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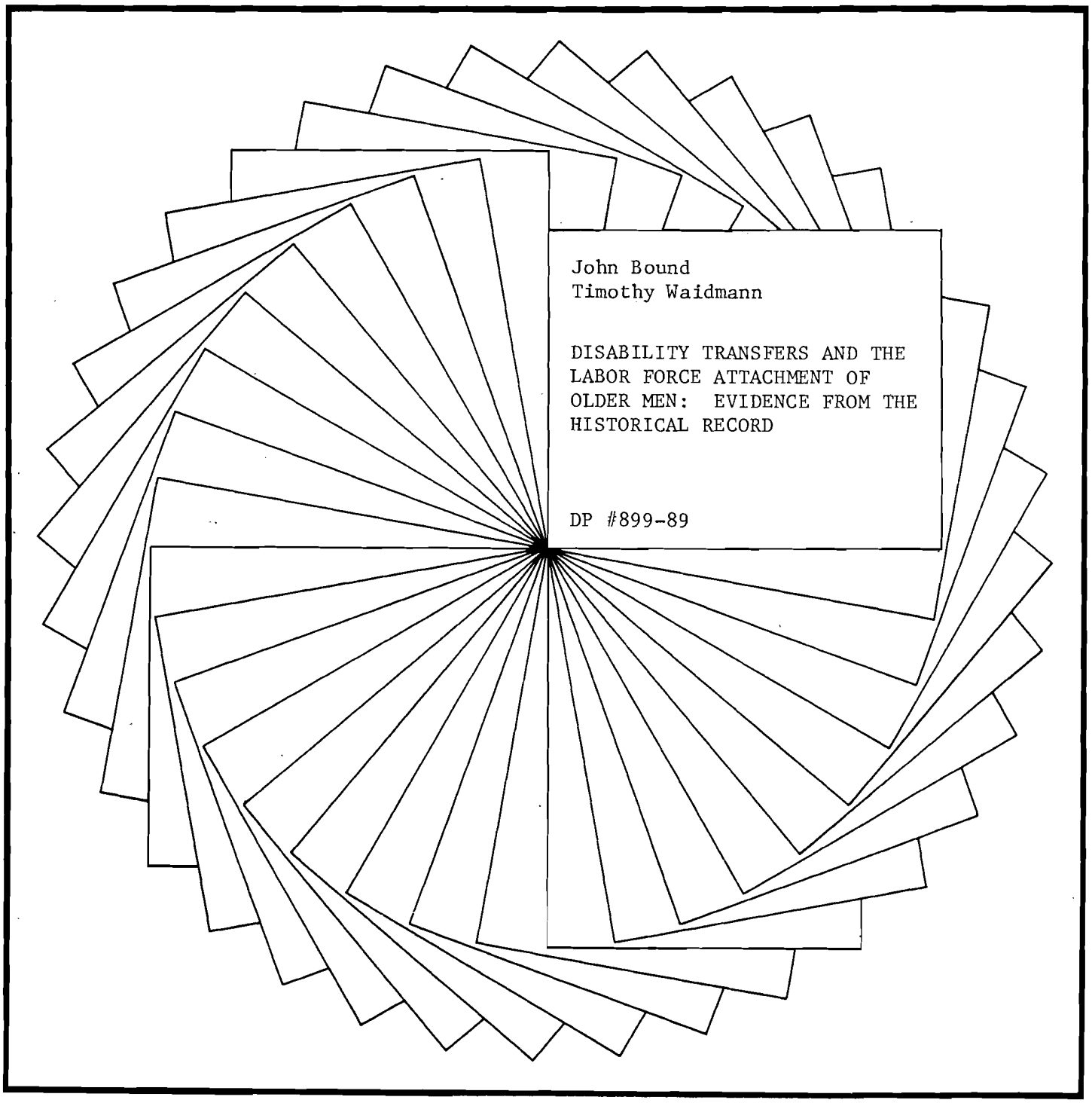

Institute for Research on Poverty
Discussion Paper no. 899-89

Disability Transfers and the Labor Force Attachment of Older Men: Evidence from the Historical Record

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December 1989

The authors wish to thank Alan Garber, Al Hermalin, Alan Krueger, Barbara Wolfe, and participants at seminars at the Poverty Institute and NBER for comments and suggestions, and Lew Oleinick and Tom Maloney for research assistance. This research was supported in part by the University of Michigan and by a grant from the U.S. Department of Health and Human Services to the Institute for Research on Poverty. The opinions and conclusions expressed in this paper are those of the authors and do not necessarily reflect the opinions or policy of the sponsoring institutions.

Abstract

In this paper we use trends in self-reported disability from the late 1940s through the late 1980s to gauge the impact of the growth of income maintenance for the disabled on the labor force attachment of older working-aged men. Under the assumption that the actual health of these men has not changed, we can use the trends in self-reported disability to make inferences about the disincentive effects of disability insurance. Our tabulations suggest that the growth of these programs can explain up to 80 percent of the drop in labor force participation of 45-54 year old men during the 1970s but considerably less (as little as 28 percent) of the larger decline for older groups.

I. INTRODUCTION

An important chapter in the history of social insurance is the dramatic growth, since the end of World War II, in both the availability and generosity of income maintenance targeted at the disabled. The Social Security Disability Insurance (DI) program and the Supplemental Security Insurance (SSI) program originated during this period,[1] while the Workers' Compensation program and the disability programs for public employees expanded dramatically. Of the major programs, only the veterans' disability programs have shown no marked postwar growth. Total expenditures on disability programs as a percentage of GNP doubled between 1950 and 1980 (see Table 1).[2] This growth in expenditures is accompanied by considerable growth in the number of beneficiaries. Table 2 shows, for example, that the number of DI beneficiaries grew from slightly more than a half-million to nearly 4 million between 1960 and 1985. Even more dramatically, Aid to the Permanently and Totally Disabled (which, in 1974, was replaced by Supplemental Security Income) grew from fewer than 200,000 beneficiaries to nearly 2.7 million between 1950 and 1985. In contrast, during the same period the male working-aged (18-64) population grew 61 percent, from 89.6 million to 143.4 million.[3]

While the original proponents of the Social Security System imagined Disability Insurance to be an important part of the system, they initially balked at recommending such a program because they foresaw problems in both the definition and certification of disability. It was not until after the war that such programs emerged.[4] In 1950 Aid to the Permanently and Totally Disabled (APTD), a forerunner of SSI, was

Table 1

Expenditures on Disability Benefits as a Percentage of GNP

	1950	1955	1960	1965	1970	1975	1980	1985
Total Public Expenditures	.87	.83	1.01	1.07	1.19	1.57	1.64	1.50
Selected Programs								
Social Security Disability Insurance	-	-	.11	.22	.30	.53	.57	.46
Public Sector Disability Insurance	.07	.08	.10	.11	.13	.17	.20	.17
Veterans Disability Programs	.58	.49	.49	.53	.39	.35	.32	.27
Workers' Compensation	.13	.13	.15	.15	.16	.20	.27	.32
Aid to the Permanently and Totally Disabled/Supplemental Security Income[a]	.02	.05	.06	.07	.11	.20	.19	.20

Source: U.S. Department of Health and Human Services, SSA, Social Security Bulletin, Annual Statistical Supplement, various years.

[a]Supplemental Security Income replaced Aid to the Permanently and Totally Disabled in 1974.

Table 2

Number of Disability Beneficiaries,
in Millions

	1950	1955	1960	1965	1970	1975	1980	1985
Selected Programs								
Social Security Disability Insurance	-	-	.11	.22	.30	.53	.57	.46
Public Sector Disability Insurance	.07	.08	.10	.11	.13	.17	.20	.17
Veterans Disability Programs	.58	.49	.49	.53	.39	.35	.32	.27
Workers' Compensation	.13	.13	.15	.15	.16	.20	.27	.32
Aid to the Permanently and Totally Disabled/Supplemental Security Income[a]	.02	.05	.06	.07	.11	.20	.19	.20

Source: U.S. Department of Health and Human Services, SSA, Social Security Bulletin, Annual Statistical Supplement, various years, and tabulations based on CPS (see Krueger, 1989 for details).

[a]Supplemental Security Income replaced Aid to the Permanently and Totally Disabled in 1974.

introduced. Disability Insurance began in 1956 as a narrowly targeted program, but in 1960 individuals under the age of 50 were made eligible, and in 1965, the definition of disability was liberalized to allow those without permanent disabilities to qualify for benefits. Benefit levels were increased 20 percent across the board and were indexed for inflation in 1972 while, in the same year, DI beneficiaries were made eligible for Medicare benefits, and SSI was enacted into law. In addition the Burton Commission on Workers' Compensation, the same year, recommended an expansion of the state-run workers' compensation programs.[5]

With the increasing availability and generosity of disability benefits, the number of individuals, and particularly the number of older men, receiving them rose sharply during the 1960s and 1970s. During the same time period, the proportion of older men out of the labor force more than doubled (see Table 3). These parallel trends seem to suggest a causal connection in which the availability of generous disability benefits induces older men to leave the labor force in order to qualify for benefits. The implication would seem to be that many of those receiving disability benefits are perfectly capable of work--that the social costs of Disability Insurance have been high and the target efficiency low.

