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THE SOCIAL SECURITY DISABILITY PROGRAM AND LABOR FORCE PARTICIPATION

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ABSTRACT

In the last twenty years the labor force participation rates of 45 to 54-year-old men have fallen 10.6 percentage points among non-whites and 4.4 percentage points among whites. I find that nearly half of this puzzling decline can be explained by the growth of the Social Security Disability program. By 1975, 6.22% of the prime-age non-white men and 3.57% of the white men were Social Security Disability beneficiaries. Despite the medical screening of applicants, I find in cross-section estimates an elasticity of .35 for beneficiary status with respect to benefit levels. As eligibility requirements have eased and as benefit levels have increased relative to earnings more men have dropped out of the labor force and become Social Security Disability beneficiaries.

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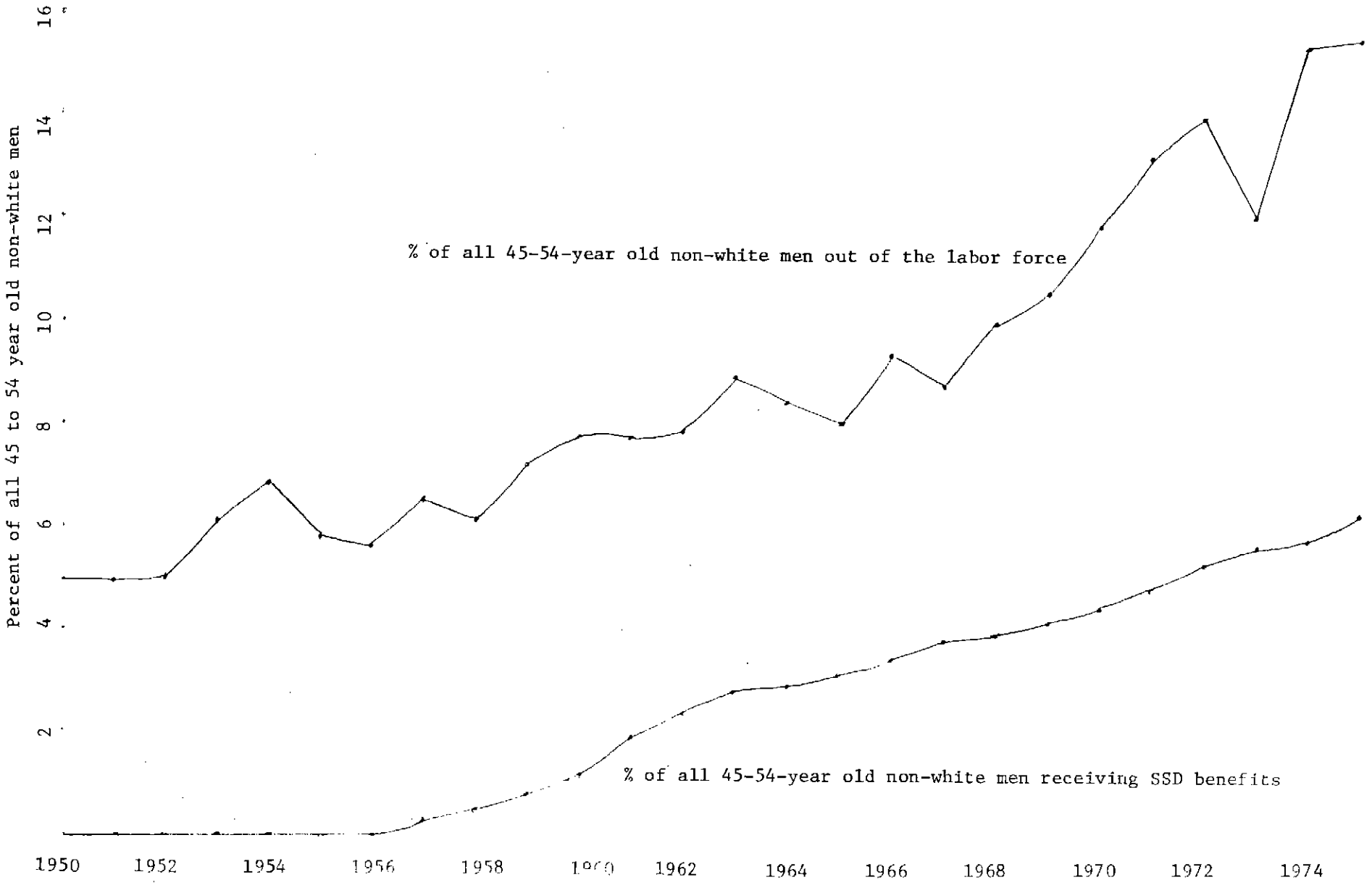
In 1977 about one out of every five non-white 45 to 54-year old men were out of the labor force during a typical week. Of these, about one-third were Social Security Disability beneficiaries. Over the past two decades the labor force participation rates of these prime-age males have fallen 4.4 percentage points among whites and 10.6 percentage points among non-whites. At the same time, an increasing proportion of these men have become Social Security Disability (SSD) beneficiaries (see Figure 1). Why are an increasing number of prime age men without a job and not looking for work? Why are so many of them becoming SSD beneficiaries?

I shall show that the liberalization of SSD eligibility requirements and the increases in SSD benefits relative to potential labor market earnings have caused more men to drop out of the labor force and become SSD beneficiaries. The liberalization of SSD benefits can account for nearly one-half of the puzzling decline in the labor force participation rates (LFPR) of 45 to 54-year old men over the past twenty years. Unlike other forms of social insurance, policy in the SSD program is explicitly predicated on the assumption that beneficiaries are medically incapable of work. The heart of the SSD program assumes that the reduction of labor supply commonly induced by welfare programs cannot occur among the totally disabled, and significant efforts are made in screening applicants in an attempt to ensure that those who could work do not become beneficiaries. Yet I shall show that even in the seemingly clear-cut case of disability insurance, a social welfare program reduces labor supply. Higher benefits cause men to drop out of the labor force and become SSD beneficiaries.[1] This helps explain how LFPR can drop and SSD beneficiary roles can expand at a time when health care expenditures are increasing and men are moving out of physically demanding work.

