income, Income Inequality, and Income Uncertainty Differences between the Disabled and Nondisabled, 1969–81**

In this section we ask the following questions: How does a single age-cohort of individuals—some of whom are disabled and others nondisabled at a point in time—fare over time? As the cohort reaches retirement age, do the differences in income expectations between the disabled and nondisabled narrow? Is the inequality in income among individuals who are disabled greater than that for the nondisabled, and does the disparity in inequality increase or decrease over time? Does a disparity in uncertainty of income exist between the two groups, and does that disparity decrease through time (reflecting the growth of public transfer programs) or increase (because of unequal access to private pensions and previously accumulated assets)?

#### **10.1.1 Data and Definitions**

To answer these questions we constructed a longitudinal cohort sample from the Michigan Panel Study of Income Dynamics. Men fifty-one to sixty-two years of age as of 1969 were identified and followed for thirteen years—to 1981.<sup>1</sup> In the early years of the analysis, this sample is of working age; by the end of the period its members are of retirement (or early retirement) age. In 1981, the age of the sample ranges from sixty-two to seventy-three years. We begin with 515 persons in 1974 and track all of those who remain in the sample over the thirteen-year period. Individuals entering the sample after 1974 are not included. Persons leave the sample after 1974 because of death, geographic mobility without a forwarding address, or institutionalization along with incapacity to answer survey-type questions. In 1981, 367 of the 515 remain in the sample.

The base population is classified as either disabled or nondisabled in 1974. Those included in the disabled group either report they are disabled in each of three years prior to 1974, or report they are severely disabled in two or more of these years. All of the disability measures are self-report measures.<sup>2</sup>

1. Owing to the need to track specific individuals in the sample and to the identification system used for each year, the earliest date from which we could follow individuals was 1974. The two groups are identified in this base year and then followed backward to 1969 and forward to 1981.

2. The survey questions on which the disabled-nondisabled designation is based are: "Do you have a physical or nervous condition that limits the type of work, or the amount of work you can do?" (Asked in all years.) "Does your health limit the work you can do around the house?" (Asked in three years.)

**Table 10.1** Mean (Standard Deviation) of Demographic and Socioeconomic Variables for Male Cohort, 1969, 1974, and 1981

	Disabled		Nondisabled	
<i>1969</i>				
Number	112		403	
Age	56.4	(3.19)	55.1	(3.69)
No. of adults in household	2.15	(0.70)	2.43	(0.94)
Education	8.5	(10.2)	9.7	(7.42)
Nonwhite	.36	(0.48)	.31	(0.46)
Spouse present	.86	(0.35)	.90	(0.30)
<i>1974</i>				
Number	112		403	
Age	61.2	(3.83)	60.2	(3.59)
No. of adults in household	2.13	(0.70)	2.34	(0.85)
Education	8.5	(10.2)	9.7	(7.42)
Nonwhite	.35	(0.48)	.31	(0.46)
Spouse present	.80	(0.40)	.89	(0.31)
<i>1981</i>				
Number	61		306	
Age	68.0	(3.77)	67.1	(3.39)
No. of adults in household	2.18	(0.81)	2.17	(0.73)
Education	9.1	(12.59)	10.1	(6.42)
Nonwhite	.38	(0.49)	.29	(0.45)
Spouse present	.84	(0.37)	.86	(0.34)

Note: Ages in cohort were fifty-one to sixty-two as of 1969.

Of the initial 1974 sample, 112 (22 percent) are tagged as disabled, 403 (78 percent) as nondisabled. Forty-five percent of the disabled group and 24 percent of the nondisabled group dropped out of the sample from 1974 to 1981. The higher dropout rate of the disabled may reflect higher mortality (in part associated with higher average age), more institutionalization, or greater geographic mobility (to the South and Southwest, for example) than among the nondisabled.

Table 10.1 reports the mean and standard deviation of certain demographic and socioeconomic characteristics of the two groups as of 1969, 1974, and 1981.<sup>3</sup> These data indicate that the groups became more alike over the time period analyzed in terms of age and number of adults in the household—two factors that might influence the income measures used below. The difference in age is statistically significant in each of the years; from 1975 on, the difference in the number of adults is not significant. The samples also differ by at least one year of education—a difference likely to be associated with income differences.

3. Even though the sample is the same, the mean and standard deviation of age may differ between 1969 and 1974 because respondents were interviewed in different months of the year.

**Table 10.2** Average Weighted Income of Disabled and Nondisabled, 1969–81 (in 1967 dollars)

	Pretax Pretransfer Income			Disposable Income		
	Disabled (1)	Nondisabled (2)	÷ (2)	Disabled (4)	Nondisabled (5)	÷ (5)
1969	\$6,514	\$11,397	.572	\$6,285	\$10,020	.627
1970	5,824	11,443	.509	5,917	10,043	.589
1971	6,155	11,442	.538	6,252	10,190	.614
1972	6,642	11,593	.573	6,773	10,506	.643
1973	6,025	11,270	.535	6,415	10,361	.619
1974	4,753	10,337	.460	5,939	9,651	.615
1975	4,644	9,242	.502	5,542	9,121	.608
1976	4,104	8,524	.481	5,573	9,000	.619
1977	4,169	8,029	.523	5,287	8,837	.598
1978	3,236	7,358	.440	5,722	8,359	.685
1980	3,809	5,417	.703	5,916	7,343	.806
1981	3,083	4,967	.620	5,326	7,294	.730

*Note:* 1979 is not included due to missing information on the available PSID tape.

### 10.1.2 Income Status of Older Disabled and Nondisabled Cohorts over Time

Table 10.2 indicates that, throughout the period, the PTY of the disabled members of the cohort is substantially below that of the nondisabled. In all but one year prior to 1980 (when nearly everyone is retired), the expected PTY of the disabled is less than 58 percent of that of the nondisabled and averages about 50 percent. Those classified as disabled have somewhat higher relative income in 1969 (when some of the group may not yet be disabled), but then face generally declining PTY through the rest of the years studied, both absolutely and relative to the nondisabled. Their relative position improves somewhat in the post-1979 period, when the mean PTY of the disabled rises to about 65 percent of that of the nondisabled. This change, however, is due largely to a relative deterioration in the PTY position of the nondisabled as retirement occurs. In constant dollars, the expected PTY of the disabled generally declines as they become older; that of the nondisabled is relatively stable through 1973, and then declines steadily through 1981, but at an accelerating rate after 1979.

Table 10.2 also shows the mean posttax, posttransfer (or disposable) income (DY) of the two groups from 1969–81.<sup>4</sup> The mean DY of the disabled is greater than their PTY in all of the years except 1969, and a ratio between the two measures rises steadily through time. Average DY of the

4. In the PSID data, both transfer income and federal income taxes for the family unit are reported in the survey instrument.

disabled group is relatively stable over the entire period, in contrast to that of the nondisabled group. For the nondisabled, mean DY is below mean PTY through 1974, when some of the cohort reaches retirement age. Beyond 1975, and especially in the retirement years after 1979, the mean DY of the nondisabled is above their PTY. Nevertheless, the mean DY of the nondisabled group is lower during postretirement years than during the preretirement years prior to 1979, as the sum of both public and private pensions does not fully offset the decline in earned income.