How many of the individuals now receiving disability benefits would have worked had it not been for the expansion? In this paper we use available historical information on the proportion of older working-aged men (45-64 years old) identified as unable to work to try to answer this question. The basic idea behind the use of the historical record can be explained very simply. If those currently receiving disability benefits

Table 3

Percentage of Men in the Labor Force and on Disability Insurance*

Year	In Labor Force				On Disability Insurance			
	45-54	55-64	55-59	60-64	45-54	55-64	55-59	60-64
1950	96.5	86.9			0.0	0.0		
1955	96.5	87.9			0.0	0.0		
1960	95.7	86.8			0.8	3.5		
1965	95.6	84.6	90.2	78.0	1.8	5.3	4.2	6.7
1970	94.3	83.0	89.5	75.0	2.5	7.1	5.3	9.3
1975	92.1	75.6	84.4	65.7	3.9	10.4	8.0	13.3
1980	91.2	72.1	81.9	61.0	4.2	11.3	8.6	14.1
1985	91.0	68.8	79.6	55.6	4.0	10.5	8.1	13.0

Source: U.S. Department of Health and Human Services, SSA Social Security Bulletin, Annual Statistical Supplement, various years, and U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, various issues.

Note: Percentages are of civilian noninstitutionalized population.

are truly incapable of gainful employment we should expect to find that during the 1950s and 1960s, before the major growth in disability insurance, there was a sizable number of men both reporting themselves disabled and either out of work or not in regular employment. On the other hand, if many of those currently receiving disability benefits are perfectly capable of work we would expect to find many of their counterparts in earlier periods working, and thus, many fewer men reporting themselves disabled and out of work in the period before the expansion of the various disability programs. More specifically, if we assume that the proportion of older, working-aged men who are truly disabled has not changed much over time, we can attribute any rise in the proportion of the population reporting themselves disabled to social and economic factors.

We find that the proportion of men identified as disabled remained approximately constant during the 1950s and 1960s, rose rapidly during the 1970s, and then leveled of in the 1980s. Comparing these trends to trends in labor force participation, we find that since 1970 changes in the proportion of 45-54 year old men identified as disabled closely mirrors changes in the proportion of this age group out of the labor force. For men 55 and above the drop in participation is substantially greater than is the rise in the proportion of men identified as disabled. This evidence suggests to us that a major part of the drop in the labor force participation of 45-54 year old men that occurred during the 1970s can be explained by the growth in the availability and the generosity of transfer income targeted at the disabled.

The next section briefly reviews the development of the literature on disability programs and their effects on labor force attachment.

Section III describes and presents the data available to study the historical record, discussing the usefulness of each source for our purposes. Section IV presents an economic explanation for the observed trends in self-reported health statistics and uses the results to measure the effect of government intervention on labor force attachment. Section V offers alternative explanations of these trends that have been suggested elsewhere in the health literature and determines the extent to which they detract from our story. Finally section VI provides interpretations of our results and conclusions that might be drawn from this research.

II. PREVIOUS LITERATURE

There is now a considerable amount of research on the impact of Disability Insurance on the labor force attachment of older men. The common strategy has been to use regression techniques to compare the labor force participation rates of those with high replacement rates (those whose potential DI benefits would replace a relatively large fraction of their pre-disability earnings) to those with low replacement rates.[6] The difference in the participation rates between these two groups is taken to be an estimate of the impact of DI on participation rates. Research following this kind of strategy has typically concluded that eliminating DI benefits altogether would have a very large impact on participation rates.[7]

This approach is likely to overestimate the impact of DI on labor force attachment. Since replacement rates for DI are decreasing functions of past earnings, it is difficult to determine whether it is

generous replacement rates or low earnings that induce individuals to leave the labor force. This is fundamental, since there are a variety of reasons to expect that those with low earnings would be the ones most likely to leave the labor force regardless of DI. We should, therefore, suspect that the coefficient on the replacement ratio is, at least to some extent, picking up these other effects and thus exaggerating the causal impact of DI itself. Haveman and Wolfe (1984b) try to avoid the endogeneity of the replacement rate by utilizing a procedure that initially predicts disability benefits as a function of exogenous information, and then incorporates these predicted values in the final estimating equations. The potential problem with this strategy is that it is hard to have faith in the legitimacy of the exclusion restrictions required in order to generate instruments.[8]

It has long been established that those reporting themselves to be disabled tend to be poorly educated, to have worked in low-skilled, blue-collar jobs, and to have earned less than average even before the onset of their health problems. Earlier researchers had taken these facts to be an indication that blue-collar workers are both more likely to suffer health limitations and more likely to have those health limitations affect their ability to work. More recent researchers have favored the interpretation that the individuals who have the greatest financial incentives to apply for disability benefits are the ones that do so. The cross-section correlations between self-reported health status, labor force participation rates, and replacement ratios cannot distinguish between the relative merits of these two explanations.

Bound (1989) has drawn attention to more direct evidence which suggests much smaller disincentive effects by considering individuals

who apply for DI but fail to pass the medical screening necessary to qualify for benefits. These rejected applicants form a natural "control" group for the actual beneficiaries. It is expected that rejected applicants are, on average, healthier and more capable of work than those who were accepted, but their labor force behavior should provide an upper bound for what might be expected of beneficiaries were they not receiving benefits. Typically, rejected applicants do not return to regular work. This suggests that, on the whole, DI benefits are going to the seriously disabled and that, as a consequence, DI can account for only a small portion of the postwar decline in the labor force attachment of older men.

While conclusions about the magnitude of disincentive effects differ, a common set of inadequacies plagues much of the existing literature. Most work has focused only on DI, and although DI is the largest of the public disability programs it is far from the only one and accounts for less than 50 percent of all disability-related transfers. More fundamentally, the use of cross-sectional data to study the impact of social insurance programs on labor force attachment over time is problematic. Since at any given time all individuals in a given age group face, more or less, the same set of programs, acceptance rates, and benefit formulae, most variation in benefits is a result of variation in lifetime income.[9] Further, any variation in individuals' *ex ante* acceptance probabilities is due to actual variation in health. If we wish to study the impact of program expansion on labor force attachment, the only way to use variation in program structure as identifying information is to use time-series data.

The historical record on the number of men who identify themselves as disabled before, during, and after the disability transfer system experienced significant growth provides simple but largely unexploited evidence on the impact of these changes on the work force attachment of older working-aged men. The historical record gives us a way to gauge the impact not just of the growth of DI but of all kinds of disability insurance. Baily (1987) attempts such an analysis and in doing so uses more objective measures of health to determine the extent to which the increase in reported incidence of disability is really health-based. In addition, he examines changes in mortality statistics and their potential effect on the size of the disabled population.

While Baily clearly recognizes the limitations of previous research in the area and provides a glimpse of what is available in the historical record, his work leaves some interesting questions unanswered. The present paper attempts to furnish a more careful analysis of the data available. While Baily's study ends in 1980, the disability transfer system and the trends in self-reported disability experienced dramatic change in the early-to-mid 1980s. The data from this period provide important variation in program structure with which we can better identify incentive effects. Second, while Baily measures the increase in disability for 45-64 year old men as a group and considers the period 1960-1980 as a whole, our analysis indicates that this level of aggregation misses important differences across decades and age groups. Combining the sixties and seventies masks the very different trends in program growth and health status between the two decades. More important, we find large differences in the strength of economic incentives for younger and older members of the 45-64 year old

group. Finally, while we make use of the same type of information as Baily, the detail of our analysis allows us to make quantitative rather than qualitative estimates of the disincentives associated with the historical growth of the disability transfer system.

III. THE PREVALENCE OF DISABILITY: DATA SOURCES AND THEIR TRENDS

A variety of historical data sources give information on the disabled. The longest historical record identifying the disabled comes from the National Center for Health Statistics National Health Interview Survey (NHIS). The advantage of the NHIS is that it has been conducted continuously since 1957 (a portion of the sample is interviewed every two weeks). Each year a large number of households representing over 100,000 individuals are surveyed. Respondents are asked both whether any individuals in the household suffer from any of a variety of specific conditions and whether their health limits or prevents them from working.[10] Information is also collected on the labor market activities of household members.[11]

The NHIS does have several drawbacks. The survey instrument was redesigned in 1969 and then again in 1982. This limits our ability to do comparisons that straddle regimes.[12] Within-regime changes in survey administration also have some potential for influencing results. In particular, the National Center for Health Statistics has in recent years been making more of an effort to avoid proxy respondents. To the extent that proxy respondents are less likely to report an individual as disabled than is the person himself, this trend in the use of proxy respondents could account for some of the apparent rise in the number of

individuals identified as disabled in periods between design changes, e.g., 1969-1981.

As a second source of information, the 1970 and the 1980 censuses asked questions of a sample of the population[13] to identify the disabled.[14] For the same samples, the two censuses asked questions about employment, labor force status, and income sources. The censuses have the advantages of very large sample sizes and better income information than the NHIS. At the same time, however, the census contains no other health information, and gives disability information only at two points in time (1970 and 1980). A question similar to that asked in the census was asked in a Current Population Survey (CPS) in 1949 and thus provides a third data point.[15] The only source of this data is a set of tables published in the Social Security Bulletin (Moore and Sanders, 1950), but the information is important for our purposes because it was gathered before APTD, DI, or SSI existed. It is therefore important for before-and-after program comparisons of labor market behavior. However, even using the CPS information to supplement the census gives us only three points of observation.

A third possible source of information on the disabled comes from the three surveys of the disabled done for the Social Security Administration by the Census Bureau. In 1966 the census oversampled DI beneficiaries, rejected applicants, and APTD and Aid to the Blind recipients. In 1972 they oversampled those who had identified themselves as disabled in the 1970 census, and in 1978 they oversampled applicants for DI who had been rejected in 1977, together with beneficiaries whose entitlement had begun within the five years prior to the survey. In each survey respondents were asked whether their health

prevented them from working altogether or limited the kind or amount of work they could do. Of all the sources of information on the disabled, the Social Security surveys contain the most detail. The surveys contain detailed information on the sources of family income, health, and the adjustment that individuals and families have made to the onset of health limitations. At the same time, this information is available at only three distinct points in time, and sample sizes are much smaller than either the census or NHIS.[16] Moreover the differences in the way the three surveys were done raises questions about comparability across years.