The following section will detail the growth of the SSD program and the concurrent decline in LFPR. We shall also see what men who are out of the labor force are living on and show the long-term nature of most non-participation. In section II I develop the specification of a model of SSD beneficiary status. Section III presents logistic regression results, applying this model to cross-section data to forge the link between expected benefits and beneficiary status. I also present time series regressions that show that the growth of the SSD program has contributed to the decline in LFPR. In Section IV I examine and reject a number of alternative explanations for the decline in LFPR, and present evidence suggesting that the reduced LFPR caused by the disability insurance program is not unique to the U.S. Conclusions are presented in the final section.

Figure 1. Percent of 45-54 Year Old Non-white Men Out of the Labor Force, and Percent Receiving Social Security Disability Benefits. 1950-1975.



*Note: Census sampling basis changed in 1972,

I. The Social Security Disability Program and Labor Force Participation.

Enacted into law in 1956, the SSD program was designed to provide income for the totally disabled, defined as those "unable to engage in substantial gainful activity because of any medically determinable physical or mental impairment of long-continued and indefinite duration or expected to result in death." There have been two major liberalizations of the eligibility requirement for SSD. In 1960 men below the age of 50 first became eligible for SSD benefits. In 1965 the definition of disability was expanded to include impairments expected to last for at least one year. At the same time, benefit levels have been increasing with the level of nominal earnings, and have in addition been sporadically but persistently increased by Congress.[2] This double indexing, common to all Social Security programs, was formalized in the 1972 amendments.

Throughout its existence the SSD program has provided average benefits for a disabled worker, his wife, and two dependant children, equal to about 55% of the average pre-tax earnings of production workers. Due primarily to double indexing this replacement ratio has risen on average to 64% in 1975 and even higher for new recipients. To the extent that SSD recipients would earn less than average, and since the relevant comparison is to after-tax earnings, the replacement ratio is even more generous. However, since few 45 or 54-year old men have eligible dependents we expect the typical replacement rate to be closer to the 52% net of tax for a male worker alone. For a sample of disabled workers allowed benefits in 1972 (Treitel, Table 5), 24.3% had annual benefits greater

than 100% of pre-tax predisability earnings, and only 23.3% had a replacement ratio below 50%.

SSD benefits are calculated in the same way as Social Security Retirement benefits. This is a complex non-linear function of past earnings and family composition.[3] Applicants must have worked in Social Security covered employment in half of the previous forty quarters,[4] must meet the disability standard stated above, and must wait five months from the date of disability determination before benefits are paid.[5]

Entrance into the program is administered at the State level. Since the program is Federally funded, the States have little incentive to police entry into the program or to review the current disability status of beneficiaries, save that explicitly budgeted for by the Federal government. In recent years there have been roughly equal numbers of denied and accepted applications for SSD benefits.[6] As the percent initially denied has risen recently, so has the percent who appeal the initial denial. In 1973, 24% of those denied eligibility at the initial medical determination were eventually enrolled through the appeals process (Social Security Administration, Office of Research and Statistics, p. 3).

The outcome has been the explosive growth of the SSD program. By 1975 the program had expended to pay out 8.414 billion dollars with 1,750,000 disabled worker beneficiaries. These included 6.22% of all non-white and 3.57% of all white 45- to 54-year old men. (See Appendix A for data on LFPR and the SSD program.)

By law a SSD recipient must be incapable of holding any job in the national economy, so the SSD program will tend to lower LFPR as long as some beneficiaries would otherwise be in the labor force. Beneficiaries are allowed trial work periods, and were allowed to earn less than $140 per month in 1972, but these

options are infrequently exercised. So most recipients are by law and in fact out of the labor force. To prove that the SSD program has led to decreasing LFPR we shall show that not all recipients would have been out of the labor force in the absence of SSD.

In effect, SSD recipients are permanently out of the labor force. "The data show that very few of the older middle-aged workers left the rolls for recovery of the ability to work in gainful employment. Essentially, the program appears to function as an early retirement program for older middle-aged persons with severe medical impairments."[7] The termination rate is about 10% - only 3% through recovery, 7% through death.[8]

Before proceeding, we can determine an upper bound on the proportion of the decline in LFPR that can be attributed to the growth of the SSD program. If all SSD beneficiaries would otherwise have been in the labor force, then at most 66% of the 8.9 percentage point decline in non-white LFPR and 90% of the 3.7 percentage point decline in white LFPR form 1957 to 1975 could be attributed directly to the SSD program. We shall actually be able to show that about 43% of the decline in LFPR of 45 to 54-year old men is due to the growth of the SSD program.

This may seem startling to those who view labor force non-participation as a transient phenomenon, fluctuating with the number of discouraged workers cast off during the downturn of the business cycle. The evidence points to a different type of non-participation: hard-core long-term drop-outs. In 1976, 39.8% of the 45 to 54-year old white men who were out of the labor force had been out of the labor force for more than five years. For non-whites the corresponding number was 43.5% (Deutermann). In 1970 more than half the 45 to 54-year old men who were out of the labor force had not held a job for at

least three years (U.S. Census 1970a, p. 706). For these men, being out of the labor force is not a temporary state. It is this long-term chronic non-participation among a large and growing portion of the adult male population that is so troubling.

What do these men live on? Table 1 shows that the major sources of income for men who are out of the labor force are Social Security Disability benefits, Veteran's Assistance payments, wife's earnings, and government employees pension or disability benefits.[9] Of these, SSD is the largest source of income. In 1970 56% of SSD recipients had received benefits for more than 3 years, matching the long-term nature of most non-participation. Given the accelerating growth of the program this is probably an underestimate of the length of completed spells of beneficiary status.

The long-term nature of most non-participation is coupled with the fact that the LFPR of 45 to 54-year old men has been declining at an accelerating rate over the last 22 years, through all phases of the business cycle. Most men who are out of the labor force claim to be disabled, but it is difficult to believe that between record health care expenditures and OSHA an increasing proportion of men are becoming and staying disabled.

