

ECONOMIC ANALYSIS OF TRANSFER PROGRAMS TARGETED ON PEOPLE WITH DISABILITIES

JOHN BOUND*

University of Michigan

RICHARD V. BURKHAUSER*

Center for Policy Research, Syracuse University

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Abstract

This chapter reviews the behavioral and redistributive effects of transfer programs targeted at working-age people with disabilities. While we primarily focus on the United States, we also include programs in the Federal Republic of Germany, The Netherlands, and Sweden. We look at how the economic well-being of people with disabilities varies across people and over time. We then present a brief history of Social Security Disability Insurance and Supplemental Security Income programs and review the evidence that attempts to explain their growth. We then review the literature on the labor supply behavior of people with disabilities and how that supply is affected by disability program characteristics. We end with a summary of our findings and a discussion of the major unresolved issues in the disability literature. © 1999 Elsevier Science B.V. All rights reserved.

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1. Introduction

Most western industrial countries began the 20th Century with private market economies that operated almost completely devoid of government regulation. At that time the primary role of government was seen as the enforcement of private contracts. Near the end of the century, western industrial countries still rely primarily on private markets to allocate resources, including labor. In these private labor markets, wages and working conditions continue to be established through the interaction of supply and demand, even if negotiations for wages and working conditions are carried out by larger entities – e.g., unions and firms – through collective bargaining.

However, Western industrial countries have developed regulations that establish socially determined boundaries for private labor market transactions – e.g., health and safety regulations, maximum hours, minimum wages – that are intended to insure minimum working conditions for all workers. In addition, sophisticated social insurance systems have grown in each of these countries aimed at protecting workers against economic hardships related to exit from a job – e.g., unemployment insurance, old-age and survivors insurance, sickness and accident insurance, and longterm disability insurance.

The economic rationale for publicly provided disability insurance is similar to that for

other social insurance programs. Public disability insurance is designed to reduce the risks associated with lost earnings resulting from poor or deteriorating health. Private savings alone are not likely to be an effective mechanism for mitigating the risks associated with the permanent loss of earnings capacity.¹ Furthermore, private disability insurance alone is not likely to be a viable alternative.² In fact, public disability insurance typically involves more than simply mandatory, actuarially fair insurance. Rather, as is true for other social insurance programs, public disability insurance also has redistributive as well as pure insurance goals.³ Equity concerns presumably justify the redistribution aspects of public disability insurance.

All insurance programs – private or social – are subject to moral hazard problems. Disability transfer programs are no exception. In this chapter, we review the behavioral and redistributive effects of transfer programs targeted at working-age people with disabilities.⁴ While most of the literature focuses on the labor supply effects of disability programs, it is important to also recognize the programs' value to society in providing social protection against the economic consequences of the onset of a disability. To do otherwise would be narrow and misleading from a social policy perspective. Ultimately, all social insurance involves trading off efficiency losses against insurance and equity gains.

While this chapter primarily focuses on the United States, it also includes programs developed in a representative group of Western European countries – the Federal Republic of Germany, The Netherlands and Sweden. An evaluation of the effects of a transfer program on people with disabilities, particularly in a cross-national context, is complicated by two issues that are less important in evaluations of other programs or other targeted groups.

¹ Deaton (1991) formalizes this argument within the context of a simple model of optimal savings by liquidity-constrained consumers. Within that context, Deaton shows that the effectiveness of savings as a buffer against shocks to labor earnings declines as the persistence of these shocks rises. At the limit, when earnings follow a random walk and shocks are permanent, savings is completely ineffective at insuring individuals against possible future declines in earnings in the sense that optimally behaving individuals will not save at all.

² Many employers in the United States provide longterm disability insurance as part of the total compensation package offered to their workers. However, most of these plans began after the introduction of publicly provided disability programs. An important market failure explanation for why disability insurance needs to be provided publicly revolves around self-selection within the context of imperfect information. With imperfectly observed risk heterogeneity, privately provided disability insurance is not sustainable (Rothschild and Stiglitz, 1976).

³ Thus, for example, in the United States, the two major federal transfer programs targeted at the population with disabilities are heavily tilted toward lower income persons. Supplemental Security Income is a means-tested program financed by general revenues and targeted only to those whose income is below a social minimum. While Social Security Disability Insurance is not means-tested, is funded by a payroll tax and provides benefits related to some degree to average monthly labor earnings, it nonetheless has a strong redistributive component since the benefits of lower wage earners replace a larger proportion of their average monthly earnings than do the benefits of higher wage earners, and those with dependents receive additional benefits unrelated to their contributions.

⁴ As will be seen, the concept of working age is a social construct which varies across countries and over time in those countries. Institutionally, in the United States age 65 is considered "normal" retirement age for purposes of our Social Security retirement program (OASI). Yet since the 1980s a majority of men in the United States have exited from the labor force at age 62. See Burkhauser et al. (1999b) for a discussion of how retirement age has changed in the United States and The Netherlands over the last 50 years.

First, unlike the Social Security retirement program (OASI), for instance, in which program eligibility is based on a straightforward and easily verifiable set of attributes – years of program participation, contributions, and age – eligibility for most disability transfer programs requires determination of “disability” based in part on a set of specific health conditions, in part on the effect of these conditions on functional capacity, and ultimately on the interaction of these functional limitations and the socioeconomic environment on work. Hence, *ex ante* program eligibility from the perspective of the applicant is uncertain and errors in eligibility decisions from the perspective of the program administrators are possible.⁵

Second, because the decision to apply for disability program benefits is not purely a function of health but is also related to economic alternatives – work or alternative program eligibility (i.e., unemployment, retirement, social assistance) – evaluation of the “demand” by the working-age population for benefits and of the “supply” of these benefits by program administrators depends not only on disability program characteristics but also on labor market factors and alternative program opportunities in a given country.

In recognition of these two additional dimensions of disability policy analysis, we begin Section 2 with a discussion of the definition of disability used in empirical studies in the United States. We then show how the resulting prevalence rates of disability in the United States population as well as the socioeconomic characteristics of the population of men and women with disabilities are affected when alternative measurement concepts of disability are used. Based on this discussion, we choose a disability definition and look at how the economic well-being of people with disabilities varies from that of the rest of the population in a given year and over the last two decades using cross-sectional data. Then, using multiperiod data, we show how the onset of a disability affects the earnings and household income of United States men and women. Finally, using the German Socio-Economic Panel (GSOEP), a multiperiod, multilevel dataset that includes information on people with disabilities, we compare the population with disabilities in Germany in the cross-section and dynamically with that of the United States.

In Sections 3 and 4 we focus on the subset of the working-age population with disabilities in the United States whose work limitations are sufficiently severe to make them eligible for disability-based government transfers. In Section 3 we present a brief history of the two most important federal disability transfer programs in the United States – Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) – and then review the evidence that attempts to explain the growing number of beneficiaries. In Section 4 we review the literature on the labor supply behavior of people with disabilities and how that supply is affected by disability program characteristics as well as the behavior of employers. We also review the small literature that has attempted to explain the welfare implications of determining disability status with imperfect information.

⁵ This complicates analysis both of behavioral issues with respect to the decision to apply for benefits (see, for instance, Leonard, 1979; Halpern and Hausman, 1986; Bound, 1989; Burkhauser et al., 1995) and issues of program design (see Diamond and Shenshinski, 1995; Aarts et al., 1996; Waidmann, 1996).

In Section 5 we put United States disability transfer policy into a broader social welfare policy context to compare it with disability transfer policies in three European countries – Germany, The Netherlands, and Sweden. We also show how the population in disability transfer programs and the labor force activity of men in these countries has varied over the past quarter of a century.

In Section 6 we summarize our findings and discuss major unresolved issues in the disability literature.

2. Work activities and economic well-being among the working-age population with disabilities

Evaluation of the working age population with disabilities must start with a definition of that population.⁶ Disability is a more complex concept to define or measure than either age, race, or gender. Mashaw and Reno (1996) argue that the appropriateness of any definition of disability depends on the purpose for which it is used. They document over 20 definitions of disability used for purposes of entitlement to public or private income transfers, government services, or statistical analysis.

In the Americans with Disabilities Act of 1990 (ADA), disability is defined as a physical or mental impairment that substantially limits one or more major life activities, a record of such an impairment, or being regarded as having such an impairment. LaPlante (1991) provides a useful discussion of alternative definitions that can be used to estimate this population. The most common measures of disability in the economics literature are built on a methodology developed by Nagi (1965, 1969a,b, 1991) that distinguishes three components of disability. The first component is the presence of a pathology – a physical or mental malfunction or the interruption of a normal process or both. This leads to a second component, an impairment, which Nagi defines as a physiological, anatomical, or mental loss or abnormality that limits a person’s capacity and level of function. The final component of disability is defined as an inability to perform or a limitation in performing socially expected roles and tasks. For men and, increasingly, for women of working age, market work is a socially expected role. Hence, those who are unable to perform or are limited in their ability to work are considered disabled.

What is most controversial about Nagi’s definition in the disability literature and especially among disability advocates is the relative importance of pathology compared to environment in determining how a given pathology results in an impairment that then leads to disability. Using the language and the legislative theories underpinning the civil

⁶ In the United States the principal disability transfer program – Social Security Disability Insurance (SSDI) – ends at age 65 and all beneficiaries are automatically transferred, at the same benefit level, to OASI. This is an indication of a societal norm that in the United States people are not “expected” to work past age 65. Most of the empirical work cited in this chapter assumes that working age ends no later than age 65. However, in some cases, especially those using cross-national data, working age is assumed to end earlier. In the longer run, the societal norm of 65 is likely to rise. For instance, legislation passed in 1983 will slowly increase the normal age of retirement for OASI benefits to age 67 over the first two decades of the 21st Century.

rights legislation of the 1960s, disability advocates argue that people with disabilities are members of an oppressed minority whose ability to compete with able-bodied workers is impaired, or prevented altogether, by the physical structure of the work environment and existing work practices. Thus, people with disabilities suffer physical barriers in addition to the more traditional forms of stigma and prejudice suffered by racial or ethnic minorities and women.⁷ Some advocates would even argue that there is no such thing as a disabled worker, there is only a society that does not provide “equal access” to all. The Americans with Disabilities Act of 1990 is the most visible legislative result of this view of the population with disabilities. While the ADA mirrors some of the language of the Civil Rights Act of 1965, it also contains important differences. It explicitly recognizes the costs as well as the benefits of equal access and accommodation in establishing the legal responsibilities of employers, government and private establishments to provide them.⁸

Less controversial is that the Nagi definition recognizes that disability is a dynamic process in which individual pathology and the socioeconomic environment interact. However, with respect to the ADA, it ignores both the broader “population with disabilities” who have a pathology and a functional limitation but who have successfully integrated into society (e.g., work full-time) and hence are not “disabled” under the Nagi definition and those who conversely are considered disabled because of perceptions of an impairment that does not exist.

2.1. Alternative empirical estimates of the working-age population with disabilities

In most surveys of income and employment, the data available on health come from a small set of questions that ask respondents to assess whether their health limits the kind or amount of work that they can perform. Other questions ask respondents to rate their health relative to others in their age group. Researchers have been cautious in using such global self-reported health measures for a number of reasons. First, self-evaluated health is a subjective measure that may not be comparable across respondents. Second, these responses may not be independent of the observed variables one wants to explain, such as economic well-being, employment status, or family structure (Chirikos and Nestel, 1984; Chirikos, 1995). Third, since society sometimes stigmatizes those who are able to work but who want to retire before the “normal” retirement age, reasonably healthy

⁷ There is a small literature on the importance of discrimination on the work and earnings of people with disabilities. In a series of papers, Baldwin (1994) and Baldwin and Johnson (1994, 1995) first define market discrimination against people with disabilities within a standard Becker (1971) discrimination model and then estimate its importance using a technique developed by Reimers (1983). They find that the average wage of disabled men is 80–85% that of non-disabled men. They then calculate that between 15 and 20% of this difference is unexplained by control variables in their wage equations and hence can be attributed to discrimination. They find employment is a more serious problem than low wages for persons with disabilities. See Baldwin (1997) for a review of this literature in the context of the potential labor market consequences of the ADA.

⁸ There is a growing literature on the social implications of the ADA. See especially West (1996). For a fuller discussion of alternative ethical views of the special rights and duties of people with and without disabilities to one another in society, see Johnson (1997).

individuals who wish to exit the labor force “prematurely” may use poor health as their excuse (Parsons, 1980a,b, 1982; Bazzoli, 1985). Finally, in the United States, federal disability transfer benefits are available only to those judged unable to perform any substantial gainful activity, so individuals with some health problems may have a financial incentive to identify themselves as incapable of work because of their health.

Misclassification based on self-reported health can overestimate both the true number of persons who suffer from a particular condition and the negative effects of health impairments on work and economic well-being. Such problems may be exacerbated when these measures are used to track changes in the population with disabilities over time.

While the problems inherent in disability measures, based on self-evaluated health, have led some researchers (Myers, 1982, 1983) to conclude that no useful information can be gained from such data, it is also clear that global self-reported health measures are highly correlated with clinical measures.⁹ Even so, if, as many have feared, reporting behavior is systematically related to the labor market outcomes we are interested in studying, then the association between global self-reported health and labor market outcomes may exaggerate the actual effect of health on such outcomes. To circumvent these problems, authors have relied on responses to questions about specific health conditions (Bartel and Taubman, 1979; Bound et al., 1995), functional limitations (Chirikos and Nestel, 1981, 1984; Bound et al., 1995) or body weight relative to height (Costa, 1995, 1996). While these measures are also self-reported, their specificity may reduce the scope for rationalization.¹⁰

While few labor market surveys include this kind of detailed health information, it is possible to use the ones that do to compare results based on the use of global self-reported health or disability measures to ones based on presumably more objective measures. This has been done within a latent variable framework in which the more objective measures were used to instrument the potentially endogenous global measures.¹¹ Surprisingly, the empirical results of such models suggest that the use of self-reported health or disability measures may, in fact, underestimate the impact of health on labor force behavior.¹²

⁹ Studies by Nagi (1969a), Maddox and Douglas (1973) and LaRue et al. (1979) all find that self-reported health or disability status is highly correlated with medically determined health or disability status.

¹⁰ Other authors have constructed health measures based on the timing of subsequent mortality (Parsons, 1980a,b, 1982; Anderson and Burkhauser, 1984, 1985).

¹¹ Within the context of cross-sectional labor force participation models, using, respectively, information in chronic conditions and on subsequent mortality as instruments, Stern (1989) and Bound (1991a) both report evidence that suggests that, if anything, the use of self-reported health or disability measures tends to lead researchers to underestimate the impact of health on labor force behavior. Within the context of a longitudinal retirement model, using functional limitation measures as their instruments, Bound et al. (1996) report similar results. Finally, examining the impact of health on retirement plans, Dwyer and Mitchell (1999) report similar results.

¹² These results may seem counter intuitive. However, it is important to realize that reporting differences across individuals implies that global self-reported health measures are error-ridden proxies for actual health or disability status. One explanation is that errors in variables bias offset endogeneity bias when global self-reported health measures are used as explanatory variables in cross-sectional data. See Bound (1991a) for a detailed discussion of these issues. In Section 4 we discuss the tradeoffs between using self-reported information in health relative to more objective measures in more detail in the context of labor supply models. Here we focus on the use of self-reported measures of health in defending a population with disabilities.

In the Panel Study of Income Dynamics (PSID), the population with disabilities can be identified using a survey question that asks respondents, "Do you have any physical or nervous condition that limits the type or the amount of work that you can do?" In their cross-sectional analysis, Burkhauser and Daly (1996a,b) and Burkhauser and Wittenburg (1996) exclude individuals from the disability population whose health limitations are shortterm by classifying as disabled only those people who report a limitation in 2 consecutive years of data, effectively requiring the limitation to have a duration of at least 1 year.¹³ In their longitudinal analysis, where they examine the effects of the onset of a disability, they define as experiencing the onset of a disability only those individuals who report 2 consecutive years of no health-related work limitations followed by 2 consecutive years of such limitations.

To assess whether these measures of the population with disabilities, which are available for each wave of PSID data, accurately capture a group of people in poorer health or with more functional limitations than the remaining population, Burkhauser and Daly (1996b) compare PSID data with additional health-related information from the 1986 PSID Health Supplement, the most recent detailed look at the health and functional status of respondents available in the PSID.

To evaluate the cross-sectional measure, they define four mutually exclusive groups: (1) individuals who report having no health-related work limitation in both 1985 and 1986; (2) individuals who report having a limitation in 1985 but not in 1986; (3) individuals who report having a limitation in 1986 but not in 1985; and (4) individuals who report having a limitation in both 1985 and 1986 (Burkhauser and Daly's cross-sectional definition of a disability). They compare these groups over the set of health-related questions asked in the 1986 Health Supplement. They then compare the labor force status and economic well-being of these four groups. Finally, they examine the responses to these questions for the subset of the cross-section who, according to their longitudinal definition, have recently experienced the onset of a disability: individuals who report a work-limiting condition in both 1985 and 1986 and who report no limitation in both 1983 and 1984 (group 5).

Table 1 reproduces the results for men from Burkhauser and Daly (1996b). Those captured by the two-period cross-sectional definition of disability (column (4)) report themselves to be in poorer health regardless of the specific question asked than do those in the other cross-sectional groups. The most dramatic differences among these four groups are in the measures of functional ability. More than one-half of men classified as having a disability in column (4) have difficulty in walking or climbing stairs and nearly two-thirds report difficulty in bending, lifting, or stooping. Of the men who report having no health-related work limitations in this time period, less than 5% report limitations in walking, climbing, bending, lifting, or stooping. The same pattern of results holds for the other measures of functional status. Men in column (4) are also in poorer economic health. They work less, and have lower median labor earnings and household income than the other three groups.

¹³ This assumes that the same limitation has been present over the entire period.

Table 1
Consistency among men of multiperiod measures of disability with other measures of disability^a

Groups	No limitation in either 1985 or 1986 (1)	Limitation in 1986 not in 1985 (2)	Limitation in 1985, not in 1986 (3)	Limitation in 1986, and 1986 (4)	No limitation in 1983 or 1984; disability in 1985 and 1986 (5)
Number of observations	3154	175	151	269	46
<i>Health status compared to others your age</i>					
Excellent/very good	72.3	47.6	30.8	21.1	18.2
Good	22.4	28.2	22.6	24.8	29.5
Fair/poor	5.2	24.2	46.7	54.2	52.3
<i>Health compared to 2 years ago</i>					
Better	14.9	17.1	17.1	10.4	0.0
Same	75.2	66.0	38.7	46.7	34.4
Worse	9.9	16.8	44.2	43.0	65.6
<i>Expected health in 2 years</i>					
Better	18.2	20.0	30.8	17.4	33.9
Same	79.4	73.1	55.3	67.4	58.9
Worse	2.4	6.9	13.9	15.2	7.2
<i>Limitations</i>					
Walking/climbing	2.8	23.9	30.2	54.4	45.7
Bending/lifting/stooping	4.4	33.1	47.6	61.7	59.2
Driving a car	0.2	2.4	8.9	17.2	18.2
Traveling unassisted	0.1	0.0	4.2	10.1	4.8
Confined indoors	0.2	1.4	5.2	12.7	10.1
Confined chair/bed	0.0	0.0	5.5	11.9	4.8
Uncorrectable eye trouble	1.7	8.5	7.2	11.1	2.1
Minor health problems	12.8	24.9	23.4	43.2	14.0

Table 1 (continued)

Groups	No limitation in either 1985 or 1986 (1)	Limitation in 1985, not in 1986 (2)	Limitation in 1986, not in 1985 (3)	Limitation in 1985 and 1986 (4)	No limitation in 1983 or 1984; disability in 1985 and 1986 (5)
Health limits physical activity	5.2	25.4	56.7	78.4	70.7
<i>Outcomes</i>					
Labor force status ^a					
Full-time	81.3	68.6	61.5	36.9	47.1
Part-time	16.3	24.2	27.1	26.6	30.7
No work	2.4	7.3	11.4	36.6	22.2
Economic well-being ^b					
Median labor earnings (\$)	33544	22784	22658	9493	15569
Median before government (\$)	29456	24785	22611	18949	22991
Median after government income (\$)	25406	21416	19332	19666	19666

^a Source: Burkhauser and Daly (1996b). Population is limited to men aged 25-61 in 1986 who were either household heads or spouses in both 1985 and 1986 PSID surveys. Group 1: individuals who reported no health-related work limitations in both 1985 or 1986. Group 2: individuals who reported a health-related work limitation in 1985 but not in 1986. Group 3: individuals who reported a health-related work limitation in 1986 but not in 1985. Group 4: individuals who reported a health-related work limitation in both 1985 and 1986. Group 5: individuals who reported no health-related work limitation in 1983 and 1984 but reported such limitations in both 1985 and 1986.

^b In 1991 dollars.

Men in column (5), those who have recently experienced the onset of a disability, are in worse health and have more functional limitations than groups (1), (2), and (3), but are in better health than those in group (4). In general, this pattern holds for the outcome measures of labor market activity and economic well-being. Group (5) people are in worse health and have more functional limitations than groups (1), (2), and (3) because, by 1986, those in column (5) have been in the state of disability longer than these first three groups. However, men in column (5) have been in the state of disability for a shorter period, and are thus healthier with fewer functional limitations, than those in group (4).

The results from this table show that individuals who report having 2 years of consecutive health-related work limitations are in poorer health and are more likely to have functional limitations than either individuals who do not report work limitations or individuals who report limitations in only one of those years. Moreover, examining the labor force status and economic well-being of these individuals, those with longer-term health-related work limitations are less likely to work and have lower median labor earnings and lower household income than do other groups. These patterns hold for both men and women (see Burkhauser and Daly, 1996b). These findings support the idea that measuring disability based on relatively simple self-report, while not perfect, identifies, both in the cross-section and dynamically, populations with substantial differences in health status and functional limitations. Burkhauser and Wittenburg (1996) repeat the comparisons in Table 1 with longitudinal data from the 1990 Survey of Income and Program Participation (SIPP) Longitudinal Microdata and find the same patterns. (The SIPP Longitudinal Microdata files were matched to special topical module information on functional limitations and disability.)

Table 2 compares the prevalence of disability within the working-age population of men and women in the United States using data from the PSID, the Current Population Survey (CPS), SIPP and the National Health Interview Survey (NHIS). All four datasets have a similar self-reported health question that can be used as a disability marker. Like the PSID, however, the panel nature of the SIPP data allows one to use the two-period disability definition discussed above.

Using the PSID and their 2-year definition of disability, Burkhauser and Daly (1996b) estimate the disability prevalence to be 9.2% of working-age males (aged 25–61) and 10.6% of working-age females in 1988. These rates lie between estimates in the CPS, based on a single-year response to a similar question, and those in the SIPP and NHIS data. Using 1990 CPS data, Burkhauser and Daly (1996b) find that 8.1% of working-age men and 7.8% of working-age women have a disability. In contrast, McNeil (1993), using one cross-section of the 1990 SIPP Longitudinal Microdata, finds higher prevalence rates of 11.7 and 11.6% for men and women, respectively, aged 21–64 in 1991.¹⁴ Using one cross-section of the 1994 NHIS, we find results very close to those of McNeil. One possible reason for the somewhat higher prevalence rates found in the SIPP is that it explicitly includes mental health as a work-limiting condition in its work limitation question.

¹⁴ Bennefield and McNeil (1989) report that estimates from the CPS are lower than estimates from both the SIPP and the National Health Interview Survey (NHIS).

Table 2
Cross-sectional estimates of the population with disabilities across data sources^a

Data	Year	Survey questions	Population	Percent of population with disabilities
PSID ^b	1989	Do you have any nervous or physical condition that limits the type or the amount of work you can do? (Must have responded yes in both 1988 and 1989)	Aged 25–61 Men Women	9.2 10.6
CPS ^c	1990	Do you have a health problem or disability which prevents you from working or which limits the kind or the amount of work you can do? Or, Main reason did not work in 1989 was ill or disabled; or Current reason not looking for work is ill or disabled (One period)	Aged 25–61 Men Women	8.1 7.8
SIPP ^d	1990	Do you have a physical, mental, or other health condition which limits the kind or amount of work you can do? (One period)	Aged 21–64 Men Women	11.7 11.6
SIPP ^e	1990	Do you have a physical, mental, or other health condition which limits the kind or amount of work you can do? (Must have responded yes in wave 3 and wave 6)	Aged 25–61 Men Women	9.8 9.8
NHIS ^f	1994	Are you limited in the kind or amount of work you can do because of any impairment or health problem? (One period)	Aged 25–61 Men Women	10.8 11.4

^a Source: Burkhauser and Daly (1996b), Burkhauser and Wittenburg (1996).

^b Panel Study of Income Dynamics (PSID) as reported in Burkhauser and Daly (1996b).

^c Current Population Survey (CPS) as reported in Burkhauser and Daly (1996b).

^d Survey of Income and Program Participation (SIPP) as reported in McNeil (1993).

^e Survey of Income and Program Participation (SIPP) as reported in Burkhauser and Wittenburg (1996).

^f National Health Interview Survey (NHIS).

Burkhauser and Wittenburg (1996) also use the 1990 Longitudinal SIPP Microdata but include in their population with disabilities only those who report a health-based work limitation or receipt of SSDI in both wave 3 and wave 6 (questions asked exactly 1 year apart).¹⁵ As can be seen in Table 2, they find disability prevalence rates much closer to those found by Burkhauser and Daly (1996b).

All of the disability prevalence rates reported in Table 2 exceed those captured by Nagi-type definitions that require failure in a socially expected role as well as a pathology and

¹⁵ Because the SIPP is a staggered panel, the questions are asked to respondents at different calendar times in the sample. The 1 year period captured between wave 3 and wave 6, hence, averages over the period between October 1990 and January 1992.

Table 3
Prevalence of disability within socioeconomic groups of working-age males (aged 25–59)^a

Year	All	Blacks	Non-blacks	Less than high school graduates	High school graduates
1970	9.4	10.0	9.3	14.4	6.6
1972	11.5	16.8	11.0	16.0	9.3
1974	10.9	17.6	10.3	15.9	8.9
1976	7.0	10.1	6.7	11.4	5.6
1978	8.1	12.7	7.6	14.2	6.2
1980	9.3	14.2	8.9	17.7	7.0
1982	7.8	13.6	7.3	14.8	6.0
1984	8.4	12.8	8.0	14.6	7.1
1986	8.3	11.8	7.9	16.9	6.9
1988	8.9	12.2	8.6	16.8	7.8

^a Source: Updated by Daly from Daly (1994).

functional limitation, that is, people who not only have a functional limitation but who work less than full-time or who are receiving health-related social welfare transfers. Using such a traditional definition, for instance, Burkhauser et al. (1993), using data from the CPS, find that in 1987 approximately 6.2% of the working-age population was disabled. The major difference between the definitions used in Table 2 and those of researchers who follow the Nagi methodology is the inclusion of people with disabilities who have nevertheless successfully integrated themselves into full-time employment. While the appropriateness of a definition must ultimately be judged by its use, this broader measure of disability explicitly recognizes the endogenous nature of the socioeconomic environment and of individual behavior on work outcomes. Thus, it allows researchers to more clearly identify a population for whom changes in the socioeconomic environment, like the passage of ADA, will have an impact in the workplace. Table 3, which is updated from Daly (1994), uses the Burkhauser and Daly (1996b) two-period definition of disability to look at the prevalence of disability and how it changed between 1970 and 1992 for different socioeconomic groups. Disability is not distributed evenly across the population. Male blacks and high school dropouts are more likely to have disabilities than non-blacks and high school graduates.¹⁶

2.2. The importance of employment to the working-age population with disabilities

2.2.1. A cross-sectional view

To understand the impact of employment policies on the diverse population with disabilities, it is important to see how successfully people of working-age with disabilities are

¹⁶ Bennefield and McNeil (1989), Wolfe and Haveman (1990), and Burkhauser et al. (1993) find similar results across race and education levels.

Table 4
 Labor force participation and transfer receipt among people with disabilities before passage of the Americans with Disabilities Act of 1990, using PSID (1989) and SIPP (1990) data (in 1991 dollars)^a

	PSID				SIPP ^b			
	Men		Women		Men		Women	
	With disability ^c	Without disability	With disability ^c	Without disability	With disability ^d	Without disability	With disability ^d	Without disability
Percent of population ^e	9.2	90.8	10.6	89.4	9.8	90.2	9.8	90.2
Percent working	65.0	97.5	52.1	80.5	54.8	96.5	43.6	79.9
Percent receiving government transfers ^f	38.0	2.9	25.8	4.4	43.7	5.6	40.7	8.2
Mean labor earnings of individual (\$)	11513	32237	576	12664	10761	29223	5445	14080
Median before-government income (\$)	20307	31635	18786	27600				
Mean after-government income (\$)	20343	27069	18705	24102	30380	46025	27703	42877
Income-to-needs ratio of median person ^g	2.93	3.90	2.70	3.48	2.37	3.68	1.99	3.28
Full-time work ^h	43.0	83.6	18.7	42.5	41.1	86.1	26.2	55.7
Percent receiving government transfers ^f	15.9	2.5	8.7	3.3				
Part-time work ⁱ	22.0	13.9	33.4	38.0	13.6	10.4	16.4	24.3
No work ^j	35.0	2.5	47.9	19.5	45.2	3.5	56.4	20.1
Percent receiving government transfers ^f	68.0	9.2	42.8	6.4	74.4	24.4	59.3	18.2

^a Source: Burkhauser and Daly (1996b) and Wittenburg (1997).

^b Because rotation groups start at different calendar times, the yearly time period is sometime between October 1990 and 1992.

^c People who reported a physical or nervous condition that limits the type of work or the amount of work they could do in both 1988 and 1989.

^d Persons who report a health limitation or receipt of SSDI in both wave 3 and wave 6 of the 1990 Full Panel SIPP.

^e Population is limited to those aged 25-61 who were either family heads or spouses and were so in both the 1988 and 1989 PSID surveys or persons aged 25-61 in both wave 3 and wave 6 of SIPP.

^f Public transfers not only include transfers targeted for people with disabilities - Social Security Disability Insurance, Supplemental Security Income, Veterans Disability Benefits and Workers' Compensation - but also Unemployment Insurance, Aid to Families with Dependent Children and Food Stamps.

^g Family income divided by the United States Census poverty line income for a family of that size.

^h People who worked at least 1820 h in 1988 (35 h per week).

ⁱ People who worked at least 52 h but no more than 1820 h in 1988.

^j People who worked less than 52 h in 1988.

integrated into the labor force. Table 4 uses data from the 1989 PSID response-non-response file (columns (1)–(4)) and the 1990 SIPP Longitudinal Microdata file (columns (5)–(8)) to measure labor force participation and transfers receipt of people with disabilities prior to the passage of the ADA. Past studies of the “disabled” population have concentrated on that part of the population with disabilities receiving Social Security benefits or working less than full-time because of a health-related impairment (see, e.g., Haveman and Wolfe, 1990; Burkhauser et al., 1993). Table 4, using PSID data for 1988, shows that this definition would have excluded over one-third of the male population with disabilities who both worked full-time (column (1), row 8) and received no disability-related transfers (column (1), row 9) [$43.0 \times (1 - 0.159)$] and more than one-sixth of the female population.