Finally, the Current Population Survey also provides information that can be used to identify the disabled. Individuals out of the labor force may be identified as unable to work according to their answer to the question: "What was ... doing most of last week--working, keeping house, going to school or something else?" The CPS interviewer has a checklist from which he assigns a classification to each individual. This list includes "working," "with a job but not at work," "looking for work," "keeping house," "going to school," "unable to work," "retired," and "other." For individuals who did not work in the previous year, the March survey also asks for the reason the individual was not working.[17] Here interviewers have a checklist that includes "Ill or disabled," "taking care of home or family," "going to school," "could not find work," "retired," and "something else." One-fourth of the households, the outgoing rotation, are also asked why those out of the labor force left their last job. Those who are working but who usually work less than 35 hours per week or who have a job but are not working for reason of illness are asked the reason with a possible answer being "illness."

In addition, the CPS information on receipt of transfer income targeted at the disabled can also be used to identify the disabled.

In many ways the CPS provides attractive data with which to do historical analysis. Sample sizes are large--more than 50,000 households (100,000 individuals) are interviewed each month--and microdata are available back to 1962. At the same time, the information that identifies the disabled is indirect and depends not just on an individual's willingness to identify himself as disabled, but also on the interviewer's recoding of this information.[18] As a result, fewer individuals are identified as unable to work in the CPS than are identified in the other surveys mentioned. What is more, trends based on CPS data may reflect changes in interviewer behavior as well as changes in individuals' willingness to identify themselves as disabled.

Tables 4 through 7 illustrate the trends in disability during the postwar period as documented by these four sources of data. Except for the CPS (Table 7), the definitions of disability used by each survey are comparable. This is not surprising given that the SSA and Census survey questions were formulated after the National Health Interview Survey and used the NHIS questions as a model. Thus, all three surveys ask whether the individual is limited in his ability to work because of his health and whether the individual is prevented from working at all. In the tables we present here the "Disabled" answered affirmatively to either of these questions while the "Severely Disabled" answered affirmatively to the latter.[19]

Table 4 presents the NHIS story beginning in 1957. The only information available prior to 1969 is in published form, so that information from the earliest years is only available in two- and three-

Table 4

NHIS Trends in Disability by Age, 1957-1987:
Percentage of Males Unable to Perform Major Activity or
Limited in the Ability to Do So

Year	Severely Disabled				Disabled				N
	45-64	45-54	55-59	60-64	45-64	45-54	55-59	60-64	45-64
1957-58	4.2	-	-	-	16.6	-	-	-	-
1959-61	4.4	-	-	-	14.8	-	-	-	-
1961-63	4.4	-	-	-	15.9	-	-	-	-
1965-66	4.4	-	-	-	15.8	-	-	-	-
1967	-	-	-	-	16.5	-	-	-	-
1968	-	-	-	-	17.3	-	-	-	-
1969	7.2	4.6	8.1	13.6	17.6	13.9	18.9	26.3	12,772
1970	7.4	4.4	8.4	15.0	17.0	12.0	19.5	28.5	11,358
1971	7.6	4.7	8.6	14.7	17.5	13.3	19.0	27.6	13,096
1972	7.6	4.9	8.8	13.6	17.8	13.5	20.0	27.0	13,059
1973	8.6	5.3	8.7	17.7	19.0	14.1	20.4	31.3	11,791
1974	9.4	5.7	10.8	17.6	19.9	14.4	23.4	30.4	11,458
1975	9.4	5.5	11.9	16.9	19.1	13.5	23.5	28.6	11,416
1976	9.9	6.3	11.1	18.0	20.0	14.9	22.6	30.4	11,036
1977	10.7	6.4	11.7	20.4	20.1	13.6	23.0	33.2	10,872
1978	10.1	5.7	11.8	19.1	19.7	14.1	22.0	31.2	10,567
1979	10.8	6.0	12.7	20.2	19.9	14.1	22.4	31.0	10,506
1980	10.9	6.8	12.7	18.9	20.2	14.0	23.1	31.9	9,725
1981	11.5	6.8	13.0	20.2	20.5	14.5	23.3	30.9	10,273
1982	11.7	6.6	13.8	20.6	19.5	13.4	22.7	31.0	9,750
1983	10.9	6.5	12.7	18.6	19.2	13.4	21.4	29.2	9,812
1984	10.8	-	-	-	18.4	-	-	-	-
1985	10.9	6.6	12.9	18.1	18.3	12.4	21.3	28.0	8,260
1986	10.6	6.3	11.8	18.6	18.2	12.5	20.7	28.0	5,578
1987	10.3	6.6	11.0	17.7	17.0	12.3	18.0	26.6	10,929

Source: Data for entire age group 45-64 obtained from tables in NCHS publications. Data for five- and ten-year age groups from authors' tabulations of NHIS microdata tapes.

Notes: "Severely Disabled" refers to those unable to perform major activity, and "Disabled" refers to those limited in the ability to perform or unable to perform major activity. Survey design effects imply that the standard errors on single-year rates are about 20 percent higher than we would expect under simple random sampling.

year aggregations. Further, since National Center for Health Statistics publications are not entirely consistent across years, some cells in Table 4 are blank. Sample sizes for the 45-64 year old group are included where these are available to give the reader a notion of the accuracy of the reported proportions.[20]

What emerges from this survey is an eleven-year period of almost no growth in the prevalence of disability between 1957 and 1968, a period of considerable growth in the early-to-mid seventies, and a period of leveling-off in the late seventies and eighties.[21] The jump that occurs between 1967 and 1969 is most likely a consequence of the change in the survey instrument that was phased in over this period of time. Beginning in 1968, the survey stopped using the "condition approach," where individuals were first asked if they suffered from any of a specific set of conditions, and began using the "person approach," where every respondent was first asked if his health limited his ability to work. In addition, interviewers began asking about the presence of each level of limitation (most serious first) rather than showing the respondent a flash card listing all levels of limitation. Work done at NCHS suggests that these changes increased both the total number of individuals identified as disabled and the fraction of the disabled classified as severely disabled.[22]

Table 5 presents a similar picture of trends in disability using the 1949 CPS and the 1970 and 1980 censuses. The period between 1949 and 1970 witnessed little growth in disability while the 1970-1980 period showed larger growth. This pattern is most pronounced for the youngest age group, indicating that this group might be most sensitive

Table 5

CPS/Census Trends in Disability by Age, 1949-1970 and 1970-1980: Percentage Disabled, by Severity

Year	Severely Disabled			Disabled			N
	45-64	45-54	55-64	45-64	45-54	55-64	45-64
1949	5.7	3.7	8.0				7,000
1970	6.7	4.0	10.0				3,955,950
1970	7.2	4.6	10.5	18.0	14.0	23.1	19,808
1980	10.2	6.0	14.6	18.0	13.1	23.3	21,082

Sources: Moore and Sanders (1950); U.S. Bureau of the Census, Census of Population (1970), Subject Reports, Final Report PC(2)-6c: Persons with Work Disability; and authors' tabulations based on 1970 and 1980 Censuses of Population Public Use Samples.

Note: The 1970 results are reported two ways such that the first gives information comparable to the 1949 CPS and the second gives information comparable to the 1980 Census.

to changes in programs. Prevalence levels are also similar to those obtained from the National Health Interview Survey.

Table 6 also shows substantial growth in the mid-seventies and smaller increases in the late sixties and early seventies. A striking feature of this table is the difference in the overall levels of disability reported by the SSA relative to those reported by NHIS and census surveys. For example, in 1978, the SSA survey reports that 15 percent of the population aged 45-64 is disabled while the NHIS figure is only slightly more than 10 percent (see Table 4). One thing that could account for the differences between the number of men identified as disabled in the Social Security surveys of the disabled as against the National Health Interview Surveys is that, as a household-based survey, the NHIS often uses proxy respondents while the Social Security surveys relied almost exclusively on individuals' responses about themselves. Available data suggest that proxy respondents are less likely to report an individual as disabled (limited in activity) than is the individual himself. For example, in a study done by Mary Kovar and Robert Wright (1973) a sample of interviewees was randomly assigned to two groups. The first (control group) was interviewed using standard interview procedures while in the second (treatment group) every adult capable of responding for himself did so. In the control group, roughly 33 percent of the individuals were reported on by proxies, while in the treatment group this proportion was only 3 percent. Kovar and Wright found that 12.4 percent of individuals in the control group and 13.6 percent of the individuals in the treatment group were identified as disabled.

Table 6

SSA Trends in Disability by Age, 1966-1978.
Percentage Disabled, by Severity

Year	Severely Disabled			Disabled			N
	45-64	45-54	55-64	45-64	45-54	55-64	45-64
1966	9.2	5.3	14.4	28.8	23.2	36.1	2,903
1972	10.8	6.5	16.3	22.0	17.2	28.3	4,817
1978	15.0	9.0	21.8	28.1	21.7	35.4	3,162

Sources: Haber (1968); U.S. Department of Health and Human Services, SSA (1981); Lando, Cutler, and Gamber (1982).