We have shown that one-third of the men who are out of the labor force are SSD beneficiaries, and most of them have been out of the labor force for years. SSD benefits have increased and eligibility has been expanded so that the proportion of SSD beneficiaries has grown as LFPR declined. In the next section we shall measure the increase in the probability of becoming an SSD beneficiary as expected benefits increase relative to expected labor market earnings, holding health characteristics fixed. Using these estimates, we shall project the increase in SSD beneficiaries and decrease in labor force participants due to the liberalization of the SSD program.

Table 1: Characteristics of Labor Force Non-participants and of Social Security Disability Recipients, 1972.

	In the Labor Force	Out of the Labor Force Non SSD Recipient	Out of the Labor Force SSD Recipient
Sample size	1646	210	217
% non-white	.08	.19	.16
% married	.89	.72	.82
% claiming total disability	.005	.68	.96
% claiming partial disability	.12	.16	.03
% receiving support from relatives	.003	.03	.02
1971 Family welfare from:			
social security	48	182	1949
veteran's payments	108	432	754
gov. employee pension or dis.	127	470	171
priv. pension or disability	34	17	351
workman's compensation	8	32	143
unemployment compensation	46	162	42
private insurance	16	17	147
AB & APTD	1	70	96
AFDC	6	138	40
railroad retirement	1	12	5
state temporary disability	1	0	69
other	124	441	116
Total welfare	520	1973	3883
1971 Family Income from:			
own earnings	11259	1668	818
wife's earnings	2425	1599	1603
childrens' (<18) earnings	6	7	31
interest, dividends, rent	437	259	173
gifts	13	20	24
Total capital & labor income	14140	3553	2049
other family members'			
earnings	926	841	708
welfare	75	557	162
Total 1971 Income	19544	6924	6802
net total assets	37067	13377	12811
assets liquidated & consumed 1971	312	402	352
1971 weeks worked	48	11	4

Note: Data derived from 1972 Survey of Health and Work Characteristics, weighted to represent the 1970 non-institutionalized civilian population of 45 to 54-year old men in the U.S.

II. The Model

I shall deal with the following model, in which equation 3 is to be estimated.

$$SSDK = F(SSD, W, X) \tag{1}$$

$$W = Zb + u \tag{2}$$

$$SSDK = F(SSD, Zb + u, X) \tag{3}$$

where

SSDK = probability of being an SSD beneficiary.

SSD = expected Social Security Disability benefits

W = expected labor market income

X = a vector of background characteristics, including marital status

Z = a vector of background characteristics determining wage, including past wage and excluding marital status.

Health and other background characteristics affect incomes and may enter significantly into our final estimates if utility functions or discount rates differ systematically across individuals. For example, the old or disabled may have higher discount rates.

Our goal is to estimate the probability of being an SSD beneficiary as a function of expected SSD benefits, expected labor market income, W, and background characteristics X. The major econometric problem is that a large portion

of our sample, in particular the SSD beneficiaries, is out of the labor force and has no observable current wage. One might want to impute wages for this group using a wage equation estimated for the sub-sample with observable wages, and correcting for sample selection bias following Heckman. This method requires estimating the probability of observing a positive wage, but in our application this is nearly equivalent to estimating the probability of not being an SSD beneficiary, which is what I am after in the first place. This approach, which does not arise in the original Heckman application because the probability of having an observable wage is not taken explicitly as a function of the expected wage, would require maximum likelihood estimation of a non-linear simultaneous system.[11]

Since I am willing to leave the coefficient on W in the beneficiary equation unidentified, I can avoid the simultaneity problem. As in indirect least squares, we replace W by Zb + u as in equation 3. Note that the estimated coefficient on an element of Z, say Z_i, that is also an element of the vector X, will be the sum of the coefficient on Z_i in equation 1 plus the product of the coefficient on W in equation 1 times the coefficient on Z_i in equation 2.

Expected SSD benefits are estimated as the product of de jure benefits given eligibility, times the probability of being eligible for benefits. Using a sample of recent applicants, we shall estimate the probability of eligibility as a function of health and background characteristics. We shall assume no sample selection bias in the eligibility equation. If applicants were more eligible than non-applicants in ways not controlled for in our eligibility equation, then the estimated coefficient on SSD would be biased toward zero in equation 3.[12]

Our data-set includes the respondents' claimed knowledge of a Social Security program that pays disability benefits. We can take this knowledge as either endogenous or exogenous. If we impute positive SSD benefits even to

those who claim to be ignorant of the program, then equation 3 can be thought of in two ways. Either we have made the restrictive assumption that everyone knows about the program, or, we are estimating the joint probability of knowing about and applying for the program. Alternatively, if positive expected benefits are imputed only for those who know of the program, then knowledge of the program is taken as exogenous, and we have a classic control group with which to test the effect of SSD benefits on labor force participation.

I use past wage to help infer current expected wage. My data set includes the Social Security Earnings Record, which reports annual earnings up to the maximum amount that is subject to Social Security taxes. I select the most recent positive past annual earnings and correct for quarters worked and inflation. The specification includes a binary independent variable set to one if the past wage was at the taxable ceiling, to correct for the truncation of this variable.

To correct for health and disability status I use a set of 27 binary independent variables for specific health conditions, as detailed in Appendix B.[13] The coefficients for this vector of health coefficients in our estimated eligibility and beneficiary equations are discussed in Appendix B.

III. Regression Results

The Social Security Disability program has had a large and significant effect in reducing labor supply. The elasticity of labor supply in response to expected SSD benefits is found to be .35 in the results discussed below. Estimation of the model supports our hypothesis that labor force participation falls because more men become SSD beneficiaries when expected SSD benefits rise relative to wage income. In this section we first estimate the probability of eligibility for SSD benefits, which will be used to impute expected benefits. We then estimate the effect of increased benefits on the proportion of SSD beneficiaries and labor-force drop-outs in the population, finding a significant strong response with health characteristics and expected labor market income controlled for.