As a result of this pattern of changes, the ratio of the expected DY of the disabled to that of the nondisabled is substantially greater than the PTY ratio. The DY ratio ranges from .59 to .64 in the preretirement years, and from .73 to .81 in the years after 1979. The PTY ratio decreases from .57 to .44 in the years prior to 1979 and then increases to .70 and .62 in the postretirement period after 1979.

How, then, do each of the cohorts fare, as they move from preretirement to postretirement ages? In terms of PTY, the disabled face a slow and continuing drop from the early 1970s; the nondisabled maintain their higher average income through 1973 and then face a more severe drop in income than do the disabled, as both cohorts pass into retirement years. This pattern does not exist for DY. In preretirement years, the disabled are helped more by the transfer system than are the nondisabled, and their DY is quite stable over the entire period. As retirement occurs, the nondisabled receive increased pension income, and the two groups become more alike in terms of DY.

The important role of federal taxes and transfers in altering the relative DY position of the disabled and the nondisabled is highlighted in table 10.3. In each of the eleven years after 1969, the continued effect of taxes and transfers increases the DY of the disabled, and by increased amounts with time. In contrast, the net effect of federal taxes and transfers on the nondisabled is negative through 1975, when the cohort is fifty-six to sixty-seven years of age. In subsequent years, the combined effect of taxes and transfers on the nondisabled population is positive and steadily increasing. Only in 1981 is the net effect of taxes plus transfers greater for the nondisabled than for the disabled, and then only slightly. Hence, except for the final year, the joint effect of federal taxes and transfers increases the DY of the disabled relative to that of the nondisabled.

The pattern of transfers alone is shown in the last two columns of table 10.3. It is as expected, and consistent with the joint transfer-tax series in the first two columns: (1) transfers to the disabled group increase over time until 1978, (2) transfers to the disabled exceed those to the nondisabled prior to 1980, (3) after 1979, when most individuals in both groups are over sixty-five, transfers to the nondisabled are greater than those to the disabled, reflecting the higher earnings base of retirement pensions of the nondisabled due to both higher earnings during working age and a longer work history.

**Table 10.3** Average Transfers Received and Taxes Paid, Disabled and Nondisabled, 1969–81 (in 1967 dollars)

	Transfers plus Taxes		Transfers Only	
	Disabled	Nondisabled	Disabled	Nondisabled
1969	\$ -229	\$ -1,377	\$ 803	\$ 280
1970	+93	-1,400	883	304
1971	+97	-1,252	1,157	377
1972	+131	-1,087	1,232	496
1973	+390	-909	1,436	716
1974	+1,186	-686	1,753	908
1975	+898	-121	1,851	1,215
1976	+1,469	+476	2,027	1,735
1977	+1,091	+808	2,570	1,994
1978	+2,486	+1,001	2,849	2,221
1980	+2,107	+1,926	2,634	2,655
1981	+2,243	+2,327	2,726	3,036

*Note:* 1979 is not included due to missing information on the available PSID tape.

### 10.1.3 Income Inequality and Uncertainty before and after Retirement: Disabled and Nondisabled

In addition to differences in the average income status of the disabled and the nondisabled, there are important differences between the two groups in (1) the degree of inequality within the two groups and (2) the uncertainty with regard to income expectations faced by individuals in the two groups. We first discuss the concepts of inequality and uncertainty that we use, and then describe our results on inequality and uncertainty for the two groups.

#### *Income Inequality and Income Uncertainty: Definitions*

Individuals within any group have differences in their permanent characteristics, which will result in differences in their observed incomes. In addition, some individuals in a group may be lucky during some time period; others may be unlucky. Luck also accounts for variations in income. We refer to the total variation in incomes observed for a group as *income inequality*; it reflects the outcome of all of the factors that contribute to income differences among people—differences in permanent characteristics whether observed or not, and luck.

*Uncertainty* in expected income is a more limited concept. It refers to the variation in income that individuals face, given their knowledge about all of their relevant permanent characteristics. It is akin to luck. For example, assume that an individual knows the trend of his or her expected income over time, which trend reflects all of his or her relevant permanent characteristics. This trend could be called the “permanent” income trend. Because all of the individual’s permanent characteristics are built into the



permanent income trend, any remaining variation is stochastic, depending on unexpected changes over time in "permanent" characteristics (e.g., motivation), intertemporal fluctuations in labor market conditions, or simply "luck." Clearly, this remaining variation can be called uncertainty, with no violence done to the term. At any time during the period, the individual may well know the trend value of his or her income, but be quite uncertain regarding whether or not actual income in the next time period will fall above or below that value.

Under certain circumstances, the income inequality within a group and the income uncertainty faced by individuals in the group may closely approximate each other. Consider a particular group, say twenty- to thirty-year-old, white, male, college graduates. The variation in their incomes during a year depicts the prevailing level of income inequality among them. The extent to which that variation is also uncertainty is far less clear. Some of this observed variation may be caused by differences in permanent characteristics among individuals in the group that are not captured by the race, sex, age, and educational characteristics of the group. Differences in such characteristics as tastes for work (motivation), appearance, religion, "connections," or health status will likely account for some of this variation. In addition, transitory labor market vagaries, accidents, or other luck-type variables will also contribute to this variation. Indeed, only if the delineation of the group is very precise and detailed, so that all of the permanent characteristics of the individuals in the group relevant to income are captured by the definition of the group, can observed inequality also be called uncertainty.

Utilizing these definitions, we can measure both the inequality in income within the disabled and nondisabled groups and the level of income uncertainty that individuals in each group face. In the following discussion, the measure of inequality will be based on the deviation of an individual's observed income in a period of time from the mean income of the individuals in the group to which he belongs. If  $Y_{it}^k$  = measured income in year  $t$  of individual  $i$  in group  $k$ ,  $i = 1, N$ , this deviation is equal to

$$R_{it}^k = |Y_{it}^k - \sum_{i=1}^N Y_{it}^k / N|.$$

The magnitude of these deviations among individuals within a group is summarized in the Atkinson index of inequality,  $I = 1 - Y_E / Y_M$ , where  $Y_E$  is equally distributed income defined as the level of income that, if received by each of the members of the group, would provide the same level of social welfare as the actual distributions of income. The assumed utility function is additive and takes the form  $U(Y_i) = \alpha + \beta Y_i^{1-\epsilon} - \epsilon(1-\epsilon)^{-1}$ ,  $Y_M$  is observed mean income, and  $\epsilon$ , the degree of aversion to inequality, is set equal to 1.5 (Atkinson 1970). (See Appendix A.)