This evidence can be used to give us a rough idea of the magnitude of the difference using self-respondents might make. Roughly two thirds of the control group, as opposed to 95 percent of the experimental group, answered for themselves. A little algebra shows that this is consistent with 13.7 percent of self-respondents as against 9.6 percent of proxies identifying individuals as disabled--a gap of roughly 40 percent. Historically 40 to 50 percent of men have responded for themselves in the National Health Interview Survey. Since the Social Security surveys avoid proxies whenever possible we might expect that they would identify roughly 20 percent more men as disabled. Thus, we might explain about half of the difference between the 1972 NHIS and the 1972 Survey of Disabled and Nondisabled Adults (the SSA survey reports 10.9 percent of 45-64 year old men severely disabled while the NHIS reports 7.6 percent--a difference of 43 percent).

Perhaps a more disturbing difference between the NHIS and the SSA surveys is in the magnitudes of increase in disability prevalence. Between 1972 and 1978, the National Health Interview Survey reports that 2.5 percent more of the population reported themselves as disabled while the SSA reports a 4.2 percentage point increase. What accounts for the discrepancy between the NHIS and census trends and those found in the Social Security surveys? Sample sizes for the relevant population (45-64 year old men) in the Social Security surveys are small--4,817 in 1972 and 3,162 in 1978. The sampling schemes imply that the effective sample size (the one appropriate for calculating standard errors) is much smaller--1,544 in 1972 and 1,066 in 1978.[23] This implies that the standard errors on the proportion of 45-64 year old men who are severely disabled are roughly 0.01, and thus that the 95 percent confidence

interval around the 72-78 change is plus or minus 0.03 (or 3 percentage points). Thus, while the SSA and NHIS surveys show qualitatively different results--4.2 versus 2.5 percent--these differences are not statistically significant.

Finally, Table 7 indicates that the CPS gives a different picture from any of the other surveys. We still observe steep growth in percentage disabled through about 1977, but in the late seventies and eighties, the trend turns downward, with a steady decrease that eliminates all of the growth of the early seventies. In addition to the different trends exhibited, the level of prevalence reported by the CPS is much lower than any of the other surveys. As discussed earlier, since it is up to the interviewer to classify an individual as disabled, it seems likely that the observed difference in the level of disability reported is due to the interviewer's lower propensity, relative to the respondent, to attribute nonwork to health problems. For this reason, the CPS classification "Unable to Work" is not really comparable to the concepts of disability used by the other three surveys.[24]

We concentrate on the National Health Interview Survey both for its continuity and for its detail. Since the phenomena we are studying rely on an individual's propensity to classify himself as disabled, the CPS, while it provides an even more continuous record, is inappropriate. The lack of collection frequency makes the census and the SSA surveys less appealing. While the SSA surveys are rich in detail, the larger sample size of the NHIS and the continuity of the survey make it a better source for our purposes. We are still able to obtain labor force information in addition to health information, and we will be able to

Table 7

CPS Trends in Disability by Age, 1964-1988.
Fraction of Civilian Noninstitutionalized Population Who
Are Out of the Labor Force and Unable to Work

Year	45-64	45-54	55-64	55-59	60-64
1964	.022	.014	.033	.028	.040
1965	.025	.014	.038	.032	.045
1966	.027	.017	.039	.036	.045
1967	.033	.021	.049	.043	.057
1968	.032	.021	.046	.040	.053
1969	.035	.024	.048	.041	.056
1970	.036	.025	.049	.043	.057
1971	.039	.027	.054	.045	.064
1972	.041	.030	.056	.048	.064
1973	.045	.032	.060	.054	.067
1974	.047	.035	.061	.052	.070
1975	.047	.034	.063	.059	.068
1976	.046	.036	.058	.056	.062
1977	.046	.035	.059	.055	.063
1978	.044	.034	.056	.053	.059
1979	.043	.032	.057	.053	.061
1980	.041	.031	.052	.049	.055
1981	.038	.028	.049	.045	.053
1982	.034	.024	.045	.041	.050
1983	.034	.025	.044	.041	.047
1984	.036	.027	.046	.045	.047
1985	.033	.025	.040	.040	.040
1986	.034	.026	.042	.042	.043
1987	.034	.028	.042	.041	.042
1988	.035	.027	.044	.045	.044

Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, various issues.

follow the incidence of specific conditions and their impact on work limitation.

In addition to information on work limitations the NHIS provides information on specific chronic and acute conditions.[25] Research using the NHIS data has found very clear trends both in terms of the specific conditions associated with work limitations and in terms of overall prevalence rates. Colvez and Blanchet (1981) looked at trends in conditions causing limitation using published NHIS data and found that for 45-64 year old men, no cause decreased in prevalence between 1966 and 1974 and five (diabetes, musculoskeletal disorders, heart conditions, hypertension, and other disease of the circulatory system) increased significantly. More recently Verbrugge (1984) looked at prevalence rates and found that, for 45-64 year old men, diabetes, diseases of the heart, hypertension, cerebrovascular diseases, emphysema, hernias and other musculoskeletal conditions all increased in prevalence.

To see whether the rise in the (self-reported) prevalence of specific conditions can account for the rise in disability rates we used the 1972 Survey of the Disabled to estimate a multinomial logit for the probability of being either partially or severely disabled as a function of the presence of any of a list of 38 specific conditions.[26] Multiplying the coefficient on each condition by the change in prevalence of that condition, we obtain a prediction of the change in the log odds of an individual reporting himself unable to work because of a specific condition. The first panel of Table 8 presents these calculations for the period (roughly) 1970-1980.[27] What can be seen from this table is that hypertension and heart conditions can account

Table 8

Actual Change in Log-Odds of Severe Disability and Change Predicted by Selected Conditions

Condition	P^i_{to}	P^i_{t1}	Δ^i	$\hat{\beta}^i$	$\hat{\beta}^i\Delta^i$	Δ	% Predicted
(19??)-(1979-81)							
Heart Conditions(1972)	97.4	131.3	33.9	2.19	0.074	0.405	18.3
Hypertension (1972)	101.3	224.6	123.3	0.64	0.079	0.405	19.5
Emphysema (1970)	22.1	34.6	12.5	2.07	0.026	0.442	5.9
Diabetes (1973)	40.6	54.0	13.4	1.14	0.015	0.267	5.7
Arthritis (1969)	148	201.4	53.4	3.78	0.202	0.462	43.7
Total (approx.)							93.1
1982-1987							
Heart Conditions	165.7	142.6	-23.1	2.19	-0.051	-0.158	32.0
Hypertension	227.5	244.3	16.8	0.64	0.011	-0.158	-6.8
Emphysema	39.6	23.4	-16.2	2.07	-0.034	-0.158	21.2
Diabetes	55.9	59.5	3.6	1.14	0.004	-0.158	-2.6
Arthritis	204.8	201.9	-2.9	3.78	-0.011	-0.158	6.9
Total							50.8

Source: Logit coefficients obtained using 1972 Survey of the Disabled, and prevalence rates (per 1000 men, 45-64) obtained from HIS data.

for 37.8 percent of the increase in the log odds of being identified as disabled; emphysema accounts for 5.9 percent; diabetes accounts for 5.7 percent; and arthritis accounts for 43.7 percent of the rise. Together these five conditions can account for nearly all (about 93 percent) of the increase in the odds of being disabled.[28] The second panel presents the same calculations for the 1982-1987 period. Prevalence rates of major disabling conditions either stopped increasing or started to decline during the eighties. Taken together changes in the same five conditions can account for about half of the decline in the log odds of severe disability.

IV. EARLY ACCOMMODATION: DEFINITION AND MEASUREMENT

The data present a clear picture of increasing prevalence of self-reported disability. It seems implausible, however, that actual health has deteriorated such that it has limited men's ability to work. Medical advances and changes in personal health habits[29] should have improved the health of the population while changes in the nature of the workplace presumably have made it less taxing.[30] If anything, these developments would indicate the opposite trend from that observed. While it is plausible that worsening environmental conditions might work in the direction of worsening health, they have seemingly little connection to circulatory and musculoskeletal conditions which, as we have seen, are associated with most of the growth in disability. Verbrugge (1984) also argues that actual health has not been deteriorating and that the most convincing explanation for the observed

change in self-reported health is the earlier diagnosis of pre-existing conditions.

Therefore, in the absence of any significant changes in "actual" health, the seemingly systematic way in which self-reported disability varies with the extent of disability programs suggests that the growth of disability insurance programs encouraged earlier accommodation of health limitations. Earlier accommodation implies that many of those reporting disability in later years would not have done so previously when faced with the same health circumstances. The key to this concept is that actual health conditions remain unchanged, but incentives around those conditions change individual behavior.

In order to use data on self-reported disability to make inferences about the impact of public policy, we first make the extreme assumption that objective measures of health have not changed, but rather that all changes in reported disability are due to the phenomena we have included under the heading of early accommodation. Once we assume that changes in self-reported health status are driven by changes in public policy, we can use the link between health status and labor force participation to measure the potential effect of government policy. Using only data on self-reported health status and aggregate data on labor force participation, if we assume that those newly classified as severely disabled would have worked previously and leave the labor force when they reclassify themselves, then the decrease in the labor force participation rate that is attributable to public policy is just the increase in the proportion of the population who report themselves as unable to work because of their health. We thus have a simple measure

of the impact of income maintenance with which to examine the changes of the last four decades.

We will discuss our findings broken into three periods. This partition is suggested by both our knowledge of the program and the availability of data. The period from 1949 to 1969 or 1970 was marked by relatively little change in the proportions reporting themselves as disabled, while the seventies were a period of higher than average growth in both programs and disability. It will also be convenient to analyze the seventies separately because of the survey changes in 1969 and 1982 and because of the more detailed data available for that period compared with the earlier period. Finally, the eighties saw a leveling-off of the trend in self-reported disability. Accordingly, we will analyze this period separately.