We estimate the effect of the SSD program on LFPR in two steps. First we estimate a cross-section logistic equation for the probability of being an SSD beneficiary. Note that this cross-section is direct evidence of the reduction in LFPR caused by the SSD program. If all SSD beneficiaries would have been out of the labor force even in the absence of the SSD program, it is unlikely that we would observe, as shown below, that the probability of being a beneficiary is strongly responsive to expected incomes. In the second step we use time-series regressions to explicitly estimate the number of labor-force withdrawals caused by the increase in SSD beneficiaries. When we apply the cross-section coefficients to changes in the variables over time, we can explain half of the increase in the SSD beneficiary population and about half of the decline in LFPR from 1957 to 1975. Separate time-series evidence from regressions of LFPR on benefit levels, earnings, and cyclical indicators

provides independent support for large decline in LFPR caused by the SSD program.

The results below are based on an unweighted sample of 45 to 54- year old men who were not last employed by the government. In general, government employees are not covered by Social Security, so they have been eliminated from the sample. The sample is drawn from the 1972 Social Security Survey of Health and Work Characteristics, in which 18,000 persons were selected from the 1970 Census 5% sample and re-interviewed. It includes 11,7000 people who indicated that they were disabled prior to 1969 on the 1970 Census questionnaire. A 1971 mail screening produced 5,100 non-disabled and 1,200 newly disabled people. The sample is designed to represent the non-institutionalized civilian population of the U.S. aged 18 to 64. This survey data is merged with beneficiary data form the Social Security Master Beneficiary Record File, and with earnings history from the Social Security Earnings Record File.

The key variable, SSD benefits, is imputed in two steps. De jure benefits are calculated as a deterministic function of past wage history and number of dependents. The correlation between our calculation of de jure benefits and actual benefits received by beneficiaries is .81, since we do not have exact data on the date of disability determination. To impute expected SSD benefits we multiply the calculated de jure benefits by the probability of being eligible, which is estimated using a sample of recent applicants. Eligibility for SSD benefits is determined by State agencies in a subjective process that takes account of age, education, occupation, and the degree of disability. Legally, total disability expected to last at least one year is the prerequisite. 90% of the recipients in the sample report themselves totally disabled, as do 68% of the non-recipients who are out of the labor force. As our results (Table

2) show, for a sample of 45 to 54-year old men who applied for SSD between 1966 and 1972, health condition is obviously a prime determinant of eligibility. Another major factor is having established disability insurance coverage by having worked the required number of quarters in Social Security covered employment. So far the provisions of the law seem to be borne out in actual practice. According to the law race should not affect eligibility. That being non-white significantly decreases eligibility is either evidence of sample selection bias or measurement error, or else reflects the de facto application of the law.

We find that a $180 increase in yearly benefits will increase the proportion of SSD beneficiaries in the population by 1 percentage point.[15] (See equation A, Table 3.) This is equivalent to an elasticity of .35, a substantial response among men who are usually considered incapable of working.[16] This specification can be interpreted as estimating the joint probability of knowing about and applying for SSD benefits, and probably underestimates the true response since we impute positive expected benefits to those who claim to be ignorant of the program. The same 1 percentage point increase in the proportion of beneficiaries is produced by a $105 increase in mean yearly benefits when the sample is limited to those who claim to know of the SSD program[17] (equation B, Table 3). This corresponds to an elasticity of .44. This estimate is unbiased if knowledge of the program is taken to be exogenous. Spreading knowledge of the SSD program does not by itself seem to be a sufficient explanation for the growth in the beneficiary rolls. Even when the sample is limited to those who know of the program, those with higher expected benefits are more likely to be beneficiaries.

Table 2: Probability of Being Eligible for Social Security Disability Benefits, Conditional on Being a Recent Applicant

Variable	Mean	Logistic[14] Coefficient	Asymptotic Standard Error	dP/dX
Married-spouse present	.73	.49	.45	.12
Non-white	.20	-1.64	.61	-.41
CVRD	.81	4.44	1.32	1.11
Log of age	3.91	6.32	3.87	1.58
Log of years of schooling	2.01	-.0006	.34	-.0001
Residence in a city	.42	.66	.42	.16
Rheumatic fever	.02	.77	1.34	.19
Heart attacks	.21	1.00	.52	.25
Stroke	.06	3.75	1.73	.94
Cancer	.04	-.65	1.45	-.16
Kidney stones	.26	-1.02	.47	-.25
Diabetes	.13	1.74	.78	.43
Epilepsy	.03	3.60	1.97	.90
Multiple sclerosis	.01	2.04	2.60	.51
Alcohol or drug problem	.02	-5.49	7.79	-1.37
Hernia	.03	-1.63	1.00	-.41
Deafness	.07	-1.36	.75	-.34
Blindness	.13	-.06	.58	-.01
Stiffness or deformity	.21	-.29	.48	.07
Back trouble	.26	2.18	.61	.54
Back stiffness	.10	-1.84	.70	-.46
Respiratory conditions	.27	.72	.46	.18
Allergies	.10	1.14	.70	.28
Circulatory conditions	.28	-.39	.47	-.10
Cardiovascular conditions	.27	.09	.45	.02
Tumors, neoplasms	.04	-1.35	.88	-.34
Digestive conditions	.23	-.77	.48	-.19
Urogenital conditions	.10	1.03	.80	.26
Mental illness	.06	1.77	.96	.44
Nervous disorders	.20	1.04	.56	.26
Other	.16	-1.59	.62	-.40
Constant		-29.41	15.48	
Mean of dependent variable	.52			
N	252.			
-2 log likelihood ratio	23.5			

Note: CVRD = covered for SSD insurance.