The summary measure of uncertainty is also based on the variation in individual incomes about some expected value. However, in this case the

deviation used is substantially different from that employed in measuring inequality; it is the difference between an individual's observed income at a point in time from the trend value of the individual's own-income stream for that year. Because this trend value is based on the individual's permanent characteristics related to income, it can be considered to be the individual's own evaluation of his permanent income at a point in time. This trend value for year  $t$ , then, can be expressed as:

$$\bar{Y}_{it}^k = \sum_{i=0}^T Y_{it}^k - \frac{Y_{iT}^k - Y_{i0}^k}{T - 1} (t - T/2),$$

where:  $t = 0, \dots, T$ ,  
and the deviation from the trend value in year  $t$  can be expressed as

$$R_{it}^k = |Y_{it}^k - \bar{Y}_{it}^k|.$$

The measure we will use to compare the uncertainty faced by the disabled and nondisabled groups is also the Atkinson index. In this case we adjust the index by adding the subgroup's matched mean income to the base deviation in order to capture the appropriate uncertainty—uncertainty around the group's expected income. We check it against an alternative measure of uncertainty, relative mean deviation ( $U$ ), where

$$U = \sum_{i=1}^N R_{it}^k / N / \sum_{i=1}^N Y_{it}^k / N = \sum_{i=1}^N R_{it}^k / \sum_{i=1}^N Y_{it}^k .^5$$

*Inequality among the Disabled and Nondisabled before and after Retirement*

Table 10.4 presents the Atkinson measure of income inequality for both PTY and DY for the disabled and nondisabled cohorts over time. Four primary patterns are present in the data: First, irrespective of the income concept used and the year, the disabled group has greater income inequality than does the nondisabled group. The year-specific ratio of the Atkinson index of the disabled group to that of the nondisabled group is greater than one throughout the period, and for both income concepts. Second, the inequality in the distribution of PTY generally increases as the cohort ages, particularly for the nondisabled. For the nondisabled, the PTY inequality index more than doubles during the preretirement period and continues rising after 1979. Indeed, in the post-1975 period, the index is quite similar for the disabled and nondisabled. Third, the tax-transfer sys-

5. We use the relative mean deviation  $\left( \frac{\sum_{i=1}^N R_{it}^k}{\sum_{i=1}^N Y_{it}^k} \right)$  rather than the mean deviation  $\left( \sum_{i=1}^N R_{it}^k \right)$  since a \$1,000 deviation from an expected income of \$10,000 is quite different from a \$1,000 deviation from an expected income of \$50,000. To reflect this difference, a percentage formulation is appropriate.

**Table 10.4** Atkinson Index of Income Inequality, Disabled and Nondisabled, 1969–81

	Pretax Pretransfer Income			Disposable Income		
	Disabled (1)	Nondisabled (2)	(1) ÷ (2)	Disabled (4)	Nondisabled (5)	(4) ÷ (5)
1969	.822	.367	2.24	.467	.275	1.70
1970	.843	.330	2.55	.443	.241	1.84
1971	.865	.390	2.22	.417	.244	1.71
1972	.844	.488	1.73	.387	.251	1.54
1973	.877	.570	1.54	.400	.254	1.57
1974	.853	.625	1.36	.334	.249	1.34
1975	.870	.681	1.28	.343	.285	1.20
1976	.850	.767	1.11	.306	.268	1.14
1977	.843	.783	1.08	.427	.284	1.50
1978	.868	.769	1.13	.360	.264	1.36
1980	.877	.801	1.09	.347	.287	1.21
1981	.865	.813	1.06	.410	.267	1.54

Note: 1979 is not included due to missing information on the available PSID tape. In Atkinson index,  $\epsilon = 1.5$ .

tem contributes significantly to a reduction in inequality for both the disabled and the nondisabled groups over the entire period of analysis. Indeed, for the nondisabled, the tax-transfer system reduces income inequality in the retirement years to a level well below that estimated for PTY in the working years. However, inequality of DY for the disabled continues to be above that of the nondisabled, even though they are the primary recipients of transfers. Thus, the disabled group has more income inequality than does its nondisabled counterpart during the entire twelve-year period, irrespective of the income definition used. Finally, during the early part of the twelve-year period—1969–75—the effect of taxes and transfers is to reduce the relative income inequality between the disabled and the nondisabled; the DY ratio lies below that of the PTY ratio. However, as the nondisabled move into retirement and receive retirement pensions, the pattern is reversed. From 1976 on, the disparity in relative income inequality between the two groups is increased by the tax-transfer system.

#### *Income Uncertainty Facing the Disabled and the Nondisabled before and after Retirement*

Table 10.5 presents the Atkinson index measuring income uncertainty for the disabled and the nondisabled populations for 1969 to 1981. As indicated above, this statistic reflects the average level of uncertainty facing individuals in each of the two groups over the period 1969–81. This evi-

**Table 10.5** Atkinson Index of Income Uncertainty, Disabled and Nondisabled, 1969–81

	Pretax Pretransfer Income			Disposable Income		
	Disabled (1)	Nondisabled (2)	(1) ÷ (2)	Disabled (4)	Nondisabled (5)	(4) ÷ (5)
1969	.489	.272	1.80	.251	.204	1.23
1970	.639	.230	2.78	.287	.177	1.62
1971	.704	.265	2.66	.306	.164	1.87
1972	.586	.356	1.65	.237	.121	1.96
1973	.719	.451	1.59	.294	.131	2.24
1974	.683	.535	1.28	.235	.162	1.45
1975	.732	.614	1.20	.282	.223	1.26
1976	.677	.718	0.94	.247	.197	1.25
1977	.635	.709	0.90	.376	.178	2.11
1978	.691	.645	1.07	.222	.110	2.02
1980	.710	.649	1.09	.258	.244	1.06
1981	.693	.588	1.18	.306	.145	2.11

*Note:* 1979 is not included due to missing information on the available PSID tape. In Atkinson index,  $\epsilon = 1.5$ .

dence on income uncertainty is complementary to that on income inequality. The typical person in the disabled group faced a higher level of income uncertainty than that faced by the typical nondisabled individual throughout the period using DY and, for all but two years, using PTY. For PTY, the level of uncertainty faced by the disabled was about 190 percent of that faced by the nondisabled in the early part of the period (1969 to 1974); in the latter part of the period, the disabled-nondisabled uncertainty ratio fell to about 1.06. Hence, during the postretirement period, the relative levels of uncertainty were about equal between the groups. The intertemporal pattern for DY was quite different from that of PTY. The ratio fluctuates erratically, reaching a high of 2.24 in 1973 and a low of 1.06 in 1980, but is generally above that measured for PTY. Across the years, the average PTY uncertainty ratio is 1.48; for DY the average ratio is 1.68.

The indicator of income inequality for pretax, pretransfer income (table 10.4) shows increased variation for the nondisabled and relatively constant variation for the disabled as the cohort aged. The corresponding uncertainty indicator suggests the same pattern. Indeed, the ratios comparing income inequality and income uncertainty of the disabled to the nondisabled for PTY follow a similar steadily decreasing pattern from 1970 through 1980, with a slight deviation in pattern in 1981. For both groups, the PTY uncertainty is greater than that of DY, providing evidence that taxes and transfers reduce uncertainty within each of the groups.

If, instead of measuring income uncertainty by the Atkinson index, we use the relative mean deviation ( $U$ ), we again find that for most years and for both PTY and DY, the typical person in the disabled group faced greater uncertainty than that faced by the typical nondisabled individual. For PTY, the level of uncertainty faced by the disabled was about 140 percent of that faced by the nondisabled, while for DY the income uncertainty faced by the disabled was about 133 percent of that faced by the nondisabled.

Thus, irrespective of the measure of uncertainty used, the conclusion remains the same: the average disabled person faced greater income uncertainty than the average nondisabled person. For both groups, uncertainty is greater using PTY than DY, indicating that taxes and transfers reduce income uncertainty within both of the groups.

## **10.2 Mean Income, Income Inequality, and Income Uncertainty, 1968–80**

In this section we focus on the entire working-age population at two points in time—1968 and 1980—inquiring into the levels of income, income inequality, and income uncertainty among the disabled and nondisabled in these years and the changes in these indicators over the period. First, we will describe the data bases that we will employ, and define the two population groups, the income concept, and the index of inequality and uncertainty. Second, we will present the tabulations of differences in incomes, inequality, and uncertainty between the disabled and nondisabled, based on these definitions.