Using the broader definition of people with disabilities, work is less common among the working-age population with disabilities than among those without disabilities, but work is still an extremely important activity which belies the notion that people with disabilities do not work. Among working-age men with disabilities, two of every three men worked in the labor market and 43% worked full-time in 1988.

The importance of work in the population with disabilities is confirmed by the SIPP data.¹⁷ Although the percent working, 54.8%, is lower in the SIPP than in the PSID, as is the percent working either full-time or self-employed (41.1%), work is still highly prevalent among men with disabilities. Part of the reason for the difference in work reported in these two datasets is related to the different years in the business cycle captured in the data. The year 1988 was near the peak of the 1980s business cycle and the sixth straight year of economic growth. In contrast, the SIPP data center around 1991, the trough year of the 1990s business cycle. As we discuss below, the employment of people with disabilities is more sensitive to business cycles than is the employment of those without disabilities.

Table 4 does not suggest that pathologies cannot result in serious employment limitations or that health never prevents work. Even using the PSID data, approximately one-third of working-age men and almost one-half of working-age women with a disability had no labor earnings in 1988. Among this non-working subgroup of the population with disabilities, nearly 70% of men and 43% of women received a disability transfer payment in that year. In the recession period captured in the SIPP data, the percent of the male population with disabilities not working is even larger (45.2%) and nearly three men in four in this non-working population receive some form of government transfer.

Table 4 also provides information on the differences in economic well-being and labor earnings between the populations with and without disabilities. Family income combines all sources of income available to the family. To account for differences in family size, the equivalence scale weighting factor contained in the US Bureau of the Census poverty

¹⁷ The SIPP values in Table 3 come from Wittenburg (1997), who used a definition of disability similar to that of Burkhauser and Daly (1996b). Because of the staggered nature of the SIPP panel, the wave 3 and wave 6 data used captures a calendar year for respondents somewhere between October 1990 and January 1992.

measures is applied to family income.¹⁸ Labor earnings include all income from labor market sources, including primary and secondary jobs, professional practices, and bonus income.

Because men with disabilities are less likely to have a job, and more likely to be employed part-time when working, the median working-age male with a disability in the United States in 1988 received only about one-third of the labor earnings of his able-bodied counterpart. The median working-age woman with a disability had an even smaller percentage – one-twentieth. The mean values from the SIPP also demonstrate a wide gap in labor earnings of those with and without a disability.

The gap in median labor earnings between those with and without disabilities in the PSID data is narrowed both by other private sources of family income and by government tax and transfer policies. As can be seen in Table 4, the gap in median family size-adjusted before-government income (gross family income net of government taxes and transfers) between the two groups is much less than the gap in earnings. The gap is further reduced when government taxes and transfers are considered by the median after-government income measure. In the SIPP data the gaps in mean before- and after-government income are also smaller than the gap in mean labor earnings between the two groups.¹⁹ These findings suggest that, on average, the economic well-being of working-age men and women with disabilities in the United States is substantially improved by other sources of family income, including those from government tax and transfer policies, but that the large difference in labor earnings between those with and without disabilities is not fully offset.

Daly (1994) uses the same PSID cross-sectional definition of disability described in Table 2 to trace the prevalence of disability as well as the employment, use of transfers, and economic well-being of the working-age population with disabilities from 1970 to 1988. In addition, she focuses on “at-risk” labor market groups within that population. Burkhauser et al. (1993), using CPS data, find that not only are blacks and those with poor educational backgrounds more likely to have a disability, but that they are “doubly disadvantaged” in the labor market and in terms of economic well-being. Fig. 1, which is updated from Daly (1994), shows the employment rates of men aged 25–59 with a disability, and of these two subpopulations. All three groups’ employment rates are sensitive to the business cycle. The mid-1970s recession led to decade-high unemployment rates for the overall population and, as seen in Fig. 1, decade-low employment rates for men with disabilities. As the economy recovered over the remainder of the decade, so did the employment rate of men with disabilities. However, the recession of 1982 and its

¹⁸ The use of equivalence scales is controversial in the literature. See Burkhauser et al. (1996) for a discussion of the issue and the sensitivity of income distribution results to the use of alternative scales.

¹⁹ After-government income is based on actual income data from PSID and SIPP. Before-government income is a “counterfactual” concept, which makes the strong assumption that behavior does not change in the absence of government. Hence, our before-government values are best thought of as a means of showing to whom current benefits go, given present government policy, rather than as a measure of what would actually occur in the absence of government.

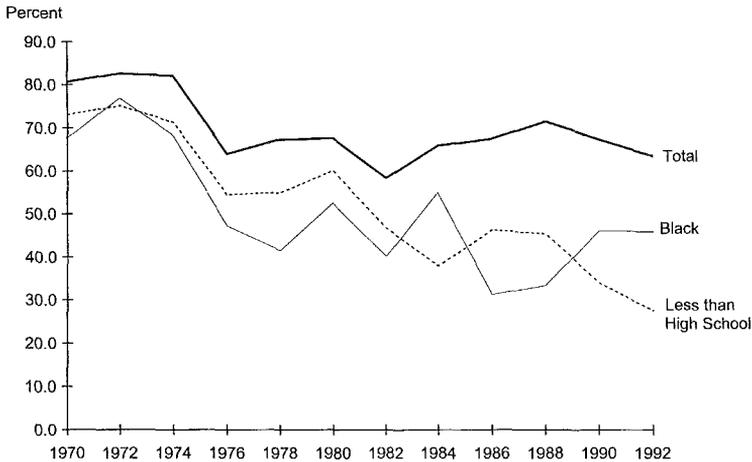


Fig. 1. Employment rates of men with disabilities.

decade-high unemployment rates in 1982 and 1983 dropped the employment rates of men with disabilities below their previous decade lows. The subsequent years of economic growth over the 1980s saw increasing employment rates for men with disabilities, but when recession hit in the early 1990s, the employment rate of men with disabilities once again fell. Importantly, while the subpopulations of blacks and poorly educated men with disabilities also show a cyclical pattern, their employment rates recovered to a far smaller degree from these recessions than did that of the rest of the population with disabilities.

Fig. 2 traces the prevalence of disability transfers among these populations and Fig. 3 traces the prevalence of any form of government transfer (e.g., Unemployment Insurance, Aid for Families with Dependent Children (AFDC), Food Stamps) in the families of these populations. Fig. 2 records substantial increases in the prevalence of disability transfer receipts among males with a disability over this period, with peaks that closely parallel business cycle troughs. While prevalence rates subsequently fell, they remained above pre-trough highs. This cyclical pattern is even more pronounced for poorly educated men with disabilities. Over this period, black men with disabilities experienced the greatest increase in their prevalence of disability benefit receipts, with the most rapid increase in the 1980s. As can be seen in Fig. 3, these same group patterns hold for the prevalence of all forms of government transfers.

Table 5, which is also updated from Daly (1994), looks at the labor earnings and family economic well-being of men with and without disabilities. Column 1 shows the ratio of mean labor earnings of men aged 25–59 with a disability to the mean labor earnings of men that age without a disability. The ratio is lowest around the troughs of the 1970s and 1980s business cycles, which suggests that men with disabilities not only have reduced earnings during the downside of the business cycle but are affected more than other male



Fig. 2. Prevalence of disability transfers among men with disabilities.

workers. There also appears to be a secular downward movement over the entire period. Column (2) compares the labor earnings for black men with a disability to black men without a disability. Not only do black men have lower mean earnings than non-blacks but black men with a disability earn substantially less than black men without a disability. There are also strong cyclical and secular movements in this ratio. And column (3) shows the same strong cyclical and secular trend for poorly educated men with disabilities relative to poorly educated men without disabilities.

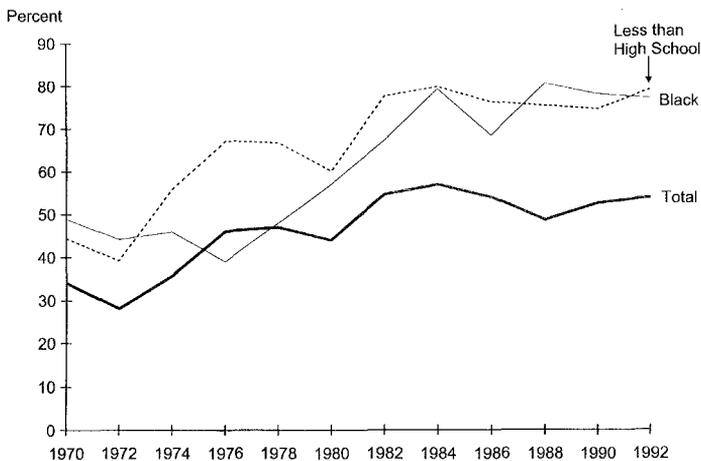


Fig. 3. Prevalence of all transfers among men with disabilities.

Table 5
Ratio of mean labor earnings and economic well-being of men with and without disabilities^a

Year	Labor earnings			Family size-adjusted income ^b		
	All	Blacks	Less than high school education	All	Blacks	Less than high school education
1970	0.57	0.33	0.41	0.77	0.56	0.70
1972	0.60	0.41	0.48	0.78	0.60	0.74
1974	0.62	0.46	0.55	0.83	0.77	0.78
1976	0.42	0.27	0.36	0.77	0.61	0.70
1978	0.52	0.34	0.40	0.85	0.74	0.77
1980	0.40	0.28	0.39	0.73	0.80	0.85
1982	0.43	0.24	0.30	0.78	0.67	0.81
1984	0.49	0.39	0.37	0.81	0.78	0.96
1986	0.46	0.15	0.36	0.78	0.66	0.96
1988	0.49	0.22	0.31	0.74	0.65	0.88
1990	0.52	0.23	0.31	0.76	0.61	0.83
1992	0.49	0.25	0.18	0.69	0.69	0.66

^a Source: Updated from Daly (1994). Population is limited to men aged 25–59 who were either family heads or spouses and were so in the two survey years (t and $t + 1$) that were paired for each year (t) reported in the table. Those who reported a physical or nervous condition that limits the type of work or amount of work they can perform in both (t and $t + 1$) are considered to be disabled in year t .

^b Family income divided by the United States Census poverty line income for a family of that size.

Labor earnings for all three populations were substantially lower relative to their non-disabled peer group in 1988 than in 1970. In contrast, the economic well-being of all men with disabilities was at about the same level relative to men without disabilities in 1988 as it was in 1970. Income from other private sources as well as a substantial increase in government transfers replaced lost earnings for men with disabilities over the period. As a result of this non-labor income, blacks and poorly educated men with disabilities actually gained ground on blacks and poorly educated men without disabilities.

2.2.2. A multiperiod view

The previous tables and figures showed substantial differences between the labor earnings and economic well-being of working-age people with and without disabilities over the previous two decades. However, such cross-sectional analyses may not accurately portray the impact that a disability has on individuals. First, cross-sectional analysis cannot distinguish between differences caused by the onset of a work-limiting health condition and differences that may have existed prior to onset. From the perspective of policy-makers, this distinction is important. Economic disparities that exist prior to the onset of a disability may not be eliminated by disability-based programs. In addition, cross-sectional “snapshots” of the population with disabilities reveal little about the transition to disability, the opportunities for intervention, or the time frame during which individual

economic well-being declines. Finally, cross-sectional data oversample “long-stayers.” Thus, any cross-section of people with disabilities will have a disproportionate percentage of individuals whose disability occurred long ago. If work and economic well-being deteriorate as a spell of disability lengthens – as is suggested by Table 1 – then cross-sectional samples may overstate the initial impact of disability on economic well-being.

In Table 6, Burkhauser and Daly (1996b) address these points by providing a multi-period view of disability. The 1970 to 1989 waves of the PSID are used to follow the life course of men and women who experience the onset of a disability between ages 25 and 61. The onset of disability is captured by requiring individuals to have two periods of no reported disability followed by at least two periods of disability.²⁰

As Table 6 shows, 2 years prior to the onset of their health-related work limitation, 90.4% of men and 67.3% of women worked. Subsequent rows show a decline in work after the onset of the disability. As was true in Table 4, labor earnings are more seriously affected than family income. The median change in labor earnings for men is a decline of 24% 1 year after onset and 31% 2 years after onset. For women, the median drops are even larger. However, while employment falls following the onset of a disability, the median man or woman experiences a much smaller drop in labor earnings than is implied by the cross-sectional results in Table 4.

Moreover, the drops in labor earnings that are observed after onset do not carry over to household income. The final two rows of Table 6 show how the median family size-adjusted before- and after-government income changes following the onset of a disability. Before-government income of men falls by 9.7% and after-government income of men falls by 2.6% during the period 1 year before and 1 year after onset. Over this time, the median percentage change for women is positive, with an increase in before-government income of 1.7% and an increase in after-government income of 5%. These results suggest that the picture cast by cross-sectional data, one in which individuals and their families face precipitous declines in economic well-being following the onset of a disability, do not represent the shortterm consequences of disability for the typical individual, although for some families large declines do occur.²¹

2.3. A cross-national comparison: the United States and the Federal Republic of Germany

Little information is available on the economic well-being of people with disabilities outside the United States. Burkhauser and Daly (1999) use data from the German

²⁰ Applying these criteria over 20 years of PSID data, a sample of 725 men and 303 women is created. To capture experiences following the first occurrence of a disability, subsequent spells are excluded from the analysis. This longitudinal sample is used to examine the labor market activity and economic well-being of individuals prior to, during, and after disability onset.

²¹ While the median change was small, for the left tail of the distribution the change was much larger. Hence, these results should not be taken to imply that the onset of a disability is related to small changes in economic well-being in all cases. Furthermore, Table 5 focuses on the shortterm changes in economic well-being. It is certainly possible that the longer term consequences of disability on the economic well-being of the family are more serious.

Table 6

Economic changes following the onset of a disability among working-age men and women in the United States, 1970–1989^a

Onset of disability	Percent working positive hours	Median labor earnings (\$) ^b	Equivalent median income (\$) ^c	
			Before-government	After-government
<i>Men</i> ^d				
2 years prior	90.4	21215	17347	16224
1 year prior	90.8	21543	18381	16812
Year of disability event	87.2	18760	16434	16160
1 year after	72.3	13220	14567	15739
2 years after	68.2	11798	13930	15406
Median percentage changes from				
1 year prior to 1 year after disability		-24.0	-9.7	-2.6
1 year prior to 2 years after disability		-31.0	-12.1	-3.7
<i>Women</i> ^d				
2 years prior	67.3	5063	18247	16842
1 year prior	68.0	6582	19921	17370
Year of disability event	70.0	5995	19827	17923
1 year after	63.6	3277	18446	17859
2 years after	57.6	1699	20251	18537
Median percentage changes from				
1 year prior to 1 year after disability		-41.0	1.7	5.0
1 year prior to 2 years after disability		-61.7	5.5	7.6

^a Source: Burkhauser and Daly (1996b).^b Median labor earnings includes zero earnings. Earnings are in 1991 dollars.^c Before- and after-government incomes are adjusted for family size using the equivalence scale implied by the United States Census poverty line. Income-to-needs ratios can be computed by dividing equivalent median income (in 1991 dollars) by the 1991 one-person poverty threshold of \$6932.^d The sample is based upon data from the 1970–1989 waves of the PSID. The sample includes family heads and spouses who reported two consecutive periods of no disability followed by two consecutive periods of disability, who were between the ages of 25 and 61 at onset. A period of disability is one in which the respondent reported that a physical or nervous condition limits the type of work or the amount of work that he or she can do. The sample size for men in the first four periods is 725. It is 677 in the fifth period (2 years after onset). The sample size for women in the first four periods is 303. It is 236 in the fifth period (2 years after onset). The sample size is smaller for women because the PSID did not ask about spouses' disability status until 1981.

Socio-Economic Panel (GSOEP) to compare German and United States men in 1988. Table 7 compares the prevalence and work activities of men aged 25–59 with and without disabilities in the United States and Germany. The PSID population with disabilities is defined by the same two-period cross-sectional definition discussed in Table 2 except that the working age is 25–59. This was done to be consistent with the German definition of working age. In Germany, “normal” retirement age is approximately age 60.²²

Unlike surveys in the United States, the German Socio-Economic Panel (GSOEP) does not consistently ask respondents if their health limits their ability to work.²³ Instead respondents are asked to report both their overall health satisfaction and whether they have any chronic conditions or persistent disabilities. In addition, respondents are asked whether they have received an official disability certificate. Those with official certificates are asked to report their officially assigned disability percentage. This can range from 10 to 100% disability. Burkhauser and Daly (1999) construct a measure of disability that captures a German population with disabilities comparable to the population selected in the United States by combining information from these three questions.²⁴ As in the United States, the population is limited to those men who are classified as disabled for two consecutive periods.

Table 7 provides estimates of the prevalence of disability among working-age males as well as their relative economic well-being for the United States and Germany in 1988. As we saw in Table 4, American working-age men with disabilities work less and earn less than the rest of the male population. They are also more likely to receive a disability transfer benefit and to have less household income than the rest of the population.

German disability transfer programs for those of working age are a much smaller component of their social welfare system than are disability transfer programs in the United States. (This is discussed more fully in Section 5.) German disability policy is more focused on keeping working-age persons with disabilities in the labor force, and longterm unemployment and longterm welfare benefits offer alternative sources of income for Germans who do not work. Hence, while the prevalence of disability among the working-age population is similar in the two countries, the mix of work and transfer

²² As discussed in endnotes 4 and 6, normal retirement age is a social construct. Labor force participation rates of men in Germany decline dramatically around age 58 when those with health conditions or who are unemployed are eligible to receive special program benefits that bridge the gap in their earnings until the normal retirement age. Age 60 is chosen because that is when labor force participation rates in Germany near the 50% level. See Daly et al. (1997) for a further discussion.

²³ The GSOEP is a longitudinal dataset that began in 1984 with a sample of 5921 households. These data are similar in design to the PSID. An English language version of the GSOEP data is available as a Public Use File developed at Syracuse University. An equivalent data file, which links variables from the GSOEP to the PSID, is also available from Syracuse University. For a discussion of these data, see Wagner et al. (1993) and Burkhauser et al. (1999a).

²⁴ Burkhauser and Daly (1999) include in their population with disabilities those men who report that they are dissatisfied with their health. This population is augmented with men whose official disability certificate ranks them as at least 50% disabled, and who also report that they have a chronic impairment or persistent disability. These two criteria are designed to include both men whose poor health limits their work and those men who have functional limitations that limit their work.

Table 7

Labor force participation and economic well-being of working-age men with and without disabilities in the United States and Germany in 1988^a

	United States male population		German male population	
	With disability ^b	Without disability	With disability ^b	Without disability
Total population (thousands)	4438294	45345115	1386739	12131683
Percent of population	8.9	91.1	10.3	89.7
Median labor earnings ^c	\$13816	\$32438	DM36715	DM47424
Before-government income ^c	\$20875	\$31108	DM39565	DM45513
After-government income ^c	\$21075	\$26397	DM33082	DM34688
<i>Labor force activity (%)^d</i>				
Full-time work	45.6	84.2	58.4	81.4
Receive disability transfers ^e	16.3	2.5	0.7	0.7
Part-time work	25.9	13.6	9.5	13.6
Receive disability transfers ^e	31.1	4.4	13.5	1.2
No work	28.5	2.2	32.1	5.0
Receive disability transfers ^e	73.8	5.8	62.6	8.2
Total	100.0	100.0	100.0	100.0
Receive disability transfers ^e	36.5	2.8	21.8	1.1
<i>N</i>	319	3431	193	2023

^a Source: Burkhauser and Daly (1999). Population is limited to men aged 25–59 who were either household heads or spouses in 1988 and 1989.

^b People in the PSID who report a physical or nervous condition that limits the type or amount of work they can do in 1988 and 1989.

^c In 1991 dollars or deutschmarks.

^d Full-time men work at least 1820 h (35 h per week). Part-time men work between 1 and 1820 h.

^e Men who received disability-related transfers. In the United States this includes Social Security Disability Insurance, Supplemental Security Income, Veterans Benefits, and Workers' Compensation.

receipt is quite different. While German men with disabilities are slightly less likely to work than American men with disabilities, they are much more likely to work full-time. Nearly three of five German men with disabilities work full-time. They also have labor earnings that are much nearer to those of their able-bodied counterparts. Hence, in Germany, disability transfers and other government tax and transfer policies have a much smaller gap to fill in order to assure that the household economic well-being of men with disabilities does not fall below that of their able-bodied counterparts.

As is the case in the United States, the majority of German men with disabilities who do not work receive disability-based transfers. However, the share of non-working men with disabilities receiving disability-related transfers is lower in Germany than in the United States. Overall only about one in five Germans with disabilities received disability-based transfers in 1988. Furthermore, German men with disabilities live in households with income levels much closer to those of their able-bodied counterparts than is the case in the United States.

This cross-sectional look at the broad population with health-related work limitations suggests that both in the United States and Germany work is more common than disability transfer receipt. Only among those who receive no labor earnings over the entire year is disability transfer receipt prevalent. This suggests that even though work-limiting health conditions cause men with disabilities to work less than other men their age, work plays an important role in the lives of men with disabilities in both countries.

2.3.1. A multiperiod view

Table 7 shows substantial differences between the labor earnings and economic well-being of working-age men with and without disabilities in 1988 in the two countries. As we have seen, however, such cross-sectional analysis cannot distinguish between differences caused by the onset of a health-limiting health condition and conditions that may have existed prior to onset.

Table 8 uses the 1983–1989 waves of PSID and GSOEP to follow the life course of men who experience the onset of a disability between that ages of 25 and 59. The first row of Table 8 shows that 2 years prior to the onset of their health-related work limitation, about 96% of both United States and German males worked. In subsequent rows we see that after the onset of the disability work declines in both countries, but more so in the United States. Labor earnings are most seriously affected in the United States. Median labor earnings fall

Table 8
Short-run economic consequences of a disability among working-age men in the United States and Germany^a

	United States				Germany			
	Before-government income ^b	After-government income ^b	Percent positive working hours	Median labor earnings ^c	Before-government income ^b	After-government income ^b	Percent positive working hours	Median labor earnings ^c
2 years prior	21906	19430	96.1	25316	40399	30081	95.9	39425
1 year prior	22973	20137	97.2	25475	39520	30658	95.9	39454
Year of disability event	21812	19766	89.4	23656	41110	31362	92.8	41960
1 year after	22585	20070	80.4	19883	39942	31462	89.7	39775
2 years after	22636	21989	78.0	18819	42910	34878	82.4	43963
Median percentage changes from								
1 year prior to 1 year after disability	-3.7	2.8	NA	-5.2	2.1	4.7	NA	0.0
1 year prior to 2 years after	-2.4	3.9	NA	-8.4	15.4	15.4	NA	4.4

^a Source: Burkhauser and Daly (1999). Population is limited to men aged 25 or more in 1983 and less than age 60 in 1989 who were household heads or spouses in all years. United States sample size in the first four periods is 179. It is 118 in the fifth period (2 years after). German sample size in the first four periods is 97. It is 68 in the fifth period (2 years after). All money values are in 1991 dollars or deutschemarks.

^b Before- and after-government incomes are adjusted for household size using the equivalence scale implied by the United States Census poverty line.

^c Median labor earnings includes those with zero earnings.

from about \$25,000 the year before onset to about \$20,000 the year following onset. In Germany there is virtually no change over this same period. The median change in labor earnings in the United States was -5.2% after 1 year and -8.4% after 2 years. While this was a substantially greater drop than in Germany, where the median change was zero after 1 year and there was an increase after 2 years, the change among United States men was still much smaller than might be inferred from the cross-sectional differences in labor earnings reported in Table 4.

This same pattern is found with respect to economic well-being. We find median real household size-adjusted income remained virtually unchanged in both countries immediately following the onset of a disability. This was true for both before-government income and after-government income. In the United States, before-government income dropped slightly from \$22,973 1 year before to \$22,585 1 year after onset. In Germany the values are DM 39,520 and DM 39,942. After-government changes were even less severe. When we look at the median percentage change over the 1-year period, before-government income falls 3.7% in the United States and actually increases in Germany. After-government income increases in both countries. These findings provide further evidence that inferences from cross-sectional data exaggerate the initial change in both labor earnings and economic well-being associated with a disability.²⁵

3. Disability transfer policies in the United States

3.1. SSDI and SSI program features

The United States relies heavily on the private sector to fund what would be considered social services in other countries and thus it has no universal temporary disability, industrial accident, or health insurance programs for workers. Compared to most Western nations, the United States has a considerably smaller social welfare system. With respect to disability, it does not have a sickness program to act as a path to the longterm disability program. Instead, it has thousands of firm-based sick leave policies and only one major public longterm disability program for labor force participants. Compared with other countries, the United States has fewer alternative public programs to match its disability insurance program.

The decentralized quality of the United States system has meant the development of state workers' compensation and unemployment compensation programs. These programs differ from state to state in the manner in which they award benefits, in the size of the benefits, and even in the nature of the benefits. Some states provide benefits to workers injured in the course of employment on the basis of a worker's impairment; other states base these benefits on an estimate of lost earning capacity. State administration of work-

²⁵ Like Table 5, Table 7 focuses on changes in earnings and family economic well-being in the first years following the onset of a disability. A weakness in the current literature is lack of information on the long-run consequences of a disability on economic well-being.

ers' compensation and unemployment compensation has also tended to isolate these programs from federally-administered permanent disability insurance.²⁶

Here we concentrate on the two major federal disability transfers programs, Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI).²⁷ SSDI benefits are financed through a payroll tax (0.85% in 1997), paid by both employees and employers. This increases to 0.90% in the year 2000. The tax was paid on the first \$65,400 of earnings in 1997. This maximum is indexed to increases in average earnings. As with every other insurance system, SSDI requires that applicants show that the insured event has occurred before benefits are paid. For SSDI, the insured event is longterm work incapacity. Only those employees who have a record of steady and recent work are insured for benefits.²⁸

3.2. *The SSDI eligibility determination process*

The actual arrangement for awarding SSDI and SSI benefits is complex. A person seeking these benefits applies for them at an office of the Social Security Administration (SSA). Once the federal officials and the applicant have gathered sufficient information to complete the application, it is submitted to a state agency for determination of disability. Disability examiners in this office, working with the aid of vocational and medical consultants, act as the primary gatekeepers of both the SSDI and SSI programs. Disability

²⁶ State and federal worker's and compensation laws covered around 100 million employees in 1997. Workers' compensation is the oldest government-run disability insurance program in the United States; by 1920 most states required firms doing business in their jurisdiction to provide coverage. The structure of this program and other transfer programs targeted on the population with disability in the United States is discussed in a cross-national context in Section 5. The literature on the effects of workers' compensation on the demand and supply of labor parallels the literature on Social Security Disability Insurance, which is the focus of Section 4. Because the workers' compensation literature is substantial and deserves a full discussion in its own right, we do not review it in this chapter. For earlier reviews of the workers' compensation literature, see Worrall and Butler (1986), Berkowitz and Burton (1987), Burton (1988), and Ehrenberg (1988). Krueger and Meyer's chapter on social insurance to appear in a forthcoming volume of the *Handbook of Public Economics* will include an updated review of this literature.

²⁷ The federal government also administers the veterans benefit program. While the income transfer component of the program is small relative to either SSDI or SSI for disability, it is not insignificant. Veterans program expenditures exceeded \$37 billion in 1994 with \$17 billion going to pension and compensation programs (this includes both disability-based pensions and retirement pensions) and \$2 billion for welfare programs. The bulk of veterans' program benefits went for health and medical programs, education, and life insurance. One can think of veterans' benefits as workers' compensation for military workers, since benefits are provided to veterans with service-connected disabilities. These non-means-tested benefits are based on the percentage of normal function lost. Payments in 1997 ranged from \$94 per month for a 10% disability to \$1924 a month for total disability. For a fuller discussion of the veterans' benefits program, see US Department of Health and Human Services (various years)

²⁸ To qualify for SSDI benefits, an individual must have worked in employment subject to Social Security contributions for about one-fourth of the time elapsing after age 21 and up to the year of disability. In addition, he or she must have recent covered work – equivalent to 5 of the preceding 10 years (or, if between ages 24 and 31, half the time since age 21, or if under age 24, half of the preceding 3 years). For a more detailed discussion of the eligibility requirement of SSDI, see US Department of Health and Human Services (various years).

decisions are made by state agencies, acting under contract to the federal government. Therefore, although the definition of disability is the same across the country, the results of the disability determination process can vary from state to state.

The law defines disability as the inability to engage in substantial gainful activity by reason of a medically determinable physical impairment expected to result in death or last at least 12 months. The worker must be unable to do any work that exists in the national economy for which that worker is qualified by virtue of his age, education, and work experience. The United States does not award federal disability benefits for partial disability but only for permanent and total disability.

As a practical matter, SSA asks the state disability determination offices to follow a five-step procedure in determining disability. First, the examiners check to see if the applicant is currently working and making more than \$500 a month, defined as the “substantial gainful activity” amount. If so, the application is denied. As can be seen in Fig. 4, almost no cases are rejected in this manner, since presumably the SSA field offices have already checked to see if the applicant is working before they send the application to the disability determination office. Second, the state disability examiners determine if the applicant has a severe impairment that is expected to last 12 months or result in death. If not, the application is denied. About 26% of all applicants were denied at this step in 1994. Third, the state disability examiners look to see if the impairment is included on a list of impairments

Allowances (percent of all applications)		Denials (percent of all applications)
	(1) Is the applicant engaging in substantial gainful activity? (earning more than \$500 per month) No _____ Yes _____ 	0%
	(2a) Does the applicant have a severe impairment (or combination of impairments) that limit basic work activities? Yes _____ No _____ 	18% ^a
	(2b) Is the impairment expected to last 12 months or result in death? Yes _____ No _____ 	8%
18% 	(3a) Does the impairment(s) meet the medical listings? Yes _____ No _____ 	
3% 	(3b) Does the impairment(s) equal the medical listings? Yes _____ No _____ (Assess residual functional capacity)	
	(4) Does the impairment(s) prevent doing past work? Yes _____ No _____ (Consider applicant's age, education, and work experience)	20%
11% 	(5) Does impairment(s) prevent any other work that exists in the national economy? Yes _____ No _____	22%
Allow 32%		Deny 68%

^aThis response includes 5 percent of claims that were denied because the applicant failed to cooperate in obtaining evidence needed for the claim. The other 13 percent were denied for "impairment not severe."
Source: Mashaw and Reno (1996).