Table 3: Probability of Being A Social Security Disability Beneficiary

Variable	Equation A Mean	Equation A Logistic Coefficient	Equation A dP/dX	Equation B Mean	Equation B Logistic Coefficient	Equation B dP/dX
log of expected SSD benefits	6.59	.40 (.065)	.045	6.71	.54 (.097)	.083
log of past wage	6.00	-.58 (.078)	-.066	5.99	-.86 (.12)	-.132
dummy for past wage at ceiling	.41	-258.35 (41.9)	-29.22	.42	-224.33 (47.35)	-34.52
interaction term	2.65	39.07 (6.33)	4.42	2.73	33.96 (7.22)	5.23
# of dependents (aged 18 or less)	-.97	-.75 (.38)	-.085	-.98	-.33 (.46)	-.051
married spouse present	.85	.24 (.18)	.028	.86	.90 (.28)	.13
non-white	.11	.16 (.20)	.018	.08	.55 (.33)	.085
log of age	3.90	-1.11 (1.17)	-.126	3.91	-3.49 (1.81)	-.54
log of years of completed schooling	2.28	.20 (.10)	-.023	2.35	-.48 (.16)	-.074
log of net assets	7.01	-.006 (.016)	-.007	7.30	-.05 (.02)	-.008
residence in a city	.46	-.36 (.15)	-.041	.46	-.35 (.22)	-.054
constant		1.80 (4.6)			12.2 (7.1)	
sample size		1685.			965.	
mean of dependent variable		.13			.19	
-2 log likelihood ratio		1446.			741.	

Note: Both equations include the vector of health characteristics.
Asymptotic standard errors in parentheses.
In equation B the sample is limited to those who claim knowledge of the SSD program.
Interaction term = dummy for past wage at ceiling times log of past wage.

Similarly, the more one expects to be able to earn the less likely one is to be a beneficiary. As past wage reaches the ceiling on Social Security taxable earnings, the probability of being a beneficiary approximates zero. The elasticity of beneficiary status with respect to having wages that surpass the ceiling is -19.4. Below the ceiling the probability of becoming a beneficiary drops by 1 percentage point with a 12% increase in the level of past monthly wages. The sharply decreased probability of becoming a beneficiary when past wages are at or above the ceiling may reflect the fact that a disabled white-collar worker can often continue working while an identically disabled blue-collar worker cannot due to the physical demands of the job. The negative coefficient on years of schooling is taken as further evidence of the same effect.

Note that the color of one's skin makes little difference. We find a higher proportion of black than white males in the SSD program, not because blacks have a greater predilection for this program, but rather because blacks face poorer job opportunities and are in poorer health. If the economic position of blacks comes into line with that of whites, we expect equal proportions of blacks and whites to be beneficiaries.

These results indicate that the growth in the proportion of SSD beneficiaries among prime age males has been due to the liberalization of eligibility requirements, and to the increase in benefit levels relative to potential earnings. Declining job opportunities seem to be a plausible explanation for the program's

accelerating growth during the 1970's, but not for the 1960's. Given the increases in real incomes and real per-capita health expenditures it seems implausible to attribute the increasing proportion of beneficiaries in a given age group to deteriorating health.

Do these estimated cross-section responses correspond to the observed changes over time? We find that we can account for half of the increase in the proportion of SSD beneficiaries by applying the cross-section coefficients from equation A to time-series data. We shall show that this in turn can explain about half of the decline in LFPR, using time-series regression. Between 1957 and 1975 the average monthly benefit of new 45 to 54-year old beneficiaries rose from $94 to $148 in real 1972 dollars. The real average monthly earnings of production workers increased from $374 to $437 during the same period. The percentage of all male workers with annual earnings below the taxable ceiling fell form 41.3 to 23.8. Over this period there have been seven jumps in the ceiling, so the annual percentage above the ceiling has not dropped smoothly. Changes in other variables have been negligible. For example, the percentage married-spouse-present inched up from 83.9 to 84.3.

Multiplying the changes over time in wages and benefits by the estimated coefficients from equation A we find an implied 1.8 percentage point increase in beneficiaries, more than half of the historical 3.5 percentage point increase for men of both races.[18] Since more men are below the taxable ceiling because the ceiling has been raised, and not because these men are earning less in the sense of the cross-section regression, we have left this factor aside. Most of the action is beneath the ceiling in any case.

Over time increases in beneficiaries have been matched more than one for one by decreases in labor force participants. In time-series regressions of LFPR on the proportion of recipients (REC) and cyclical indicators (eq. 1-6, Table 4), we observe LFPR to drop by at least one point when REC increases by one point. We would be unlikely to observe this relation if all beneficiaries would have been out of the labor force even in the absence of the SSD program. Since we previously found a 1.8 percentage point increase in beneficiaries applying cross-section coefficients to time-series changes, and that LFPR drops by more than 1 point when the percentage of SSD beneficiaries increases by 1 point, our results imply at least a 1.8 percentage point decrease in LFPR. The actual decline from 1957 to 1975 was 4.2 points for men of all races, so we conclude that the growth of expected benefits relative to potential earnings can explain nearly half of the puzzling decline in LFPR.

In a separate set of time-series regressions of LFPR on average SSD benefit levels and average earnings (eqs. 7-12, Table 4) we see evidence consistent with our cross-section findings of a large effect of benefit levels on LFPR. Even when the business cycle, trend, median earnings, and trend since 1960 when the eligibility rules changed, are controlled for, the SSD benefit levels still significantly contribute to the decline in LFPR. With earnings controlled for, the business cycle does not strongly or significantly affect LFPR. These time-series results indicate that a $100 increase in average real SSD benefits will reduce non-white LFPR by 4 percentage points and white LFPR by 3 percentage points.

Table 4: Time Series Regressions of Labor Force Participation Rates, 1957-1975.