### **10.2.1 Data, Definitions, and Concepts**

The data used in this analysis are the microdata of the 1969 and 1981 Current Population Survey (CPS), pertaining to income years 1968 and 1980, respectively. The sample is restricted to households in which both a head and spouse are present; single individuals, with or without dependents, are excluded. The weighted number of households is 42.9 million (48.5 million) in 1968 (1980); 69.3 percent (58.8 percent) of the total. This sample was chosen to enable comparison of income, inequality, and uncertainty levels for living units in which (at least) two adults are potential labor market participants.

A determination of the disability status was made for both the head and the spouse in each household. This determination was made on the basis of individual information in the CPS on (1) participation in programs designed for the disabled, (2) nonwork or limited work due to illness or disability, and (3) wage and occupational characteristics consistent with shel-

**Table 10.6** Composition of the Disabled and Nondisabled Population in 1968 and 1980, by Age, Education, and Race (in percentages)

	1968		1980	
	Nondisabled	Disabled	Nondisabled	Disabled
<i>Age</i>				
18–35	31.3%	16.2%	33.3%	23.1%
36–64	56.9	66.1	52.5	55.3
65 or more	<u>11.8</u>	<u>17.1</u>	<u>14.2</u>	<u>21.6</u>
	100.0	100.0	100.0	100.0
<i>Education</i>				
< 12 years	40.2	55.8	25.1	42.1
12 years	33.0	26.1	36.7	33.0
> 12 years	<u>26.8</u>	<u>18.1</u>	<u>38.2</u>	<u>24.9</u>
	100.0	100.0	100.0	100.0
<i>Race</i>				
White	92.9	90.4	91.7	89.1
Nonwhite	<u>7.1</u>	<u>9.6</u>	<u>8.3</u>	<u>10.9</u>
	100.0	100.0	100.0	100.0

tered workshop employment.<sup>6</sup> For family heads, 11.73 (12.12) percent were classified as disabled in 1968 (1980); 5.08 (8.24) percent of spouses were so classified in 1968 (1980).

On the basis of this classification, four household disability categories were established: (1) neither head nor spouse disabled, (2) head only disabled, (3) spouse only disabled, (4) both head and spouse disabled. In comparisons presented in the following section, group 1 is taken to be the nondisabled population and group 2 is taken to be the disabled population. The sum of the number of weighted households in these two categories is 94.9 (91.8) percent of the total number of weighted head-and-spouse households in 1968 (1980).

The households in the disabled and nondisabled populations were further subdivided into eighteen age, race, and education categories on the basis of the characteristics of the head. These categories and the percent of the weighted sample in each of the groups are shown in table 10.6.

For each of the eighteen disabled and nondisabled population subgroups, a variety of economic status indicators were calculated for both 1968 and 1980. These include: (1) mean pretax, pretransfer income (PTY), (2) mean posttax, posttransfer (disposable) income (DY),<sup>7</sup> (3) the

6. The criteria for classifying an individual as disabled or not are described in Appendix B. See Wolfe 1979 and 1980 for more detail.

7. The tax calculation adjusts for federal income taxes only. It is simulated using tax tables for the appropriate year (1968 or 1980) assuming (1) all families take the standard deduction appropriate for their family size and age of head and spouse, and (2) the minimum deduction is 10 percent.

Atkinson index of inequality (with  $\epsilon = 1.5$ ) of PTY, (4) the Atkinson index of inequality (with  $\epsilon = 1.5$ ) of DY.

The first two of these indicators reflect the resources available to households both before and after the impacts of a portion of the fisc. These indicators for any of the eighteen subgroups of the disabled and nondisabled populations represent the expected value of income for the households in the group. The difference between the first two indicators for any group reflects the impact of those transfers and taxes analyzed here on the mean income of the group. Comparison of this difference in mean income levels between the disabled and nondisabled populations (for any age-education-race category) indicates the effect of these taxes and transfers in reducing the gap between the specific categories of the disabled and nondisabled populations in access to income. This effect of taxes and transfers can also be measured over time for any age-education-race category.

The second two indicators reflect the inequality in income flows both before and after the impacts of transfers and taxes for each of the eighteen categories of the disabled and nondisabled populations. Comparison of the within-group inequality of income can be made among subgroups of the disabled and the nondisabled, and between the disabled and nondisabled with any set of characteristics. Again, comparing the difference in this indicator for PTY and DY for any subgroup shows the effect of taxes and transfers in reducing income inequality for that subgroup, and this comparison can be made between the disabled and the nondisabled, and over time.

### 10.2.2 Income Status of the Disabled and Nondisabled, 1968–80

Table 10.7 presents the calculation of mean PTY for the disabled and nondisabled populations for 1968 and 1980; table 10.8 presents the calculation for DY. Breakdowns by age and education are shown. The breakdown by racial group is discussed in Appendix C.

Comparing the total disabled and nondisabled populations, a wide gap in PTY is observed for both 1968 and 1980.<sup>8</sup> This is shown in table 10.7. While mean real income (in 1968 dollars) rose slightly over this time period for the nondisabled (from \$10,200 to \$10,800), it fell substantially for the disabled (from \$7,500 to \$6,400). As a result, the ratio of PTY between the two groups fell from .74 to .59 over the twelve-year period.

This fall in the mean real PTY of the disabled population is concentrated in the middle-age group (36–64), and within that group especially those with twelve years or more than twelve years of education. For example, those disabled and in the middle-age group with more than a high school education experienced a fall in income from \$13,100 to \$10,400 over the

8. Earlier comparisons of the economic status of disabled and nondisabled households are Lando and Krute 1976 and Wolfe 1979 and 1980.

**Table 10.7** Mean Pretax, Pretransfer Income (PTY) of Disabled and Nondisabled Household Heads (in 1968 dollars)

	Disabled		Nondisabled		Ratio of Disabled to Nondisabled	
	1968	1980	1968	1980	1968	1980
<i>Young head (18-35)</i>						
Schooling:						
< 12 years	\$ 5,512	\$ 5,087	\$ 7,282	\$ 6,537	0.76	0.78
12 years	8,556	7,082	9,004	8,911	0.95	0.79
> 12 years	9,676	8,851	11,006	11,577	0.88	0.76
<i>Middle-age head (36-64)</i>						
Schooling:						
< 12 years	6,718	5,657	9,364	9,383	0.72	0.60
12 years	9,785	7,579	11,804	12,249	0.83	0.62
> 12 years	13,132	10,398	15,953	16,023	0.82	0.65
<i>Older head (65+)</i>						
Schooling:						
< 12 years	2,169	2,006	3,668	3,153	0.59	0.64
12 years	3,614	3,400	5,370	4,876	0.67	0.70
> 12 years	4,559	4,887	9,007	8,376	0.51	0.58
TOTAL	7,514	6,397	10,182	10,752	0.74	0.59

*Note:* Presents disabled and nondisabled household heads, in head-spouse families, by head characteristic.

period. A similar pattern of reductions exists for the disabled in the younger group, although the falloff is not as substantial as for those in the middle-age group.

The pattern of PTY for the nondisabled group shows far less change over the period than for the disabled group. Some decrease in PTY is observed for the young group of nondisabled families with less education. Income for all of the education groups in the middle-age category of nondisabled workers showed some small increase; however, a sizable decrease in real PTY is observed for all education categories among the older group.