If we use data from the 1949 Current Population Survey and the 1970 census (see Table 5), we find that during the fifties and sixties, the proportion of men 45-54 who were unable to work rose from 3.7 percent to 4.0 percent while the proportion of men 55-64 who were severely disabled increased from 8.0 percent to 10.0 percent. As discussed above, under the assumption that actual health has not changed and that the newly disabled leave the labor force, the impact of public income maintenance (PIM) on labor force participation rates of a particular population is simply the change in the percentage reported as severely disabled. Thus, as is summarized in Table 9, for 45-54 year old men, the growth of disability programs reduced the labor force participation rate by three-tenths of 1 percent. For those 55-64, these programs induced 2 percent of the population to leave the labor force. Between 1949 and 1970, the labor force participation rate for men aged 45-54 declined

Table 9

Actual and Predicted Changes (Decreases) in Labor Force Participation Rate: A Comparison of Methods and Age Groups

Time Period	Age Group	Actual Decrease	Predicted Decrease	Method	Percentage Predicted
1949-1970	45-54	1.3	0.3	(1)	23
	55-64	4.5	2.0	(1)	44
1970-1980	45-54	3.1	2.4	(1)	77
		3.23	2.57	(2)	80
		3.23	2.07	(3)	64
	55-59	7.6	4.3	(1)	57
		7.44	4.94	(2)	66
		7.44	3.82	(3)	51
	60-64	14.0	3.9	(1)	28
		14.25	5.01	(2)	35
		14.25	2.58	(3)	18
1980-1987	45-54	0.5	-0.2	(1)	-40
	55-59	2.2	-1.7	(1)	-77
	60-64	6.1	-1.2	(1)	-20

Source: U.S. Department of Labor, Bureau of Labor Statistics (1989).

Note: Method (1) uses BLS estimates of labor force participation, and "Predicted Decrease" equals the increase in percentage severely disabled. Method (2) uses NHIS estimates of labor force participation and "Predicted Decrease" equals $\Delta LFP - w_{nd}^{70} (\Delta LFP_{nd})$. Method (3) also uses NHIS estimates and predicts the change as $\Sigma_j (w_j^{80} - w_j^{70}) LFP_j^{80}$.

from 95.6 percent to 94.3 percent, a drop of 1.3 percentage points, while the rate for 55-64 year old men declined from 87.5 percent to 83.0 percent, a drop of 4.5 points (U.S. Department of Labor, 1989). Therefore, the proportions of these drops that would seem to be explainable by the phenomenon of early accommodation are 0.23 for the younger group and 0.44 for the older group.

During the middle period, 1970 to 1980, the NHIS figures in Table 4 indicate that the proportion of men 45-54 reporting themselves unable to work increased from 4.4 percent to 6.8 percent, while labor force participation, as reported in Table 3, declined from 94.3 to 91.2 percent. For the youngest group, then, early accommodation might explain 2.4 of the 3.1 point decline in labor force participation (77 percent). For the group aged 55-59, we can explain 4.3 of the 7.6 point drop (57 percent), and for the oldest group, we can explain 3.9 of the 14.0 point drop (28 percent).

For the most recent period--one of little program growth and little or even negative growth in self-reported disability--Table 4 shows that between 1980 and 1987 the proportion of men reporting themselves unable to work decreased from 6.8 to 6.6 percent of the youngest age group, decreased from 12.7 to 11.0 percent of the middle group, and decreased from 18.9 to 17.7 percent of the oldest group. For all three age groups there was a small decrease in self-reported disability during the first three quarters of this decade. During the same period of time labor force participation rates continued to drop but at a much slower rate than they had during the 1970s. The U.S. Department of Labor (1989) reports that for the 45-54 age group participation declined hardly at all, from 91.2 percent to 90.7 percent. For the 55-59 group, the rate

dropped from 81.9 to 79.7 percent, and for the 60-64 group the rate dropped from 61.0 to 54.9 percent of the population.

For the seventies and eighties, then, the congruence of trends in self-reported disability, labor force participation, and PIM generosity presents convincing evidence that early accommodation is a real phenomenon. Self-reported disability increases dramatically during the seventies, levels off in the late seventies and early eighties, and then declines slightly. These trends mimic the trends in participation in public disability programs. At the same time labor force participation rates decline steadily during the seventies and flatten in the eighties. This is especially true for the youngest age group. The fact that the rates for men over the age of 55 continue to decrease in the latter part of the 1980s only indicates that forces besides early accommodation are at work in the participation decision--not a widely disputed claim.

Using information on only the portion of the population identified as severely disabled we are forced to assume that the same men who are identifying themselves as disabled are also leaving the labor force. While it is true that virtually all of those men identified as severely disabled are also out of the labor force, it is not true that all those identified as able-bodied are in the labor force. Rather than assuming that all of those newly classified as disabled would have worked before programs like DI existed, another natural assumption would be that their participation rates would have mirrored those of the able bodied. Under this scenario, we are imagining that disability programs changed the proportion of the population identified as severely disabled, partially disabled, or not disabled at all, but had no impact on labor force attachment within disability category. Any changes in the labor force

attachment of the severely disabled, the partially disabled, or the able-bodied are assumed to be independent of the growth of disability insurance. Alternatively, we might imagine that much of the change in the participation rates of the severely and partially disabled can be attributed to public policy. Specifically we could assume that all of the change in labor force participation attributable to between-category change and the within-category change for the partially and severely disabled are a result of changes in public policy toward disability. These clearly do not exhaust the set of possible assumptions, but they provide a reasonable range of estimates for the effect of disability programs on labor force attachment.

Making such refined measurements requires the use of the microdata available from the NHIS to do cross-tabulations of labor force status and disability status. Using these data we can decompose the 1970-80 changes in labor force participation, ΔLFP, into changes in disability status, w_j, holding constant disability-specific participation rates, and changes in these participation rates, LFP_j, holding constant disability status. Thus, we can write

$$\Delta LFP = \sum_j (w_j^{t1} - w_j^{t0}) LFP_j^{t1} + \sum_j (LFP_j^{t1} - LFP_j^{t0}) w_j^{t0}.$$

We can now measure the contributions of each component to the decline in labor force participation and, based on the kinds of assumptions described above, produce estimates of the work disincentive of public policy changes. Table 10 shows the components of the change in labor force participation between 1970 and 1980 as derived from the National Health Interview Survey. If we make the first assumption

Table 10

Components or Change in Labor Force Participation, 1970-80

Age	45-54	55-59	60-64
$LFP^{80} - LFP^{70}$	-3.23	-7.44	-14.25
$\Sigma_j(w_j^{80} - w_j^{70})\ LFP_j^{80}$	-2.07	-3.82	-2.58
$(\Delta w_{sd})LFP_{sd}^{80}$	0.23	0.27	0.15
$(\Delta w_{pd})LFP_{pd}^{80}$	-0.37	-0.62	-0.33
$(\Delta w_{nd})LFP_{nd}^{80}$	-1.93	-3.47	-2.40
$\Sigma_j(LFP_j^{80} - LFP_j^{70})w_j^{70}$	-1.16	-3.63	-11.67
$(\Delta LFP_{sd})w_{sd}^{70}$	-0.33	-0.39	-0.38
$(\Delta LFP_{pd})w_{pd}^{70}$	-0.17	-0.73	-2.05
$(\Delta LFP_{nd})w_{nd}^{70}$	-0.66	-2.50	-9.24

Source: Derived from the National Health Interview Survey.

Note: sd, pd, and nd indicate severely, partially and not disabled, respectively.

above--that within-category change is independent of public policy--this decomposition suggests that between 1970 and 1980, the amount of the drop in labor force participation among 45-54 year old men that we can attribute to public income maintenance is 2.07 percentage points out of 3.23.[31] For the 55-59 group, the numbers are 3.82 out of 7.44; and for the oldest group, 2.58 out of 14.25. A clear age pattern emerges from these numbers.

Respectively, 64, 51, and 18 percent of the drops in participation rates are explained by the increased availability of disability benefits during the seventies. Alternatively, we might use the assumption above that attributes all change in labor force participation except the component attributable to participation decisions of the nondisabled to public income maintenance.[32] Under this assumption, as is summarized in Table 9, changes in public income maintenance explain 80, 66, and 35 percent, respectively, of the decline in labor force participation. Not surprisingly, Table 9 also illustrates that when the data allow a variety of assumptions about the interdependence of labor force participation and disability, we form a range of numbers which includes that produced when we were restricted to one such assumption.

Thus, the early accommodation story seems capable of explaining much larger portions of the trends for the youngest group than for either of the older groups--regardless of the assumptions we made to calculate the predicted change in participation. Our calculations suggest that during the time of greatest change (the 1970s), we are able to predict more than 70 percent of the decline in labor force participation as a result of early accommodation to disability for the youngest group. Among the older groups, PIM seems to affect the very

oldest the least--we predict only 30 percent of the decline for those 60-64 while we can explain between 50 and 60 percent of the decline for those 55-59.