Eq.#	Race	Rec	Avben	Earn	Cycle	T54	T60	Constant	Rho/D.W.	$\bar{R}^2$
1	White	-1.4 (.28)	-	-	-.001 (.002)	-	-	98.2	.86/ - (.12)	.97
2	"	-1.5 (.29)	-	-	-0.8 (.04)	-	-	98.4	.88/ - (.11)	.97
3	"	-1.5 (.29)	-	-	-.03 (.04)	-	-	98.2	.86/ - (.12)	.97
4	Non-white	-1.9 (.27)	-	-	.019 (.01)	-	-	96.7	.37/ - (.22)	.89
5	"	-1.6 (.24)	-	-	.16 (.30)	-	-	95.6	.38/ - (.22)	.87
6	"	-1.6 (.11)	-	-	-.58 (.14)	-	-	98.3	-.17/ - (.23)	.90
7	White	-	-.028 (.0005)	.11 (.03)	-.006 (.003)	-.28 (.16)	.08 (.15)	90.3	- /1.7	.98
8	"	-	-.026 (.004)	.10 (.02)	-.19 (.06)	-.27 (.11)	.05 (.11)	91.2	- /1.8	.98
9	"	-	-.036 (.006)	.11 (.03)	.14 (.07)	-.21 (.13)	.001 (.12)	90.1	- /2.0	.98
10	Non-white	-	-.047 (.02)	.005 (.11)	.019 (.01)	.29 (.57)	-.77 (.53)	96.9	- /2.8	.95
11	"	-	-.044 (.02)	.16 (.09)	-.009 (.27)	-.39 (.53)	-.14 (.48)	85.6	- /2.4	.94
12	"	-	-.044 (.02)	.16 (.12)	-.0006 (.27)	-.38 (.52)	-.15 (.47)	85.7	- /2.5	.94

Variable Definitions:

REC percentage of 45-54 year old men who are SSD beneficiaries, eqs. 1-3, 7-9: white, eqs. 4-6, 10-12: non-white.

AVBEN average real monthly SSD benefits of 45-54 year old male beneficiaries, exclusive of dependents' benefits.

EARN average real monthly earnings of production workers.

T54 Time, starting in 1954

T60 Time, starting in 1960

CYCLE a business cycle indicator, defined as follows:

eqs. 1,4,7,10: deviation of real GNP from trend, the residual from GNP=391+28.8*TIME

eqs. 2,5,8,11: deviation of the employment population ratio of all males from trend, the residual from EMPR=77-.26*TIME

eqs. 3,6,9,12: unemployment rate for all males

Since it is difficult to separate out the effects of the SSD program from other macro-economic factors in a set of 22 observations, the time-series results should only be considered suggestive of the magnitude of the effect of the SSD program on LFPR. While future research may find smaller effects, it is unlikely to overturn the basic result that the growth of the SSD program has caused a significant part of the decline in LFPR.

IV. Alternative Explanations

We have shown that the growth of the Social Security Disability program has been the major factor behind the decline in LFPR over the past twenty years. In this section we shall examine and dismiss three alternative explanations of the decline in LFPR. 1) The decline is due to the dissolution of the American family. 2) Male LFPR declined because female LFPR increased. 3) The decline is the product of past economic dislocations.

The first argument is that since single men commonly have lower LFPR, the break-up of the family could account for the reduction in aggregate LFPR. The premise that fewer men are with spouses in this age group is false. For 45 to 54-year old non-white men, the proportion married spouse-present has remained a steady 71% in every census since 1940. For both races it has increased from .78 in 1940 to .84 in 1970. Using more recent CPS survey data for 1964 to 1975, changes in the marital status of 45 to 54-year old non-white males, which itself shows no strong trend, can account for at most 16% of the variance in LFPR.

If the decline in male LFPR is not due to the weakness of the family, perhaps it is due to the strength of the family. If more women are entering the labor force, perhaps their husbands can afford to take longer vacations by dropping out. Once again the premise is incorrect. Among both married and unmarried non-white 45 to 54-year old women LFPR declined from 1965 to 1974 (U.S. BL.S). In regressions using the 1966 National Longitudinal Survey, wife's income had no significant effect on husband's LFPR.

Perhaps the decline in LFPR we observe today is not the product of current forces, but rather the fruit of seeds sown long ago. If the mature man of today was unemployed as a youth, might not the permanent scars reduce current LFPR? If so we would expect this cohort to have had low LFPR over its entire life-cycle. Decennial Census data shows this is not true. The 50- to 54-year olds of 1970 were the 40 to 44-year olds of 1960, and had a LFPR of 89.9%. This is only 1.2 percentage points less then the LFPR of 40 to 44-year olds in 1950, and only 1.8 percentage points less than the LFPR of 40 to 44-year olds in 1940. The problem is not one of a peculiar cohort that has always had a weak attachment to the labor force. The drops in LFPR have occurred across a number of age groups, primarily in the last twenty years.

This suggests that a more recent event is at the source of our current problems, perhaps a great occupational or industrial shift like the black exodus from Southern farm to Northern factory. Such a dislocation could also reduce LFPR because the grey area between working and not working is more sharply defined once off the family farm. Only 2% of the non-white cohort aged 55 to 64 in 1970 were employed as farmers in 1970 (U.S. Census 1970b, Table 4). 5.6% of the same cohort were farmers in 1960, and 12.7% in 1950 (U.S. Census 1960, Table 7). Over the same period this cohort has moved into crafts and service work and out of non-manufacturing labor. But we have already seen that this cohort had fairly typical LFPR in 1960. The changes in occupational and industrial distribution since 1960 out of unskilled physical labor and into crafts and services do not seem large enough to have "shocked" many men out of the labor force.

The phenomenon of a falling LFPR in response to a disability insurance program does not appear to be unique to the U.S. In Canada, the LFPR of 45 to 54-year old men has fallen 2.3 percentage points in the past 7 years (Statistics Canada, 1972-1979), following the inclusion of disability insurance in the Canada and Quebec Pension plans in 1970.[19] Perhaps the most outstanding example of this sort is in the Netherlands, where disability insurance has reached crisis proportions. By 1977, 23% of all insured 50 to 54-year olds, 31% of the 55 to 59-year olds, and 42% of the 60 to 64-year olds were beneficiaries of the Dutch Disability Security Act (Hans Emanuel, p. 10).[20]

Social insurance programs for disability seem to have reduced LFPR among prime age males in the Netherlands and Canada, as well as in the U.S. Other explanations of the decline in LFPR in the U.S. do not appear to be consistent with the data.