As a result of these income changes over the period, the pattern of intertemporal change in the disabled-nondisabled PTY income ratio varies substantially among the groups. For all of the groups with a head younger than sixty-five years of age (except one), the ratio falls substantially over the period. The greatest reductions are for the middle-age group, especially those with the most education (e.g., for the middle-age group with twelve years of education, the fall in the mean PTY ratio is from .83 to .62 over the period).

Table 10.8 presents the same comparisons, but using DY rather than PTY. For both groups, mean DY rose somewhat over the period, with the larger increase experienced by the nondisabled. The ratio of incomes be-



**Table 10.8** Mean Disposable Income (DY) of Disabled and Nondisabled Household Heads (in 1968 dollars)

	Disabled		Nondisabled		Ratio of Disabled to Nondisabled	
	1968	1980	1968	1980	1968	1980
<i>Young head (18-35)</i>						
Schooling:						
< 12 years	\$ 5,403	\$ 5,334	\$ 6,268	\$ 6,033	0.86	0.88
12 years	7,560	7,043	7,589	7,768	1.00	0.91
> 12 years	8,279	8,525	9,082	9,502	0.91	0.90
<i>Middle-age head (36-64)</i>						
Schooling:						
< 12 years	6,673	6,630	7,964	8,342	0.84	0.79
12 years	8,782	8,645	9,886	10,490	0.89	0.82
> 12 years	11,104	10,876	12,967	12,967	0.86	0.84
<i>Older head (65+)</i>						
Schooling:						
< 12 years	3,853	4,909	5,078	5,821	0.76	0.84
12 years	5,152	6,696	6,473	8,010	0.80	0.84
> 12 years	6,334	8,234	9,381	11,503	0.68	0.72
TOTAL	7,231	7,523	8,738	9,581	0.83	0.79

*Note:* Presents disabled and nondisabled household heads, in head-spouse families, by head characteristic.

tween the two groups fell slightly (from .83 to .79), in spite of the rapid growth in disability transfers over this period. By and large, the patterns are similar, although the changes are not as substantial as those observed using PTY.

For both the disabled and nondisabled groups, real DY remained virtually unchanged over the period for both the younger and middle-age groups, irrespective of educational level. For the older group, sizeable increases in mean real DY are recorded for all of the education groups, with the largest increases experienced by the highest education group. For example, for the older group with more than twelve years of education, real mean DY rose from \$6,300 to \$8,200 for the disabled population and from \$9,400 to \$11,500 for the nondisabled. Indeed, mean DY for the older nondisabled group with more than a high school education was the second highest of all of the groups, exceeded only by the middle-age nondisabled group with more than a high school education.

Some deterioration in the disabled-nondisabled DY ratio over the decade of the 1970s is seen for nearly all groups other than the oldest age group, where an increase is recorded for all of the education categories.

By comparing the data in tables 10.7 and 10.8, the changing role of the tax-transfer system can be observed. In 1968 the combination of taxes and

**Table 10.9** Atkinson Inequality Index of Pretax, Pretransfer Income (PTY) of Disabled and Nondisabled Household Heads (in 1968 dollars)

	Disabled		Nondisabled		Ratio of Disabled to Nondisabled	
	1968	1980	1968	1980	1968	1980
<i>Young head (18–35)</i>						
Schooling:						
< 12 years	.631	.666	.227	.452	2.78	1.47
12 years	.246	.561	.154	.243	1.60	2.31
> 12 years	.237	.324	.201	.196	1.18	1.65
<i>Middle-age head (36–64)</i>						
Schooling:						
< 12 years	.715	.746	.300	.373	2.39	2.00
12 years	.537	.682	.210	.263	2.56	2.59
> 12 years	.559	.644	.244	.249	2.29	2.59
<i>Older head (65+)</i>						
Schooling:						
< 12 years	.817	.766	.808	.760	1.01	1.01
12 years	.804	.743	.783	.716	1.03	1.04
> 12 years	.861	.776	.786	.716	1.10	1.08
TOTAL	.759	.751	.487	.515	1.56	1.46

Note: In Atkinson index,  $\epsilon = 1.5$ .

transfers increased the income ratio between the two groups from .74 (PTY) to .83 (DY). In 1980 the tax-transfer system had a substantially larger effect; the PTY ratio of .59 was increased to a DY ratio of .79.<sup>9</sup> In spite of this, the real DY gap between the disabled and nondisabled groups was larger in 1980 than in 1968.

### 10.2.3 Income Inequality between the Disabled and Nondisabled, 1968–80

Table 10.9 presents the calculation of the income inequality indicators based on PTY for each of the subgroups of the disabled and nondisabled populations for 1968 and 1980; Table 9.10 presents the within-group inequality calculations for DY.

Table 10.9 indicates that, irrespective of subgroup, inequality is larger for the disabled population than for the nondisabled. The index of within-group inequality for the entire disabled group was 156 percent of that for the nondisabled in 1968, and only a slightly smaller 146 percent in 1980. The ratio of the disabled-nondisabled indexes is substantially greater for

9. The growth in transfers targeted on the disabled grew rapidly during the decade of the 1970s. From 1965 to 1978, public expenditures (in current dollars) on programs targeted on the disabled grew from \$8 billion to \$82 billion. See Burkhauser and Haveman 1982.

the middle-age group than for either the younger or the older groups, and stands at 2.00 or more for all educational categories for this age group in both of the years. For the older group, the level of within-group inequality of PTY is only slightly larger for the disabled than for the nondisabled groups.

The stability in the disabled-nondisabled PTY inequality index ratio over time, however, disguises the fact that within-group inequality for both disabled and nondisabled groups rose from 1968 to 1980 for nearly all of the subgroups in the younger and middle-age ranges. However, for the group of families whose head is over sixty-five years, the income inequality index based on PTY fell for both the disabled and nondisabled from 1968 to 1980.

Table 10.10 presents the inequality indexes for both groups in 1968 and 1980, but in terms of DY, rather than PTY. All of the indexes are lower for both groups, and in both years, than those recorded for PTY. This is especially true for the disabled groups, irrespective of age, and for the above-sixty-five group of the nondisabled population. For both the disabled and nondisabled groups taken as a whole, the DY indexes are less than one-half the value of those based on PTY. The disabled-nondisabled ratio in 1968 was 1.39 based on DY; it fell to 1.30 by 1980.

**Table 10.10** Atkinson Inequality Index and Disposable Income (DY) of Disabled and Nondisabled Household Heads (in 1968 dollars)

	Disabled		Nondisabled		Ratio of Disabled to Nondisabled	
	1968	1980	1968	1980	1968	1980
<i>Young head (18-35)</i>						
Schooling:						
< 12 years	.341	.309	.197	.264	1.73	1.17
12 years	.127	.219	.130	.165	0.98	1.33
> 12 years	.170	.148	.175	.145	0.97	1.02
<i>Middle-age head (36-64)</i>						
Schooling:						
< 12 years	.293	.305	.223	.202	1.31	1.51
12 years	.264	.240	.152	.150	1.74	1.60
> 12 years	.339	.239	.178	.146	1.90	1.64
<i>Older head (65+)</i>						
Schooling:						
< 12 years	.256	.239	.283	.250	0.90	0.96
12 years	.255	.225	.285	.243	0.89	0.93
> 12 years	.296	.386	.345	.379	0.86	1.02
TOTAL	.327	.288	.235	.221	1.39	1.30

Note: In Atkinson index,  $\epsilon = 1.5$ .