Fig. 4. Social Security Disability Insurance determinations: sequential decision-making process and outcomes of decisions on initial SSDI applications, 1994.

defined as disabling by SSA. If the impairment is listed, and if it can be expected to last at least 12 months – medical doctors hired by the state agencies help to make this decision – then the person receives benefits. If the impairment is judged to be the equivalent of one of the listed disabling impairments, then the person also receives benefits. Most recipients are awarded benefits at this stage because their impairment either “meets” or “equals” (21% of all applicants in 1994) one of those on the list.

If a decision cannot be reached on medical factors alone, the applicant’s residual functional capacity is examined, to see if the person’s impairment prevents him or her from meeting the demands of “past relevant work.” If not, then benefits are denied. About 20% of all applicants were denied at this step in 1994. If so, examiners determine if the impairment prevents the applicant from doing other work. Here vocational factors are considered. If, for example, a person’s maximum sustained work capacity is limited to sedentary work and he is at least aged 50–54, with less than a high school education and no skilled work experience, then the person would be considered disabled and given benefits. But if the person’s previous employment experience includes skilled work, then he or she would not receive benefits. At this point, 11% of all applicants were allowed and 22% were denied in 1994.

Applicants who are denied benefits can ask for a reconsideration. Their file will then go back to a second team of examiners. Rejected on this reconsideration, an individual may appeal the case to an administrative law judge. Here is the first time that an applicant will actually come face to face with the decision makers. Denied benefits at this stage, an individual may appeal the decision to the Social Security Appeals Council and then to the District Courts.

Only a minority of claims get past the initial hearing (34% in 1995), with an even smaller portion getting as far as an administrative law judge (19% in 1995) (US House of Representatives, 1996). Still, as the proportion of claimants who were initially denied benefits rose during the late 1970s, the proportion of those who appealed also rose. The proportion of initial decisions that were reversed also went up (Lando et al., 1982). For the claimants who are either allowed benefits at the initial level or who do not appeal, the process usually takes a few months. For those who appeal through to the administrative law judge, the process can take a year or more.

The validity of the medical screening involved in determining SSDI and SSI eligibility has always been questioned. During the 1960s the Social Security Administration commissioned several studies to consider this issue. The most ambitious effort was a study conducted by Nagi (1969a). Independent panels evaluated the work potential of a sample of SSDI applicants. These panels included doctors, psychologists, and occupational and vocational counselors. They were authorized to enter applicants’ homes to conduct any of a variety of tests and to collect any information they felt to be relevant to the case. Moreover, in their deliberations they were not bound by the legal definition of disability.

The teams evaluated applicants on an eight-point continuum ranging from “fit for work under normal conditions” to “not fit for work.” Table 9 from Nagi (1969a) compares the clinical teams’ eight-point evaluations of work capacity to the actual Social Security Administration decisions to provide or deny benefits. Somewhat surprisingly, even

Table 9

Final determination of disability and the clinical teams' evaluation of work capacity of applicants^a

Work capacity	Final determinations					
	Allowance		Denial		Total	
	Number	Percent	Number	Percent	Number	Percent
Fit for work under normal conditions	–	–	9	100.0	9	100.0
Fit for specific jobs, including former job, under normal conditions	23	13.9	142	86.1	165	100.0
Fit for specific jobs, excluding former job, under normal conditions	94	36.0	167	64.0	261	100.0
Fit for work under special conditions	92	50.5	90	49.5	182	100.0
Can work part-time under normal conditions	82	49.4	84	50.6	166	100.0
Can work under sheltered conditions	134	60.6	87	39.4	221	100.0
Can work at home only	66	69.5	29	30.5	95	100.0
Not fit for work	1019	75.2	336	24.8	1355	100.0
Total	1150	61.5	944	38.5	2454	100.0

^a Source: Nagi (1969a, p. 94).

among the subsample of people the clinical team judged to be non-borderline cases there is a 30–40% disparity compared to Social Security evaluation outcomes. For example, of those the clinical team judged to be fit only for work at home, 30.5% had been denied benefits. Of those the clinical team judged to be fit for work in specific jobs, excluding former jobs, under normal circumstances, 36% received SSDI allowances.²⁹

Nagi (1969a) pointed out the limitations of the SSDI screening process. Because the vast majority of its applicants suffer significant health limitations, the SSDI gatekeepers have considerable difficulty distinguishing the more deserving from the less deserving. They have particular difficulty in evaluating cases that involve either multiple impairments or psychological or vocational components. While it is possible to imagine improving the quality of the screening process, such evaluations probably will always involve elements of subjective judgment³⁰ (see Mashaw, 1983 for a further discussion of this issue).

²⁹ SSDI applicants represent a very select subset of the population – at the time of the Nagi (1969a,b) study, less than 2% of the adult, working-aged population would have ever applied for SSDI benefits. Thus, while the team evaluations were often at odds with those of the Social Security Administration, agreement rates would undoubtedly be higher for a random sample of the population.

³⁰ While the Nagi (1969a,b) study was designed to study the validity of the medical screening involved in the evaluation of SSDI applicants, it does not shed much light on the reliability of the Social Security evaluations across jurisdictions. The Social Security Administration conducted one study during the late 1970s that evaluated the reliability of SSDI screening (Gallicchio and Bye, 1980), and the evidence suggests that reliability at the level of the initial screening seems to be reasonably high. In the Gallicchio and Bye study applicant files were sent to two different disability determination teams and evaluations were compared. The overall probability of a disagreement between two teams was just over 15%. The reliability of the process at the administrative law judges level is much more problematic. Large discrepancies suggest that different judges interpret the law differently.

As discussed below, there have been substantial changes in the nature of the medical screening used to evaluate disability insurance applicants since Nagi's study. Not only has the Social Security Administration made changes in the criteria used to evaluate disability applicants, but the fraction of individuals appealing decisions substantially increased. As a result, it is unclear to what extent the Nagi study still applies. Still, no similar study has ever been commissioned and so it continues to be the most reliable guide to the accuracy of the medical screening used to evaluate applicants.

In a recent paper, Benitez-Silva et al. (1999), using data from the Health and Retirement Study, provide more contemporaneous information on the validity of the screening process. Benitez-Silva et al. (1999) find that a large part of the screening function of the SSDI program is done by the applicants themselves via self-selection. The self-selection works at each stage of the process. Those who initially apply for SSDI benefits have greater functional limitations than do comparably aged individuals in the population. Furthermore, among those initially denied SSDI benefits, those who appeal have significantly worse health than those who do not. The overall effect of self-selection in the appeal process increases the fraction of individuals identifying themselves as "unable to work" from 68% in the initial applicant pool to over 76% of rejected applicants who choose to appeal. Accounting for the additional screening done by the disability examiners, 82% of successful applicants identify themselves as "unable to work," while only about one-half of the rejected applicants do so.³¹ Taking these percentages at face value implies a type I error (disabled individuals denied disability benefits) rate of 50% and a type II error (non-disabled individuals awarded benefits) rate of 18%, estimates that are consistent with Nagi's study. If, as seems likely, those who apply for SSDI and especially those who are awarded benefits tend to exaggerate the extent of their work limitations (relative to those who do not apply), then these estimates will underestimate the number of type I errors, and overestimate the number of type II errors. Still, the notion that self-selection at each stage of the process works to significantly reduce error rates seems both sensible and important.

3.3. SSDI benefit amounts

The size of SSDI benefits is determined by a two-step process. Benefits are based on average covered Social Security earnings (Average Indexed Monthly Earnings (AIME)) adjusted by a progressive benefit formula. The progressive nature of the Primary Insurance Amount (PIA) formula yields a lower replacement rate for higher wage earners. This can be seen in the example shown in Table 10. A worker who became eligible to receive SSDI at age 50 in 1996 and who had worked full time at the federal minimum wage since age 22

³¹ The fact that roughly 50% of those denied disability benefits identify themselves as severely disabled is consistent with Bound's (1989) tabulations using retrospective data derived from the 1972 Survey of Disabled and Non-Disabled Adults and the 1978 Survey of Disability and Work. In contrast, Bound found that a higher fraction of those awarded benefits identified themselves as unable to work (93% using the 1972 survey, and 97% using the 1998 survey). What accounts for these discrepancies remains unclear.

Table 10

Social Security Disability Insurance benefits amount and replacement rates in 1996^a

Average indexed yearly earnings (\$)	Worker only ^b		Worker, spouse, and one child ^b	
	Amount (\$)	Replacement rate (%)	Amount (\$)	Replacement rate (%) ^c
11256 ^d	6828	61	9828	87
17844 ^e	9000	50	13488	76
23784 ^f	10956	46	16428	69
35604 ^g	13148	40	21204	60
51276 ^h	16572	32	24852	48

^a Source: Derived from Table 2A26, US Department of Health and Human Services (1997).

^b Assumes the worker started employment at age 22, became disabled at age 50 in 1996, had no earnings in 1996, and had no previous disabilities.

^c The 1980 Amendment to the Social Security Act placed a maximum on the amount of disability benefits a family could receive. For disabled workers entitled after June 1980, the maximum is the smaller of 85% of the worker's Average Indexed Monthly Earnings or 150% of the worker's Primary Insurance Amount. In all examples in this column family benefits are limited by the maximum family benefit criteria.

^d Worker earned the federal minimum wage for 2080 h of work per year in each year of his work life.

^e Worker earned 75% of average Social Security covered earnings in each year of his work life.

^f Worker earned the average of Social Security covered earnings in each year of his work life.

^g Worker earned 150% of average Social Security covered earnings in each year of his work life.

^h Worker earned the maximum taxable Social Security covered earnings in each year of his work life.

would have received \$6828 in SSDI benefits in 1996. This is 61% of his average yearly earnings (AIME multiplied by 12).³² If that same worker supported a spouse and a child, additional benefits to them would have increased total family SSDI benefits to \$9828 in 1996 for an 87% replacement rate. In principle, those with additional dependants can receive even higher benefits, but in fact, such benefits since 1980 have been limited to the smaller of 150% of the worker's PIA or 85% of the worker's AIME. The replacement rate if this same worker had earned the average of Social Security covered earnings in each work year, was 46% in 1996, or 69% if the worker had a spouse and a dependent. If the same worker's earnings were at the Social Security taxable maximum during every past work year would have received even lower replacement rates.³³

³² SSA estimates an average indexed monthly earnings amounts for each worker based on the highest 35 years of Social Security-covered earnings where earnings in each year are adjusted for changes in overall wage growth. Hence, replacement rates are comparisons of SSDI payments to average yearly covered earnings. The PIA bend points make benefits "progressive."

³³ The replacement rates shown in Table 10 may understate the value of total disability benefits relative to wage earnings for two reasons. First, these are pre-tax replacement rates. Because SSDI benefits are tax free for most beneficiaries, net of tax replacement rates will be larger, especially for higher wage earners whose marginal tax rates on earnings are larger. Second, after a 2-year waiting period, all SSDI recipients become eligible for Medicare benefits. This is particularly important for lower wage earners, who are less likely to have medical insurance in their compensation package than are high wage earners.

For SSDI recipients who qualify for other federal, state, or local government disability or workers' compensation programs, SSDI benefits are reduced if total benefits exceed 80% of average earnings prior to the disability. Means-tested benefits, veteran's disability and public employment benefits are exempt from this test.

3.4. Work disincentive effects of SSDI

Once a person begins to receive SSDI benefits, it is possible for him or her to return to work without immediately losing those benefits. Concern about the disincentives to work that people on SSDI face spurred program changes in the 1980s that expanded the period of eligibility (EPE) and the period of Medicare coverage for those who have labor market earnings after coming onto the SSDI program.

In 1998, the law provided a 45-month period for disabled beneficiaries to test their ability to work without losing their entitlement for benefits. The period consists of (1) a "trial work period," which allows disabled beneficiaries to work for up to 9 months (within a 5-year period) with no effect on their disability or (if eligible) Medicare benefits, and (2) a 36-month "extended period of eligibility" (EPE), during the last 33 of which disability benefits are suspended for any month in which the individual is engaged in substantial gainful employment. Medicare coverage continues so long as the individual remains entitled to disability benefits and, depending on when the last month of substantial gainful employment occurs, may continue for 3–24 months after entitlement to disability benefits ends. The substantial gainful employment limit in 1998 was \$500 per month; earnings of more than \$200 per month constitute "trial work."

The introduction of the EPE for SSDI beneficiaries (and section 1619(b) for SSI beneficiaries, see below) represented a potentially important major change in the law. Its purpose was to reduce the risks associated with attempted by those currently receiving benefits to return to work. How effective the EPE has been in achieving its goal remains unclear. Other program changes that occurred around the time the EPE was introduced probably swamped any effect of the EPE on the return to work of SSDI beneficiaries (Hennessey and Dykacz, 1993).³⁴

Despite these work incentives, an exit from the SSDI program because of a permanent return to work is rare. Fig. 5 (from Burkhauser and Wittenburg, 1996) shows one reason for this by plotting how a single male's 1994 net income – the sum of labor earnings, SSDI benefits and the cash value of Medicare minus taxes – changes with each additional dollar of his labor earnings. The figure represents the implicit tax on work faced by the 17% of working age men with disabilities who receive SSDI benefits but not SSI benefits. It includes the effects of the loss of SSDI benefits and Medicare, Federal income and FICA taxes, and the Earned Income Tax Credit (EITC). The shape of Fig. 5 is sensitive to the initial amount of SSDI benefits and the family composition of the worker. In this

³⁴ Hoynes and Moffitt (1997) provide the most detailed discussion available of the possible behavioral effects of the EPE, but, as they acknowledge, they ignore behavioral effects resulting from reducing the risks associated with work attempts.

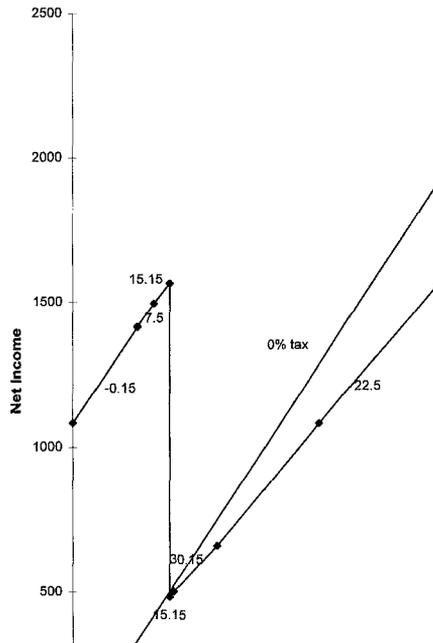


Fig. 5. Marginal tax rates on labor earnings and net income for a single person receiving SSDI and Medicare in 1994. Source: Burkhauser and Wittenburg (1996).

example the worker’s monthly SSDI benefits equal \$750, the average benefits paid to males in 1994. To this is added \$333, the 1994 monthly cash value of Medicaid for SSI-disability or SSDI beneficiaries. Hence, in Fig. 5, the combined value of monthly SSDI and Medicare insurance for a single male with no labor income is \$1083.

Because SSDI beneficiaries are allowed to earn up to \$500 per month before they reach the substantial gainful activity level, the only effects on earnings to that point are caused by the net tax effects of the EITC and FICA taxes (−0.15 to 15.15%). The phase-out tax on EITC benefits begins at \$418 and at that point net marginal taxes reach 15.15%. Once the substantial gainful activity level is established at \$500 (and all delays in its enforcement are completed), the worker faces a dramatic loss in benefits. The drop is so great that this worker would actually lose \$1083 in program benefits by earning one more dollar in labor income. To reach the same level of economic well-being that he enjoyed with no work at all, he would have to make \$1287 per month in pre-tax labor earnings. To reach the level of net tax income he enjoyed while earning \$500 he would have to make \$1918 per month in pre-tax labor earnings. Not only does the cliff at \$500 discourage work past this earnings level, but the EITC also sends mixed signals about work. While the EITC slightly encourages work at lower earnings levels, it is already in its phase-out range by the time the \$500 cliff is reached and, when mixed with the introduction of federal income

taxes, further discourages work past \$500 by raising the implicit tax rate on earnings to 30.15%.

3.5. SSI eligibility and benefit amounts

SSI provides a basic minimum income for those unable to work due to a disability. The medical eligibility criteria for SSI are the same as for SSDI. But, unlike SSDI, SSI recipients must also satisfy a family means-test. In 1997, the maximum federal SSI benefit was \$484 for a single person and \$726 for a couple. SSI recipients are required by law to apply for every government program for which they may be eligible. They are eligible in most states for Medicaid without an application.³⁵

While SSI recipients originally lost their eligibility for benefits and Medicaid if they passed the substantial gainful activity test, since 1986 SSI benefits and eligibility for Medicaid are continued for those who earn above substantial gainful activity under section 1619(b) provisions. In general, the special eligibility test for Medicaid applies if the individual has earnings over the level that offsets their SSI benefits but is still lower than a threshold amount established by the state in which they reside.³⁶

In 1995, only about 46,000 (1.3%) of the 3.5 million SSI disability recipients were in 1619(b) status (Mashaw and Reno, 1996, Table 9.1). As we saw in Fig. 5 with respect to SSDI beneficiaries, despite attempts to reduce the work disincentive effects of SSI contained in 1619(b) legislation, few SSI beneficiaries work. SSI recipients have a \$20 monthly income disregard for all forms of income with the exception of means-tested transfer income. They also have an additional \$65 monthly disregard for any labor income. After these disregards, for every \$1 in labor earnings a worker loses \$0.50 in SSI benefits. Therefore, after all disregards, a SSI recipient faces a 50% implicit tax rate on labor earnings.³⁷ In-kind assistance from government programs like food stamps and housing are not counted as income against the individual's overall SSI benefit. All other benefits from government programs are taxed at 100%.

Fig. 6 (from Burkhauser and Wittenburg, 1996) shows how a single male's 1994 net income changes with each additional dollar of his labor if he is eligible to receive the federal SSI benefit of \$458 in addition to the average cash value of Medicaid insurance for SSI disability or SSDI beneficiaries of \$540 per month. With no labor earnings, this person would receive \$998 per month in SSI benefits and Medicaid insurance. Fig. 6 shows the

³⁵ In 1992, 79% of the applicants lived in states that did not have separate applications for Medicaid. In the remaining states, there were separate applications and/or eligibility requirements for the Medicaid program (US House of Representatives, 1992).

³⁶ In making this determination, the Social Security Administration takes the average expenditures on Medicaid and SSI (including state SSI) and compares this amount to an individual's earnings (US Social Security Administration, 1995).

³⁷ In certain cases, impairment-related expenses may be deducted from this total. Also, income is disregarded when it is used for Plans for Achieving Self Support (PASS).

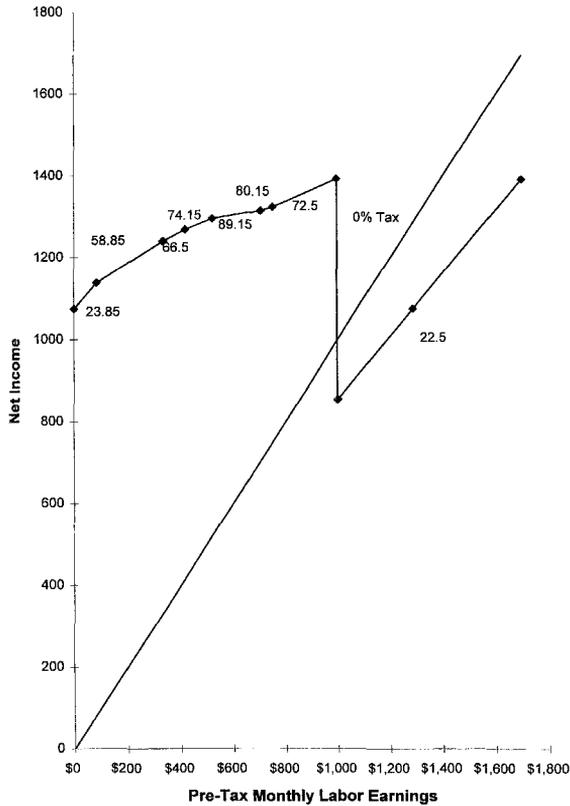


Fig. 6. Marginal tax rates on labor earnings and net income for a single person receiving Medicaid, SSI and food stamps in 1994. Source: Burkhauser and Wittenberg (1996).

interaction of the EITC and federal taxes as well as food stamps, which more than one-third of this population receives.

As was the case in the previous figure, the EITC phase-in subsidy to work offsets FICA taxes, but because the food stamp program subtracts 24 cents in food stamps for every dollar of labor earnings, the net tax on the first dollar of labor earnings is 23.85%. This tax rate continues up to the SSI disregard level of \$85 per month. At this point the 50 cent loss in SSI benefits per dollar of labor earnings interacts with the food stamp program taxes on work, resulting in a net tax of 58.85%. When the EITC plateau begins, the net tax on labor earnings rises to 66.5% and when the EITC phase-out tax begins, the net tax on labor earnings rises to 74.15%. When the federal income tax standard deduction level is passed and federal income tax starts, the marginal tax rate rises to 89.15%. Marginal tax rates only begin to fall when food stamps and EITC break-even points are reached. The final increase in tax rates occurs just before SSI benefits phase out, when all Medicaid benefits are lost

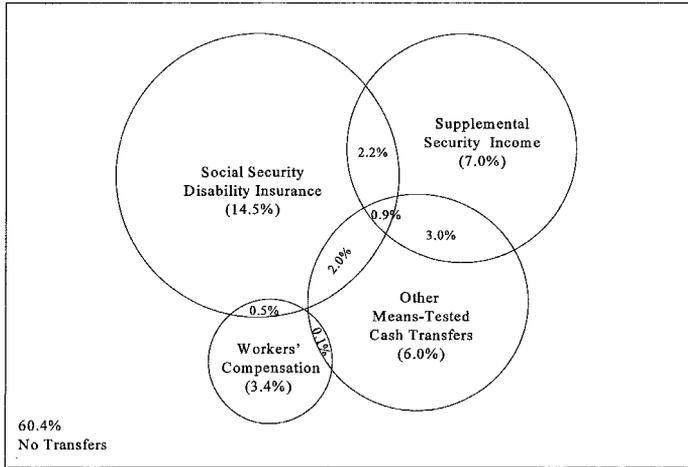


Fig. 7. Distribution of male population with disabilities across transfer programs. Source: Burkhauser and Wittenberg (1996).

because earned income now equals the Medicaid special eligibility plateau. As Figs. 5 and 6 show, multiple program eligibility will substantially increase the disincentive to work for SSDI or SSI participants.

While we focus here on SSDI and SSI, people with disabilities may also be eligible for other government programs either targeted specifically on them – e.g., Workers' Compensation – or more generally on low-income populations. Fig. 7 (from Burkhauser and Wittenburg, 1996) uses a Venn diagram to show the interaction of transfer programs participation of the working-age male population with disabilities captured in a monthly cross-section of the 1990 SIPP Longitudinal Microdata file. While 60% of this population received no transfer payments, the remaining population received benefits from a variety of sources. For instance, of the 20.1% of the male population with disabilities receiving SSDI benefits, almost one-third (5.6% of the male population with disabilities) also receives benefits from at least one other transfer program. The most common other program for those receiving SSDI is SSI (3.1% of the entire population) but other transfer benefit programs include food stamps, general assistance, and Aid to Families with Dependent Children. Workers' compensation and SSDI are received jointly by 0.5% of the male population with disabilities. Fig. 7 shows that multi-program eligibility is common for those who receive some type of disability transfer.³⁸

³⁸ Veterans benefits were not included in the Burkhauser and Wittenburg (1996) analysis. Using the same dataset, Wittenburg, in personal correspondence, found that 8.9% of men with disabilities received veteran's benefits. Of these men, 70.6% received no other government transfers, 21.7% received SSDI, 3.2% received SSI, 1.0% received Workers' Compensation, and 5.3% received other means-tested cash transfers.

3.6. A brief history of the Social Security Disability Insurance and Supplemental Security Income programs

SSDI operates as a social insurance program, with benefits payable as a matter of right for those who have contributed to the system. SSI functions as a welfare program, with beneficiaries required to demonstrate financial need. The origins of both of these programs can be traced to the Social Security Act of 1935.

The Social Security Act initiated an old-age insurance program and also marked the start of federal public assistance or welfare programs financed by federal grants to state governments. Poor blind citizens qualified for welfare benefits under the terms of the 1935 legislation. The social insurance program covered industrial and commercial workers but excluded the self-employed and agricultural workers. The welfare program covered permanent residents of a particular locality (families that moved to a different locality risked losing their benefits) who could demonstrate to the satisfaction of local authorities that they were in financial need. The actual size of the welfare grants and the standards of need varied greatly from place to place.

In 1950, Aid to the Permanently and Totally Disabled, a forerunner of SSI, was enacted. In 1956, SSDI was enacted into law. While the basic structure of SSDI has remained fairly constant since its inception, eligibility requirements and benefits levels have changed over time in important ways. The original 1956 law required that an individual be incapable of any substantial gainful activity by reason of any medically determinable physical or mental impairment which can be expected to result in death or be of "long or indefinite duration." To qualify, an individual had to be over the age of 50 and had to have worked in covered employment for 20 of the last 40 quarters and 6 of the last 13 quarters, ending with the quarter of onset of disability. Benefits could begin only 6 months after the onset of the disability. Some of these requirements have subsequently been relaxed. The 6 of the last 13 quarters requirement was eliminated in 1958. In 1960, individuals under the age of 50 became eligible. The 1960 provisions also included a number of changes designed to encourage beneficiaries to return to work. A trial work period of 9 months was added, so that a beneficiary who still met the requirements could return to work but continue to receive benefits. If, after the initial 9-month trial work period, the worker was found to be capable of gainful employment, his benefits would be terminated after an additional 3 months. A second provision allowed former beneficiaries who returned to the disability rolls to do so without waiting 6 months. In 1965, the requirement that a disability be expected to be "of long continued and indefinite duration" was replaced with the requirement that it be expected to last at least 12 months.

In 1967, after a series of liberalizing amendments, Congress for the first time tightened requirements for benefits. Beneficiary rolls were expanding faster than expected, and there was fear that the program was simply providing early retirement benefits for older men who had, for one reason or another, lost their jobs. The courts were interpreting the law to imply that the burden of proof was on the Social Security Administration to show that an individual who could no longer function in his old job could find an alternative. The 1967

amendments were intended to emphasize the role of medical factors in the determination of disability. The new language specified that an individual's physical or mental impairment(s) must be "... of such severity that he is not only unable to do his previous work but cannot, considering his age, education and work experience, engage in any substantial gainful work which exists in the national economy, regardless of whether such work exists in the immediate area in which he lives, or whether a specific job vacancy exists for him, or whether he would be hired if he applied for work."

Although the 1967 amendments tightened the definition of disability, they continued the liberalization of coverage. Workers under the age of 31 became eligible as long as they had worked half of the quarters between the date they attained the age of 21 and the date they became disabled. Attorneys' fees for successful claimants became reimbursable. The trend towards liberalization continued with the passage of the 1972 Amendments to the Social Security Act. Benefits were increased across the board by 20% and were indexed. Because the index erroneously adjusted benefits to inflation, real benefits increased in excess of inflation for the rest of the decade. The waiting period was reduced from 6 to 5 months and beneficiaries were made eligible for Medicare after having been on the rolls for 24 consecutive months. Finally, Title XIV of the 1972 amendments "federalized" the state public assistance programs for the needy aged, blind and disabled, replacing them with SSI. Those individuals already receiving benefits under the various state programs were "grandfathered" into SSI but new applicants had to meet the same definition of disability as applicants for SSDI beneficiaries. The intent was to increase both the availability and generosity of means-tested disability benefits by relaxing standards and raising benefits in the most stringent and least generous states.

Not surprisingly, the increased generosity and availability of SSDI benefits led to rapid increases in the number of beneficiaries. As can be seen in Table 11, in 1960 roughly half a million workers were receiving SSDI benefits. Fifteen years later, nearly 2.5 million were. The program was doubling every 7 years. As a result of the growth in both the number of beneficiaries and in the average payment per beneficiary, the SSDI trust fund was nearing bankruptcy by the mid-1970s. Actuarial projections put it in deficit as of 1978. Congress responded by raising Social Security taxes, but there was also increased concern that many of those getting on the SSDI rolls might not, in fact, be disabled according to the legal definition of the term. This concern was magnified by a number of disturbing findings by congressional committees. In particular, they discovered wide discrepancies in the proportion of claimants denied benefits both across states and across administrative law judges. There was an almost two-fold difference between the most liberal and the most stringent states in terms of the proportion denied benefits. Variations in the percentage of initially negative determinations that were successfully overturned upon appeal to different administrative law judges were even more dramatic.

There was a growing sense that the Social Security Administration was losing administrative control over the disability determination process. The Social Security Administration first responded to this situation both by trying to refine their regulations guiding decisions and by negotiating agreements with various states. The consequences were quite

Table 11
United States Disability Transfer Program characteristics, 1960–1994^a

Year	Awards per 1000 insured workers	Social Security Disability Insurance ^b			Supplemental Security Income blind and disabled adults		Total ^c	
		Acceptance rate (%) ^d	Population (000)	Yearly % change	Population (000)	Yearly % change	Population (000)	Yearly % change
1960	4.5	49.6	455	–	–	–	–	
1965	4.7	47.9	988	–	–	–	–	
1966	5.1	51.1	1097	11.0	–	–	–	
1967	5.4	52.6	1193	9.1	–	–	–	
1968	5.7	46.9	1295	8.5	–	–	–	
1969	4.9	47.5	1394	7.6	–	–	–	
1970	4.8	40.4	1493	7.1	–	–	–	
1971	5.6	45.0	1648	10.4	–	–	–	
1972	6.0	48.0	1833	11.2	–	–	–	
1973	6.3	46.1	2017	10.0	–	–	–	
1974	6.7	40.3	2237	10.9	1415 ^e	–	3652 ^c	
1975	7.1	46.1	2489	11.9	1678	18.6	4167	
1976	6.5	44.8	2670	7.3	1686	0.1	4356	
1977	6.5	46.1	2837	6.3	1709	1.4	4546	
1978	5.2	39.2	2880	1.5	1706	0.0	4586	
1979	4.4	35.1	2871	–0.3	1682	–1.4	4553	
1980	4.0	31.4	2859	–0.4	1688	0.4	4547	
1981	3.4	29.7	2776	–2.9	1665	–1.4	4441	
1982	2.9	29.3	2604	–6.2	1614	–3.1	4218	
1983	3.0	30.6	2569	–1.3	1651	2.3	4220	
1984	3.4	34.5	2597	1.1	1743	5.6	4340	
1985	3.5	35.4	2657	2.3	1851	6.2	4508	
1986	3.8	37.3	2728	2.7	1972	6.5	4700	
1987	3.7	37.5	2786	2.1	2070 ^f	5.0	4856	
1988	3.6	40.2	2830	1.6	2168	4.7	4998	
1989	3.7	43.2	2895	2.3	2271	4.8	5166	
1990	4.0	43.8	3011	4.0	2417	6.4	5428	
1991	4.5	44.4	3195	6.1	2599	7.5	5794	
1992	5.2	47.7	3468	8.5	2843	9.4	6311	
1993	5.2	44.6	3726	7.4	3102	9.1	6828	
1994	5.1	43.8	3963	6.4	3287	6.0	7254	
1995	5.1	48.2	4185	5.6	3422	4.1	7607	
1996	4.9	48.8	4386	4.8	3501	2.3	7887	

^a Source: US Department of Health and Human Services (various years).