V. Conclusion

The labor force participation rates of prime age males have been decreasing since 1957 in response to the growth in the number of Social Security Disability beneficiaries. We have shown that the increase in SSD benefits relative to earnings can explain roughly half of the increase in beneficiaries and decrease in labor force participants. The SSD program has acted as an escape hatch out of the labor force for disabled men. The more generous the benefits and the poorer labor market conditions, the more attractive the escape hatch. Reducing unemployment, improving rehabilition efforts among the partially disabled, and recent legislation to extend Social Security hospital insurance and supplemental medical insurance to the disabled in the labor force would all be humane ways of helping these men to continue productive lives. We are left with the disturbing question: why are so many men in a position where the Social Security Disability program is an appealing alternative?

Appendix A: The Growth of the Social Security Disability Program And the Decline in Labor Force Participation

Year	(1)	(2)	(3)	(4)	(5)	(6)
1957	0.32	0.26	--	57	93.5	96.6
1958	0.50	0.39	165.50	249	93.9	96.6
1959	0.79	0.56	188.30	457	92.8	96.3
1960	1.18	0.72	192.20	568	92.3	96.1
1961	1.87	1.06	193.80	887	92.3	95.9
1962	2.38	1.26	194.70	1105	92.2	96.0
1963	2.71	1.43	196.10	1210	91.1	96.2
1964	2.88	1.52	197.10	1309	91.6	96.1
1965	3.16	1.66	216.30	1573	92.0	95.9
1966	3.47	1.83	217.80	1781	90.7	95.8
1967	3.74	1.96	217.30	1939	91.3	95.6
1968	3.96	2.09	242.00	2294	90.1	95.4
1969	4.12	2.20	241.30	2542	89.5	95.1
1970	4.38	2.33	273.20	3067	88.2	94.9
1971	4.79	2.55	296.70	3758	86.9	94.7
1972	5.22	2.81	362.80	4473	86.1	94.0
1973	5.57	3.04	367.20	5718	88.0	93.5
1974	5.72	3.27	411.30	6903	84.7	93.0
1975	6.22	3.57	454.00	8414	84.6	92.9

1. % of 45 to 54-year old non-white men who are SSD recipients.
2. % of 45 to 54-year old white men who are SSD recipients.
3. Average monthly SSD benefit, male worker, wife, and two ore more dependent children.
4. Total disability benefits paid out, million $.
5. Labor Force Participation Rate, non-white males aged 45-54.
6. Labor Force Participation Rate, white males aged 45-54.

Source: Social Security data derived from Social Security Bulletin, Annual Statistical Supplement. Earnings and LFPR data from Manpower and Training Report of the President.

Appendix B: The Health Condition Vector, Coding and Results.

The coefficients on the vector of health conditions from equation A are generally sensible. The most disabling condition, multiple schlerosis, increases the probability of beneficiary status by 34 percentage points. Since eligibility benefits has already been allowed for, the coefficients presented below as well as on all variables that enter the structural wage equation, reflect the effect on beneficiary status directly as well as indirectly through the prospective wage.

		Equation A	
Variable	Mean	Logistic Coefficent	Asymptotic Standard Error
Rheumatic fever	.012	-.64	.49
Heart attacks	.091	1.01	.18
Stroke	.017	.58	.30
Cancer	.013	.81	.40
Arthritis	.213	.20	.15
Diabetes	.059	.61	.21
Epilepsy	.018	1.28	.32
Multiple sclerosis	.008	3.04	.48
Alcohol or drug problem	.017	1.77	.51
Hernia	.039	-.30	.36
Deafness	.064	.51	.24
Blindness	.049	1.09	.20
Stiffness or deformity	.118	.75	.17
Back trouble	.202	.29	.15
Stiffness in back	.065	1.22	.23
Respiratory conditions	.144	.45	.15
Allergies	.088	.13	.21
Circulatory conditions	.174	.10	.15
Cardiovascular conditions	.119	1.23	.16
Tumors	.030	.51	.28
Digestive conditions	.143	.23	.16
Urogenital conditions	.047	.33	.23
Mental illness	.027	1.58	.24
Nervous disorders	.102	.73	.15
Other	.160	.07	.18

References

Monroe Berkowitz, "Workers' Compensation Compared with other Disability Programs," Monthly Labor Review, April 1977, 100, 57-58.

William Deutermann, "Another Look at Working Men Who Are Not in the Labor Force," Monthly Labor Review, June 1977, 100, 9-14.

Hans Emmanual, "Factors Behind the Growth in the Number of Disability Benefits in the Netherlands," unpublished paper, 1979.

Joseph Gastwirth, "On the Decline of Male Labor Force Participation," Monthly Labor Review, October 1972, 95, 44-46.

Zvi Griliches, B. Hall, and J. Hausman, "Missing Data and Self-Selection in Large Panels," Annales de l'Insee, April 1978, 30.

John Hambor, "Unemployment and Disability: An Econometric Analysis with Time Series Data," Social Security Administration Staff Paper No. 20, 1975.

James Heckman, "Sample Selection Bias as a Specification Error," unpublished paper.

Mordechai Lando and Aaron Krute, "The Growth in Observed Disability Incidence Rates 1967-1974," unpublished paper.

Phillip Lerner, "Social Security Applicant Statistics," Social Security Administration, 1972.

S. Nagi and L. Hadley, "Disability Behavior, Income Change and Motivation to Work," Industrial and Labor Relations Review, January 1972.

Frederic Siskind, "Labor Force Participation of Men, by Race," Monthly Labor Review, July 1975, 98, 40-42.

Ralph Treitel, "Disability Beneficiary Recovery," Social Security Office of Research and Statistics Working Paper #2, 1979.

International Labour Office, Yearbook of Labour Statistics, 1977 and 1978, Geneva.

Statistics Canada, Census of Canada 1971, Vol. III, part 1, bulletin 3-1-2, Ottawa 1974, p. 2-2.

_____, Labour Force Surveys Section, The Labour Force, April, Annual editions 1972-1979.

U.S. Bureau of the Census, Census of the United States: 1950, Vol. 4-1B.