Again, the disabled-nondisabled ratio of the within-group inequality indexes is largest for the middle-age groups, ranging from 1.31 to 1.90 in 1968 and 1.51 to 1.64 in 1980. For the young group, the ratio of the inequality indexes was relatively close to one—ranging from .97 to 1.73 across the educational groups in 1968 and from 1.02 to 1.33 in 1980. The major change from the results on within-group inequality based on PTY occurs in the groups of aged heads. Using DY as the indicator of well-being, the level of inequality for the aged who are disabled is less than that for the aged nondisabled in both of the years. In 1968 the disabled-nondisabled inequality ratio for the older population group ranged from .86 to .90 across the education categories; in 1980, the ratio ranged from .93 to 1.02.

#### 10.2.4 Uncertainty between the Disabled and Nondisabled, 1968–80

The previous section indicated that the disabled with almost any set of age-education-race characteristics tend to experience greater within-group income inequality than do the nondisabled with these same characteristics. Is this information in itself sufficient to claim that the disabled in general, or those in any subgroup, face greater income uncertainty than do their disabled counterparts? As indicated above, if the characteristics used to define a group composed the full set of permanent characteristics relevant to the income determination process, the income inequality within the group and the income uncertainty facing individuals within the group would be equivalent concepts. Somewhat more generally, the measured income inequality of each of two groups can be interpreted as differences in the levels of uncertainty facing individuals in the two groups only if the definition of the groups is sufficiently precise to capture all of the relevant permanent characteristics of the members of the groups. While age, education, race, and sex would appear to be among the most important determinants of income, the existence of other characteristics not captured in the definitions of our groups implies that our measures of income inequality may not, in themselves, be reliable indicators of income uncertainty.

However, this is not to say that the measure of income inequality can give no indication of the relative degrees of uncertainty among groups. Indeed, if for each group the contribution to inequality in incomes of permanent characteristics *not* used to define the groups is a constant proportion of the inequality attributable to *all* of the relevant permanent characteristics in the two groups, the ratio of income inequality between the groups also measures the relative extent of uncertainty facing individuals within the groups.

A crude measure of the extent to which income inequality proxies for income uncertainty can be obtained from calculations based on the longitu-

dinal data analyzed in section 10.1. Using PTY, the ratio of income uncertainty to income inequality<sup>10</sup> in the sample over the twelve-year period is slightly greater for the nondisabled than for the disabled using the Atkinson index, and equal using the relative mean deviation measure of variation.<sup>11</sup> Using the DY concept, the uncertainty-to-inequality ratio is higher for the disabled than for the nondisabled using both measures of variation.<sup>12</sup> For both income concepts, then, the proportion of measured inequality that is attributable to uncertainty appears to be similar for the disabled and for the nondisabled. Hence, irrespective of income concept, the uncertainty of income facing the disabled appears to be substantially greater than that facing the nondisabled. In addition to the fact that those in the disabled population have lower and more unequally distributed incomes than the nondisabled, the disabled also confront greater uncertainty in income flows than do the nondisabled. Indeed, the differences in disposable income inequality between the disabled and nondisabled reported in table 10.10 would appear to understate the differences in income uncertainty faced by these two groups.

### 10.3 Conclusions

Disabled individuals fare worse in terms of PTY than do the nondisabled. The tax and transfer system reduces these differences so that DY of these two groups is less dissimilar than PTY. Nevertheless, the income available to the disabled is less than that available to the nondisabled. Moreover, both PTY and DY are more unequally distributed for the disabled than for the nondisabled, although again the tax and transfer system reduces this inequality of income for both groups.

The uncertainty of income, another aspect of economic well-being, is greater for the disabled than the nondisabled, also suggesting that the disabled are worse off than the nondisabled. The disparity between the disabled and the nondisabled in income uncertainty was found to persist over time for a single age cohort.

10. The uncertainty-to-inequality ratios measure the dispersion of an individual's income from the individual's own expected trend value based on individual observed incomes over the twelve-year period of observation, relative to the dispersion of an individual's income from the mean trend value of all observations in the individual's group. The groups are the disabled and the nondisabled. Using these ratios to implicitly measure differentials in uncertainty between the disabled and the nondisabled rests on two assumptions: (1) the uncertainty-to-inequality ratios measured for the group of older males in the longitudinal data accurately proxy the ratios for all males eighteen years or older (the sample used in the cross-sectional analysis); and (2) the uncertainty-to-inequality ratios of the disabled and nondisabled in the longitudinal data are applicable to the somewhat different definitions of these two groups in the cross-sectional data (see note 13).

11. For the Atkinson and relative mean deviation measures, the uncertainty-inequality ratios were .77 (disabled) versus .80 (nondisabled), and .44 for both, respectively.

12. For the Atkinson and relative mean deviation measures, the uncertainty-inequality ratios were .72 (disabled) versus .65 (nondisabled), and .41 versus .38, respectively.

Over the time period studied in the cross-sectional analysis, the expected income of the disabled deteriorated relative to the nondisabled. The deterioration was substantial using PTY, but was partially offset by the growth of the tax-transfer system. Hence, the deterioration in relative DY (and growth of the absolute dollar difference in DY between the two groups) was small. From 1968 to 1980 the average expected net transfer of income to the disabled increased by approximately \$1,400 (in constant dollars).

Following a single age cohort through time shows a similar picture. Over the 1969–79 preretirement period, the expected PTY of the disabled deteriorated relative to that of the nondisabled. The tax-transfer system made up most of this deterioration, however, as the absolute amount of transfers (and transfers less taxes) to the disabled increased over time until 1979. During the postretirement period after 1979, however, the PTY of the nondisabled group deteriorated substantially owing to the reduction in labor force participation. At this time the transfers received by the nondisabled increased substantially and exceeded those received by the disabled.

For the disabled as well as the nondisabled, both income inequality and uncertainty in PTY increased over the period from 1968 to 1980. The exception is for those in the retirement years. The cross-sectional analysis shows that for older heads, the PTY inequality index declined from 1968 to 1980. For the cohort traced over time, the inequality index for PTY increased over the twelve years studied for the nondisabled but stayed constant for the disabled. The index of PTY uncertainty followed a similar pattern.

Inequality and uncertainty of expected income is reduced by the tax-transfer system. The indexes of inequality in DY are substantially lower than for PTY. In the cross-sectional results, the inequality in the distribution of DY for the disabled is generally greater than that for the nondisabled. The exception is among the sixty-five-or-older age group in both 1968 and 1980. This pattern does not hold in the longitudinal analysis. Here, even in the retirement years, the index of inequality of DY for the disabled is greater than that facing the nondisabled.<sup>13</sup>

Both of these approaches—cross-sectional and longitudinal—suggest that the nondisabled become more like the disabled in terms of PTY as they reach retirement age. This is largely due to a deterioration in the earnings of the nondisabled as they age. In the retirement years, the DY of the

13. This difference may be caused by differences in the definitions of the disabled and nondisabled groups in the two sections of the study. The CPS disabled post-sixty-five group is more homogeneous than that in the analysis based on the Michigan data. All of the CPS disabled older than sixty-five are disabled at each point in time and are part of intact head-spouse families. The longitudinal analysis defines men as disabled as of 1974, but some of them may not be disabled in the later years, and they may or may not be part of an intact family.

two groups also becomes less dissimilar, as both groups become heavily reliant on transfers. Nevertheless, the relative position of the disabled appears to have deteriorated over time in terms of expected income, irrespective of the income concept used.