^b Worker beneficiaries only.

^c This total will overstate the number of persons receiving benefits since part of the population is dually entitled. In 1992 around 16% of male SSDI beneficiaries also received SSI benefits (Burkhauser and Wittenburg, 1996).

^d The acceptance rate measure is the number of awards in a given year divided by applications in that year. Because the award process can overlap calendar years, this ratio is only an approximation of actual acceptance rates of those applying in a given year.

^e Estimation based on assumption that program distribution across aged, blind, and disabled categories for adults was the same as in 1975.

^f Estimation assumes equal growth between 1986 and 1988.

dramatic. As Table 11 shows, acceptance rates fell from 46.1% to 31.4% between 1975 and 1980, with this fall concentrated among the states that had been more lenient. The overall effect was to narrow the gap between states. In 1975, the strictest states rejected 80% more applicants than the most lenient. By 1980, the strictest states rejected only 40% more applicants than did the most lenient (US Congress, 1978; unpublished data from Social Security Administration as reported in Gruber and Kubik, 1997).

In 1980 Congress passed legislation designed to tighten administrative control over the disability determination process in a number of ways. Importantly, the 1980 law changed both the frequency and nature of the medical eligibility reviews done on disability beneficiaries.³⁹ Before 1980, the only beneficiaries targeted for medical eligibility review were those who had conditions that were likely to improve over time. The new law stipulated that all beneficiaries should periodically go to continuing disability reviews (CDRs), and that all but the ones deemed to have permanent disabilities should be reviewed every 3 years. Moreover, as practice had evolved, beneficiaries had not been terminated unless there was evidence of actual improvement. The 1980 law changed this so that the standards used in the CDRs became identical to those currently being applied when initially evaluating claimants. In addition, replacement rates fell somewhat as the error in the formula for indexing Social Security benefits for inflation made in the 1972 Amendments to the Social Security Act was corrected.

The 1980 law also included a number of changes meant to encourage individuals to return to work. The extended period of eligibility (EPE) discussed above was introduced for SSDI beneficiaries as was the 1619(b) program for those on SSI. Work-related expenditures were excluded when determining whether an individual was engaged in SGA, and Medicare coverage was extended to beneficiaries for a full 3 years after they returned to work.

As could be expected, the 1980 law had a discernible impact on administrative practice. As can be seen in Table 11, the number of new awards continued to drop (from 4.0 to 2.9 per 1000 insured workers between 1980 and 1982). At the same time, the number of CDRs increased by over four-fold and the number of terminations by five-fold. In 2 years' time, 25% of beneficiaries had their cases reviewed and over 40% of these individuals had their benefits terminated. However, many who had their benefits terminated appealed their cases, and a majority won reinstatement. At the same time, there was a growing concern

³⁹The 1980 law tightened the Social Security Administration's administrative control over the state disability determination services. In particular, the SSA had always reserved the right to review initial determinations before they were transmitted to the applicant, but during the 1970s it was reviewing only 5% of them. The 1980 amendments required that SSA review a full two-thirds of the successful applications. To enforce some kind of administrative control on administrative law judges, the secretary of the US Department of Health and Human Services (DHHS) was empowered to appeal administrative law judge rulings that were favorable to the applicant. Prior to 1980, the law provided that disability determinations be performed by state agencies under an agreement negotiated by the state and the secretary of DHHS. The 1980 amendments required that disability determinations be made by state agencies according to regulations of the secretary. It also required the secretary to issue regulations specifying performance standards to be followed in performing the disability determinations, and if the secretary found that a state agency was failing to make disability determinations consistent with regulations, then the secretary was required to terminate the state's authority and assume federal responsibility for the determinations.

that many of those terminated who did not appeal, were, in fact, eligible for benefits, and that due process was not being followed. Fears were only heightened when the Social Security Administration refused to accept court decisions as precedent setting.

Finally, in 1984, the Social Security Administration agreed to a moratorium on CDRs pending the enactment and implementation of revised guidelines. The 1984 law had profound effects on the standards used to evaluate a person's potential eligibility for SSDI or SSI. When reviewing existing beneficiaries, the burden of proof was shifted onto the Social Security Administration to show that a beneficiary's health had improved sufficiently to allow him to return to work. A moratorium was imposed on re-evaluations of the most troublesome cases, those that involved mental impairments or pain, until more appropriate guidelines could be developed. Finally, benefits were continued pending the outcome of an appeal.

The 1984 law substantially increased the weight given source evidence (evidence provided by the claimant's own physician) by requiring that it be considered first, prior to the results of an SSA consultative examination. The Social Security Administration was also required to consider the combined effect of all of a person's impairments, whether or not any one impairment was severe enough to qualify a person for benefits. Perhaps most importantly, the Social Security Administration substantially revised its treatment of mental illness, reducing the weight given to diagnostic or medical factors and emphasizing the ability of an individual to function in work or work-like settings.

As can be seen in Table 11, since the passing of the 1984 law the SSDI and SSI populations have continued to grow. When the next economic downturn came in the early 1990s, conditions were ripe for a surge in applications and in the number of people on both the SSDI and SSI disability rolls. The increases in the disability transfer population in the early 1990s exceeded anything seen in SSDI and SSI since the early 1970s, when the disability transfer system had been considered out of control. The annual acceptance rate for SSDI benefits was almost 48% in 1992, the highest since 1972. Economic recovery and congressional action with respect to SSI disability eligibility, culminating in the Welfare Reform Act of 1996, slightly lowered the increases in applications and acceptances to SSDI and SSI over the next 4 years, but they remained well above those experienced in the 1980s.⁴⁰

In addition to changes in the size of the SSDI program over the past several decades, there have also been dramatic changes in its composition. Table 12 compares the distribution of primary diagnostic conditions reported by new SSDI beneficiaries in the years between 1972 and 1996. In 1972, during the last great increase in the SSDI transfer population, when acceptance rates were at 48%, seven of ten workers who came onto

⁴⁰ Most importantly, the welfare reform act ended drug and alcohol addiction as conditions that by themselves qualify a person for disability benefits. Under the new law, individuals are not eligible for either SSI or SSDI if their drug addition or alcoholism is the main factor contributing to their disability. This change in eligibility standards is likely to have a much larger impact on SSI than on SSDI. As of 1995, there were about 135,000 SSI recipients whose disability was based solely on drug addiction or alcoholism, although the Congressional Budget Office estimates that perhaps as many as 65% of these individuals would be eligible for SSI based on other sufficiently disabling conditions (for more details, see US House of Representatives, 1997).

the disability rolls were aged 50 or older. Among those under age 50, one in five was disabled due to a mental disorder. In 1982, when acceptance rates were 29%, 6.2% lower than the previous year, older workers still dominated the new beneficiary rolls. But the lower acceptance rate was disproportionately felt by older workers. Younger beneficiaries increased to 37% of the total. Nevertheless, the mix of health conditions among these younger beneficiaries did not change. Only about 20% entered the program because of a mental disorder.

Since 1982, however, much has changed in the age and health composition of new SSDI beneficiaries. The change in mental disability criteria in the mid-1980s from medical diagnosis to functional results greatly improved the likelihood that people with a given level of mental impairment would be declared eligible for SSDI benefits. Since then, as Table 12 shows, there has been a dramatic increase in the fraction of awards going to individuals identified as having mental impairments. In 1992 mental disorders were the primary cause of disability for 40% of younger enrollees, twice the prevalence rate of only a decade ago. Mental disorders have also increased as the primary cause of disability among older workers. In 1982 only 5.2% of new beneficiaries aged 50 and over reported a mental disorder; in 1992 it was 11.9%.⁴¹

3.7. Explaining program growth

Growth in the size of the disability insured population from just under 50 million in 1960 to over 125 million in 1995 has importantly contributed to the growth in overall awards. However, as Fig. 8 shows, since 1960, awards per 1000 insured workers has fluctuated quite dramatically to a low of 2.9 in 1982 from a high of 7.1 in 1975. Variation in the fraction of insured workers who apply for SSDI benefits and those who are awarded benefits contribute roughly equally to the large variations in the fraction of insured workers being awarded benefits each year.

Fig. 8 also illustrates how dramatically application rates have varied. What can explain first the dramatic growth and then the decline and rebound in the application rate for SSDI? Most obviously, applications would seem to mirror changes in eligibility standards, rising when standards were being relaxed during the 1960s and early 1970s, contracting when eligibility standards were tightened in the late 1970s and early 1980s. The rate of applications per insured worker appears to have responded more slowly to the relaxation of eligibility standards that occurred after 1984, perhaps because of the strong economic growth that continued through the decade. Substantial increases in the value of benefits during the 1960s and 1970s could also have contributed to the growth in the number of

⁴¹ The one other major change in the distribution of diagnostic groups in 1992, and one which appears to have a greater health-related impetus, was the rapid increase in AIDS/HIV cases. More than one in ten new beneficiaries under the age of 50 had this disease in 1992. AIDS/HIV was practically unknown in 1982. Since 1990, AIDS/HIV cases have been reported in the category of infectious and parasitic diseases by the Social Security Administration. AIDS/HIV is the dominant diagnosis in this category and increases in AIDS/HIV explain the major increase in this category since 1990.

Table 12
Changes in primary diagnostic groups among new SSDI beneficiaries, 1972–1996, by age when benefits began^a

Condition	Aged 18–50				Aged 50–64				Aged 18–64					
	1972	1982	1988	1996	1972	1982	1988	1996	1972	1982	1988	1992	1996	
Infectious and parasitic diseases ^b	3.0	1.0	0.5	11.1	6.8	1.5	0.6	1.4	1.1	1.9	0.8	0.7	6.2	3.7
Neoplasms	7.8	13.4	9.2	8.4	7.5	10.3	19.2	16.4	15.7	9.6	17.1	13.2	12.1	10.1
Mental disorders	20.3	19.9	34.6	40.1	32.5	5.8	5.2	9.9	11.9	9.9	10.6	20.9	25.7	21.2
Circulatory	18.8	13.1	8.5	6.0	6.0	37.4	31.7	25.0	21.9	19.5	32.2	24.9	17.6	14.1
Musculoskeletal	15.6	16.4	12.7	8.4	18.5	17.1	16.4	20.0	21.8	26.9	16.7	16.4	16.8	15.2
All others	34.5	36.2	35.0	26.0	28.7	27.9	26.9	28.1	27.3	28.8	29.7	30.2	30.8	26.7
Total number (in thousands)	128	109	183	313	294	327	190	226	324	455	299	409	637	624
Share of total, aged 18–64	28	37	45	49	47	72	63	55	51	100	100	100	100	100

^a Source: Derived from tables in US Department of Health and Human Services (various years).

^b Effective 1990, AIDS/HIV records are included in infectious and parasitic diseases.

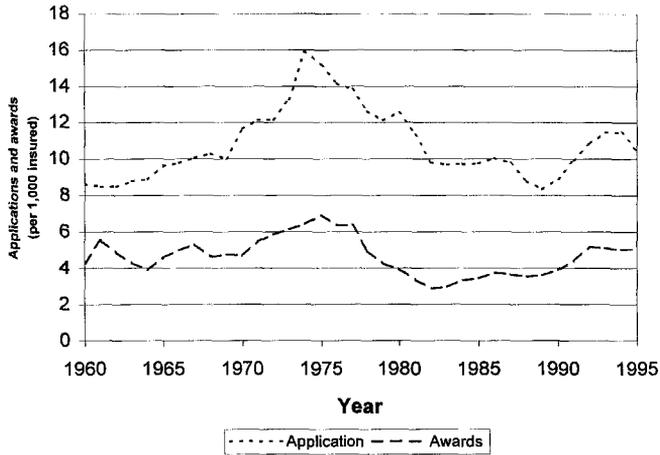


Fig. 8. SSDI applications and awards per 1000 insured workers, 1960–1995. Source: US Department of Health and Human Services (1996) and Council of Economic Advisers (1998).

applications during those years. Since then, they have stayed relatively constant, but the value of the accompanying Medicare benefits has risen, which could explain part of the recent rise in applications. Also, both during the early 1970s and more recently during the late 1980s and early 1990s, there were substantial outreach efforts made both by SSA and state governments to actively search for eligible applicants.

A number of researchers, both inside and outside SSA, have used administrative records to try to model the relative importance of these factors in determining the number of new applications. To study the rise in applications during the 1960s and 1970s, a number of researchers used quarterly data and regressed the number of applications received by district offices on a variety of measures including a measure of the replacement ratio, the unemployment rate, the number of workers insured for SSDI, and proxies for changing eligibility requirements.

Before reviewing this work it is worth learning more about the potential magnitude of effects. Between 1965 and 1975, the before-tax replacement rate rose about 35% for workers with average earnings and 50% for those with low earnings. At the same time applications per 1000 insured workers rose about 50%. Thus, if we attribute all the growth in applications to increases in benefits we would calculate arc elasticities of roughly 1.3. Because there were also changes in eligibility requirements during this time period that influenced applications, this 1.3 is an upper bound.

Halpern (1979) regressed the log of the number of new applications received in SSA district offices on the log of a measure of the replacement ratio. Also included were dummy variables to reflect the years after the introduction of SSI and after the 1967 liberalization of coverage for younger workers, the number of individuals insured for SSDI, the number of individuals under the age of 45 insured for SSDI, and various

measures of the unemployment rate. Depending on specification, the estimated coefficient on the replacement rate varies between 0.40 (0.15) and 0.44 (0.14). Since Halpern's specification was log-log this coefficient can be interpreted as an elasticity. The coefficients on the SSI and 1967 variables were both positive and significant. The coefficients on the unemployment rate variables were uniformly weak and insignificant.

Halpern's estimates imply that the increased generosity of SSDI benefits that occurred between 1965 and 1975 can account for roughly an 18% increase in the number of applications (holding coverage constant) while the increased availability of benefits can account for a 39% increase in the number of applications. Thus, we conclude that the increased generosity of SSDI has had somewhat less of an effect on the number of new applications than has the increased availability of the program.

Lando et al. (1979) estimated a model that was very similar to Halpern's, but entered both the dependent variable and the replacement ratio in linear rather than logarithmic form. Depending on the specification and time period used, Lando et al. (1979) estimated elasticities of applications with respect to benefits of between 0.4 and 0.6. They, too, find much stronger effects for their proxies for eligibility than for the replacement ratio, but, in contrast to Halpern, find significant positive effects of the unemployment rate on the number of new applicants.

The fact that SSDI is a national program restricts the extent to which regional variation in benefits can be used to try to identify the effect of the size of benefits on applications. However, in recent work, Black et al. (1998) have used regional variation in economic conditions to identify the effect of financial incentives on the decision to apply for SSDI and SSI benefits. In particular, they study the impact of the coal boom during the 1970s and the coal bust during the 1980s on the number of SSDI and SSI beneficiaries. Using panel data on 186 counties in Kentucky, Ohio, Pennsylvania and West Virginia, they estimate an elasticity of program payments with respect to local area earnings of between -0.3 and -0.4 for SSDI and between -0.5 and -0.7 for SSI. While these results lend some support to the notion that labor market conditions in an area affect the decision of individuals to apply for disability benefits, the point estimates are hard to interpret. Black et al. (1998) interpret the estimated coefficient on the local earnings variable as reflecting the effect of changes in the financial attractiveness of disability insurance. However, given the nature of the specification used, it is possible that the earnings variable is picking up the effect of general economic conditions rather than the relative financial attractiveness of SSDI and SSI.⁴² Furthermore, their estimates reflect the short-run effect of changes in the local economies in Kentucky, Ohio, Pennsylvania and West Virginia on the number of disability beneficiaries. Given the fact that the typical SSDI or SSI spell is quite long, long-run effects are likely to be substantially larger than short-run effects. Put differently, changes in flows onto SSDI or SSI will only slowly translate into changes in the number of SSDI or SSI

⁴² As is discussed below, the evidence that recessions lead to increases in the number of applications for SSDI is strong.

beneficiaries. Hence, short-run beneficiary elasticities are likely to be substantially lower than short-run application elasticities or even short-run award elasticities.

There has also been some work done examining the effect of screening stringency on application rates. Tighter screening by gatekeepers during the late 1970s varied across states, with the initially more lenient states showing the greater changes. These differential changes actually provided a natural experiment to test the magnitude of potential responses to changes in their probability of being awarded benefits. Over the 1976–1978 period, application rates fell more steeply in states that had tightened their screening. Parsons (1991), using information on the fraction of initial determinations that were positive, estimates elasticity of applications with respect to the initial award rates to be 0.45.⁴³ More recently, Stapleton et al. (1998) re-estimated Parsons' equations, including demographic and business cycle controls, and found that doing so reduced the magnitude of the estimated coefficient by 50%.⁴⁴ In fact, there are a number of reasons to believe that these elasticities underestimate the long-run effect of eligibility standards on application rates. First, the data cover only a short period of time. If there were lags in applicants' responses to the changing regime, this would imply that long-run effects would be larger than short-run ones.⁴⁵ Second, while the award rate at initial determination was going down, the fraction of applicants appealing their denials rose, and many of those who appealed won reversals. As a result, final award rates declined less rapidly than did initial award rates. Finally, if, as we might presume, tightening eligibility standards had a greater effect on the less seriously impaired, then the drop in the number of applications for SSDI would have tended to increase award rates.⁴⁶

There has been a considerable amount of government-sponsored research geared at explaining the recent dramatic growth in both the SSDI and SSI programs. A good summary of this work can be found in Rupp and Stapleton (1995). Much of this analysis has used state-level data on applications and awards, giving researchers considerable access to variables that vary across states. Using cross-state data from 1988 to 1992, Stapleton et al. (1995a,b, 1998) find convincing evidence that the recession of the early 1980s contributed importantly to the rapid rise in the number of applications for SSDI benefits. They estimate that a 1 percentage point rise in the unemployment rate was associated with a 4% rise in applications for SSDI and a 2% rise in applications for

⁴³ Parsons' work builds on earlier work by Marvel (1982). According to Parsons, Marvel's estimates are to be disregarded due to data errors.

⁴⁴ More details can be found in Lewin-VHI, 1995b.

⁴⁵ It seems natural to imagine that applications would respond only slowly to changes in eligibility standards. The nature of the behavioral responses to the 1995 change in the criteria used to evaluate the eligibility of individuals suffering from mental health conditions represents a good example. An observable blip in applications lasted for a number of years after criteria for evaluating mental health claims were changed. Even after that, however, learning continued: court cases were decided, adjudicators were trained, and states started shifting their indigent mental illness populations onto SSI (Stapleton et al., 1995a,b, 1998; Stapleton and Livermore, 1995).

⁴⁶ Acceptance rates dropped roughly 30% between 1977 and 1980. At the same time, applications per insured worker dropped about 40% (see Fig. 8). If most of the change in the number of applicants can be attributed to the change in denial rates, this suggests an elasticity greater than 1.0.

SSI. The effects on final awards were somewhat lower. Using a long time series, Stapleton and Dietrich (1995) estimate that a 1 percentage point rise in the unemployment rates was associated with a 2% rise in applications for SSDI during the year of the rise, a 3% rise after 1 year and a 5% rise after 2 years. Again, they estimate a somewhat weaker effect for SSI. Both Stapleton et al. (1995a,b, 1998) and Stapleton and Dietrich (1995) estimate that changes in the unemployment rate had a smaller effect on benefit awards than on applications, suggesting that recessions induce those with less severe disabilities to apply for SSDI and SSI benefits.

Stapleton et al. (1995a,b, 1998) also provide strong, if indirect, evidence that recent changes in screening stringency played a central role in explaining program growth. Indeed, the very fact that award rates were rising at the same time that application rates were rising would support that inference. Moreover, they find that changes in the unemployment rate together with other factors they include in their models could explain almost all of the growth in applications for impairments related to conditions of internal organs, but could account for much less of the growth in applications for impairments related to musculoskeletal or mental health conditions. These patterns suggest that regulatory changes such as the increased weight given to pain and other symptoms, the increased reliance on source evidence, and the broadening of the standards used for those with mental impairments all have contributed importantly to the recent surge in applications for SSDI and SSI.

While the 1990s recession seems to be part of the explanation for the rapid rise in applications for SSDI benefits that occurred during the first part of the 1990s, no such rise occurred during the severe recession of the early 1980s. A reasonable interpretation of these patterns is that the tightening up of eligibility standards that occurred during the early 1980s counteracted the effects of the 1980s recession. During the mid-1980s, when eligibility standards were relaxed again, the booming economy slowed any immediate response. However, when the last recession hit, applications grew rapidly.

Researchers studying the recent growth of SSI have found evidence that an important factor has been efforts by states to shift individuals off state-funded programs such as general assistance onto SSI. States that cut general assistance benefits experienced above average growth in the application for SSI benefits (Lewin-VHL, 1995a). Using monthly administrative data from Michigan, Bound et al. (1995) also find that the increase in the application for SSI benefits exactly coincided with the end of general assistance in Michigan. One interesting aspect of this finding is that general assistance benefits are typically less generous than SSI benefits. Within the context of a simple labor supply model, it is hard to explain why the disabled would apply for general assistance, but not for SSI benefits. The fact that many did not do so suggests that applying for disability benefits may be difficult and onerous. There is also considerable anecdotal evidence that states and third parties often act as intermediaries to facilitate the SSI application process (Bound et al., 1998; Livermore et al., 1998).

Increases in the value of Medicare benefits for those on SSDI and in Medicaid benefits for those on SSI may have also contributed to the recent growth in applications for both

programs. Since Medicare is a nationally-run program, simple direct evidence on the effect of the increasing value of such benefits on the attractiveness of SSDI is difficult to obtain. Yelowitz (1998) uses cross-state variation in Medicaid benefits to estimate the effect of changes in their value on participation in SSI. In particular, in response to court orders, many states increased Medicaid benefits in 1991. Using these increases, Yelowitz estimates that increases in the value of Medicaid that occurred over the late 1980s and early 1990s can explain about 20% of the increased fraction of the working-aged population receiving SSI benefits.

However suggestive Yelowitz's results are, they do not seem to be very robust. Stapleton and his colleagues (Lewin-VHI, 1995b) used Yelowitz's methodology to look at the effect of changes in the value of Medicaid on the application for SSI benefits and found no measurable effects. Since we would expect that increases in the value of Medicaid would have a proportionately bigger effect initially on the number of applications (a flow) than on the beneficiaries (a stock), this non-result is surprising. While it is hard to imagine that eligibility for Medicare and Medicaid benefits does not make SSDI and SSI more attractive, finding simple statistical evidence to this effect has proven to be quite difficult.

Parsons, Halpern and researchers inside SSA have studied the impact of benefit levels and screening stringency on applications using aggregate data. There have been several attempts to study these same issues using micro data. Halpern and Hausman (1986) use techniques developed by Hausman to study the responsiveness of applications to benefit levels and screening stringency using data drawn from the 1972 Survey of Disabled and Non-disabled Adults (SDNA). These data included retrospective questions regarding individual applications for disability benefits and were matched to Social Security earnings records, allowing Halpern and Hausman to accurately calculate potential disability benefits.

They incorporated the decision to apply for SSDI benefits within the linear labor supply model used by Hausman in his earlier work. The utility gained from not applying for disability benefits is just the utility gained from working. Applying represents a gamble. If applicants manage to pass the medical screening, they gain the utility associated with not working and receiving SSDI benefits. If they fail to pass the medical screen, they can return to work but are penalized for applying in terms of their lost wages. Both the probability that an individual will pass the medical screening and the wage penalty associated with applying for SSDI benefits are estimated separately using the same sample used to model the application decision.

In simulations they find that a 20% drop in the proportion of men accepted onto SSDI lowers the proportion of men applying for SSDI by about 4%. This implies an elasticity of applications with respect to acceptance probabilities of 0.2. They also calculate that a 20% increase in benefits increases applications by 26%, implying an elasticity of 1.3.

Thus, Halpern and Hausman find an application elasticity that is larger, and a probability of acceptance elasticity that is much smaller than studies using aggregate data. It is not too surprising that cross-section and time series estimates differ. They use different information to identify effects and are subject to quite different biases. However, using a sample of men aged 45–59 from the same data used by Halpern and Hausman, Bound

(1987) estimates the probability of applying for SSDI benefits as a function of average earnings and potential SSDI benefits, based on Social Security-covered earnings from prior to the onset of work limitations, as 0.2. Leonard (1979), in an often cited but unpublished paper, calculates expected SSDI benefits by multiplying potential benefits calculated using the earnings record by an estimate of the probability that an individual would pass the medical screening. Leonard then includes this variable, together with a measure of past earnings, in an equation predicting program participation. Using this procedure, Leonard calculates an elasticity of program participation with respect to benefit levels of 0.35.⁴⁷ Since it seems likely that awards go up less than one for one with applications, a 0.35 award elasticity translates into something more than a 0.35 application elasticity. Still, the approximately 4:1 ratio between the magnitude of Halpern and Hausman's and Leonard's estimates seem too large to be explained by differences in the dependent variable used.

Halpern and Hausman are modeling the response to three distinct decisions: whether or not to apply for SSDI, whether or not to work, and how many hours to work, for those who do. These three separate decisions represent three distinct equations, but modeling these decisions in the context of a utility function also implies cross-equations restraints. One possible explanation for the discrepancies between Halpern and Hausman and Bound might be that the cross-equation restrictions are violated and that, as a consequence, the application equation does not fit as well as it would in a less structured estimation. While imposing restrictions, even when they are binding, may improve the quality of the Bound estimates, in this case there is reason to believe that Halpern and Hausman have overestimated the sensitivity of applications to benefit levels. An elasticity of 1.3 implies that the growth in benefits can explain the entire 1965–1975 growth in the number of applications. Yet, it seems implausible that the relaxing of eligibility standards did not also have an independent effect on application rates.

In recent work, Kreider (1998) uses the 1978 Survey of Disability and Work to capture the effect of benefit levels and the probability of being accepted onto SSDI on the decision to apply for benefits, using estimates of the lifetime value of having been awarded benefits.⁴⁸ Within this context, Kreider concludes that a 10% increase in SSDI benefit levels would increase applications by 7%, while a 10% increase in the probability of being accepted would increase SSDI applications by 6%. Kreider includes a discussion of why his results are at odds with those of Halpern and Hausman. To begin with, Halpern

⁴⁷ Since Leonard includes the same variables in the equation he uses to predict program participation as he does to estimate the probability that an individual will pass the medical screening, identification comes from the independent variation in the computed benefits and the non-linearities involved. Leonard enters his variable in logs. Thus, his specification represents a restriction that two coefficients are similar in magnitude. In a personal communication, Leonard reported that when this restriction was relaxed, the coefficient on the SSDI benefit variable dropped in magnitude.

⁴⁸ In many respects the 1978 Survey of Disability and Work is similar to the 1972 Survey of Disabled and Non-Disabled Adults, although they use different schemes to oversample the disabled. The 1972 survey oversampled those who identified themselves as disabled in the 1970 census in a preliminary screen. The 1978 survey oversampled applicants for SSDI.

and Hausman estimate the probability of being awarded SSDI benefits using the sample of individuals who applied for these benefits, without controlling for self-selection. Presumably, this procedure overestimates the probability that those who do not apply for SSDI benefits would be awarded benefits were they to apply. In addition, Kreider estimates the SSDI acceptance equation along with the application equation. Kreider finds that this accounts for most of the difference between his estimates and those of Halpern and Hausman with respect to the sensitivity of applications to screening stringency. Kreider also notes that Halpern and Hausman ignore the lifetime nature of the decision to apply, and he provides simulations that suggest that accounting for the potential future wage growth that non-applicants will experience can explain much of the difference between his estimates of the elasticity of applications with respect to benefits levels and those of Halpern and Hausman. At a minimum, Kreider's work would seem to point out important features of the application decision that should be incorporated into any future attempts to estimate the decision to apply for SSDI or SSI benefits using micro data.

Table 13 summarizes various estimates of the elasticity of applications with respect to benefit levels. The estimates vary considerably. What stock should we put in any of them? The aggregate time series studies of the effect of benefit levels on applications use exogenous variation in benefit levels. However, within the context of a single time series, it is hard to distinguish the effects of various factors that are changing at the same time. If, as seems likely, there are adjustment lags, the situation becomes that much more difficult.

In theory, cross-sectional studies should estimate long-run effects. However, these studies face a number of distinct problems. As was discussed above, the Halpern and Hausman approach requires very stringent assumptions. Kreider imposes much less structure in his analysis than they do, but his estimation strategy requires the imputation of a considerable amount of non-randomly missing data. This raises difficult issues of identification.⁴⁹

Bound's more reduced form approach does not require the imputation of missing data, but has a problem endemic to all cross-sectional studies. In a cross-section, the variation in benefit levels represents variation across individuals. However, individual benefits are a function of past earnings and are thus endogenous. As we saw in Table 10, the SSDI benefit structure is quite progressive. As a result, replacement ratios tend to be higher for those with lower past earnings. At the same time, there are a variety of reasons why those with low earnings would probably be more likely to apply for benefits than higher wage earners, regardless of the difference in financial incentives. They may be in worse health, and are presumably in jobs for which health limitations have larger effects on productivity.⁵⁰ As a reflection of this presumption, the vocational component to the disability determination favors those with lower skills. However, this also means that, holding constant health status, those with fewer skills are more likely to be awarded disability benefits than are higher skilled workers. For all of these reasons, simple comparisons

⁴⁹ For example, Kreider's approach requires him to impute post-application earnings for both those who apply for disability benefits and are awarded benefits and those who never applied.

⁵⁰ Researchers generally try to control for health, but, as we discuss later, it is hard to do so adequately.

Table 13
Elasticity of Social Security Disability Insurance applications and awards with respect to benefit levels

Study	Data	Elasticity	Period/sample
<i>Applications</i>			
Aggregate time series data			
Halpern (1979)	US quarterly	0.4	1964–1978
Lando et al. (1979)	US quarterly	0.4–0.6	1964–1978
Cross-sectional micro data			
Bound (1987)	SDNA ^a	0.2	Men, aged 45–59, 1972
Halpern and Hausman (1986)	SDNA ^a	1.3	Men, less than age 50, 1972
Kreider (1997)	SDW ^b	0.8	Men, aged 45–59, 1978
<i>Awards</i>			
Aggregate cross-sectional time series data			
Black et al. (1998)	County data	0.3–0.4	KY, OH, PA, WV counties, 1970–1993
Cross-sectional micro data			
Leonard (1979)	SDNA ^a	0.35	Men, aged 45–54, 1972

^a 1972 Social Security Survey of Disabled and Non-disabled Adults.