V. HOW WRONG COULD WE POSSIBLY BE?

There are several alternative explanations of the trends in health statistics that have been offered in the literature. To the extent that these interpretations explain trends in health statistics, they detract from the early accommodation story presented above. The first group of explanations centers on survey design and holds that at least some of the change in self-reported health status may be artifactual. The second group of these stories explains changes in health measures as a result of compositional changes in the population. For example, mortality rates for older men began to drop during the 1970s, and it is possible that this decline increased the frailty of the average 45-64 year old (Shepard and Zeckhauser, 1980; Feldman, 1983). In this way, improvements in health status and survivorship might lead to more *actual* disablement. To the extent that individuals who would have died in earlier years are kept alive by improved medical technology, for example, they are more likely to be of poorer health than the average survivor. On the other hand, if mortality improvements are due to decreasing incidence of disease, many of those who would have been disabled in the past never become ill. To the extent that the former effect dominates the latter, marginal survivors tend to add to the stock of the disabled. A second compositional explanation, one mentioned in Verbrugge (1984), focuses on the deinstitutionalization of the mentally

ill that occurred during the sixties and seventies. To the extent that those who would previously have been institutionalized are still unable to participate in the labor market they will add to the noninstitutionalized disabled. Since the surveys we use and Bureau of Labor Statistics participation rates are based on the noninstitutionalized civilian population, this compositional change might have contributed to the observed rise in self-reported disability and decline in labor force participation.

Survey Design Effects

In the specific case of the NHIS, Wilson and Drury (1981, 1984) and Kovar and Poe (1985) present explanations of trends in reported health status in which those trends result from changes in questionnaires and changes in survey procedures. There are two major sources of potential effects. First, since NHIS was changed in 1969 and 1982, we might expect different patterns of response for the periods 1957-1968, 1969-1981, and 1982-present. The changes do not, however, explain trends within a regime; i.e., they cannot explain the dramatic changes in reported disability between 1969 and 1981.

Another source of influence for survey design, as mentioned earlier, is the decrease over time in the rate of proxy response, since available data suggest that proxy respondents are less likely to report an individual as disabled than is the individual himself. Our calculations using NHIS data suggest that these differences in the propensity to report disability can explain very little of the observed upward trend in reported disability. In 1970, 43 percent of 45-64 year old men represented by the NHIS responded for themselves while 57

percent were represented by proxies. By 1980, 49 percent of men were responding for themselves. If, as calculated earlier, self-respondents are 40 percent more likely to be identified as disabled than those for whom a proxy responds, then a rise in the number who respond for themselves from 43 percent to 49 percent could account for a 2 percent rise in the proportion of individuals identified as disabled. Even if self-respondents were twice as likely to identify themselves as disabled the proportion identified as disabled would go up by only 4 percent. The observed increase in severe disability is something on the order of 40 percent (7.4 to around 11). Thus while the move away from the use of proxies may have raised the proportion of men identified as disabled, it can account for only a trivial portion (perhaps 5 percent) of the observed rise in disability rates.

Mortality Effects

Our aim here is to determine the magnitude of the increase in disability that may be attributable to the actual changes in average health induced by declining mortality. As will be explained below, these numbers are only upper bounds on the mortality effect and as such represent worst-case scenarios for our assumptions. We first develop the framework with which we will measure increases in survivorship.[33] We define the survival ratio to age x for a member of the cohort born in year w as[34]

$$S^w(x) \equiv \frac{l_x^w}{l_{45}^w} = \prod_{t=45}^{x-1} (1 - q_t^w),$$

which is the actual probability of survival to *exact* age x conditional on survival to exact age 45.[35] The life table death rate, q_t,[36] is defined as the probability that an individual dies between birthdays t and t+1 and l_x is the number surviving (out of l_{45}) to their xth birthday.[37] Next we define a hypothetical survival ratio, $HS^{W,W-S}(x)$. Suppose those aged x years in year r had experienced their own mortality schedule until r-s, but between r-s and r experienced the schedule of a cohort born s years before them. Symbolically,

$$HS^{W,W-S}(x) \equiv \begin{cases} \prod_{t=45}^{x-s-1} (1 - q_t^W) \prod_{t=x-s}^{x-1} (1 - q_t^{W-S}) & \text{if } 45 < x - s; \\ S^{W-S} & \text{otherwise.} \end{cases}$$

Finally, we define marginal survival as

$$MS^{W,W-S}(x) \equiv \frac{S-HS}{S}.$$

These ratios are defined in terms of single-year exact ages, but to make meaningful comparisons with the results calculated in the preceding section, we must calculate the marginal survival into a five- or a ten-year age group. For example, we need to determine what proportion of those aged 45-54 in 1980 would have been dead if, during the 1970s, they had experienced the mortality of the cohorts born ten years before them. To do this, we first define single year of age survival ratios as

$$\frac{L_x^W}{l_{45}} = \frac{S^W(x) + S^W(x+1)}{2} \quad \text{and} \quad \frac{L_x^{W,W-S}}{l_{45}} = \frac{HS^{W,W-S}(x) + HW^{W,W-S}(x+1)}{2}$$

We can then estimate the survival ratio for the population falling within a given five- or ten-year age group in any year by weighting the

single-year survival ratios by single-year population estimates (P's) from s years before.[38] Marginal survival ratios are then calculated substituting our multiple-year ratios for the single year S and HS terms above.

The next task is to use this marginal survival measure to give a pessimistic estimate of the error in our assumption of the previous section. What we find is that if *all* marginal survivors are classified as severely disabled and *none* of the able-bodied population in 1980 would have been disabled in 1970, we can explain between a third and a half of the increase in self-reported disability between 1970 and 1980. Specifically, Table 11 shows that if those aged 45-54 in 1980 had experienced their own mortality schedules until 1970 and then the schedules of the cohorts born ten years before them between 1970 and 1980, 0.66 percent of them would have been dead. Instead this 0.66 percent is severely disabled. Thus, 28 percent of the increase in self-reported disability in this age group is conceivably explained by declining mortality. Conversely, at least 72 percent of the increase in self-reported disability is *not* explained by mortality improvements. The fraction not explainable by mortality effects declines as we look at older age groups, however. For the 55-59 group, 1.82 of the 4.3 percentage point rise in disability (42 percent) is potentially explainable by mortality effects, and for the oldest group, 2.54 of the 3.9 percent increase (65 percent) might be explained. As a comparison, Poterba and Summers (1987) estimate that 3.9 percent of 60 year old men are excess survivors in 1980 while Baily (1987) estimates that proportion of 45-64 year old men to be 1.25 percent. Our estimates are slightly larger than Baily's and considerably smaller than those

Table 11

Percentage of Those Alive in 1970, 1980, 1985 Who Would Have Been Dead Had They Experienced the Mortality of Cohort Born 10, 10, 5 Years Earlier

	1960-1970			1970-1980			1980-1985		
	45-54	55-59	60-64	45-54	55-59	60-64	45-54	55-59	60-64
All Causes	0.069%	0.357%	0.4567%	0.658%	1.824%	2.539%	0.358%	0.593%	0.955%
Infective Diseases	0.072	0.299	0.360	0.021	0.076	0.117	-0.004	-0.006	-0.012
Neoplasms	-0.045	-0.193	-0.320	-0.028	-0.069	-0.212	-0.036	-0.026	-0.026
Endocrine Diseases	-0.003	0.003	0.016	0.017	0.050	0.084	-0.003	0.002	0.006
Blood-related Diseases	0.001	0.001	0.002	0.001	0.004	0.007	0.000	-0.001	-0.001
Mental Disorders	-0.008	-0.013	-0.020	-0.009	-0.031	-0.039	0.004	0.005	0.006
Nervous System and Sense Organs	0.129	0.396	0.723	0.104	0.448	0.767	0.001	-0.002	-0.006
Circulatory System	-0.003	0.004	-0.050	0.371	0.957	1.312	0.192	0.446	0.742
Respiratory System	-0.022	-0.102	-0.237	0.055	0.122	0.146	0.016	0.028	0.048
Digestive System	-0.027	-0.055	-0.067	0.020	0.038	0.071	0.049	0.059	0.073
Genitourinary System	0.024	0.079	0.120	0.026	0.078	0.106	0.004	0.005	0.007
Skin	0.001	-0.001	-0.002	0.001	0.005	0.006	0.000	0.000	-0.000
Musculoskeletal System	-0.001	-0.005	-0.004	0.001	0.004	0.001	0.001	0.002	0.004
Congenital Anomalies	-0.000	-0.000	-0.003	0.005	0.010	0.008	0.001	0.001	0.000
Infant Death	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	0.000
Symptoms/Ill-Defined	-0.015	-0.035	-0.057	0.007	0.010	0.012	0.012	0.023	0.030
Accidents	-0.033	-0.020	-0.007	0.067	0.132	0.172	0.051	0.060	0.085

Source: Authors' tabulations based on National Center for Health Statistics, Vital Statistics of the United States.

Note: Rows correspond to major headings in Vital Statistics of the United States. While the classifications were revised in 1965 and 1975, the major classifications were unchanged.

calculated by Poterba and Summers. Table 11 also shows very little mortality improvement during the sixties and a continuation of the seventies' trend into the first part of the 1980s.

Table 11 also presents these calculations broken down by specific causes. These numbers give an idea of the relative importance of these conditions to the overall mortality improvement. These numbers represent the proportion of the cohort alive in a given year (1970, 1980, or 1985) who would have been dead had they experienced the cause specific mortality rates[39] of the cohort born s years earlier for the previous s years, and their own mortality schedule otherwise. For example, if, between 1970 and 1980, the birth cohorts aged 45-54 in 1980 had faced the age-specific infective disease mortality schedules of the cohorts born ten years before them (but otherwise faced their actual mortality schedules), 0.021 percent of them would have been dead. As can be seen in the table, improvements in mortality due to circulatory conditions can account for around 50 percent of the excess survivorship of the seventies and even more during the early eighties. The improvements in mortality due to disorders of the nervous system and sense organs[40] contribute about 25 percent of the excess during the seventies and none during the eighties.