The implications of these results are important. First, while disability transfer income below that of labor market income is justified on work incentive grounds, the resulting income gap reflects neither the greater income inequality among the disabled nor the greater income uncertainty that they face relative to the nondisabled. Indeed, the income of those relying on transfers is often viewed as “guaranteed.” Our results indicate that the substantial DY gap between the disabled and the nondisabled is compounded by greater inequality within the disabled group and greater uncertainty in income expectations for the disabled. Second, because of the rapid growth of the transfer system, the relative economic status of the disabled is viewed as having improved over time and through time. In fact, it has not. Finally, the greater existing income inequality and uncertainty faced by the disabled relative to the nondisabled should cast doubt upon current policy designed to remove from the rolls current disability recipients through reexamination and application of stricter eligibility standards. Is it sound policy to increase income inequality and income uncertainty for those already disadvantaged in this regard? Would it not be more appropriate to look to reform in the current income support system for the disabled, a reform designed to integrate a set of transfer programs—Social Security Disability Insurance tied to prior earnings for the totally and permanently disabled, earnings-conditioned Supplemental Security Income, workers’ compensation, vocational rehabilitation and training, labor market opportunities, private insurance—that at present may provide adequate incomes to many of the disabled, but allows others to fall through the cracks?

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## Appendix A

### *Calculating the Atkinson Index*

The Atkinson index of inequality is based on a concept of equally distributed income ( $Y_E$ ) and reflects aversion to inequality of income. An additive (strictly concave) concept of social welfare is assumed where each individual's utility equals

$$U(Y_i) = \alpha + \beta Y_i^{(1-\epsilon)} (1-\epsilon)^{-1}.$$

The value of  $\epsilon$  chosen reflects the degree of aversion to inequality.

In this analysis,  $\alpha$  is set equal to 0 and  $\beta$  to 1.  $Y_E$ , the equally distributed income, is calculated by

$$\sum_{i=1}^n U(Y_i) = \sum_{i=1}^n [Y_i^{(1-\epsilon)} (1-\epsilon)^{-1}],$$

$$U(Y) = \frac{\sum_{i=1}^n U(Y_i)}{n}$$

$$Y_E = U(Y)(1-\epsilon)^{\frac{1}{1-\epsilon}}.$$

Thus  $Y_E$  is the level of income that, if received by each of the  $n$  members of society, would provide the same level of social welfare as the actual distribution of income (the  $Y_i$ s).

Then, the Atkinson index is calculated by the following formula:

$$I = 1 - \frac{Y_E}{\bar{Y}}, \text{ where } \bar{Y} \equiv \text{mean of } Y_i \text{ or } \frac{\sum_{i=1}^n Y_i}{n}.$$



## Appendix B

### *Definition of Disabled in Cross-Sectional Analysis*

In the cross-sectional analysis reported here, a broad definition of long-term disability is used. The disabled are defined by three basic categories: program participation, work limitation, and low wage and participation in a sheltered workshop-type occupation. These categories reflect a goal of defining as disabled all those who are disabled in a long-term sense—not just those who are working part time or who are being served by a program for the disabled.

There are a number of programs designed specifically for the disabled. Included are Social Security Disability Insurance (SSDI); Supplemental Security Income (SSI), an income-tested program; railroad disability annuities; workers' compensation; and veterans' benefits.

Except for payments under the Social Security program and railroad retirement, individuals who receive any dollar benefits from one or more of these programs are designated as disabled. The exceptions include those who receive veterans' benefits only and who are veterans and nonstudents. Among Social Security recipients aged twenty to sixty-four, the following distinctions define the disabled: individuals nineteen to sixty-one who are not students, or students twenty-three to sixty-one, or widow(er)s nineteen to fifty-nine who have no dependent children under eighteen. These distinctions are based on program eligibility.

Individuals are also defined as disabled because they do not work or are limited in the amount of work they can perform. Individuals who do not work are so designated for one of the following two reasons: either the main reason they did not work last year is that they were ill or disabled (variable P133 = 1, 1980 CPS tape), or they are classified as unable to work on the employment status recode (variable P12 = 6). The latter variable is the one generally used by the Bureau of Labor Statistics.

Individuals are designated as "limited in amount of work" if personal illness is the reason they usually work less than thirty-five hours. This classification is given to two groups: one that worked some last week, but less than 35 hours, and another that did not work last week (variable P18 = 2 and P19 = 10, or P23 = 2 and P21 = 1). Alternatively, individuals are designated disabled if they work less than fifty weeks and most of the remaining weeks are ill or disabled (P145 = 1). The definitions for 1968 are analogous but the variable numbers differ. In a sense, this attempt to define an eligible population is similar to that used by Projector and Murray (1978), who use the 1971 CPS to attempt to identify those eligible for welfare.

Thus, this approach defines as disabled those who are unable to work or are ill for substantial periods of time, while excluding those who missed work for short periods of time because of short-term, acute illnesses.

Individuals who work in programs designed especially for the disabled are also included in the definition of disability. Many of these may not respond to inquiries directed at work limitations, so an additional definition is used. Individuals whose hourly wage rate is positive but less than \$1.00 are included as disabled if their occupation is one that is included in sheltered workshops. These include services such as nonprivate housecleaning, food, health and personnel, certain laborers, some operatives, and certain sales and clerical workers. A total of 0.04 percent of heads in 1968 and 0.8 percent in 1980 are designated as disabled by this definition.

Using all three factors to define disability, the proportions of disabled are 14.6 percent in 1968 and 15.9 percent in 1980. In Wolfe (1980) this measure of disability is compared to the self-assessment designation used in the 1972 Survey of Disabled Adults (SDA). Using the 1977 CPS and our definition, 13.5 percent of men are defined as disabled; the comparable percentage is 14.0 for the SDA. In other respects, the two surveys (CPS and SDA) show similar disabled population patterns: more disabled in the South than in the other regions, fewer whites disabled than nonwhites, and a greater percentage of disabled among older age groups.

## Appendix C

### *Income and Inequality Comparisons of White and Nonwhite Disabled and Nondisabled Populations, 1968–80*

Table 10.A.1 indicates the changes in DY for white and nonwhite disabled and nondisabled households over the 1968–80 period. Looking first at the disabled groups in 1968, it is clear that black households fared far worse than their white disabled counterparts; black disabled households had but 72 percent of the DY of white disabled households. For the nondisabled population, the comparable 1968 figure was 80 percent. The relative status of nonwhite disabled households improved substantially from 1968 to 1980, however, and in the latter year nonwhite disabled families had 89 percent of the income of their white disabled counterparts. The relative nonwhite gains for the nondisabled population are much smaller—an increase from 80 to 90 percent. From the population subgroup comparison, it appears that the smallest nonwhite-white ratios are for the middle-age, less-educated populations.