^b 1978 Social Security Survey of Disability and Work.

between application rates for those with potentially higher SSDI benefits may tend to exaggerate the causal effect of benefit levels on applications.

On the other hand, the fact that Bound relied on retrospective data might have lead him to underestimate the impact of benefit generosity on application rates. Bound computes average earnings and benefit levels at the time a worker first reports that his health began to limit his capacity for work. Given the secular trend in benefits that was occurring prior to the 1972 SDNA survey Bound was using, we would expect there to be a positive correlation between replacement ratios and the date of onset of work limitations. At the same time, respondents with more recent onset will have had less of an opportunity to apply for SSDI. It would be worth redoing the Bound calculations, using prospective data.

If estimating the effect of benefit levels on the application for SSDI benefits is difficult, estimating the effect of screening stringency on applications is more so (Table 14 summarizes existing estimates). The differential responses of states to the reforms of the late 1970s provide something of a natural experiment, but there is reason to believe that Parson's estimated elasticity underestimates the effect of screening stringency. Efforts to use micro data to estimate the effect of eligibility standards on applications is problematic to the degree that variations in individuals' ex ante acceptance probabilities are due to actual variations in health, since health presumably has a direct effect on an individual's probability of applying for disability benefits. This makes it difficult to estimate separately the effect of health and acceptance probabilities on the probability of applying for benefits using micro data.

Table 14
Elasticity of Social Security Disability Insurance applications with respect to award rates

Study	Data	Elasticity	Period/sample
<i>Cross-sectional micro data</i>			
Halpern and Hausman (1986)	SDNA ^a	0.2	Men, less than age 50, 1972
Kreider (1997)	SDW ^b	0.6	Men, aged 45–59, 1978
<i>Aggregate cross-section time series data</i>			
Parsons (1991)	State data	0.45 ^c	States from 1977–1980

^a 1972 Social Security Survey of Disabled and Non-disabled Adults.

^b 1978 Social Security Survey of Disability and Work.

^c Elasticity of applications with respect to initial determination award rates.

The most compelling evidence of program effects comes from the simple time series data. Application rates seem to mirror screening stringency. When eligibility standards are relaxed, more individuals apply. When they are tightened, fewer do so. The relative constancy of award rates suggests quite high application elasticities with respect to award rates, with Stapleton et al.'s (1998) estimate of 0.22 being perhaps a lower bound. Application rates rose as benefits rose in the 1960s and early 1970s. If increases in benefits were the sole explanation for rising applications, then the implied elasticity of applications with respect to benefit level would be quite large (above 1), but, as our discussion suggests, this surely is an upper level since other factors – probability of acceptance resulting from changes in screening rules – explain a substantial portion of this rise.

3.8. Persons leaving the SSDI and SSI rolls

The discussion above has concentrated on applications for SSDI, but growth in the rolls can also be affected by changes in exit rates. Beneficiaries leave the SSDI rolls for one of four reasons: they die, they shift to retirement benefits at age 65, they medically recover, or they return to work despite their impairments. As Fig. 9 shows, termination rates (the number of persons who leave the SSDI rolls each year per 100 beneficiaries) have been more stable than award rates (the number of SSDI awards each year per 1000 insured worker, see Fig. 8), but they have fluctuated to some degree and have substantially declined since the change in the continuing disability review process in the mid-1980s.

Death and retirement account for the vast majority of SSDI benefit terminations and the rate of terminations due to these factors has been relatively constant since the 1980s. Changes in these rates are primarily functions of the underlying health and age distribution of the beneficiary population.⁵¹ The rate of benefit termination due to medical recovery or return to work has always been small, but it has drifted to an all-time low near zero in the 1990s.⁵²

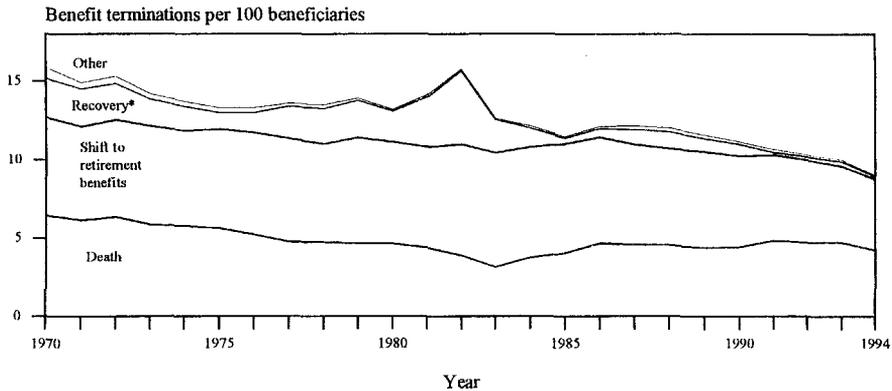


Fig. 9. Social Security Disability Insurance termination rates, 1970–1994. *Includes terminations because of return to work or a finding that the beneficiary no longer has disabling impairment. Source: Mashaw and Reno (1996).

Benefit terminations for medical recovery and return to work, combined, were substantially higher two decades ago. Several policies might have contributed to higher termination rates then. First, in the 1970s, systematic procedures were in place to “diary” and conduct followup reviews of beneficiaries whose conditions were thought likely to improve. The spike in benefit terminations in the early 1980s reflects continuing disability review policies adopted then, but abandoned in 1983–1984. The very low rate of terminations in the early 1990s reflects the virtual cessation of continuing disability review activity as administrative resources were shifted to processing initial claims.⁵³ Second, in a mechanical way, the introduction of the extended period of eligibility (EPE) discussed above would tend to reduce termination rates, since SSDI beneficiaries who return to work remain on the SSDI rolls for up to nearly 3 years after the end of the trial work period. Third, the investment in vocational rehabilitation for SSDI beneficiaries has dropped over the last two decades. In inflation-adjusted dollars, funds allocation to vocational rehabilitation agencies to serve SSDI beneficiaries in 1975–1979 were about five to six times those in the early 1990s. Thus the number of beneficiaries whose benefits were terminated

⁵¹ Rupp and Scott (1996) provide a detailed analysis of the effect of changes in the distribution of age of entitlement on exit rates from SSDI and SSI.

⁵² SSA data do not distinguish between medical recovery and return to work as a cause of benefit termination. This is unfortunate, since SSDI beneficiaries who return to work despite continued impairment maintain Medicare coverage and benefit eligibility while they test their ability to work; people who medically recover do not.

⁵³ During the late 1970s, roughly 3% of those on SSDI had their cases reviewed each year. Somewhat less than 50% of these reviews resulted in a termination. Changes in the law in 1984 made it harder to remove someone from the rolls. Since then, only about 15% of those whose cases have been reviewed have been removed from the rolls. See the US House of Representatives (1997).

after receiving rehabilitation services in the 1970s was a larger share of the benefit rolls than it is today (Mashaw and Reno, 1996).⁵⁴

It should also be noted that the substantial drop in benefit terminations for medical recovery does not necessarily mean that a higher fraction of those initially entitled to benefits returned to sustained employment two decades ago than now. It is not clear during the 1970s what fraction of those deemed to have medically recovered, and whose SSDI benefits were terminated, ever returned to sustained employment. We do know that of those terminated during the 1980s, 50% eventually won reinstatement, and of those who did not, only 50% returned to work (US General Accounting Office, 1989).

The best evidence we have on those who leave the rolls due to recovery or return to work comes from SSA researchers. Hennessy and Dykacz (1989) used administrative data to follow a cohort of SSDI beneficiaries first entitled to benefits in 1972. Using data through 1981, they estimated that 11% of this cohort eventually would leave the program due to recovery or return to work, while 53% would have their benefits converted to retirement benefits, and 36% would die while on the rolls. Not surprisingly, these fractions varied tremendously by age at first entitlement. They estimated that 38% of those first entitled at or below age 35 would eventually recover while only 4% of those aged 50 or over at first entitlement would ever recover. In followup research, Dykacz and Hennessey (1989) focused on the post-recovery experience of the same 1972 cohort and estimated that 43% of recovered beneficiaries eventually come back onto the SSDI program.

Further insights into post-entitlement work behavior of those on SSDI have been obtained using the New Beneficiary Survey (NBS) and the New Beneficiary Followup (NBF). A sample of individuals initially awarded disability benefits between mid-1980 and mid-1981 were surveyed in 1982 and re-surveyed in 1992. The NBS and NBF contain information regarding employment behavior not available in the administrative data, and researchers at the SSA have been using them to describe work patterns of SSDI beneficiaries (Hennessey and Muller, 1994, 1995; Hennessey, 1997; Schechter, 1997). These data show that while a reasonable fraction of those entitled to SSDI benefits return to work while still on the rolls (12% in this cohort), only a fraction (30%) of those who do so actually leave the rolls. Most end up leaving work instead (Hennessey, 1997).

There are substantially less data on SSI than on SSDI, and less research has been done on program dynamics. Individuals leave the SSI disability rolls not only because they die, reach the age of 65, or recover, but also because family income or resources rise enough to disqualify recipients for further benefits. In fact, Rupp and Scott (1996), in their analysis of individuals awarded SSI disability benefits between 1974 and 1982, estimated that over one-third of those who leave SSI disability benefits do so because of increases in family income or other resources. As a result, the SSI disability rolls are substantially more volatile than the SSDI rolls.

The Social Security Administration has conducted two large-scale return-to-work

⁵⁴ Existing experimental evidence discussed below suggests only moderate effects of vocational rehabilitation on subsequent employment. Thus, although the drop in rehabilitation expenditures may have been problematic, the effect of those changes on the number of SSDI beneficiaries was probably quite small.

demonstration projects to study the effectiveness of providing rehabilitation and employment services to SSDI and SSI beneficiaries. The first, the Transitional Employment Training Demonstration (TETD) project, which operated between 1985 and 1987, focused on SSI beneficiaries whose primary condition was mental retardation. The second, Project NetWork, operated between 1992 and 1995 and included SSDI and SSI beneficiaries with a wide range of diagnoses (see Rupp et al., 1994, 1996). The two demonstration projects were run in a similar fashion. Eligible beneficiaries in selected cities were invited to participate in the two projects. Volunteers were then randomly assigned to treatment and control groups. The treatment groups were provided with rehabilitation and employment services, while the control group was not. Using both survey (in the case of Project Network) and administrative data, the effectiveness of the rehabilitation and employment services could then be studied by comparing outcomes of the experimental and control groups. The employment and rehabilitation services provided to SSI beneficiaries increased earnings for participants by roughly \$700 per year on average (in 1996 dollars) over the 6 years they were observed (close to 70% higher than the control group) but the program only reduced SSI outlays by a little over \$100 per year. This small reduction in SSI payments was not sufficient to cover the average costs of transitional employment services for program participants (Decker and Thornton, 1995).⁵⁵ However, when the employment and earnings gains for program participants are weighed against the costs of providing the employment services, the program may very well have produced a net social benefit. Results from Project NetWork are not available yet.

Importantly, in both cases the fraction of eligible program participants who volunteered for either TETD or Project NetWork was small – roughly 5% in each experiment. Thus it seems that, however beneficial it might be to those who participate, the provision of transitional employment services to those on SSDI and SSI who wish to avail themselves of such services is unlikely to have much of an impact of the fraction of population receiving benefits (Rupp et al., 1996).

Given the tiny percent of terminations due to recovery or return to work seen in Fig. 9 and the evidence from TETD and Project NetWork, it is unlikely that programs targeted at the population currently on the SSDI or SSI rolls will ever lead to a substantial share of this population voluntarily leaving the rolls to return to work. This is hardly surprising. Beneficiaries go through a long process to establish that they have medical conditions that prevent them from performing substantial gainful activity. At least at the time they apply for SSDI or SSI benefits, applicants would appear to have put substantial energy into becoming eligible for program benefits – benefits that must more than compensate applicants both for any loss of income associated with moving onto SSDI or SSI as well as for the costs associated with applying for benefits. For the great majority of those awarded benefits, their health is unlikely to improve over time and their labor market opportunities

⁵⁵ The net effect of the transitional employment services provided is harder to evaluate and depends crucially on the extent to which the services provided by the project substitute for other services paid for by the government (Decker and Thornton, 1989).

are probably deteriorating. Furthermore, as Figs. 5 and 6 demonstrate, those who return to work are subject to a high marginal tax rate.⁵⁶ Under these adverse conditions, return to work will be rare.

4. The behavioral effects of disability transfer programs

4.1. *The effect of SSDI and SSI on labor force participation*

Like all insurance programs, SSDI and SSI must contend with potential moral hazard problems. Because the United States has few program alternatives that offer longterm benefits to working-age persons who are not working, the relatively generous benefits and imperfect screening mechanisms in SSDI and SSI could be significant work disincentives for persons with disabilities. Hence, some individuals with disabilities who nevertheless are capable of work may apply for benefits and, with imperfect screening, receive an award.

A large empirical literature has developed that attempts to estimate the magnitude of moral hazard effects. Some researchers have examined the net effect of SSDI (and SSI) on labor force participation rates, e.g., how much higher would participation rates be were it not for these programs? Others have tried to estimate the disincentive effects of program parameters, benefit generosity, or screening stringency. We will consider each of these related literatures in turn.

As Table 15 shows, during the 1960s and 1970s, while the fraction of older working-age men receiving SSDI benefits was rising, the proportion of older working-age men who were out of the labor force more than doubled. These concurrent trends suggest a causal connection in which the availability of generous SSDI benefits induces older working-age men to leave the labor force in order to qualify for benefits. It is also possible that the two trends are independent, that is, that SSDI has drawn from a population that would have been out of the labor force in any case, and that those leaving the labor force did not end up on SSDI.

Gastwirth (1972) was the first researcher to connect the rapid growth of SSDI over the 1960s with the parallel drop in labor force participation rates of men aged 45–64. He used the SSA's 1966 Survey of the Disabled to estimate how many of those on SSDI might work if they were not receiving benefits. He found that 86.3% of men with work impairments who received no income transfers were in the labor force and suggested that this was probably an upper bound for the proportion of those on SSDI who would work if they were not receiving benefits.

⁵⁶ The evidence we have on the extent of work activity by those who have been awarded SSDI or SSI benefits comes mostly from the analysis of Social Security earnings data. Anecdotal evidence suggests that some fraction of those on SSDI and SSI are actually working, but are working "off the books." Research targeted on such work by SSDI and SSI beneficiaries along the lines of that done by Edin and Lein (1997) on welfare recipients would be valuable.

Table 15
Percent of men in the labor force and percent of men receiving Social Security Disability Insurance (1950–1995)^a

Year	In labor force				Receiving Social Security Disability Insurance			
	Aged 45–54	Aged 55–64	Aged 55–59	Aged 60–64	Aged 45–54	Aged 55–64	Aged 55–59	Aged 60–64
1950	95.8	86.9	—	—	0.0	0.0	0.0	0.0
1955	96.4	87.9	—	—	0.0	0.0	0.0	0.0
1960	95.7	86.8	91.6	81.1	0.8	3.5	2.4	4.7
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
1990	90.7	67.7	79.8	55.5	3.7	9.1	7.5	10.8
1995	88.8	66.0	77.4	53.2	4.8	10.8	8.9	12.9

^a Universe: Civilian non-institutionalized population. Source: US Department of Labor (various years), US Department of Health and Human Services (various years).

Swisher (1973) suggested that Gastwirth (1972) seriously exaggerated the potential disincentive effects of SSDI. She noted that the 1966 Survey of the Disabled distinguished between the severely disabled (those unable to work or work regularly), the occupationally disabled (those unable to continue working at the same kind of job as they had before the onset of health problems), and those with only a secondary work limitation (those able to work full-time and regularly at the same occupation but with limitations on the kind of full-time work they could do). Of the men identified as disabled, only 27.3% were severely disabled while 28.5% were occupationally disabled and another 44.2% had secondary work limitations. At the same time, the vast majority of men on SSDI reported themselves to be severely disabled. Swisher (1973) argued that Gastwirth (1972) should have only included the severely disabled who received no public income transfers in his comparison group. Only 44% of this group were in the labor force. Swisher (1973) also noted that only a small fraction of the severely disabled worked full-time all year round (10.4%). She could have equally well noted their low earnings. Average annual earnings for those severely disabled who did work was only about 13% of prime-aged men that year.

If the appropriate comparison group for those on SSDI are those severely disabled who are not receiving transfers, the impression we get of SSDI's impact on the workforce attachment of beneficiaries is quite different than if the comparison group includes those who are either occupationally disabled or who only have secondary work limitations. In the first case we would infer that, if SSDI benefits were not an option for these men, few would work, fewer still would work full-time and only 20% would earn enough to keep their families out of poverty. If the appropriate comparison group includes all of those with a work limitation, then we might conclude that most of those on SSDI are capable of work and would work if they were not receiving government support. Furthermore, the average earnings of the latter group were only 25% below that of their able-bodied counterparts.

There are a variety of things worth noting about Swisher's critique of Gastwirth. The classification of men as "disabled" or "severely disabled" was based on respondents' answers to a question about whether their health limited their ability to work. Swisher (1973) takes these reports at face value, but, since to qualify for SSDI benefits a person has to be determined incapable of substantial gainful employment, it seems likely that beneficiaries would report themselves severely disabled regardless of their true health. In some sense, the real question is just what portion of beneficiaries are, in fact, sufficiently work-impaired to be eligible for the SSDI program.

In addition, both Gastwirth (1972) and Swisher (1973) compare SSDI recipients to a disabled population receiving no public transfers. But a majority of the severely disabled not on SSDI still receive some kind of public support (60% did so in the 1966 survey). Gastwirth (1972) and Swisher (1973) are either assuming that the men receiving SSDI benefits would have been eligible for no other public transfers, which is clearly wrong, or they are imagining a world in which there are absolutely no public transfers. But this is not the appropriate comparison, if we are interested in explaining post World War II trends in the labor force attachment of older working-age men, since SSDI is by no means the only form of public transfer for people with disabilities.

Bound (1989) suggests the pool of rejected SSDI applicants as an alternative comparison group. Since it is reasonable to assume that SSDI recipients are more limited in their ability to work than rejected applicants, Bound argues that the participation rate for the rejected population represents an upper bound on the labor force participation of beneficiaries in the absence of the SSDI program. Using samples of men aged 45 to 64 drawn from the 1972 Survey of Disabled and Non-Disabled Adults (SDNA) and the 1978 Survey of Disability and Work (SDW), Bound finds that less than one-third of rejected applicants were working as of the survey dates, while less than 50% worked at all the previous year. Of those who worked at all, less than half worked the full year. These low employment rates among rejected applicants mirror results found earlier by SSA analysts (Goff, 1970; Smith and Lilienfeld, 1971; Treitel, 1976).

Since less than half of rejected applicants return to work, Bound estimates that SSDI can account for less than half of the decline in the labor force attachment of men aged 45–54 and less than one-quarter of the decline among men aged 55–64 that occurred over the 1950s, 1960s and 1970s. Bound's calculation depends crucially on the assumption that poor health is the primary reason for the low work force attachment of rejected disability insurance applicants.

It seems likely that the very act of applying for SSDI reduces employment prospects. Many applicants may not be able to return to the job they held prior to applying for benefits and their other employment prospects could easily be far from attractive. But gauging the magnitude of this effect is difficult. (For a fuller discussion of these issues, see Bound, 1989, 1991b; Parsons, 1991.)

In addition to questions regarding the plausibility of using rejected applicants as a control group, there are two problems with using the Bound (1989) findings to make inferences about the importance of all disability transfer programs on work. First, SSDI is by no means the only such program. Presumably, in the absence of SSDI some individuals would turn to other income transfer programs, and thus the labor force participation effect of eliminating SSDI probably understates the effect of the whole transfer system. Furthermore, results are based on the assumption that all other programs and macroeconomic conditions remain unchanged. Since other programs were changing both before and after the survey on which his research is based, we cannot use Bound's (1989) calculations to measure the impact of changes in benefit availability and generosity on labor force attachment over the entire post-war period.

This raises a fundamental problem common to all studies using cross-sectional evidence to assess the impact of social insurance programs on labor force attachment over time. Since, at any given time, all individuals in a given age group face approximately the same set of programs, acceptance rates and benefit formulae, most variation in benefits is a result of variation in lifetime income. The cross-state variation that exists for programs such as unemployment insurance or workers' compensation does not exist for either SSDI or SSI. Furthermore, some of the variation in an individual's *ex ante* acceptance probability is due to actual variations in health. This suggests that the most straightforward way to use variations in program structure to study the impact of program expansion on labor force

attachment 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 evidence on the impact of these changes on the work force attachment of older working-age men. The historical record gives us a way to gauge the impact not just of the growth of SSDI but of all kinds of disability transfers.

Bound and Waidmann (1992) use data on the growth of the fraction of individuals reporting themselves unable to work to make inferences on the impact of the growth of disability insurance programs on work force attachment. If those currently receiving disability benefits are truly incapable of substantial gainful employment, we should expect to find that during the 1950s and 1960s, before the major growth in disability insurance programs, a sizable number of men were reporting themselves both disabled and either out of work or not regularly employed. Alternatively, if many of those currently receiving disability benefits are capable of working, we would expect to find many of their counterparts in earlier periods working and, thus, we should find 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-age 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.

Using data from the National Health Interview Survey, Bound and Waidmann (1992) found that the proportion of men who identify themselves as disabled remained approximately constant during the 1950s and 1960s, rose rapidly during the 1970s, and leveled off in the 1980s. Comparing these trends to trends in labor force participation, they find that since 1970, changes in the proportion of men aged 45–54 identified as disabled closely mirrors changes in the proportion of this age group out of the labor force. For men aged 55 and above, the drop in participation is substantially greater than the rise in the proportion of men identified as disabled. This evidence suggests that for men aged 45–54, but not for those aged 55 and above, a major part of the drop in labor force participation that occurred during the 1970s represented men moving out of the labor force and onto the disability rolls. Fig. 10 graphically illustrates these patterns.

Bound and Waidmann's evidence suggests that the movement of older men in relatively poor health out of the labor force and onto the disability rolls can account for a substantial fraction of the drop in the labor force participation of older working-age men during the 1970s. However, it is much more difficult to gauge the extent to which this phenomenon can be causally attributed to the exogenous growth in the size and availability of disability insurance as opposed to other forces, such as a drop in the demand for older, less skilled workers in poor health.

However, we suspect that the growth in the size and availability of disability benefits has played, at minimum, an important causal role facilitating exit from the labor force at older working ages. What were largely exogenous changes in the availability of benefits, liberalizations through the mid-1970s, retrenchment through the mid-1980s and liberal-

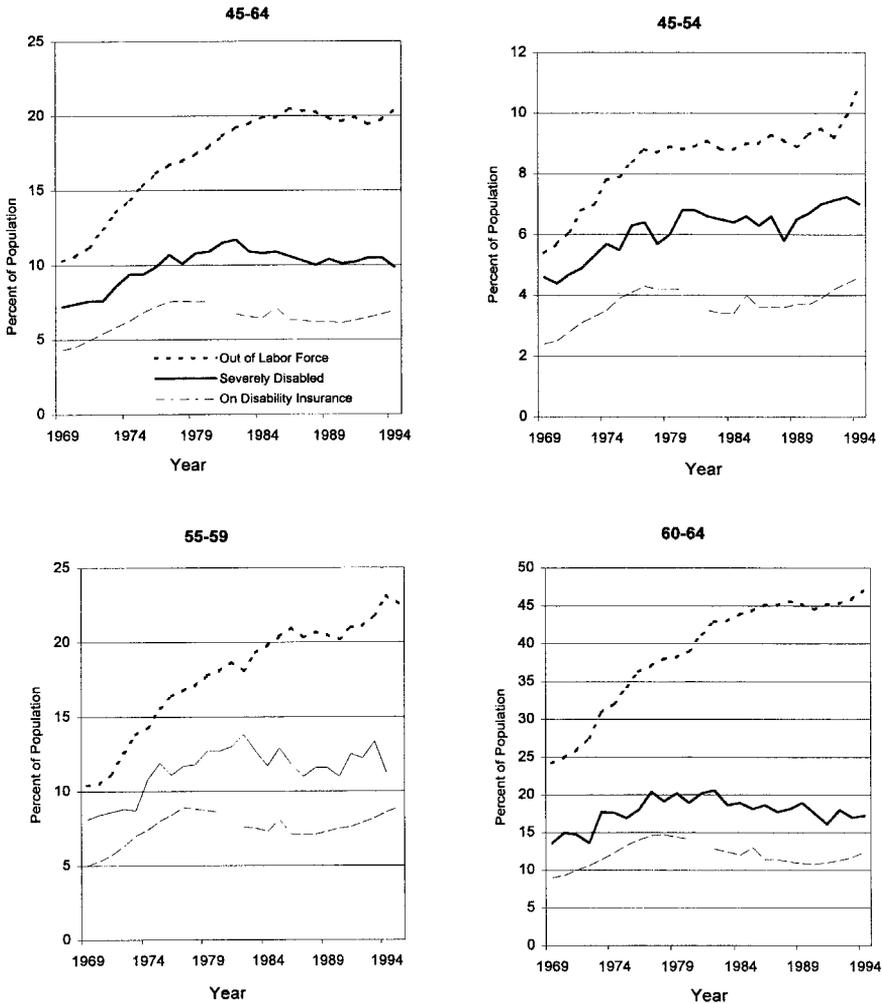


Fig. 10. Fraction of men out of the labor force, unable to work and on SSDI, 1969–1995. Source: National Health Interview Survey, *Social Security Bulletin Annual Statistical Supplement* (1996) and Bureau of Labor Statistics, *Employment and Earnings* (various issues). Data for men on SSDI in 1982 are not available.

ization since then, have been associated with changes in the fraction of working-aged men receiving benefits. At the same time, during the 1970s, 1980s, and early 1990s although not before, changes in the fraction receiving disability benefits seem to have closely mirrored changes in the number of men self-identified as disabled. These patterns suggest an important causal role for changes in the availability and perhaps the generosity of disability insurance in explaining these trends.

Of the two sources of evidence, the historical record more than the information on rejected applicants, suggests that the growth in the size and availability of disability benefits had a larger role explaining the drop in labor force attachment of older working-age men. However, the discrepancy between the two sets of results is smaller than it might appear. First, the historical record would seem to suggest that prior to 1970, SSDI was drawing primarily from a population that would not otherwise have been working. Second, even taken at face value, data on rejected applicants answer a somewhat different question than do data on changes in the fraction of men identifying themselves as unable to work. In particular, changes in the fraction of men identified as unable to work represents the effect of the expansion of not just SSDI but of other disability insurance programs as well. The movement of men out of the work force and onto the disability rolls is likely to reflect the causal effect of various factors, not just the effect of SSDI on work force attachment.

While this kind of simple evidence is compelling, there are important questions that such evidence cannot answer. In particular, there is good reason to be interested not just in the overall effect of SSDI on work force attachment, but of the effect of program parameters on work force attachment. Thus, for example, we would like to know the extent to which increases in the availability and generosity of benefits influenced behavior. We turn next to research that addresses these questions.

4.2. *The effects of benefit levels and screening stringency on labor force participation*

Modeling the behavioral response to SSDI and SSI is complicated, involving multiple decisions. Individuals, who may or may not be working, must first decide whether to apply for benefits. A person who applies will either be initially accepted or rejected. If rejected, the worker must then decide whether or not to pursue the case to the next judicial level or return to work. A complete model will thus include the worker's decision to apply for benefits, the decisions by the state evaluators and the administrative law judge as to whether or not an applicant is accepted onto SSDI or SSI, and the employment decisions of rejected applicants. As a result, most researchers have used reduced-form approaches to model these decisions.

Parsons' (1980a,b) estimates of the labor supply effects of SSDI have drawn the most attention in the literature. Using data from the National Longitudinal Survey of Older Men, Parsons (1980a,b) estimated labor force participation equations with a measure of the SSDI replacement ratio as one of his explanatory variables. His coefficient estimates imply an elasticity of non-participation with respect to benefit levels of between 0.49 (1980a) and 0.93 (1980b).⁵⁷ Simulations using the smaller of these two estimates suggest

⁵⁷ The elasticity estimates Parsons reports in his original 1980 papers are 0.63 and 1.8 in the *Journal of Public Economics* and *American Economic Review*, respectively. However, Parsons (1984), in his response to Haveman and Wolfe (1984), corrects these reported elasticities. The numbers quoted in this text represent the corrected elasticities.

that SSDI can account for the entire post-World War II drop in the labor force participation rates of men aged 45–54.

The differences between Parsons' two estimates appear to be accounted for largely by the manner in which he imputed his replacement ratios. In both papers, he uses the ratio of estimated potential Social Security benefits to the market wage. What differs is his method of imputing wages. Parson (1980a) predicts labor force participation as of 1969 on the basis of 1966 wages. The majority of men out of the labor force in 1969 were working in 1966 and so had usable responses. Parsons (1980b) predicts participation in 1966 and uses regression techniques to impute wages for those out of the labor force.

An individual's Social Security benefits depend on his or her entire history of earnings in Social Security-covered employment. Since the National Longitudinal Survey does not contain this information, Parsons imputed his earnings streams on the basis of the measure of wages he was using in the paper. Thus, his measure of potential Social Security benefits is simply a nonlinear function of the wage. Slade (1984) reproduces Parsons' (1980a,b) results using the Retirement History Survey (RHS) in which individual responses were matched to Social Security earnings records. Thus, Slade (1984) accurately calculates potential Social Security benefits. Moreover, given the non-linearities in the disability benefit schedule, Slade could have separately included both past earnings and potential benefits in his model. However, Slade notes that the correlation between potential disability benefits and past earnings was sufficiently high that, rather than including the two separately, he, like Parsons (1980a,b) simply used the ratio of the two. Slade's (1984) estimates imply an elasticity of non-participation with respect to benefits of 0.81.

Parsons (1980a,b) and Slade (1984) estimate coefficients on their replacement ratio variables which imply that SSDI enormously influenced the labor force participation rates of older working-age men. Each implies that SSDI alone could account for more than 100% of the drop in participation of older working-age men in the 1970! But there are other good reasons to believe their estimates exaggerate the causal effect of changes in the generosity of benefits on labor force participation rates. SSDI benefits increase less than proportionately as a function of previous earnings. Thus, the replacement ratio will be a decreasing function of past earnings, and it is difficult to distinguish whether it is those with generous benefit levels or low past earnings who are leaving the labor force. Moreover, an individual's wages and earnings will be functions of past investments and work effort and thus should be correlated with, for example, taste for work. These problems are, of course, endemic to cross-sectional work and cross-sectional work on labor supply in particular. Still, these considerations should make us suspect that the replacement ratio variables are, to some extent, picking up this heterogeneity and, thus, that the coefficients on them are biased upward in magnitude.