It should be stressed, however, that the numbers we obtain are only upper bounds on the contribution of mortality effects. If we assume that the incidence of specific diseases has remained constant, then the percentages reported in Table 11 do represent additions to morbidity caused by declining mortality. But because declining mortality certainly reflects some decreased incidence of disease, some of those kept alive by improved mortality conditions are *not* disabled and are

working. In addition, mortality improvements also suggest improvements in health-maintenance technology. The development of pacemakers and limb prostheses, for example, might improve the ability of individuals with health problems to engage in gainful employment. We would expect this effect to be especially pronounced in a world of less taxing work environments. Both of these phenomena have the effect of reducing the impact of mortality improvements on work disability.

Several factors suggest the actual effect of declining mortality on disability rates is much lower than the upper bound we have calculated. First, as can be seen in Table 11, mortality rates continue to decline into the 1980s, even after disability rates level off. This is an indication that the extent of the link between mortality and disability in the seventies calculated above is overstated. The fact that much of the increased survivorship is due to the lessening cardiovascular risks gives force to the notion that many of the marginal survivors are able-bodied. In a review article Goldman and Cook (1984) estimate that more than half of the decline in ischemic heart disease mortality (the largest single component of circulatory system mortality) between 1968 and 1976 can be attributed to lifestyle changes--reduced cigarette smoking, weight reduction, and lower serum cholesterol levels. This would tend to indicate that much of the decline in this mortality results from reduced incidence of heart disease, which implies that many of these "marginal survivors" are not in poor health. In addition, many more of those who survive heart attacks are able to return to work due to improved health maintenance technology (pacemakers, for example) and rehabilitation programs. All in all, it seems doubtful that decreases in cardiovascular mortality increased disability rates much at all.

Thus, it is seems likely that much of the marginal survivorship we calculate is made up of people who are able to work. At least for this age group, economic research suggests that the workplace may actually be more accommodating to some health problems, and medical research suggests that large portions of calculated mortality improvements reflect an increased prevalence of healthy individuals.

Deinstitutionalization Effect

Between 1960 and 1980 the proportion of the 45-64 year old male population in mental hospitals dropped dramatically to about a fourth of its original size. The (percentage point) changes are summarized in Table 12. These numbers suggest that by 1980 deinstitutionalization may have contributed as much as .49 percentage points to the growth in the proportion of 45-54 year older men that are disabled. For the older age groups the percentages are somewhat higher. Comparing the trends in the institutionalization of the mentally ill to trends in the proportion of men identified as severely disabled we see that the change in the institutionalized population between 1970 and 1980 could explain at most a .22 percentage point rise in the proportion of 45-54 year old men identified as disabled, which represents just less than 10 percent or the 2.4 percentage point change in the portion of men identified as disabled during the same period of time. For the older groups deinstitutionalization can explain even less of the rise in self-reported disability rates.

Of these three alternative explanations for the rise in the prevalence of self-reported disability among older men the mortality effects are the only ones that have a chance to explain a sizable

Table 12

Changes in Proportions of Men in Mental Hospitals

Age	1960 Level (%)	1960-1970 Change	1970-1980 Change	1980 Level (%)
45-54	.67	-.27	-.22	.22
55-59	.80	-.32	-.28	.20
60-64	.94	-.41	-.33	.20

Source: Authors' tabulations based on the 1960, 1970 and 1980 Census.

portion of the observed change. Survey design effects can plausibly explain not much more than 5 percent of the 1970-1980 change, while deinstitutionalization can explain at most 10 percent of the same change. Although mortality effects could conceivably explain as much as 28 percent of the observed 70-80 change for the youngest group and 65 percent for the oldest, there is reason to believe that these numbers severely over state the true impact of the declines in mortality on the fitness of the surviving population. Thus while we can attribute some changes in reported health statistics to other causes, we are still left with large amounts that can be described as earlier accommodation to health problems, and this phenomenon seems to be especially pronounced among the younger groups of the men in question.

VI. DISCUSSION

The proportion of noninstitutionalized 45-64 year old men identified as unable to work for reasons of health rose quite dramatically during the 1970s but then stabilized during the 1980s. We have argued that these changes in the prevalence of self-reported disability cannot plausibly be attributed to changes in survey design or administration or to changes in the actual health of the noninstitutionalized population. What remains the most plausible explanation for the observed trends would seem to be the earlier accommodation of pre-existing health conditions: during the seventies men who, in earlier cohorts, would have continued to work despite some degree of health limitation on their ability to do so were increasingly

likely to leave the labor force and identify themselves as unable to work.

A comparison of the trends in the proportion of older working-aged men identified as unable to work and out of the labor force suggests that, among 45-54 year old men, earlier accommodation can account for most of the changes in participation rates that have occurred since 1970, but little of the change that occurred before that date. In contrast, for 55-64 year old men earlier accommodation would seem to be capable of explaining some--but by no means all--of the drop in the labor force attachment of these men.

A comparison of trends in the prevalence of self-reported disability to trends in program statistics suggests that during the 1950s and 1960s, DI and other forms of disability insurance were drawing from a population already out of work. During these decades, program growth was not associated with any substantial changes in the proportion of the population identified as disabled. On other hand, it would seem that during the 1970s both DI and other disability insurance programs were drawing increasingly from a population that would previously have been working; i.e., program growth *was* accompanied by increases in the proportion of men identified as disabled. At the same time administrative records show that the growth in DI was greater than the increase in the fraction of the population identified as disabled. Since the growth in programs other than DI matched the growth in DI it would seem that, even in this period, many of those being attracted to these programs would not have been working earlier.

It seems quite plausible that changes in the availability and generosity of public income maintenance targeted at the disabled can

explain much of the earlier accommodation that occurred during the 1970s. In particular, the fact that the growth in the number of men identified as disabled stopped at the same time that program growth stopped is extremely suggestive.

Another variety of early-accommodation explanations for the observed trends in labor force participation and self-reported disability rates holds that, over time, attitudes toward work and the appropriate conditions for retirement have changed and led men to leave the labor force sooner. This theory goes on to say that in order to rationalize earlier retirement, individuals report that their health caused them to leave work. However, it seems implausible that this simple story is capable of explaining the drastic changes in trends we have observed during the last twenty-five years. In particular, we have seen that much of the rise in self-reported disability occurred in the late sixties and early seventies while the late seventies and eighties were a period of little or no increase. Had period 1965-1985 been characterized by static--or even uniformly changing--disability programs, we might accept the attitudinal explanation, but this is not the case. While there have been no major changes in the statutory definition of disability since 1965 it is clear that de facto standards have changed since then, with standards being liberalized during the 1965 to 1975 period and being stiffened since then. Program statistics show new awards as a fraction of the insured population rising from .48 percent in 1965 to .71 percent in 1975 and then falling to .37 in 1985. What is more, the fraction of awards involving not just medical but vocational factors as well rose from 16 percent in 1965 to 27 percent in 1975, but then fell again to 22 percent by 1978. During the

liberalization, applications as a proportion of the insured population rose over 50 percent from 1.00 percent to 1.54 percent. At the same time the fraction of applicants qualifying for benefits remained virtually stable over the same period of time, dropping from 47.6 percent in 1965 to 46.1 percent in 1975. If attitudes toward work were changing without concurrent accommodation to those changes on the part of the Social Security Administration, we would have seen acceptance rates falling over this period. Thus during this period of liberalization, changes in the de facto standards used by disability examiners seemed to mirror the changing standards of potential applicants.

A more complicated attitudinal theory holds that changes in social programs result, through the political process, from changes in the public's perception of disability. In this way, changing attitudes provide the institutional structure necessary for individuals to behave according to these views. While this could conceivably explain the liberalization of the early seventies, it seems implausible that it explains the retrenchment of the late seventies, since these program changes were largely a result of in solvency problems in the DI trust fund. The fact that we see a response in self-reported disability to largely exogenous institutional changes as well would seem to indicate that economic incentives play an important role in these reports.

Any early-accommodation explanation for changes in the fraction of the population identified as disabled leaves as a puzzle why the changes in self-reported prevalence rates for specific conditions should mirror changes in the portion of the population identified as disabled. Verbrugge (1984) argues that the most plausible explanation for the

increase in self-reported prevalence rates for specific conditions is the earlier diagnosis of pre-existing conditions. Earlier diagnosis would have occurred for a number of reasons: changes in detection technology, changes in the awareness of the importance of early detection, and changes in the availability of medical care for an important part of the population with the introduction of Medicaid.

If earlier diagnosis of preexisting conditions can explain the growth in the prevalence of self-reported chronic conditions while earlier accommodation to health limitations can explain much of the growth in the proportion of the population identified as disabled, what can explain the congruence of these trends? Is it simply a coincidence that prevalence rates leveled off at the same time that trends in self-reported health also leveled off? There exist a variety of explanations that might link the two trends. One suggests that it is men seeking medical attention for pre-existing conditions in order that they may qualify for disability benefits. Although this may go on, it cannot account for most of the rise in prevalence rates--since the rise among the able-bodied, whether in percentage or absolute terms, is greater than the rise among those identified as disabled! Alternatively, one might draw the causal arrow in the other direction. Men told that they suffer from some specific condition may be advised by their doctor to stop working or may now simply have a good rationalization for doing so. We find it hard to evaluate the plausibility of this scenario, but it is hard to imagine that changes in medical technology and the availability of medical care, could, on their own, lead a large number of men to stop working. More plausibly the increased awareness of pre-existing conditions may have given men either

reasons or rationalizations for leaving the labor force, while the increased availability of transfer income gives them the wherewithal to do so. Time series data on self-reported health and labor force status cannot distinguish between these two offerings, but we find that some combination is probably the most plausible. Men would not have identified themselves as disabled had they been working and would have worked had they not had other sources of income, but were it not for the cooperation of doctors and disability examiners, there would be no other source of income available.[41]

While public policy changes during the sixties and early seventies may account for much of the earlier accommodation to health problems that has occurred and therefore could easily account for a substantial portion of the decline in the labor force attachment of older men that occurred over the time period, we think that theories that emphasize the interrelations between different policy changes do a better job of explaining observed trends than those that emphasize only the increasing generosity of disability benefits.