This 1968–80 gain in DY for the nonwhite disabled relative to white disabled is due to both the improved relative status of disabled nonwhites in the labor market and the rapid expansion of the transfer system during this period. From 1968 to 1980, the ratio of nonwhite to white PTY for the disabled population increased from .62 to .91. For the same two years, the

**Table 10.A.1** Nonwhite-White Ratio of Mean Disposable Income (DY)  
(in 1968 dollars)

	Disabled		Nondisabled	
	1968	1980	1968	1980
<i>Young head (18-35)</i>				
Schooling:				
< 12 years	.82	—	.86	.87
12 years	—	.97	.87	.99
> 12 years	—	1.07	.98	1.00
<i>Middle-age head (36-64)</i>				
Schooling:				
< 12 years	.80	.88	.80	.91
12 years	.95	.99	.88	.98
> 12 years	—	.97	.92	.91
<i>Older head (65+)</i>				
Schooling:				
< 12 years	.75	.66	.92	.86
12 years	—	—	—	.97
> 12 years	—	—	—	.80
TOTAL	.72	.89	.80	.90

*Note:* Represents disabled and nondisabled household heads, in head-spouse families, by head characteristic.

tax-transfer system raised PTY of black disabled individuals by 11 and 15 percent, respectively (see table 10.A.2). The increased impact of the tax-transfer systems on the white disabled population is even more remarkable. The system actually lowered white disabled PTY by 5 percent in 1968, but raised it by 18 percent in 1980. Thus, over the period, disabled nonwhites improved their labor market performance relative to disabled whites, while the rapidly growing income transfer system appears to have concentrated its increased benefit flows on the white, relative to the nonwhite, disabled population. This comparison raises the conjecture that the transfer system in 1968 targeted benefits on nonwhite relative to white disabled households and that expansion in the system from 1968 to 1980 was

**Table 10.A.2** Percentage Change in Income Due to the Tax-Transfer System  
(in 1968 dollars)

	Disabled		Nondisabled	
	1968	1980	1968	1980
Nonwhites	.11	.15	-.13	-.09
Whites	-.05	.18	-.14	-.11

*Note:* Represents white and nonwhite, disabled and nondisabled household heads in head-spouse families.

**Table 10.A.3 Atkinson Index of Disposable Income Inequality (in 1968 dollars)**

	Disabled		Nondisabled	
	1968	1980	1968	1980
Whites	.319	.280	.230	.215
Nonwhites	.347	.343	.274	.278
Nonwhite-white ratio	1.09	1.23	1.19	1.29

*Note:* Represents white and nonwhite, disabled and nondisabled household heads in head-spouse families. In Atkinson index,  $\epsilon = 1.5$ .

focused on the white disabled population. In both 1968 and 1980 the tax-transfer system decreased the incomes of the nondisabled population—by about 13 percent in 1968 and 9 to 11 percent in 1980. The reduction in the negative impact is again due to the rapid expansion of the transfer system from 1968 to 1980.

The patterns of DY inequality between whites and nonwhites are shown in table 10.A.3. They indicate that, even after the effect of the tax-transfer system, inequality is higher among nonwhite families than among white disabled families in both years. Indeed, from 1968 to 1980 the nonwhite-white ratio for the disabled increased from 1.09 to 1.23. This change is also consistent with the conjecture that the growth in the transfer system from 1968 to 1980 was relatively targeted on the white disabled population. For nondisabled families, a similar nonwhite-white pattern holds with nonwhite, nondisabled families experiencing more inequality in DY than white nondisabled families. The 1968–80 increase in the ratio for nondisabled is not as severe as that for the disabled.

## Comment Dan Usher

1. Suppose for some group of people, the income of the  $i$  person in the  $t$  year is

$$Y_{it} = \bar{Y} + Y_t + Y_i + \eta,$$

where  $\bar{Y}$  is the double mean of all incomes in all years,  $Y_t$  is the average deviation of income in the year  $t$ ,  $Y_i$  is the average deviation of the income of the person  $i$ , and  $\eta$  is a random variable independent of  $i$  and  $t$ . By definition, the means of  $Y_t$  and  $Y_i$  are both zero. What Haveman and Wolfe call inequality would seem to correspond to the average of the variances of the series  $Y_{1t}, Y_{2t}, Y_{3t}, \dots$  for every year  $t$ . What Haveman and Wolfe call uncertainty would seem to correspond to the average of the variances of the

detrended series  $Y_{i1}, Y_{i2}, Y_{i3}, \dots$  for every person  $i$ . Obviously both variances would in general be positive along with the variance of  $\eta$ . It follows that what appears as inequality in a given year may be nothing more than a reflection of uncertainty. Even if all the terms  $Y_i$  were equal to zero, some variation in the series  $Y_{1t}, Y_{2t}, Y_{3t}, \dots$  would still occur. This variation would not be indicative of a fundamental inequality because an above-average income this year would be no predictor that one's income would be above average next year as well. It should be possible to mix the time-series and cross-sectional data so as to yield an unbiased estimate of the variance of  $Y_i$  alone rather than of the sum of  $Y_i$  and  $\eta$ . Similarly it should be possible to construct an Atkinson inequality index that is not biased by the variance of  $\eta$ .

2. It might be interesting to experiment with different values of  $\epsilon$  in the utility function  $U = Y^{1-\epsilon}/(1-\epsilon)$ . A value of  $\epsilon = 1.5$  means that an uncertain income consisting of a 50 percent chance of \$100,000 and a 50 percent chance of \$25,000 has a certainty equivalent of \$44,000. That does not seem too far off the mark, but may be a little low for many people.

3. The great disparity between incomes of disabled and nondisabled among the highly educated may arise because disability destroys human capital acquired before the onset of the disability. Also, for educated and uneducated alike, variation of income among the disabled may reflect variation in the extent of the disability.

4. From the way the data are presented, it is difficult to tell whether the disabled are receiving transfers because they are disabled or because they are poor. Of two people with identical pretax and pretransfer incomes, one disabled and the other not, does the former get the higher posttax and posttransfer income? This question has some bearing on the finding that differences between disabled and nondisabled are closer for posttax and posttransfer income than for pretax and pretransfer income. It would be a simple matter to reconstruct tables to deal with this question, so as to be able to say, for example, that  $x$  cents out of every dollar of transfers to the disabled is because they are poor and  $100 - x$  cents is an additional transfer because they are disabled. It would also be useful to make allowance for transfers in kind.

5. Little discussion takes place in this chapter of the social or political significance of the numbers. In particular, it is questionable whether inequality among the disabled ought to be a consideration of public policy. We are concerned as a society to reduce inequality in total. We are not concerned about inequality among academics, doctors, lawyers, or taxi drivers. Academics may be concerned about inequality among academics, but that is of little interest to anyone else. Similarly with the disabled. Suppose A and B are both disabled, and society has decided that A who is poor is to be assisted in some manner. Should it make any difference to that decision whether B is rich or very rich? Only if one can answer yes to this question is inequality among the disabled important. Nor is it evident

what to make of the data on uncertainty. One might expect the disabled to display considerable year-to-year variation in income because the severity of disabilities changes over time. Should evidence of uncertainty constitute a justification for supporting the disabled more generously than otherwise? Should payment to a disabled person this year take account of whether the disability was less severe last year, or of whether it will become less severe next year?

This brings us to the larger question of how to choose the proper compensation for the disabled. Nothing in the Haveman and Wolfe chapter enlightens us as to whether the transfers to the disabled are too small, too large, or just right. What I would like to see—though it would be unfair to fault Haveman and Wolfe on this account—is a theory, comparable to the theory of optimal progressivity of the income tax, that somehow organizes our perceptions of proper economic policy or enables us to deduce right policy by maximizing a social welfare function subject to constraints. I have no guidance to offer as to how this theory might be designed, and can only express regret that I have nothing but sentiment with which to construct policy on the basis of the numbers in this chapter.

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