If our conjecture is right, we should find that those with poorer labor market opportunities would be the ones out of the labor force, even before the growth of SSDI. This is, in fact, precisely what the data suggest. Older, less well-educated black workers were substantially less likely to be in the labor force in 1950, long before SSDI existed. It is true that over the next four decades non-participation rates fell more than proportionately

for the less well-educated and for blacks. While there are a variety of explanations for this pattern, a plausible one would be that the growth in transfer income could be expected to differentially affect this group. Our point is not that SSDI has had no effect on participation rates, but that cross-sectional estimates tend to overstate these effects.

The data in Parsons (1980a,b) and Slade (1984) did not allow them to directly identify SSDI applicants. This raises further questions as to whether they are picking up causal effects. Bound (1989) re-estimates Parsons' specification with data drawn from the 1972 SDNA. Restricting the sample to those who have never applied for SSDI benefits, he estimates an elasticity of non-participation with respect to the replacement ratio of 0.88 with a standard error of 0.07. In this case, there is no possible causal connection between high benefit levels and labor force withdrawal, yet he still estimates an elasticity remarkably close to that of other cross-sectional studies.

One approach to the potential heterogeneity bias in Parsons' (1980a,b) specification is to instrument the replacement ratio. This is the approach used by Haveman and Wolfe (1984). They correctly point out that SSDI is only one of a variety of income transfer programs available for people with disabilities. Rather than attempt to model individual responses to a multitude of programs with different eligibility requirements and benefit structures, they consider the choice between two basic alternatives: working and not working. Then, using regression techniques, they impute total expected income flows per year for each alternative.

The statistical model Haveman and Wolfe (1984) use is the same as Lee (1978) used in his study of unionism. In the first stage, they estimate a reduced-form participation equation. In the second stage, they use the inverse Mills ratio, computed using first-stage estimates to get proxies for the two income flows. Then, in the third stage, they substitute these imputed incomes into the participation equation. However, this technique requires that some variables be excluded from both the income and "structural" participation equations. Results are only as reasonable as are these exclusion restrictions. They include such things as religious preference variables in their participation equation, but not in their income equations, and then include such things as education and an age spline in their income equations, but not in their participation equations. Furthermore, most of the coefficients on their variables are imprecisely estimated with the median t-statistic below 1. In particular, the coefficients on the inverse Mills ratios are large (the one for earnings implies a cross-equation correlation of 0.5) but imprecisely estimated. Thus, the procedure imputes low earnings for those who do not work and low transfers for those who do, but the standard errors on these contrasts would be as large as the contrasts themselves and are based on arbitrary identifying restrictions.

Haveman and Wolfe summarize their results in two ways. Evaluating their estimates at the mean of the explanatory variables used in the model, they calculate elasticities of participation with respect to expected disability income of between -0.0003 and -0.0005 . At the same time, they report simulations that suggest that a 20% rise in benefits would lower participation rates from 91.37% to 90.73% and that a 20% drop in benefits would raise participation rates to 92.41%. These simulations imply arc elasticities of

participation with respect to benefit levels of between -0.035 and -0.057 . Alternatively they imply elasticities of non-participation with respect to benefit levels of between 0.37 and 0.60 , only slightly smaller than those estimated by Parsons.⁵⁸

Which set of elasticities should we use when we interpret Haveman and Wolfe's results? If we are interested in knowing the responsiveness of behavior to program parameter changes, it would seem to be the simulations that give us the conceptually most sensible numbers. An evaluated elasticity gives us the responsiveness of individuals with some given characteristics, who may or may not be "at the margin," to a change in program rules. The simulation averages these responses across the population. Thus, in interpreting Haveman and Wolfe's results we would emphasize that their simulations have come close to reproducing Parsons' (1980a,b) results.

In subsequent work with de Jong (de Jong et al., 1988; Haveman et al., 1991), Haveman and Wolfe used a similar switching regression model to analyze the effect of disability benefits on the work force attachment of older working-aged women using the PSID and then of older working-aged men using the 1978 Survey of Disability and Work. Other than the differences in the way de Jong et al. (1988) and Haveman et al. (1991) treat health (see below), the statistical model these authors use is similar to the model used by Haveman and Wolfe (1984) and, as a result, the estimates are subject to the same kind of concerns.

Since there is ample evidence of a strong association between labor earnings (or other measures of economic well-being) and health, and since health is an important predictor of labor market behavior, controlling for health is important when using cross-sectional data to study the impact of SSDI benefits on work force attachment.⁵⁹ Parsons (1980a,b) uses information on subsequent mortality, while Haveman and Wolfe (1984) use self-reported disability status. Important questions can be raised regarding either approach. On the one hand, subsequent mortality will pick up only a component of health (many disabling conditions such as arthritis are not life threatening). As a result, using it will not adequately control for the confounding effect of health. On the other hand, many have been suspicious of self-reported disability status (Parsons, 1982, 1984; Anderson and Burkhauser, 1984), fearing that individuals may be using poor health to rationalize behavior that would have occurred for other reasons. The literature that has compared results using a variety of different kinds of health measures (Chirikos and Nestel, 1981; Lambrinos, 1981; Parsons,

⁵⁸ We would not expect the computed elasticities and the simulations to exactly agree, but what accounts for the dramatic discrepancy? Haveman and Wolfe (1984) follow the standard approach, evaluating the elasticity at the mean of the explanatory variables. In particular, they evaluate the formula, $\overline{\text{ben}} \times \hat{\beta}(\varphi(z)/\Phi(z))$, at $z = \overline{X'}\hat{\beta}$. For reasons that remain unclear, $\overline{X'}\hat{\beta}$ is above 3. Thus, they are evaluating the elasticity in the tail of the normal distribution. Since the operative part of the elasticity formula is the familiar inverse Mills ratio and since this approaches zero as Φ approaches 1, we have an explanation for why the computed elasticities are so low. While they are not incorrect, they are misleading. One way to see this dramatically is to realize that if Haveman and Wolfe (1984) had reported elasticities of non-participation (rather than participation) with respect to benefit levels, as Parsons (1980a,b) does, they would have gotten elasticities an order of magnitude larger than his.

⁵⁹ There is an extensive literature discussing the appropriateness of using various measures to proxy for health or disability status. Bound (1991a) contains an analytic discussion of the issues involved, while Currie and Madrian (in this volume) contains a recent review of the evidence.

1982; Anderson and Burkhauser, 1984, 1985; Bound, 1991a) finds that the estimated effect of economic variables on outcomes depends importantly on the measure used. In particular, authors have consistently found that the use of global self-reported health measures tends to minimize the estimated impact of economic variables on labor market outcomes. Most authors have interpreted these results as an indication of the biases inherent in using global self-reported measures. However, it is also possible that alternative measures simply do not adequately control for the confounding effect of health.⁶⁰ Which view is closer to the truth remains an open question.

One alternative to the use of either limited but “objective” or global and “subjective” health measures is to use the limited measures to instrument the global, potentially endogenous ones. This strategy has been used by a number of individuals studying the effect of health in labor market behavior (e.g., Stern, 1989; Bound et al., 1996). The strategy used by de Jong et al. (1988), and Haveman et al. (1991) to control for health can be thought of as a generalization of this instrumental variables (IV) approach. In particular, in both papers the authors used a health index derived from a multiple indicator multiple cause (MIMIC) model that is a function of socioeconomic characteristics of the individual, family income, personal habits (e.g., smoking), and the occupational requirements of the individual’s normal occupation.⁶¹ The problem with this IV strategy is that if those with more of an incentive to leave the work force are, holding health constant, the ones more likely to report themselves in poor health, then the IV strategy will tend to underestimate the impact of economic incentives on behavior (see Bound 1991a for a fuller discussion of this issue).

More recently, Gruber (1996) uses a large (36%) change in benefit generosity that occurred in the Canadian provinces, except Quebec, in 1987 to identify the effect of benefit generosity on participation. Using data from 1985 to 1989, Gruber compares changes in the labor force participation of men aged 45 to 59 in Quebec to those in the rest of Canada. Estimates using a difference in differences approach imply an elasticity of non-participation with respect to benefit levels of 0.32. A more parameterized model yields similar estimates. However, Gruber is estimating short-run effects. Since program changes can affect stocks of those on disability and out of the work force only by affecting flows, and since the stocks are substantially larger than flows, the long-run effects are likely to be substantially larger than the short-run effects.

To our knowledge there has been only one attempt to estimate the effect of screening stringency on labor force participation. Gruber and Kubik (1997) examine the impact of the increase in the initial determination denial rates during the late 1970s on the labor force participation of men aged 45–64 during the early 1980s. Gruber and Kubik’s estimates imply that a 10% increase in denial rates would lower non-participation by 2.8%. Once

⁶⁰ We have argued that existing evidence suggests that the use of global self-reported health status to proxy actual health produces reasonable estimates of the effect of health on labor market outcomes. However, it may also lead researchers to underestimate the effect of economic factors on outcomes (see Bound, 1991a).

⁶¹ The kind of IV strategy used by Stern (1989) and Bound et al. (1996) can be thought of as a single indicator (self-reported health or disability status) multiple cause (the instruments) model.

again, these estimates presumably reflect the relatively short-run effects of the increase in denial rates.⁶²

Table 16 summarizes a number of estimates of the elasticity of labor force participation with respect to benefit generosity. We have argued that Parsons' and Slade's estimates are likely to overestimate the causal effect of benefit generosity. Evaluating the potential biases involved in the studies that use switching regression methods or the Gruber study is difficult.

Let us compare these estimates to estimates of the effect of benefit generosity on benefit applications or program participation. As was shown in Table 12, Leonard (1979) estimated an elasticity of program participation with respect to benefits of 0.35. While an elasticity of SSDI participation with respect to benefits levels of 0.35 looks quite close to the 0.49 elasticity in Parsons (1980a), what this means in terms of labor force participation depends on how an impact on program participation translates into an impact on labor force participation. If we assume that each of the beneficiaries attracted by the higher benefits would be working if they were not receiving SSDI benefits, then each new beneficiary means one less labor force participant.⁶³ To convert this one-for-one change in the number of labor force participants into an elasticity, it is necessary to take into account the fact that there are more than twice as many older working-age men out of the labor force as on SSDI (see Table 15). Even assuming that all of those who were attracted to SSDI by higher benefits would otherwise be working, the 0.35 elasticity of program participation with respect to benefit levels implies something less than a 0.16 elasticity of labor force non-participation with respect to benefit levels. The Leonard (1979) results thus seem to imply non-participation elasticities that are about one-third of those in Parsons (1980a,b).

Studies using aggregate time series statistics on applicants (Lando et al., 1979; Halpern, 1979) have estimated that a 10% increase in SSDI benefits would raise applications by roughly 5%. Assuming that the new applicants are no less likely to pass the medical screening than were those already on the program, this 5% increase in applications should

⁶² It is possible to compare Gruber and Kubik's estimates of the impact of changes in initial denial rates on participation to Parsons' estimates of their impact on applications. In the late 1970s there were roughly 1.2 million individuals applying for SSDI benefits each year. Parsons' estimates imply that a 10% increase in initial denial rates would lower applications by roughly 50,000 individuals per year. As of 1980, roughly half of applicants for SSDI were men aged 45–64, so the 50,000 needs to be cut in half. By comparison, in the late 1970s there were about 3.6 million men aged 45–64 out of the work force. Gruber and Kubik's estimates imply that a 10% increase in denial rates would shift roughly 100,000 of these men into the work force. Presumably, some of those who could have applied for benefits, but did not do so, would have been out of the work force, but are not. Thus, Gruber and Kubik's estimates seem large relative to those of Parsons.

⁶³ While it is possible that some of those who were induced to apply for SSDI because of higher benefits would not have been working, it is also possible that some of those who applied because of the higher benefits who were subsequently rejected would not return to work. There is some evidence that during the 1970s these two effects tended to cancel out. Remember that the historical record seemed to suggest that during the 1970s there was a one-for-one relationship between the number of older men moving onto SSDI and the number induced by program expansion to leave the work force.

Table 16
Estimated elasticity of labor force non-participation with respect to Social Security Disability Insurance benefit levels

Study	Data	Sample	Health variable	Elasticity
Parsons (1980b)	NLS ^a	Men, aged 45–59, 1966	Mortality	0.49 ^b
Parsons (1980a)	NLS ^a	Men, aged 48–62, 1969	Mortality	0.93 ^b
Slade (1984)	RHS ^c	Men, aged 58–63, 1969	Self-rated; mobility limitation	0.81 ^d
Haveman and Wolfe (1984)	PSID ^e	Men, aged 45–62, 1978	Self-rated; disability	0.49 ^d
de Jong et al. (1988)	PSID ^e	Single women, aged 45–62, 1978	Health index	0.72 ^f
de Jong et al. (1988)	PSID ^e	Married women, aged 45–62, 1978	Health index	0.26 ^f
Haveman et al. (1991)	SDW ^g	Men, aged 45–62, 1978	Health index	0.21 ^h
Gruber (1996)	CLFS ⁱ	Men, aged 45–59; 1985–1989	None	0.25 ^j

^a National Longitudinal Survey of Older Men.

^b Evaluated at the mean of the explanatory variables used in the analysis. These elasticities are the corrected values reported by Parson (1984) to Haveman and Wolfe (1984) in his reply.

^c Retirement History Survey.

^d Participation elasticity evaluated at the mean of the explanatory variables used in the analysis and converted into a non-participation elasticity by multiplying by the sample odds of non-participation.

^e Panel Study of Income Dynamics.

^f Elasticity of non-participation with respect to benefit levels.

^g 1978 Social Security Survey of Disability and Work.

^h Calculated as an average arc elasticity.

ⁱ Canadian Labor Force Survey.

^j The index was derived from a MIMIC model estimated on the same data uses in the analysis and is a function of socioeconomic characteristics of the individual, family income, personal habits (e.g., smoking), and the occupational requirements of the individuals' normal occupation. This value is based on sample means. When a regression is used the value is 0.32.

translate into a 5% increase in the number of beneficiaries but a less than 2.5% increase in the number of older working-age men out of the labor force. If, as seems likely, the new applicants would be less likely than the earlier ones to pass the medical screening, this 2.5% should decrease correspondingly. In any case, 2.5% is roughly half the 4.9% suggested by Parsons' (1980a) estimate.

What can we conclude from these studies? Although we have sympathy for a variety of concerns raised by Haveman and Wolfe (1984), their statistical model is suspect. There is good reason to believe that Parsons (1980a,b) and Slade (1984) overestimate the true impact of SSDI benefit levels on participation rates. The Leonard (1979) study, which actually focuses on the program itself, seems to imply substantially smaller non-participation elasticities, but we do not know how to translate program elasticities into labor force elasticities. Hence, while we believe Parsons' (1980a,b) estimates are too high, just how high remains an open question.

4.3. The role of worker adaptation and employer accommodation

While, as we have seen, the majority of those who experience the onset of a work limitation continue to work, little research has focused on the factors that facilitate their continued work. Rather, most of that research has looked at the effect of health on exit from the work force. Typically, models depict individuals facing a dichotomous choice: the person can stay in the work force or can leave and, perhaps, apply for SSDI or SSI benefits. However, existing survey evidence suggests a more complicated pattern: workers who continue to work following the onset of a health limitation that affects their ability to work often do so by adapting, through their own actions and with the help of their employer, to their work impairment.

Both the 1978 Survey of Disabled Workers (SDW) and the Health and Retirement Study (HRS) asked individuals retrospective questions regarding their experience subsequent to the onset of a work limitation. Daly and Bound (1996) use the HRS data to document the kinds of adaptations workers make to the onset of a work limitation. Of those HRS respondents who reported a work limitation at baseline, 50% continued to work for their old employer after the onset of the limitation, 23% changed jobs and 27% left work altogether. Interestingly, younger workers were less likely to quit work altogether, but they were also more likely to change jobs. If one thinks of changing jobs as an investment, this pattern makes good sense – younger workers have a longer time horizon over which to recoup the costs associated with such investments.

In a similar spirit, Charles (1996a) uses the Panel Study of Income Dynamics to look at the dynamic effect of the onset of a work disability on subsequent employment and earnings, by comparing post-onset employment and earnings of those who identify themselves as having a work limitation to what they would have been in the absence of the limitation. He finds that men experience a sharp drop in earnings around the time they first identify themselves as work-limited, but then experience some rebound in earnings. The younger a man is when health begins to limit his capacity for work, the less of an immediate effect

there is on either his employment or earnings. Moreover, younger men experience more of a recovery than do older men. Charles develops a human capital interpretation of these patterns. Health shocks destroy job-specific human capital. The younger a worker is the less such human capital he has to lose and the more incentive he has to invest in skills that will facilitate the adaptation to the work limitation.⁶⁴

Both anecdotal and survey evidence suggest that employers also play an active role facilitating the continued employment of workers who begin to suffer health limitations. The HRS asked respondents who identified themselves as suffering work limitations whether their employer had done anything to explicitly accommodate them after the onset of their work limitation. Roughly one-third of those who reported that they continued to work for their old employer also reported that employer had taken explicit steps to accommodate the worker (Charles, 1996b; Daly and Bound, 1996). The 1978 Survey of Disability and Work shows similar patterns (Lando et al., 1979; Burkhauser et al., 1995). In a 1982 survey of federal contractors, about 30% reported having accommodated a worker (Collignon, 1986).

How effective is employer-provided accommodation in encouraging individuals to continue to work after the onset of a work limitation? Using the HRS, Charles finds that those workers who report that their employers accommodated a work limitation were almost twice as likely to be still working for their old employer 2 years after the onset of a work limitation than those who reported no such accommodation. Using the 1978 SDW, Burkhauser et al. (1995) find comparable shortterm differences that grow with time. Using both datasets, Butler et al. (1999) find that workers who report employer accommodation are also significantly less likely to apply for SSDI or SSI. However, as these authors recognize, these estimates are likely to be upper bounds on the causal effect of accommodation since accommodation is endogenous. Presumably, employers will be more likely to accommodate workers when the cost of such accommodation is low, which will typically be true when the limitation is relatively minor. Moreover, employers will be more likely to accommodate workers if they expect the worker is likely to continue with that employer. Otherwise, the investment will not pay off. For both reasons, it seems likely that these are upper bound measures of the causal impact of employer accommodation on the employment of workers following a disability.

Both the 1978 SDW and the first wave of the HRS predate the Americans with Disability Act of 1990 (ADA). Title I of the ADA requires employers to make reasonable accommodation for workers with disabilities unless this would cause undue hardship to the operation of business. One of the hopes underlying the ADA is that accommodation at the onset of a disability would delay job exit and subsequent movement onto the disability rolls. The evidence cited above seems to suggest that employers were providing a substantial amount of accommodation before the ADA was in place. What effect has the ADA had

⁶⁴ What also seems likely is that the nature of the limitations varies by age of onset. If the limitations experienced by those with late onsets are typically more severe and/or permanent than the limitations experienced by those with early onset, then these differences could also explain part of Charles' findings. The data Charles uses do not allow him to directly address these issues.

on the employment or earnings of people with disabilities? Despite the fact that the ADA was intended to lower barriers to employment among people with disabilities, a number of economists have warned (Oi, 1991; Rosen, 1991; Weaver, 1991) that since the ADA increases the costs of hiring such workers, it could have the opposite effect. At issue, among other things, is the extent to which ADA mandates may raise an employer's cost of discharging a worker with disabilities and hence reduce the likelihood of such workers being hired by firms. If the law is ineffective in forcing firms to hire workers with disabilities, but is effective in preventing firms from discharging such workers without some effort to accommodate them, then the law is likely to adversely affect the employment of workers with disabilities.⁶⁵

DeLeire (1997) uses SIPP data to examine employment rates for the disabled relative to the non-disabled both before and after the ADA was enacted. DeLeire estimates that relative employment rates fell 8% after the ADA was enacted in 1990 and interprets this as the causal effect of the law. However, there are a number of reasons to suspect that this 8% seriously exaggerates the causal impact of the ADA on the employment of the disabled. First, SSDI and SSI were expanding rapidly over this period of time, presumably lowering employment among the disabled. Second, as we have seen, the disabled seem to be particularly hard hit during recessions. Thus, we would expect the relative employment of the disabled to decline in the early 1990s even were it not for the ADA.

Acemoglu and Angrist (1998) try to address a number of weaknesses in the DeLeire analysis. In particular, in their regressions they control for being on either SSI or SSDI, although this still leaves open the possibility that the recession caused the drop in relative employment. They also test to see if employment rates of the disabled were lower in states with more ADA-related discrimination charges. They find weak evidence of such effects. The question of the ADA's effects on the employment prospects of the disabled clearly merits further research.

4.4. Welfare implications of disability insurance

The empirical literature on disability transfer programs has primarily focused on either the determinants of program growth or on the impact of SSDI and SSI on labor force attachment. This focus on the efficiency costs is both somewhat narrow and misleading since social benefits of these programs are ignored. Implicit in much of the literature seems to be the assumption that if the SSDI or SSI programs were working effectively they would have no effect on participation rates. But this notion is wrong for two reasons. First, even if actual disability status were perfectly observable, we would probably still want to target benefits for low-income workers. SSDI will have both income and substitution effects on

⁶⁵ This is a variation of the argument that civil rights legislation, intended to protect minorities and women from discrimination, raises the costs of their hire and thus sends the wrong signal to potential employers. Acemoglu and Angrist (1998) provide an extended discussion of these issues. See also Lazear (1990).

labor supply. Any analysis of the welfare implications of the program needs to distinguish between the two. Second, in a world where actual disability is not perfectly observable, some individuals will be denied benefits who are less capable of work than are some of those accepted. In such a world, more generous benefits will involve a tradeoff between the equity and insurance value of generous benefits on the one hand and efficiency losses on the other. The issue is: do the social benefits outweigh the efficiency costs arising from insuring workers against income loss and transferring income to those in need?

As was discussed in Section 2, there is considerable documentation of the economic well-being of the disabled, particularly the “doubly disabled” who are also black, women, or have low levels of education (e.g., Haveman and Wolfe, 1990; Burkhauser et al., 1993; Daly, 1994; Burkhauser and Daly, 1996b). This research shows that publicly provided income transfer programs are an increasingly important source of income for people with disabilities. However, it does not really answer questions about the social value of disability insurance, since it does not answer the counterfactual question of what the incomes of people with disabilities would be under different regimes and because it ignores the potential benefits associated with reduced work effort (e.g., the value of leisure).⁶⁶

From a theoretical perspective, a number of authors have examined issues regarding the impact of imperfect screening validity on optimal program design. Typically, the models are all static (one-period) models, with variation across individuals in the degree to which they suffer a disability (modeled as the disutility of work). Productivity differences across individuals are assumed away. In this context the equity/insurance distinction disappears. Imagine a two-period model where everyone is able-bodied in period one, and some are disabled in period two. Here, risk averse individuals benefit from the insurance against adverse health shocks. Alternatively, imagine permanent differences across individuals, in which case social welfare rises because resources are transferred across individuals.

Diamond and Sheshinski (1995) provide the most complete treatment of the problem. They examine optimal program design when both early retirement (or welfare) and disability benefits are available to an individual, but eligibility for disability benefits requires passing an imperfect medical screen, while eligibility for early retirement benefits is universal. Diamond and Sheshinski show that as long as the probability of passing the medical screening rises with the level of disability (in their model, disability is modeled as the disutility of work) and some other regularity assumptions are satisfied, overall welfare can be increased if the government distinguishes between those who are disabled and those who are not – disability benefits will exceed retirement benefits. Of course, in the United States early Social Security retirement benefits are not available until age 62 and no universal safety net exists. Thus, the Diamond and Sheshinski (1995) results do not

⁶⁶ While we have shown that increased work by other family members offsets the decline in the work of men following the onset of a disability, without some kind of publicly provided disability transfer system many people would be likely to experience serious declines in economic well-being following the onset of a disability. Gertler and Gruber (1997) provide quantitative evidence of this using data from Indonesia.

apply to the United States.⁶⁷ Furthermore, Diamond and Sheshinski ignore the costs of applying for disability benefits. Such costs are clearly important – without them, it would be hard to understand why application rates respond to changes in screening stringency. Once such costs are introduced, the optimality of trying to distinguish the disabled from the non-disabled becomes ambiguous (Crocker and Snow, 1986; Waidmann, 1996).

Diamond and Sheshinski (1995) provide a purely theoretical paper. In an ambitious effort, Waidmann (1996) uses available information on the reliability and validity of the medical screening of SSDI applicants together with information regarding the sensitivity of applicants to screening stringency and benefit levels to calibrate a model quite similar to that of Diamond and Sheshinski. He then uses the calibrated model to study optimal program design. His model does include costs associated with screening for SSDI, so the optimality of distinguishing those who do and do not pass the disability screen is not a foregone conclusion. Empirically, his calibrations suggest that the medical screening involved in evaluating SSDI applicants is valid enough to justify using it. However, what is striking about Waidmann's results are that they suggest that optimal program design would involve giving those who do not pass the medical screen almost as much in benefits as those who do. The implication would seem to be that the medical screening is not accurate enough to justify heavy reliance on it. While this result is intriguing, it is not clear to what extent the conclusion depends on the specific way that Waidmann sets up his model. Waidmann's results are suggestive but certainly not definitive.

It is much easier to examine the welfare consequences of a specific policy change than it is to study optimal program design. Still, as far as we know only one person has tried to incorporate such an analysis into his work. Gruber (1996) tries to estimate the welfare implications of the 1987 benefits increase in Canada. He notes that the benefits of the increase include both the transfer of income from the financially better-off workers to the less well-off population with disabilities as well as the value of leisure for those induced to leave the work force by the benefits increase.⁶⁸ The costs involve the lost production associated with the labor force withdrawal of a segment of the working population.⁶⁹ The costs associated with lost production are closely related to the kind of parameter much of the literature has been trying to estimate. The benefits, due to the fact that those in poor health can now leave the work force, have been largely ignored, but may be quite high for a population at the margin of leaving the work force for health-related reasons.

⁶⁷ Parsons (1996) sets up a model somewhat differently. In his model, a “faithful” administrator chooses benefits and screening stringency in order to maximize the well-being of the “truly” disabled, subject to a fixed-budget allocation. Within the context of the model, Parsons is able to show that the severity of screening rigor is strictly increasing in the magnitude of safety-net benefits (benefits available to all regardless of whether they pass the disability screen) available. Unless there is a safety net, screening will not, in general, be optimal.

⁶⁸ These benefits will include both equity and insurance components.

⁶⁹ The costs also include the deadweight burden associated with raising taxes to pay for the increased benefits. However, Gruber argues that since empirical evidence (Summers, 1989; Gruber, 1994; Anderson and Meyer, 1995) suggests that the incidence of these taxes falls almost entirely on workers, the deadweight burden of the tax increase will be negligible.

Gruber notes that revealed preference arguments can be used to evaluate the value of this leisure – it must be great enough to compensate the labor force leavers for both the drop in income associated with moving onto the disability program and the risks associated with applying for disability benefits. Evaluating the welfare effects of a benefit increase requires evaluating the costs of taking the gamble to apply for disability benefits. If the costs of applying for benefits are low, then the implied value of leisure for applicants is low, whereas if the cost of applying is high the implied value of leisure is high. In order to actually quantify the value of leisure, Gruber makes assumptions about the impact on family income of having a disability claim rejected.⁷⁰

Gruber's calculations suggest that, even though the negative labor supply effects of increasing disability benefits substantially increase the efficiency cost of raising benefits for the disabled, as long as individuals are reasonably risk averse (i.e., as long as they can be characterized by a relative risk aversion parameter of above 2), the benefit increase is still welfare-enhancing.

It is possible to do similar back-of-the-envelope calculations using United States data to determine whether or not SSDI benefit increases would be welfare-enhancing. In these calculations we are explicitly thinking of SSDI as a social insurance program. Thus, the question we are asking is whether the insurance value of increased benefits offsets the efficiency costs associated with reduced labor supply. We do the calculation for a worker with moderate earnings. Consider a man who has yearly labor earnings of \$20,000, which represent half of his family's total income. Assuming the man is married but has no dependents, this translates into after-tax family income of \$32,800. SSDI benefits for this man would be approximately \$10,000 (see Table 10). If this worker were to move onto SSDI, his family income would drop to \$27,400 if his wife did not change her labor supply.

What are the welfare consequences of a marginal change in the level of SSDI benefits? In particular, consider a 1% (i.e., \$100) increase in SSDI benefits. This \$100 represents increased income for those already on SSDI. Using a relative risk aversion parameter of 3.5, the insurance value of this \$100 is about \$190 per SSDI beneficiary.⁷¹ The costs of the increase include both the direct costs of financing the increase (\$100) and the costs associated with the behavioral response to the benefit increase. Since the men induced to apply for SSDI benefits by the increase are at the margin, they neither benefit nor lose from the increase. Workers do, however, have to pay for the publicly provided transfers to these individuals as well as for any lost taxes. To calculate these numbers, we assume that the 1% increase in benefits induces a 0.5% increase in the number of SSDI beneficiaries, and that those induced to apply who are rejected do not end up receiving alternative private

⁷⁰ Gruber assumes that those who are denied benefits do not return to work and receive incomes equal to the average non-SSDI income of those who identify themselves as unable to work.

⁷¹ Based on questions on the HRS asking individuals about their willingness to take risks, Barsky et al. (1997) estimate that over 75% of the population have relative risk aversion parameters above 3.5.

or public transfers.⁷² Transfers to these new beneficiaries amount to \$50 per beneficiary. We also assume that the increase in labor force non-participation equals the increase in program participation. Lost taxes from this group represent \$18 per beneficiary. Thus, the insurance value of the change exceeds the costs by about 13%.

Estimating the welfare effects of changes in screening stringency requires additional assumptions. To be concrete, we imagine that eligibility requirements are changed in such a way that there is a 0.5% increase in the number of beneficiaries and that changed standards increase the total number of men applying for benefits by the same fraction. We need to make some assumptions about the effect of these changes on the behavior of both the men who would now pass the medical screening but would not have done so in the past. We also need to make assumptions about the effect of applying for SSDI on those induced to do so by the relaxed standards. For our calculations, we assume that 50% of those who apply for SSDI benefits are rejected, and that 50% of those that are rejected return to work at their old rate of pay, while 50% stop working altogether. The change in eligibility standards shifts men who would otherwise be in the pool of rejected applicants onto the SSDI rolls. We assume that these men are typical of rejected applicants – 50% would then be out of work. Assuming that this shift has no effect on other sources of income, after-tax family income increases from \$17,400 to \$27,400 for this group. The insurance value of this increase is roughly four times the nominal value. Thus, per SSDI beneficiary this increase is worth \$100. Welfare also presumably goes up for those newly entitled beneficiaries who would have been working, but by less, and we ignore this effect in our calculation. The direct cost of the increase in the number of beneficiaries is \$50 per beneficiary. The labor supply effect of the change in eligibility standards includes both the effect on those who would not have been receiving benefits before the regime change and on those induced to apply for benefits. We have already assumed that 50% of the new beneficiaries would have been working. We make the additional assumption that 50% of those induced to apply for benefits but rejected do not return to work – i.e., that the application itself lowers labor force attachment by 50 percentage points. Together, these two assumptions imply labor supply effects that are 0.5% as large as the original SSDI beneficiary population. The lost taxes associated with this shift are \$4600 for each worker who leaves the work force, or \$23 per existing disability beneficiary. Thus, our calculations suggest that benefits exceed costs by roughly one-third.