_____, Census of the United States: 1950, Vol. 4-1B.

_____, Census of the United States: 1960, Vol. 2-7A.

_____, Census of the United States: 1970a, Vol. 1.

_____, Census of the United States: 1970b, Vol. 2-7A.

U.S. Bureau of Labor Statistics, Special Labor Force Reports, "Marital and Family Characteristics of Workers".

U.S. President, Employment and Training Report of the President, 1978.

U.S. Social Security Administration, Office of Research and Statistics, Note #3, "Appeal of Disability Decisions".

_____, Social Security Bulletin, Annual Statistical Supplement, Annual editions.

Footnotes

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1. I shall not deal with the issue of whether part of the growth of the SSD beneficiary roles is fraudulent. Given the law that is essentially a medical issue on which I have neither the data nor the skill to judge. This paper does suggest that it is difficult to determine whether a person is totally disabled.
2. A more equitable indexing system would deflate earnings before computing average monthly earnings, then index benefits to correct for inflation. Since the present system calculates benefits based on nominal earnings it tends to benefit beneficiaries with more recent, highly inflated earnings.
3. Between January, 1971 and September, 1972, the primary insurance amount (PIA) was equal to 90.01% of the first $110 of the average monthly wage plus 32.74% of the next $290, plus 30.59% of the next $150 plus 35.96% of the next $100 plus 20% of the next $100. Half of the PIA is added for each eligible dependent, subject to certain individual and family minimums and maximums.
4. There are special eligibility requirements for the blind and those younger than 31.
5. The date of disability determination may precede the date of application for benefits, so benefits may be paid sooner than 5 months after applications. Conversations with the Social Security Administration indicated that in 1979 the shortest wait would probably be 77 days, the average processing time.

6. In 1970, the leading primary diagnoses among 40 to 49-year old male new beneficiaries were chronic ischemic heart disease - 16.2%, schizophrenia - 8.1%, slipped disc - 6.4%, tuberculosis - 3.4%, and emphysema - 2.5%. (See Lerner, p. 27.)

7. (See Treitel, p. 11.) He also notes the curious fact that the recovery rate among SSD recipients has not increased even though the average age has declined. He finds in a logit regression that high ratios of benefits to predisability earnings significantly reduces the probability of recovery, holding health, occupation and other background variables constant.

8. These termination rates are derived from 1972 data in Social Security Bulletin, Tables 67 and 108.

9. In cross-section regressions, veteran status increases the probability of being out of the labor force. The percentage of veterans among 45 to 54-year olds has been declining since the 1960's as the bulk of World War II veterans passed through this age group. It should also be noted that both Government employees' disability and private disability insurance programs reported unusual growth during the 1970's, contributing to the decline in LFPR.

10. We assume a discount rate sufficiently high that current income is a sufficient indicator of the present value of a stream of income. Note that it is probably not in the worker's interest to delay entrance into the SSD program if he is eligible. The average 45 to 49-year old new beneficiary in late 1972 had benefits of $201 per month, which corresponds to average yearly earnings of $3828. Assuming that the worker had static expectations on the benefit computation law, he would have to increase his average yearly earnings by 16% if he worked another year in order to increase his benefits by 10%. Of course, to increase average yearly earnings by this much earnings in the additional year he would have to increase by much more than 16% over the previous year; an unlikely prospect.

11. The missing data problem could be dealt with and the coefficient on expected wage identified using maximum likelihood techniques as outlined in Griliches, Hall and Hausman, but these methods are quite expensive in this application.

12. We underestimate the true effect of SSD benefits. For example, consider two men, Smith and Jones, with identical reported characteristics but different true levels of disability. Assume only Jones, who is more disabled in ways the Social Security Administration can observe but which are not recorded in our data, applies for SSD benefits. We use only the reported characteristics to infer Smith's eligibility; so we will overestimate it. Since expected benefits are simply benefits conditional on eligibility times the probability of eligibility, we also overestimate expected SSD benefits among non-applicants, biasing the coefficient toward zero.

13. Our data-set includes self-reported disability status. We prefer to use the detailed health questions because they invite less self-justification on the part of those men out of the labor force. We did not use the health vector to form instrumental variables for disability status in the implicit structural wage equation because of the nature of our reduced form estimation procedure.

14. The estimated coefficients are the B from the logistic equation $p = 1/(1+\exp(-B))$.

15. $dp/dx=B(p)(1-p)$ in the logistic model: $\ln(p/1-p)=xB$, where p is the mean probability of being a beneficiary. The elasticity is equal to $B(1-p)$ since benefits are measured in logs. Since the logistic function is non-linear, all elasticities are calculated holding the mean values of other variables constant, and using mean probabilities.

16. It is unlikely that the estimated relation between high SSD benefits and the probability of being a beneficiary is just a spurious correlation. When the sample is limited to those who do not know of the program, the coefficient becomes weaker and less significant. Similarly, high SSD benefits increase the probability of being out of the labor force in cross-section estimates, but the coefficient becomes weak and insignificant when SSD beneficiaries are eliminated from the sample. If all SSD beneficiaries would have been out of the labor force in the absence of the SSD program it is unlikely that we would observe that the probability of being out of the labor force increases with SSD benefits, and that higher expected earnings decrease the probability of being a beneficiary.

17. In other regressions it appears that the effect of higher expected benefits works mostly through the changes in expected eligibility.

18. The calculation is: Δ% beneficiaries=.1131*(.40*ΔLSS2-.58*ΔLW5), where LSS2 increased from 4.52 to 5.07 and LW5 increased from 5.98 to 6.08.

19. Decennial census data, though not strictly comparable, shows only a 1.6 percentage point drop for this same group from 1961 to 1971.

20. Though Dutch disability beneficiaries need not withdraw totally from the labor force, most of the older ones do. In 1977, the LFPR for men aged 60 to 64 was 58.0, a drop of 13.9 percentage points from only 6 years earlier. 55 to 59-year olds dropped 7 points to 79.9 and 50 and 54-year olds dropped 4.8 points to 87.8 (I.L.O.).