Notes

[1]Both DI and SSI are administered by the Social Security Administration. DI provides benefits to disabled workers in amounts related to their former wages in Social Security-covered employment. In order to qualify for DI benefits individuals must have worked in Social Security covered employment for 20 of the 40 quarters preceding the onset of their disability. SSI provides cash assistance to the needy aged as well as to the needy blind and disabled, with no requirement that they have worked in covered employment. As a needs-based program SSI provides payments based on the amount of other income available to an individual.

[2]Burkhauser and Haveman (1982) provide a good summary of the variety of disability programs that exist in the U.S.

[3]Civilian noninstitutionalized population (U.S. Department of Labor, 1989).

[4]See Berkowitz et al. (1976) for a discussion of these issues.

[5]See Myer (1979) or Lando et al. (1982) for a more detailed discussion.

[6]See Parsons (1980a, 1980b, 1982a, 1982b, 1982c), Slade (1984), Haveman and Wolfe (1984a, 1984b), Leonard (1979). Leonard (1985) provides a review.

[7]Parsons's and Slade's results imply that virtually all of those receiving DI benefits would be in the labor force were it not for the program. Haveman and Wolfe find smaller impacts for DI.

[8]See Leonard (1985) for a more extensive review of this literature.

[9]While DI and SSI are federal programs run under a single set of standards, both programs are administered by individual states. As a result, there is some cross-state variation in how the two programs are administered. Workers' Compensation is a state-run program and so shows more cross-state variation.

[10]In the early years of the survey, respondents were asked, "Has anyone in the family had any of these conditions during the past 12 months?" Then for each reported condition, the interviewer showed the respondent a flash card and asked the respondent to choose the statement that best describes how he is affected by this condition "1) Not able to work at all; 2)...limited in the amount or kind of work; 3)...limited inkind or amount of other activities; and 4) Not limited in any of these ways." Beginning in 1969 the Health Interview Survey began to ask all working-aged men whether their health limited them in the kind or amount of work they could do or prevented them from working altogether. Specifically respondents are asked "Does ...'s health now keep him from working? Is he limited in the kind of work he could do because of his health? Is he limited in the amount of work he could do because of his health?"

[11]Respondents are asked about household members' activity during the past 12 months ("What was ... doing most of the past 12 months: working or doing something else?") as well as the past two weeks ("Did ... work at any time last week or the week before...Does he have a job or business?...was he looking for work or on layoff from a job?").

[12]See Wilson and Drury (1984).

[13]A 5 percent sample in 1970 and a 15 percent sample in 1980.

[14]For example, in 1980 the question was asked "Does ... have a physical, mental or other health condition which has lasted six months or more which: a) Limits the kind or amount of work this person can do at a job? b) Prevents this person from working at a job?" In 1970 the question did not limit disability to that which has lasted six months, but asked the duration of limitation which allows compatibility between the two years.

[15]The following two questions were added in September 1949: "First of all, I would like to check persons (in this household) who aren't able to do their regular work or other duties today because of illness or disability." and "Is there anyone else (in the household) under 65 years old with a physical or mental condition that allows him to work only occasionally or not at all?"

[16]Information was collected on 8,700, 18,000, and 12,000 individuals in 1966, 1972, and 1978 respectively.

[17]The exact question is, "What was the main reason ... did not work in year."

[18]To illustrate the importance of interviewer discretion, the CPS Interviewer's Manual (U.S. Bureau of the Census, 1985) instructs the interviewer to "Mark 'U' for a person, who, because of his/her own long-term physical or illness or disability is unable to do *any kind* (emphasis in original) of work.... [We] mean something specific and not a combination of minor disabilities that normally comes with advanced age. The specific illness must be of such severity that it *completely*

incapacitates the individual.... [An] example would be a truck driver who says he/she is unable to drive a truck because of a heart condition, but who might be able to do less strenuous work. Do not mark 'U' in this instance...."

[19]The National Health Interview Survey goes beyond these two questions to determine whether an individual is limited in other activities besides work, but in our classifications only those with *work* disability are counted among the disabled.

[20]Survey design effects imply that the standard errors on single-year rates are about 20 percent higher than we would expect under simple random sampling.

[21]As a comparison, we estimated average growth rates of the proportion disabled for nonwhites and all men and found them to be nearly identical after 1982 (-2.1 percent) and slightly smaller, though the difference is statistically insignificant, for nonwhites than for the entire population between 1970 and 1981 (3.5 and 4.1 percent, respectively). While nonwhites had higher levels of self-reported disability (12.4 percent of nonwhites and 7.4 percent of the entire population 45-64 were severely disabled in 1970), these differences in growth rates imply that the gap was narrowing slightly. Similarly, across education groups, no post-1982 growth rate was significantly different from zero, and while college graduates experienced lower rates of growth before 1982, other educational categories had roughly equal growth rates.

[22]Between July 1967 and June 1968 the person method was used on half of the surveyed households while the condition method was used on

the other half. Those surveyed using the person method were more likely to be identified as disabled. See Gleeson (1972).

[23]The reason that the effective sample size is so much smaller than the actual is the oversampling of the disabled that occurred in the 1972 and 1978 surveys. Standard errors that take into account this oversampling use $N_e = \frac{(\Sigma w_i)^2}{\Sigma w_i^2}$, where the w_i's are the sample weights in place of N, the sample size. The discrepancy grows as the dispersion in the weights grows. See Rodgers (1989) and Kish (1965).

[24]Robert Haveman and Barbara Wolfe (1986), in a series of recent papers using CPS data, have used a definition that combines a variety of different pieces of information. While the composite index shows prevalence rates in line with other sources, trends in the index show more of a humped-back shape than do trends based on NHIS data. We suspect that a major reason for this difference stems from the fact that the CPS data reflect not only the individual's but also the interviewer's assessment of disability.

[25]From 1969 onward, after asking respondents whether health limits their ability to work, the survey asks "What condition causes this limitation? Is this limitation caused by any other condition? Which of these conditions is the MAIN cause of this limitation?" Individuals are also prompted with one of six lists of broadly grouped specific conditions (partitioned according to major classifications used in Table 11). Before 1978, all individuals were asked the same list in a given year; since that time, each list is asked of one-sixth of the sample.

[26]In the SSA survey, the interviewer shows the respondent a flash card with each condition listed and asks, "Do you have any of these conditions or impairments?"

[27]We are constrained by the fact that the survey asks about different conditions in each year before 1978.

[28]Augmenting the list to include more conditions increases the proportion explained to over 100 percent.

[29]See Verbrugge (1984).

[30]The workplace has changed both because of more stringent OSHA regulation during this period and the altered industrial and occupational mix. Baily (1987) provides a discussion of this issue.

[31]The total contribution of between-category change is $\Sigma_j(w_j^{80} - w_j^{70})LFP_j^{80}$, in the second row of the table.

[32]Then the total attributable to PIM is $LFP^{80} - LFP^{70} - (\Delta LFP_{nd})w_{nd}^{70}$.

[33]This discussion benefited immensely from discussions with Al Hermalin.

[34]The life table symbols and terminology here will be familiar to demographers.

[35]By concentrating on only ages 45 and above we eliminate the effect of mortality improvements at earlier ages, which are concentrated in infancy.

[36]The mortality data used to calculate these death rates are found in the 1950 through 1985 volumes of Vital Statistics of the United States, and the population estimates are found in various volumes of the

P-25 series of Current Population Reports. The method of calculation using these data is described in detail by Shryock and Siegel (1971). Basically the technique calculates rates for five-year intervals using Vital Statistics and Population data and uses graduation methods to fit a smooth curve over single-year age intervals. Using these mortality rates we then constructed cohort life tables for every cohort that reached age 45 between 1950 and 1985.

[37]If we assume that people die off uniformly between ages x and x+1 then we approximate the size of the mid-year population, or the average size of the population during the year, between the two ages (out of l_{45} that started) as $L_x = (l_x + l_{x+1})/2$.

[38]For example, ${}_5L^*_{55}/l_{45} = (P_{55}/{}_5P_{55})(L^*_{55}) + \ldots + (P_{59}/{}_5P_{55})(L^*_{59})$.

[39]Cause specific mortality rates are assumed to be in the same relative proportions as deaths, by cause; that is, for any given year and five year age group, $\frac{q^i_t}{q_t} = \frac{D^i_t}{D_t}$ where D^i_t is the number of deaths due to cause i in period t. Implicit in this calculation is the assumption of independence of risks among all causes of death. While this assumption is certainly incorrect, for probabilities as small as those involved here, this assumption is not terribly distorting.

[40]These include such things as Multiple Sclerosis, Meningitis, Epilepsy and Parkinson's Disease.

[41]Some might suggest that the increase in the generosity of benefits led an increasing number of men to apply for benefits and gamble on the imperfection of health screening. However, the proportion of DI applicants who were accepted did not change appreciably during the

decade of program expansion, and if truly marginal applicants were entering the pool, one would expect the proportion accepted to decline.

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