While our calculations suggest that the worker we considered should be willing to pay for either benefit increases or eased eligibility standards, the calculations were made using a variety of assumptions, each one of which could be questioned. As much as anything, these calculations are meant to suggest the kind of information required to evaluate the welfare effects of policy shifts. We need to know more than we can possibly learn from the reduced-form models of the effect of benefit increases that have dominated the empirical literature. In

⁷² Recall that the time series evidence suggested an elasticity of applications with respect to benefits of about 0.5. If those induced to apply for SSDI benefits by generous benefits tend to be the more marginal applicants, then award elasticities will tend to be lower than application elasticities.

particular, to evaluate the welfare effects of a change in benefits or eligibility standards not only requires that we know the effect of such changes on the number of individuals applying for and receiving benefits, but that we also know the effect of these shifts on the family income, earnings, and employment levels of those affected by the envisioned changes.⁷³ We also need to know the extent to which changes in the availability or generosity of disability benefits crowd out other sources of income for people with disabilities.

5. A cross-national comparison of disability policies

In Section 2 we showed that the majority of men and women of working age with disabilities are not receiving disability transfers and that a large percentage of them work. But employment and prevalence of transfer receipts among this population have had both cyclical and secular trends. In Section 3 we showed that factors other than health have been responsible for the great fluctuation in the SSDI and SSI population over the last 25 years. In this section we look more closely at disability transfer policy in the United States and compare it with policies in three European countries – Germany, The Netherlands, and Sweden. We suggest that the dramatic differences in the ratio of disability transfer recipients to the working population across countries and time cannot be explained by underlying differences in the health of their populations and is more likely to be related to the disability systems. We further argue that to understand the behavioral incentives inherent in these programs, it is important to place disability transfer programs in the broader context of social welfare policy in the countries.

5.1. A cross-national comparison of disability transfer populations

Table 17, derived and updated from Aarts et al. (1996), suggests that economic and political forces play an important role in determining the relative size of the disability transfer population and how it changes over time. This table shows the number of disability transfer recipients per thousand workers by age over the past quarter century in the United States, The Netherlands, Sweden, and Germany. All four countries have experienced growth in this ratio since 1970, but the initial starting points and the patterns of growth are different, and these cross-national differences cannot be explained by differences in underlying health conditions in the four countries.

As discussed in Sections 3 and 4, in the United States the 52% increase in the relative disability transfer rolls in the 1970s is correlated with both substantial increases in real benefits and the easing of eligibility standards for older workers. It was among those aged 45 and over that the ratio grew most rapidly (see Burkhauser and Haveman, 1982 for a discussion of this period of disability policy history). Growth in the United States was only exceeded in The Netherlands, which experienced explosive growth – 151% – in its overall

⁷³ While it might appear that Gruber (1996) avoids such assumptions, they are imbedded in his estimates of the value of leisure to those induced to leave the work force by the increase in disability benefits.

Table 17
Disability transfer recipients per thousand workers by age, in four OECD countries, 1970–1994^a

Age	1970	1975	1980	Growth change 1970–1980 (%)	1985	1990	Growth change 1980–1990 (%)	1995	Growth change 1990–1995 (%)
<i>Aged 15–64</i>									
United States	27	42	41	52	41	43	5	64	49
The Netherlands	55	84	138	151	142	152	10	142	-7
Sweden	49	67	68	39	74	78	15	106	36
Germany ^b	51	54	59	16	72	55	-7	47	-15
<i>Aged 15–44</i>									
United States	11	17	16	45	20	23	44	39	70
The Netherlands	17	32	57	235	58	62	9	57	-8
Sweden	18	20	19	6	20	21	11	32	52
Germany ^b	7	6	7	0	8	5	-29	6	20
<i>Aged 45–59</i>									
United States	33	68	83	151	71	72	-13	103	43
The Netherlands	113	179	294	160	305	339	15	271	-20
Sweden	66	95	99	50	108	116	17	151	30
Germany ^b	75	64	84	12	103	75	-11	87	16
<i>Aged 60–64</i>									
United States	154	265	285	85	254	250	-12	314	26
The Netherlands	299	437	1033	245	1283	1987	92	1872	-6
Sweden	229	382	382	67	512	577	51	716	24
Germany ^b	419	688	1348	222	1291	1109	-18	890	-20

^a Source: Derived and updated from Aarts et al. (1996, Table 1.1).

^b German data refer to the population in the states in the former Federal Republic of Germany.

transfer ratio during the decade (see Berkowitz and Burkhauser, 1996 for a discussion of disability policy in the United States during this period and through 1994).

As we saw in the United States, the political responses to rapid program growth were both the introduction of a stricter set of eligibility criteria and more vigorous enforcement of program rules. The political backlash caused by the heavy-handed enforcement of these new rules led to a substantial relaxation in program rules in the mid-1980s. A strong economy over the rest of the decade postponed the inevitable growth in the rolls due to these changes, so that by 1990 the relative disability transfer population was only slightly greater than it had been at the start of the decade. However, the pattern of program growth in the United States over the 1980s was much different than in the 1970s and signaled an important change in the characteristics of the new disability transfer population.

In the 1970s the United States joined The Netherlands, Sweden, and Germany in using its disability transfer system to provide early retirement benefits for older workers with health conditions that affected their ability to work, but who were not yet old enough to be eligible for benefits through the traditional social security retirement system. The growth in the disability transfer rolls in Germany and Sweden during the 1970s was almost completely confined to workers aged 45 and over. Only in The Netherlands were workers under the age of 45 a significant component of the disability transfer population. The use of disability transfers as a bridge to early retirement in the United States is consistent with the creation of SSDI in the 1950s as a program limited to older workers (see Haveman et al., 1984 for a discussion of disability policy in these four countries over this period).

Retrenchment in United States disability policy in the early part of the 1980s together with a strong economy in the remainder of the 1980s led to a mere 5% increase in the relative disability transfer population during the decade. Only Germany, which experienced a decline in its disability transfer ratio, had smaller growth among the four countries shown in Table 17. But this small increase in overall growth in the United States conceals a 44% increase in the relative disability transfer population aged 15–44, an increase that far exceeded that of younger workers in the other countries. This increase put the United States ahead of Sweden and Germany in the rate of disability transfer recipients per worker over this younger age range, even though the United States was well below these two countries in overall disability transfer prevalence rates.

Propelled by the economic recession of the early 1990s in the United States, the relative disability transfer population aged 15–44 rose by 70% between 1990 and 1995, and the overall relative disability transfer ratio rose by 49% (see Burkhauser, 1997 for a discussion of the public policy issues surrounding this event). This is in sharp contrast to what was happening in the other countries. Over these same years, the ratio of transfer recipients per active worker actually fell in both The Netherlands and Germany. Only in Sweden did the ratio rise, but at about three-quarters the overall rate increase in the United States. Hence, by 1995 not only did the overall ratio of transfer recipients per worker in the United States exceed that of Germany, but for persons aged 15–44 the use of disability transfers in the United States was now substantially higher than in either Sweden or Germany. Only The

Netherlands had a higher ratio of disability transfer recipients per worker among the younger population. Clearly the 1990s have seen a convergence in the prevalence of disability transfers as the welfare states of Europe struggle to reduce their disability transfer populations and the United States has substantially added to its disability transfer population (see Aarts et al., 1998 for further discussion).

Nonetheless, there are still major differences in the employment rates and sources of income between the United States and these countries. No two OECD countries offer a better example of the consequences of social welfare policy on employment than the United States and The Netherlands. Table 18, taken from Burkhauser et al. (1999b), uses the data from the Health and Retirement Study (HRS) and a similarly designed Dutch dataset (CERRA) to look at the work effort of men aged 51–61 in the early 1990s in much greater detail than has previously been possible.⁷⁴ The first column of each country component in Table 18 shows the percentage of men who are currently working by age. Work patterns for those aged 51–53 appear to be quite similar in the two countries. But for all ages between 54 and 61, work is less prevalent in The Netherlands – at age 54 fewer than three in four men work; by age 58 fewer than one in two works; and by age 60 only one in five works. In the United States, while work declines past age 54, the fall is much less precipitous – from 85 to 66%. It is not until age 62, the earliest age of eligibility for social security retirement benefits, that work dramatically drops in the United States.

Table 18 also provides information on the sources of income for those not currently working. Not surprisingly, given the relative generosity of and access to disability benefits in The Netherlands, disability transfers play a much more important role in the provision of income for men in this age cohort in The Netherlands than in the United States. Those who report they are not working and are receiving disability transfers range from about 3 to 8% in the United States but from 8 to 33% in The Netherlands. Consistent with the numbers reported in Table 17, at ages 60 and 61 more Dutch men are receiving disability transfer benefits than are working.

The next column looks at men who are not working and are receiving employer pensions.⁷⁵ Employer pensions play a more important role than disability transfers in the United States past age 60. Employer pension receipt follows a similar pattern in The Netherlands but the prevalence of employer pension income is much higher than in the United States past age 55. Again, this is not surprising since employer pensions are mandated in The Netherlands and form a major part of their integrated social security

⁷⁴ For a discussion of the HRS data, see Juster and Suzman (1995). For a discussion of the Dutch data, see Burkhauser et al. (1999b).

⁷⁵ Because some people who receive disability transfers may also receive employer pension income, the number of people who are not working and receiving employer pensions in this table is understated. Nor does this number capture all those receiving employer pensions, since some men who are currently working may also be receiving such benefits. The same can be said of our disability transfer count. These measures are arbitrary but convenient means of segmenting the population without double counting.

Table 18
Prevalence of work and transfer benefits for men by age in The Netherlands and the United States^a

Age	United States			The Netherlands		
	Not working			Working ^b		
	Disability transfers ^c	Employer pension ^d	Other ^e	Disability transfers ^c	Employer pension ^d	Other ^e
51	82.6	4.1	0.9	83.3	0.0	3.0
52	84.9	3.0	2.4	87.5	1.9	2.5
53	82.8	3.5	0.5	81.9	1.7	2.3
54	84.6	2.9	2.7	74.6	1.9	6.2
55	78.5	4.5	1.8	72.2	3.5	7.5
56	76.9	5.0	6.3	59.0	10.2	6.8
57	80.3	4.6	7.0	58.7	15.6	8.3
58	71.5	7.5	9.2	49.0	19.0	7.0
59	68.9	6.5	9.3	44.1	27.5	5.2
60	67.9	6.1	12.6	20.9	42.3	3.5
61	65.9	5.6	16.0	16.8	50.5	5.8

^a Source: Burkhauser et al. (1999b).

^b Those who are working at the time of the interview – 1993 in The Netherlands and 1992 in the United States.

^c Those who are not working and are receiving disability transfers at the time of the interview.

^d Those who are not working or receiving disability transfers but who are receiving private pension benefits at the time of interview.

^e Those who are not working and receiving neither disability transfers nor private pension benefits at the time of interview.

retirement system.⁷⁶ By age 59 more than one man in four in The Netherlands is receiving benefits from an employer pension, and this rises to one in two by age 61.

In the final column we look at non-working men who receive neither disability nor employer pensions. Once again a profound difference appears between the two countries. While the vast majority of men aged 51–61 in the United States work, of those who do not, a large share neither receive disability transfers nor employer pension benefits. In fact, for those men aged 51–55 who do not work, the majority receive no such transfers. Furthermore, after age 55, when disability and employer pensions are more common, a large share of non-working men this age still do not receive them – even at age 61 at least one in three non-workers is receiving neither disability nor employer pension benefits.

In contrast, the vast majority of non-working Dutch men at every age between 51 and 61 receive either disability transfers or employer pension income. Hence, even though the Dutch social welfare system provides longterm unemployment benefits and a guaranteed minimum income, at this age these programs are not highly utilized because most non-workers are already receiving even more generous disability transfers or early employer pension benefits. In the United States, where eligibility for disability transfers is far more restricted and early retirement benefits are less widespread, non-workers are much less likely to have either of these sources of income to rely upon.

Burkhauser et al. (1999b) compare several health measures for the United States and Dutch samples described in Table 18 and find very similar levels of measured health, which suggests that differences in underlying health between the populations is not likely to be the primary reason for the vastly different employment patterns in these two countries.

If the differences in the work activity of men aged 51 to 61 in the two countries cannot be traced to underlying health conditions, what other possible explanations are there? A look at the social institutions in the two countries and the incentives they provide for job exit offers one such explanation. As was discussed above, easier entry into disability programs, availability of private pensions at younger ages, and more generous and longer lasting unemployment benefits, all suggest that The Netherlands offers greater incentives to leave the labor force at older “working ages” (51–61) than is the case in the United States. The greater use of these programs as income sources is verified in Table 19 from Burkhauser et al. (1999b).

Table 19 shows the sources of household income for the sample men. Table 19 reinforces the view from Table 18 that work is a far more important source of income for men aged 50–60 in the United States than it is in The Netherlands.⁷⁷ Overall, 86% of men in the

⁷⁶ The first tier of retirement benefits in The Netherlands is a flat benefit paid to all residents at age 65. The second tier of benefits comes from mandated employer benefits based on labor earnings. While early retirement benefits are not mandated, they are available to the vast majority of workers as early as age 60. In most cases, acceptance of early benefits will not lead to an actuarial reduction in the normal retirement benefit payment at age 65.

⁷⁷ As in the Panel Study of Income Dynamics and the Current Population Survey, household income data in the HRS and CERRA are for the year prior to the interview; hence, the age of these men is 50–60 in this year.

Table 19
Total amount and sources of household income for men aged 50–60 in the United States and The Netherlands (total household income in 1991 United States dollars and 1992 Dutch guilders)^a

Source	United States			The Netherlands		
	Percent with positive income	Mean (\$)	Share of total mean income (%)	Percent with positive income	Mean (guilders)	Share of total mean income (%)
Own work	86.0	35419	56.2	57.8	44495	48.6
Work of other household members	69.2	14756	25.5	24.7	7053	7.1
Disability transfers	10.8	820	3.6	23.8	7380	17.3
Employer pension transfers	16.9	2362	5.6	19.9	10947	14.9
Other government transfers	11.8	433	2.6	18.5	3536	6.1
Private assets	49.6	4758	5.9	18.5	1409	1.4
Others	2.6	153	0.5	18.6	3612	4.6
Total household income ^b	100.0	58701	100.0	100.0	78433	100.0

^a Source: Burkhauser et al. (1999b). HRS sample includes 4506 age-eligible men who report income information. CERRA sample includes 2183 age-eligible men who report income information.

^b Total household income does not equal the sum of the means of income sources because of rounding error. Median household income is \$27,532 in 1991 for the United States and f41,152 in 1992 for The Netherlands.

United States reported income from own work in the previous year (1991) compared to only 58% of men in The Netherlands (1992). Own work accounts for 56% of total household income in the United States sample and 49% in the Dutch sample. When the income of other household members is included, work accounts for over 80% of total household income in the United States but less than 56% of household income in The Netherlands.

In contrast, no other source of income in the United States accounts for more than 6% of household income, although private assets in the United States are held by about one-half of all households versus less than 20% in The Netherlands. Disability and employee pension income combined account for less than 10% of household income in the United States but over 32% of household income in The Netherlands. Table 19 makes clear that income from their own work and that of other household members is the dominant source of income for United States men aged 50 to 60, while income from work is far less important for similar households in The Netherlands.

5.2. Placing disability transfer programs within the broader social welfare system

Comparing United States and Dutch employment rates and sources of income among persons of older working age in the two countries illustrates how programs and policies may interact on individual behavior. But to understand how disability transfer policies impact behavior and economic well-being across the countries we have been describing it is useful to look at these policies in a broader context. Disability transfer programs are only one part of a social welfare system that attempts to ameliorate the consequences of a separation from the labor market over a worker's lifetime for economic as well as health reasons. These programs can influence the response of both employers and workers when such a separation is imminent.

Fig. 11 illustrates various government policies to ameliorate job loss caused by economic or health factors as a series of paths that workers may take as they move from full-time work to normal retirement.

For workers who remain on the job over their work life the path to retirement is straightforward. Not until they reach early retirement age do they have to choose between retirement and continued work. But for a significant number of workers, job separation before retirement is a reality which social welfare policy must anticipate.

To put Fig. 11 into focus, it is useful to recognize that the typical working-age person with a disability in the United States was able-bodied during most of his or her lifetime. For instance, for the United States, Burkhauser and Daly (1996b), using data from the Health and Retirement Study, find that, in 1992, 70% of men and women aged 51–61 who reported having a health-related impairment said it started during their work life. The social welfare policy of the country may not only influence whether or not such workers remain in the labor force or end up in some form of transfer program but the speed at which such transitions are made. Fig. 11 illustrates five paths that workers may take following the onset of a health-related impairment.

The *early retirement path* (a) encompasses public and private provisions that allow

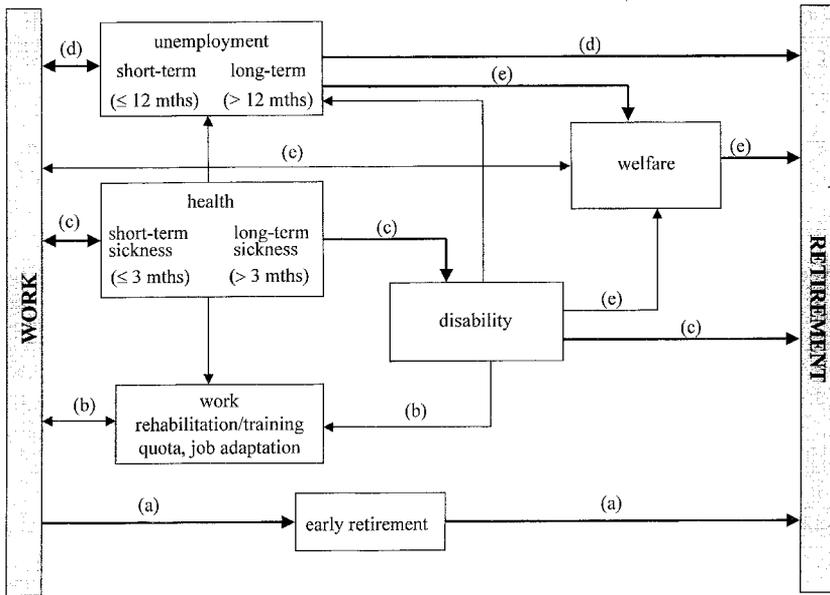


Fig. 11. Alternative life paths following the onset of a health-related work limitation. Source: Aarts et al. (1996).

workers to retire prematurely. Since the end of the 1970s these provisions have become immensely popular and, together with disability insurance, have undoubtedly accounted for some of the decrease in labor force participation at older ages reported in Table 20. In 1970 the male labor force participation rates in all four countries were approximately the same, with four out of five men aged 55–64 in the labor force. By 1994 men in all four countries had experienced dramatic drops in work at these ages. While The Netherlands and Germany experienced the greatest declines – less than one-half of men aged 55–64 were in the labor force in 1994 in these countries – both Sweden and the United States also experienced substantial declines. When early retirement schemes are actuarially fair, they are neutral with respect to the financial inducement to retire. But in general, such schemes are not neutral and instead encourage workers to retire early. In The Netherlands, for instance, many firms offer early retirement benefits which exceed those paid at normal retirement age over the years until age 65. Such plans allow workers with some health conditions to exit from the labor market without going through the formal health path (see Kapteyn and de Vos, 1998 for a detailed discussion of the Dutch retirement system).

The *work path* (b) encompasses public programs that provide or encourage rehabilitation to overcome the work limitations caused by a disability. It also includes more direct labor market intervention through the creation of specific government jobs for people with disabilities, subsidies to those who employ such workers, job quotas, and job protection legislation – dismissal rules, etc., or general antidiscrimination legislation requiring

Table 20

Labor force participation rates and unemployment rates in four OECD countries, 1970–1995^a

Category	1970	1975	1980	1985	1990	1995
<i>Labor force participation rates, aged 55–64</i>						
United States	81	76	72	68	68	66
The Netherlands	81	72	63	47	46	42
Sweden	85	82	79	76	75	70
Germany ^b	80	70	67	60	58	53 ^b
<i>Overall unemployment rates</i>						
United States	4.8	8.3	7.0	7.1	5.4	5.6
The Netherlands	1.0	5.2	6.0	10.6	7.5	7.0
Sweden	1.5	1.6	2.0	2.8	1.5	7.6
Germany ^b	0.6	3.6	2.9	7.1	4.8	8.4 ^c

^a Source: OECD (various years).^b German data refer to the population in the states in the former Federal Republic of Germany.^c Figures refers to 1994.

accommodation for workers with disabilities. These policies attempt to maintain those with disabilities on the job and in the labor market, either through the carrot of subsidies or the stick of mandates. The Americans with Disabilities Act of 1990 is the most recent example of this type of policy in the United States.

The *health path* (c) encompasses traditional disability insurance-based transfer programs. These may include shortterm programs that mandate employers to replace lost wages during the first few weeks of sickness or that directly provide such replacement through shortterm social insurance. In all European countries, this includes providing health care at no marginal expense to the worker. In the United States health care and shortterm sickness benefits are provided through private contracts between employers and employees with only limited government regulation over terms and conditions of those contracts. After some point, workers are then eligible to move to a longterm disability insurance program, which often requires meeting both health and employment criteria. This path eventually merges with the social security retirement program. In European countries like Sweden, workers are encouraged onto the longterm disability transfer program or the work path by more coordinated procedures than in the United States, where there is almost no coordination between government agencies providing disability transfers and those providing rehabilitation or training.

The *unemployment path* (d) encompasses shortterm unemployment benefits to replace lost wage earnings due to cyclical economic downturns. At some point longer term unemployment insurance is made available, often at a lower replacement rate. Eventually, this also merges with the social security retirement system. As can be seen in Table 20, business cycles have influenced unemployment rates in all four countries, but there has been a longterm secular increase in official unemployment rates in all three European

countries relative to the United States over the last 25 years. Disentangling exits from a job because of a health condition and exits from a job because of economic forces is in practice a difficult and often controversial task, especially as these exits are influenced by the rules established by a country's social welfare system.

The *welfare path* (e) encompasses the set of means-tested programs which serve as a safety net for those workers without jobs who are not eligible for health- or unemployment-based social insurance programs. Welfare programs can be universal, subject only to a means test and/or linked to an inability to work either because of poor health, poor job skills, or child rearing responsibilities. This track can continue past retirement age for those few individuals who are not eligible for social security retirement benefits.

5.3. Choosing among life paths

When a health condition begins to affect one's ability to work, important job-related decisions must be made by both the worker and his or her employer. These decisions may be influenced by the social policies of the country. The worker will consider the relative rewards of continued movement along the work path versus entry onto an alternative path. In like manner, an employer's willingness to accommodate workers will also be influenced by the social policies within which the firm must operate.

In countries in which welfare benefits are low compared to disability transfers, where unemployment benefits are of short duration, and little is available in terms of rehabilitation and job protection, it is likely that the demand by applicants for the health path will be relatively large. This demand by applicants will increase as the replacement rate increases, as the period over which benefits can be received lengthens, and as the probability of acceptance onto the rolls increases. In The Netherlands and the United States, for example, increases in applications for benefits put tremendous pressure on the disability system in times of serious economic downturns when people with disabilities are more likely to lose their jobs (for a fuller discussion of the Dutch disability system, see Aarts and de Jong, 1996a). Alternatively, in Germany, where the protection offered by the unemployment path is similar to that offered by the health path, and minimum non-health-related social welfare is available as a universal benefit, much less application pressure is put on the disability gatekeepers during economic downturns (for a fuller discussion of the German disability system, see Frick and Sadowski, 1996). And in Sweden, where health benefits are even more generous than in The Netherlands, application pressure is less severe because all persons suffering a health impairment are required to receive rehabilitation (for a fuller discussion of the Swedish disability systems, see Wadensjö and Palmer, 1996). Following rehabilitation, it is government policy to provide jobs in the public sector if private sector jobs are unavailable. In Germany, a combination of mandatory rehabilitation and a quota system deflects much of the pressure on the disability system.

Fig. 11 can also describe the "supply" of disability program slots. To enter any of the five paths described in Fig. 11, it is necessary to satisfy entry requirements. The entry rules for early social security retirement insurance program benefits are usually straightforward.

A worker must have worked in covered employment for a given time or have performed other easily measured activities (e.g., attended school, raised children) and must be a given age. Such eligibility criteria are easy to administer. The front line gatekeepers simply follow relatively objective criteria with little room for individual interpretation.

The overall size of the population on the retirement rolls will change if a higher benefit is paid or the age of eligibility is lowered, but this is not subject to gatekeeper discretion. Gatekeepers will simply follow the new criteria. Determining eligibility for the various paths open to those who have a health condition that begins to affect their work but who are below early retirement age is not as clear cut. In a search for easily measured screens for eligibility, most disability benefit systems require applicants to wait around 1 year after the onset of the condition to become eligible for benefits. They also check how much that person is actually working. They then use evidence from either a private physician or a physician employed by the system to determine the degree to which the health condition limits that person's ability to work. While the first two criteria are easily observable, the third is less so. Doctors can evaluate health conditions as they relate to a norm, but there is no unambiguous way to relate a health condition to ability to work. Hence, much of the problem with administering a disability system is in establishing criteria for eligibility and developing procedures that will insure consistency in their use. Here, gatekeeper discretion in carrying out established criteria is much greater than it is for retirement.

Access to the work path and the health path may be closely coordinated, as in Germany and Sweden, where a centralized group of gatekeepers determines who is provided with rehabilitation services and who goes directly onto disability transfers. However, these paths may also be administered in quite independent ways. In the United States, rehabilitation services are administered by a gatekeeper with little or no connection to the gatekeepers who administer the disability transfer system. And in The Netherlands the emphasis on income protection and the use of the disability insurance program as an exit route from the labor market sharply limits the provision of rehabilitation services.

In periods of economic downturn the number of workers who leave their jobs rises and applications to transfer programs increase. In countries like the United States and The Netherlands, with generous disability benefits relative to other alternatives, pressure is put on the disability system to provide income for those unemployed workers with disabilities and their families. The pressure may lead to a specific easing of the rules or simply a change in the interpretation of the rules. In this way "supply" may shift outward to accommodate demand.

5.4. A comparison of disability transfer program features⁷⁸

The disability systems of the United States, The Netherlands, Sweden, and Germany share

⁷⁸ The summary of disability program details in the remainder of this paper is based on Aarts and de Jong (1996a) for The Netherlands; Frick and Sadowski (1996) for Germany; Wadensjö and Palmer (1996) for Sweden; and Berkowitz and Burkhauser (1996) for the United States. Table 20 is updated and extended from Aarts and de Jong (1996b).

common features. Each provides some form of wage replacement for those with shortterm or longer term disabilities that result in lost wage earnings. Each provides a social minimum floor of benefits for persons with disabilities regardless of past earnings. Each has some commitment to integrating people with disabilities into the labor market. But the level of benefits, the eligibility criteria for the programs, the relative share of resources used in these programs, and their administration varies greatly across countries. In Table 21 we summarize the major features of each country's disability system.

5.5. Temporary disability transfer programs

With the exception of the United States, which leaves it to employers to provide "sick pay" to replace lost earnings due to shortterm sickness or disability, temporary disability benefits are a standard part of each country's disability transfer system shown in Table 21.⁷⁹ While Mashaw and Reno (1996) estimate that about 44% of private sector employees in the United States are covered by some type of shortterm disability insurance, all workers in The Netherlands, Sweden, and Germany are covered against the risk of wage loss due to temporary sickness through agencies either directly or indirectly under government supervision. These programs typically last up to 1 year and, for those who require it, are seen as bridges to the longer term disability insurance program. Sick pay usually covers all health contingencies. The degree of risk sharing varies. In recent years both The Netherlands and Sweden have attempted to reduce program costs by requiring individual firms to bear more of the costs of these programs through experience rating contributions. This has moved them closer to the United States system in which private firms bear direct responsibility for such costs.

5.6. Work-related disability transfer programs

If a disability is work-related, there is a transition from temporary disability benefits to a work injury program in each country shown in Table 21. Work injury programs were the first form of social insurance in all four countries, but the distinction between work-related and other causes of disability was abolished in The Netherlands disability insurance program in 1967.

Workers' compensation schemes in the United States are difficult to summarize since they originated at the state level and continue to vary by state. However, in such programs, benefits most commonly replace about two-thirds of earnings up to some maximum. This is similar to replacement rates in Sweden and Germany. All three countries use a loss of earning capacity model which allows for partial benefit payments. Experience rating is used in the United States and Germany and is under the supervision of state agencies in these countries. Employers are responsible for funding the system in all three countries.

⁷⁹ Shortterm disability benefits are mandated in five states in the United States. However, for the great majority of workers, shortterm sickness benefits are provided on a firm-by-firm contractual basis.

Table 21
Disability policies in four western industrial countries in 1997^a

	United States	The Netherlands	Sweden	Germany
I. Temporary disability transfer programs				
Benefit level	No government-based program but is part of the fringe benefit package of about 44% of private sector employees	70% of earnings ^b	Day 2-3: 75% of earnings Day 4-14: 90% Day 15-365: 80% Day 366 on: 70%	80% of earnings ^b
Qualifying conditions		Inability to perform current job	Inability to perform current job (shortterm), other suitable job (longer term) Unlimited	Inability to perform current job
Maximum duration		52 weeks		78 weeks
Funding		Employer	Employer, employee, government	Employer, employee
Contributions		Firm ^c	National ^d	Region, industry, or firm
Risk sharing		Private sector (firms and private agencies) under supervision of the National Institute of Social Insurance	National agency under direct government supervision	Non-governmental agencies run by employees' and employers' representatives under direct government supervision
Administration				
II. Longer term disability transfer programs				
Work-related programs				
Benefit level	Varies by state, most commonly 66.7% of last earnings, with dollar maximums	No specific program for work-related injuries	70% of last earnings	66.7% of last earnings
Partial benefits	Varies by state, percentage of full pension, corresponding to loss of earning capacity		Percentage of full pension, corresponding to loss of earning capacity	Percentage of full pension, corresponding to loss of earning capacity

Table 21 (continued)

	United States	The Netherlands	Sweden	Germany
Waiting period	Varies by state		Flexible	Flexible
Qualifying conditions	Loss of earning capacity due to work injury or occupational disease		Loss of earning capacity due to work injury or occupational disease of at least 6.7% Age 65	Loss of earning capacity due to work injury or occupational disease of at least 20% Age 65
Maximum duration	Varies by state and type of impairment			
<i>Funding</i>				
Contributors	Varies by state, most commonly fully paid by employer		Employer	Employer
Risk sharing	Risk group		National	Risk group
Administration	Varies by state; combinations of state funds, private insurers, and self-insured employers supervised by state agencies		National agency under direct government supervision	State agencies under direct government supervision
<i>Non-work-related programs</i>				
Benefit level	90% of first \$437 of average yearly earnings, plus 32% of the next \$2198 of average yearly earnings, plus 15% of each additional dollar of average yearly covered earnings. Benefits increase if worker has dependent children ^e	70% of last earnings during 6–72 months depending on age at onset if older than 33; thereafter, 70% of minimum wage plus 1.4% of (earnings – minimum wage) for each year older than 15 (maximum benefit is equivalent to \$27,000 per year)	65% of assessed earnings	General disability: 60% (plus 1.5% times max [55, age]) of assessed earnings

Partial benefits	None	Percentage of full pension, corresponding to loss of earning capacity (minimum 15%)	75%, 50%, or 25% of full pension corresponding to loss of earning capacity	Occupational disability: 40% (plus 1% times max [55, age]) of assessed earnings
Waiting period	5 months	12 months	Flexible	Flexible
Qualifying conditions	Inability to perform any substantial gainful activity	Incapacity for gainful activity	Inability to work in commensurate employment (above age 60; in previous work	General: incapacity for gainful activity. Occupational: 50% reduction of capacity in usual occupation
Maximum duration	Age 65	Age 65	Age 65	Age 65
<i>Funding</i>				
Contributors	Employer, employee	Employer, employee	Employer, employee, government	Employer, employee, government
Risk sharing	National	National; in 1998 funding of new awards will be experienced-rated at the level of the firm	National	National
Administration	State agencies under direct federal government supervision	Privately competing administrative offices under supervision/coordination of the National Institute of Social Insurance	National agency under direct government supervision	State agencies under direct federal government supervision

^a Source: Update of Aarts and de Jong (1996b).

^b Earnings are capped at some level.

^c Except for pregnancy leave and coverage of temporary employees, which are funded by the government.

^d First 6 weeks experience-rated by firm.

^e A means-based minimum benefit is paid to those ineligible for disability insurance or whose benefits are below the social minimum. Bend points are for 1996. They automatically increase each year based on increases in average covered earnings.

5.7. *Non-work-related disability transfer programs*

The primary sources of disability transfer benefits in all four countries are their non-work-related disability transfer schemes. These programs cover social risks – i.e., non-work-related contingencies – and usually consist of an employment-related social insurance scheme and a separate arrangement for disabled persons with little or no earnings history.

5.7.1. *Benefit levels*

In The Netherlands and Sweden, compensation for loss of earnings capacity due to long-term impairments is provided by a two-tier disability insurance program. The first tier is available to all citizens with disabilities. These national disability insurance programs typically offer flat rate benefits that are earnings-tested. They target those disabled at birth or in early childhood and provide benefits after age 18. In The Netherlands, these basic benefits also cover self-employed people with disabilities. In Germany, employees who become disabled before age 55 enjoy entitlements as if they had worked and contributed to the national pension system until age 55. In the United States, the means-tested disability program – Supplemental Security Income – provides transfers to those ineligible for Social Security Disability Insurance benefits or whose insurance benefits are below the social minimum.

Eligibility for the primary tier of benefits is restricted to labor force participants in all four countries. These primary benefits are based on age or employment history and wage earnings. In Germany, Sweden, and the United States, an earnings-related disability insurance program is part of the legal pension system. Coverage depends on contribution years. More specifically, at least 3 years (Sweden), 3 out of the last 5 years (Germany), or 20 out of the last 40 quarters (United States) preceding a disability must be spent in paid employment. In Germany and Sweden, wage earners are required to participate, and the self-employed may participate voluntarily or are covered by universally flat rate social insurance benefit programs. In the United States, both wage earners and the self-employed are required to participate. The Netherlands has no contribution requirement for earnings-related benefits in terms of years of covered employment, but in 1993 it introduced a system of age-dependent supplemental benefit levels that simulate a contribution years requirement.

5.7.2. *Qualifying conditions*

By definition, eligibility for disability pensions is based on some measure of (residual) capacity or productivity. The United States has the strictest disability standard: inability to perform any substantial gainful activity with regard to any job in the economy. Full benefits are based on a formula that provides higher replacement rates for low-wage earners. Germany has a dual system: full benefits for those who lose two-thirds or more of their earning capacity with regard to any job available in the economy, and partial benefits, equal to two-thirds of a full benefit, for those who are more than 50% disabled with regard to their usual occupation. Under the Handicapped Act of 1974, workers having

a permanent reduction in their labor capacity of at least 50% are entitled to the status of “severely disabled” (*Schwerbehinderte*). Such workers are entitled to extra vacation and enjoy protection against dismissal. Although being recognized as a severely disabled worker does not give access to cash benefits, it allows one to retire at age 60 with a full pension, given sufficient (15) contribution years.

Sweden has a more lenient eligibility standard. Capacity to work is measured with regard to commensurate employment instead of the more stringent standards in Germany and the United States and in The Netherlands since 1994. Moreover, the Swedish program has four disability categories, depending on the size of residual capacity, with corresponding full and partial pensions.

The Dutch disability program is unique in that it distinguishes seven disability categories ranging from less than 15% disabled to 80–100% disabled. The minimum degree of disability yielding entitlement to benefits is 15%. The degree of disablement is assessed by consideration of the worker’s residual earning capacity. Since 1994, capacity is defined by the earnings flow from any job commensurate with one’s residual capabilities as a percentage of predisability usual earnings. The degree of disability, then, is the complement of the residual earning capacity and defines the benefit level. Prior to 1994, only jobs that were compatible with one’s training and work history could be taken into consideration. Since then, in an effort to reduce the flow of new entrants onto the disability rolls, not only has the definition of suitable work been broadened, but the medical definition of disability has been tightened, as well. Under the new ruling, the causal relationship between impairment and disability has to be objectively assessable.

5.7.3. Replacement rates

Table 22, based on Blöndal and Pearson (1995), provides gross replacement rates in 1993 for the four countries in our study. Because in each country benefits are related to past earnings and the degree of disability, no simple summary value can capture the full distribution of such benefit possibilities. Table 22 values are based on a “typical” worker who gains entitlement at age 40, has worked since age 18, and has either an “average” age-earnings profile or a two-thirds of average profile. Benefits are shown for a male who is single or married without children. An average replacement rate is then calculated for all the cases considered. Sweden and The Netherlands are most generous, with overall replacement rates of 74 and 63%, respectively. This is followed by Germany at 46% and the United States at 30%. The gap in replacement rates for the United States is somewhat exaggerated by this comparison since the rates are importantly influenced by the presence of dependent children. As was discussed in Section 2, in the United States, children of disabled workers are eligible to receive benefits equal to 50% of the worker’s benefit, as is a spouse under the age of 55 who is caring for at least one child under the age of 16. Hence, for a married disabled worker in Table 22 with one child, replacement rates would double to 48% for the average earner and 72% for the worker with two-thirds of average earnings. While such replacement rates would still place the United States below The Netherlands

Table 22
Gross replacement rates for longterm disability benefits, 1993^a

Country	Average earner		Two-thirds average earner		Average		
	Two-thirds disability		Full disability				
	Single	Couple	Single	Couple			
United States	0 ^b	0 ^b	24	24	0 ^b	36	30
The Netherlands	51	51	76	76	58	58	63
Sweden	53	57	79	90	57	63	74
Germany	37	37	56	56	37	37	46

^a Source: Derived from Blöndal and Pearson (1995). Definitions: The individual is assumed to gain entitlement at 40 years of age with a full contribution record from age 18. Earnings are assumed to increase monotonically by 5% nominal and 2% real each year, reaching the ratio of average earnings the year before entitlement. Each figure is the average of the case of a single person and a married person with a dependent (but not disabled) spouse. (If the latter gives rise to an additional allowance, this is included). The individual has no children. No "constant care" allowances are included. The final column gives a simple average of all cases considered.

^b Partial disability benefits are available to workers injured on the job via workers' compensation but no partial benefits are available via the primary non-work-related disability insurance system.

and Sweden in replacement rate generosity, they are in a range similar to those of Germany.

5.7.4. Administration

While the lower replacement rates and stricter standards for eligibility in the United States and Germany seen in Tables 21 and 22 help explain the lower prevalence of disability transfer recipients per worker in these two countries relative to Sweden and The Netherlands, it is the administration of their programs prior to the recent reforms in the Dutch system that distinguishes The Netherlands from Sweden.

Prior to its recent reforms, Dutch disability policy differed from other nations not only in its lack of a separate work injury scheme and in its more elaborate system of partial benefits, but more importantly, its because social insurance programs (disability and unemployment insurance, as well as sickness benefits) were run by autonomous organizations – Industrial Associations – which lacked direct governmental (political) control. These organizations were managed by representatives of employers' organizations and trade unions. Until March 1997, membership in a legally specified Industrial Association was obligatory for every employer. The Industrial Associations had discretion to develop benefit award and rehabilitation policies without having to bear the fiscal consequences, as disability program expenditures were funded by a uniform contribution rate. Thus, administrative autonomy was not balanced by financial responsibility.

In Germany and Sweden, disability insurance is part of the national pension program run by an independent national board that is closely supervised by those who are politically responsible for the operation of the social security system and therefore subject to parliamentary control. These boards monitor disability plans and safeguard uniformity in award policy by issuing rules and guidelines to local agencies. The difference between these countries and The Netherlands, prior to the recent reforms, was that their disability systems were under some form of government budgetary control.

In The Netherlands, disability assessments were made by teams of insurance doctors and vocational experts employed by the administrative offices of the Industrial Associations. These teams also had to determine the rehabilitation potential of disability claimants and to rehabilitate those with sufficient residual capacities. A further potentially important difference from other European countries, then, was that the Dutch disability assessment teams were legally obliged to examine every benefit claimant personally, not just administratively. This may have spurred a liberal, conflict-avoiding attitude, especially since neither the gatekeepers themselves nor their managers were confronted with the financial consequences of award decisions.

Sweden administratively checks disability claims by means of written, medical, and other reports to prevent the program gatekeepers from being influenced by self-reports and the physical presence of claimants. In Germany, too, award decisions are made using medical reports and applying uniform decision rules developed by specialists' panels, each covering a diagnostic group.

In the United States, individual states administer disability determinations. While there

is some variation in the acceptance rates across states, a monitoring process is in place that links these state agencies to those – Congress and the federal executive branch – who are politically responsible for the program.

Like other fringe workers, persons with disabilities have a higher than average sensitivity to cyclical downswings. Even in the absence of a disability transfer program it is likely they would have a greater risk of job loss during a recession. However, when gatekeepers are allowed to use their discretion to determine eligibility, unemployed workers may swell the disability rolls. A recent illustration of this sensitivity can be found in Sweden. During the early 1990s the Swedish welfare state was no longer willing to cushion cyclical unemployment by providing public sector jobs. As a consequence, both unemployment and disability transfer program beneficiaries soared (see Tables 17 and 20).

European workers who lose their jobs are usually covered by unemployment insurance. Entitlement to earnings-related unemployment insurance benefits is of limited duration and is followed by flat-rate, means-tested social assistance. In The Netherlands, Germany, and Sweden, entitlement duration depends on age; workers older than 58 or 60 may stay on unemployment insurance until they reach pensionable age (65) or qualify for disability insurance benefits on non-medical, labor market grounds. The use of disability benefits as a more generous, less stigmatizing alternative to unemployment benefits was quite common in these countries between 1975 and 1990. It provided employers with a flexible instrument to reduce the labor force at will and kept official unemployment rates low. This approach was used without question in Sweden until 1992 when, in reaction to rising costs, the law was changed and disability pensions based solely on unemployment could no longer be awarded. Note in Table 20 that official unemployment rates in Sweden in 1995 were 7.6%, four times higher than in previous years, in part because the use of the disability and early retirement transfer rolls to “hide” unemployment in this manner was reduced.

The Netherlands had similar experiences. Until 1987, the law explicitly recognized the difficulties that impaired workers might have in finding commensurate employment by prescribing that the benefit adjudicators should take account of poor labor market opportunities. The administrative interpretation of this so-called labor market consideration was so generous that it led to a full disability benefit to almost anyone who passed the low threshold of a 15% reduction in earnings capacity. The share of unemployed or “socially disabled” among disability insurance beneficiaries, applying the pre-1994 eligibility standards, was estimated to be 40% (see Aarts and de Jong, 1992). The fact that the abolition of this legal provision could not halt the growth in the incidence of disability transfer payment recipients, as can be seen in Table 17, induced further amendments between 1992 and 1994.

Even in Germany, labor market considerations influence disability determinations to some degree. In 1976, the German Federal Court ruled that if insured persons have limited residual capacities and the Public Employment Service is unable to find them a commensurate job within 1 year, they can be awarded a full disability pension retroactively.

Because partial disability benefits are based on the availability of commensurate work, certified skilled workers may refuse any job that is not at least semi-skilled in nature. A semi-skilled worker is required to accept only unskilled jobs that are prominent in pay and prestige. Unskilled workers who are not eligible for a full disability pension must accept any job or turn to unemployment or welfare. These regulations, in combination with a slack labor market, have reduced the proportion of partial disability pensioners from 30% in 1970 to less than 5% in the early 1990s. In the United States, vocational criteria are also used to determine disability eligibility. Their use is sensitive to economic conditions. It is argued that the increase in disability rolls in the early 1990s was partially caused by the recession of 1991 (see Rupp and Stapleton, 1995).

5.8. Assessing disability transfer policy outcomes

How one views the increases in the disability-transfer population depicted in Table 17 in the United States is largely influenced by one's view of the social purpose of disability transfers. Some believe that all Americans have the right to a minimum benefit with no quid pro quo. The negative income tax, which was proposed in the 1970s, would have provided a guaranteed minimum benefit to all families but this idea was never enacted into law, in part because most voting Americans were uncomfortable with the notion of providing benefits to those who are expected to work. For those "not expected to work," a negative income tax (NIT) was more politically popular and in 1972 it became the SSI program, which provides a guaranteed income to those over age 65 and those considered unable to work because of disability. It, together with SSDI, is the primary source of federal transfers for people with disabilities.

Hence, for those who see SSI as a substitute for a universal guaranteed income program like the NIT, growth in the SSI program is seen as appropriate because it brings the United States into line with most Western European countries that provide such a universal safety net for all their citizens. However, for those who are concerned about the longterm effect of a life on government transfers, the rise in the prevalence of disability transfer recipients, particularly among younger persons, depicted in Table 17 is of more concern.

Supporters of the ADA, for instance, argued that people with disabilities should have equal access to employment. They viewed unequal access to jobs to be a greater impediment to employment than an impairment. Furthermore, they demanded that social policy focus on altering workplace institutions to more fully accommodate people with disabilities. Hence, in a world of full accommodation, the disability-transfer population would be zero.

Fundamentally, what is at issue in the current policy debate over expanding transfer rolls is how society should treat people with disabilities. Should people with disabilities be expected to work or not?

There are no easy answers to this question. As we discussed in Section 4, programs meant to protect against work loss unavoidably create incentives to not work. This general policy dilemma is illustrated in Fig. 12 with respect to the disability population. Circle A

contains the working-age population with disabilities as defined by the ADA, which Burkhauser and Daly (1996b) estimate to be about 10% of the working age population in 1988.

Circle B is the working-age population that is eligible for disability transfers, based solely on their health impairments, but some of them work and hence do not meet the work test for SSDI or SSI. As we have seen, both health and vocational characteristics are considered in eligibility determination. Over time, both the criteria themselves and their enforcement have changed because of changes in economic conditions and in political will.

Circle C contains the working-age population with disabilities who receive disability benefits. Circles B and C are subsets of circle A but do not coincide for several reasons. Some, who would be eligible for benefits if they stopped working, keep working. Hence, some people in circle B are not in circle C. Some people in circle B are denied benefits even though they are not working. Likewise, some people in circle C are awarded benefits even though they are not truly eligible.

The ADA requires employers to make reasonable accommodations for workers with disabilities unless this would cause an undue hardship for the operation of business. In a world where all costs of accommodation (through job changes or rehabilitation) are met by society, all people with disabilities would be expected to work, and circles B and C would disappear. In a world where all people, or at least all people with disabilities, are eligible for a minimum benefit with no quid pro quo, circles A and B would coincide. In a world with no administrative errors, circle C would be totally subsumed into circle B.

While circle A is determined by health-based impairments, the size and location of circles B and C are determined by social policies and how people with disabilities, employers, and frontline program administrators react to them. Judgements by administrative gatekeepers, economic conditions, accommodation, and the X-factor that makes people more or less willing to work all influence the share of the population with disabilities who receive transfers.

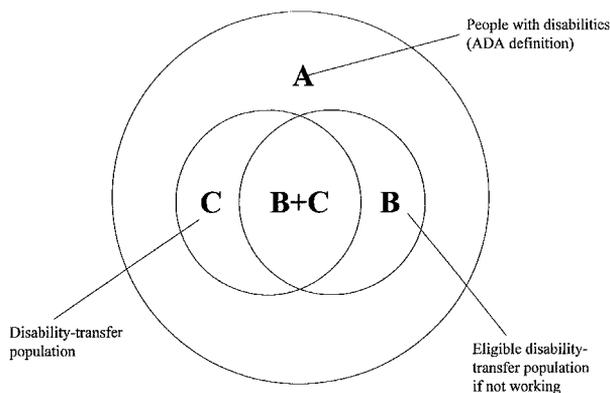


Fig. 12. Targeting social policies on the working-age population with disabilities. Source: Burkhauser (1997).

5.9. Explaining program growth in Europe

There has been relatively little empirical evidence of the behavioral consequences of disability programs in Europe. The literature that does exist has focused almost exclusively on program growth. We will focus only on the literature on program growth in The Netherlands and Germany. To our knowledge, there is no literature of this type on Sweden's disability programs. There has been some work done on the growth of the number of disability insurance claims in the United Kingdom but since we are not focusing on the United Kingdom, we will not describe this work in any detail.⁸⁰

Aarts and de Jong (1992) report on an ambitious effort to study the growth in the numbers of disability beneficiaries in The Netherlands. In 1975 the Social Security Council commissioned what has come to be known as the Dutch Disability Study. The research team in the Center for Research in Public Economics at Leiden University fielded a survey designed to shed light on the decisions of individuals to seek disability benefits. Two samples were surveyed during the first 6 months of 1980. The first was composed of individuals in their fifth month of receiving sickness benefits. Such individuals would be at high risk of applying for longterm disability benefits. The second was composed of healthy individuals working in the private sector. Administrative data was then used to follow these two survey cohorts over time. Thus, the sampling scheme used by Aarts and de Jong allows them to study the transition from working to being on the temporary disability transfer program for 5 months, and then the transition from the temporary to the permanent disability program.

Using the combined sample, Aarts and de Jong estimate the effect of various factors on the probability that a worker will move onto the permanent disability roles. To capture the effect of financial incentives Aarts and de Jong construct for each individual in the combined sample a measure of the lifetime replacement ratio associated with moving onto the permanent disability program. To calculate this number, the authors estimate for each person his present discounted value of expected income from continued work versus applying for permanent disability benefits.⁸¹ They then enter minus the log of the ratio of these two numbers into models predicting movement onto the permanent disability roles. Their estimates imply that a 1% rise in the value of lifetime disability benefits

⁸⁰ Using administrative data, Molho (1989, 1991) estimates cross-sectional models predicting flows onto disability that include both past weekly earnings and potential disability benefits. Higher benefits and lower weekly earnings are associated with an increased likelihood that both men and women move onto the disability rolls, with implied elasticities for most of the estimated models ranging from roughly 0.5 to 2.0. As is true in the case of the United States studies discussed above, these estimates are likely to exacerbate the causal effect of benefits. In other work, Disney and Webb (1991) identify high unemployment as a primary factor explaining increases in the number of individuals receiving disability benefits.

⁸¹ In the estimates they report, Aarts and de Jong (1992) use the discount rate (0.3) that maximizes the likelihood function of the equation predicting permanent disability program participation. This is substantially above the market discount rate. They also report a sensitivity analysis that shows that when they use a lower discount rate, the standardized coefficient on the replacement rate variable drops. Aarts and de Jong (1992) do not report enough information to allow us to convert these standardized coefficients into elasticities.

increases the probability that an individual ends up on the rolls by roughly 1%.⁸² When Aarts and de Jong look separately at the movement from working onto the temporary disability rolls and from there to the permanent disability rolls, they find that replacement ratios were associated with the first, but not the second of these two transitions.

Taken at face value, these results suggest that the potential availability of generous disability benefits discourages those receiving temporary disability benefits from returning to work, but has little direct effect on the probability that someone already receiving these benefits will move onto the permanent rolls. As was the case for the micro data studies using United States data, the key decision is made early in the Dutch process. It is not clear to what extent Aarts and de Jong's replacement rate variable is picking up the causal effect of generous benefits on the decision of individuals in The Netherlands to apply for disability benefits (see the discussion above).

In recent work, Riphahn (1995) uses the German Socio-Economic Panel to study the effect of the generosity of potential disability benefits on the movement onto the disability rolls in Germany. Riphahn uses a discrete time, competing risks hazard model to study transitions between working, non-employment and disability employment among working-age men. Riphahn's estimates imply that a 10% increase (decrease) in wages will lower (raise) the exit rate from work to early retirement based on a disability by roughly 12%, while a 10% increase (decrease) in expected benefits will raise (lower) the exit rate by roughly 4%. Largely because there appears to be relatively little variance in the expected benefit variable, the latter number is rather imprecise.⁸³

6. Summary and conclusions

Table 17 demonstrates that the prevalence of disability transfer recipients per worker has increased at all working ages over the last quarter of a century in the United States and in The Netherlands, Sweden, and Germany. This coincides with an increase in both access to and the generosity of publicly provided social insurance and social welfare programs targeted at people with disabilities in the industrialized world. Comparisons between countries and within countries across time suggest that these changes have had significant effects on both the economic well-being and the work force attachment of those individuals whose health limits their capacity for work. This said, there remains a tremendous amount of uncertainty regarding the behavioral (and thus the welfare) effects of disability insurance programs. This is in striking comparison to the situation with respect to research

⁸² Aarts and de Jong (1992) report a probit coefficient on the natural log of the replacement ratio of 0.6. This implies a logit coefficient of roughly 1.0. Since for low or moderate probabilities $\ln[p/(1-p)] \approx \ln[p]$, this 1.0 can be interpreted as something close to an elasticity of program participation with respect to the replacement rate. The sample that Aarts and de Jong (1992) use is choice based, but this should not affect logit coefficients.

⁸³ Riphahn (1995) estimates her model with and without controls for unobserved heterogeneity. The simulations used to calculate the 12 and 4% are based on models with such controls, since the model with controls for unobserved heterogeneity is identified largely off its functional form. In fact, simulations based on the two sets of estimates are quite similar.

on normal retirement behavior, where a consensus has emerged that the financial incentives built into both private pensions and the social security system have fundamentally altered behavior.⁸⁴

A combination of factors can probably account for the uncertainty that exists regarding the effects of disability insurance on behavior. One fundamental problem is that we do not observe the budget set faced by workers. Leonard (1986, p. 92) in a review of the literature he did over a decade ago said:

The central unavoidable problem is that we can observe neither the wages of those that are out of the labor force nor the SSDI benefits and other non-labor income of those in the labor force. We can make noble attempts to estimate what a labor force non-participant would earn were he or she to enter the labor force and what income a worker would receive were he or she to drop out of the workforce, but by their very nature such estimates extrapolate beyond what is observed and so are subject to more than the usual level of error.

Indeed, the two fold difference between Parsons' two estimates would seem to be accounted for entirely by the difference between the way he imputes missing income. Some of the difference between Parsons' estimates and those of Haveman and Wolfe may also be due to differences in the way missing income is imputed in their various studies.

Longitudinal data that has followed workers through their retirement years has been crucially important for modeling retirement behavior. In particular, longitudinal data together with detailed information regarding the rules governing both private and public pension accruals has given researchers a reasonable basis for imputing future earnings and retirement income. While researchers have used longitudinal data such as the NLS or the PSID to study the effect of disability insurance on labor force participation, neither of these two datasets contains information regarding whether respondents ever applied for SSDI or SSI.⁸⁵ Thus, researchers using these datasets have had to rely on reduced form specifications far removed from the decisions that workers make. The two surveys of the population with disabilities commissioned by the Social Security Administration in the 1970s allow researchers to identify those who applied for SSDI or SSI and have the advantage of being linked to administrative records that can be used together with retrospective information to model the decision to apply for SSDI, but they are fundamentally cross-sectional in nature, which seriously limits what researchers can do with the data. The Health and Retirement Survey *is* longitudinal and *does* allow the researcher to contemporaneously identify those who experience the onset of a disability or who apply for SSDI or SSI. Thus, the HRS promises to be an invaluable dataset for those interested in the impact of SSDI or SSI on behavior.⁸⁶

⁸⁴ See Mitchell and Lumsdaine, this volume, for a review of the large literature on retirement.

⁸⁵ Neither Parsons nor Haveman and Wolfe use the longitudinal nature of the PSID or NLS to fullest advantage.

⁸⁶ However, the HRS has one very important weakness for studying the entire working-age population. Because the survey was primarily interested in capturing the transition into retirement, its population is confined to men and women aged 51–61 in 1992 and their spouses, regardless of age. As we have seen, a large and increasing fraction of SSDI and SSI awards are going to men and women below this age.

Modeling the effect of disability insurance on behavior is substantially more difficult than modeling the effect of either private pensions or social security on behavior. If we are to understand the effect of changes in the availability or generosity of disability insurance on such things as work force attachment or overall welfare, we need to understand the effect of these factors on the decision to apply for disability benefits or to continue working for those who do not pass the medical screen. We also need to understand the extent to which the medical screening successfully distinguishes among those who are more or less capable for work.

In terms of the decision to apply for disability benefits, presumably both the generosity of benefits and the probability that an individual passes the medical screening affect the decision. Benefits can be approximated using a person's Social Security earnings history, but the probability that an individual passes the medical screening depends both on factors that are observable to the researcher and the potential applicant and to factors observable only to the potential applicant. The decision to apply for disability benefits also depends on the costs associated with doing so, costs that can at best only be approximated. Thus, trying to incorporate a potential applicant's assessment of the probability of passing the medical screening is difficult. However, understanding how individuals respond to the incentives they face requires taking into account all of these factors.

For those who apply for benefits and are rejected, there is the decision whether or not to appeal, as well as whether to return to work. Some will be able to return to the job they held before applying for disability benefits, while others will not be as fortunate. Presumably, the options a rejected applicant faces are affected both by the reduced health of the applicant and by the very act of applying for benefits. Sorting out the relative importance of these factors is crucial for understanding both the costs of applying for disability benefits (which affects the decision to apply) and the effect of applying on behavior.

Much recent research on retirement behavior has focused on models that try to explicitly incorporate uncertainty into the modeling of behavior. This is a feature of both the option value model used by Stock and Wise (1990) and the dynamic programming models used by Berkovec and Stern (1991) and Rust and Phelan (1997). Perhaps because appropriate longitudinal data have not been available or because of the complexity of the modeling effort that would be required, no similar models have been used to study workers' responses to the incentives built into the disability insurance system. However, a number of researchers are currently trying to do so. The challenge will be to keep such models credible. They will have to be complex enough to capture the major features of the decisions, but simple enough to allow researchers to understand the basis for any inferences that are made.

Recent empirical work has put a premium on generating credible inferences. Within the context of a world where almost everything can be plausibly thought of as endogenous, this is not easy task. Increasingly researchers have emphasized the value of natural experiments for generating exogenous variation in explanatory variables.⁸⁷ Examples include

⁸⁷ Meyer (1995) contains a good discussion of the use of "natural" experiments in economics.

Gruber's (1996) work comparing employment changes in Quebec to employment changes in the rest of Canada, Yelowitz's (1998) work looking at the effect of changes in the value of Medicaid on the receipt of SSI benefits, and Stapleton et al.'s (1995a,b, 1998) work looking at the effect of recessions on the application for SSDI and SSI.

However, it is important to note that there are potential problems associated with the use of natural experiments to study behavioral responses to changes in the generosity or availability of disability insurance. Since SSDI and SSI are national programs, there is little in the way of cross-state variation to exploit. Beyond this, the kind of difference in differences estimator used by Gruber and Yelowitz is most appropriate in contexts where the regime shift was unexpected and sudden, where knowledge of the shift was likely to be widespread, and where the effects of the shift were expected to be immediate. None of these conditions is likely to be met within the context of Gruber or Yelowitz's studies. Importantly, since individuals typically stay on the disability rolls for years, even dramatic changes in the flow of new beneficiaries will, in the short run, have but small effects on the stock of individuals on the disability rolls and out of the labor force. Thus, studies of regime shifts should, where possible, focus on flows rather than stocks. Social Security data on applications and awards would be extremely useful for this purpose; however such data has not generally been available to researchers outside the Social Security Administration.

Despite the limitations of the data and the difficulty of finding variations in Social Security policy variables, there are a number of approaches individuals can take to increase the credibility of their estimates. Sensitivity analysis of the kind often proposed by Leamer (1978, 1994) would help. We have seen evidence that the choice of health proxy can have fundamental effects on estimates. It also seems probable that the methods used to construct the alternatives available to individuals will also fundamentally affect results. What is crucial is not just that researchers report sensitivity analyses, but that models be constructed in ways that permit us to understand the nature of the assumptions built into the various specifications reported. At least in some cases, such an approach can establish plausible parameter bounds.

How individuals respond to the onset of health limitations in general and whether they apply for disability benefits in particular needs to be understood within a lifecycle context. Labor market choices presumably look different for someone who experiences the onset of a disability in their 30s or 40s as opposed to their 50s or 60s. Younger workers' benefits will be lower relative to what they could expect to earn were they to continue working. Beyond this, younger workers have more of an incentive and maybe also more of a capacity to invest in their future. However important these lifecycle effects might appear to be, they have been virtually ignored in the literature.⁸⁸

Empirical analysis of programs targeted on individuals with disabilities have focused almost exclusively on trying to understand the behavioral effects of such programs.

⁸⁸ Aarts and de Jong (1992), Burkhauser et al. (1995), Kreider (1997), and Charles (1996b) are notable exceptions to this general rule.

With the exception of Gruber's (1996) paper on the effect of benefit increases in Canada, the welfare effects of such programs has been virtually ignored. As economists, we actually have the technology available to quantify such effects. Empirical analysis of the welfare effects of disability insurance would seem to be a useful direction for future research.

Both in the United States and in Europe, transfer programs targeted at people with disabilities have generated a considerable amount of controversy. From a variety of perspectives, concern has been expressed that many of those receiving benefits may be quite capable of gainful employment. Different countries have approached this issue in quite different manners. In particular, both Sweden and Germany have encouraged people with disabilities to continue to work. Cross-country studies or studies that attempt to model the behavioral and welfare impact of disability programs outside the United States have enormous potential.

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