

Labor-Force Participation and Earnings of SSI Disability Recipients: A Pooled Cross-Sectional Times Series Approach to the Behavior of Individuals

*by L. Scott Muller, Charles G. Scott, and Barry V. Bye**

This article examines two important aspects of work behavior, labor-force participation, and earnings among persons who since 1976 have become entitled to SSI disability benefits and received payments for a full calendar year or longer during the intervening time period. A data set was developed containing the records of a random sample of all individuals who had ever received Supplemental Security Income (SSI) disability benefits and matched to earnings records maintained by the Social Security Administration (SSA). A multivariate analysis based on a pooled cross-sectional time series approach was employed using individual-level data to first estimate the probability of an SSI recipient performing work and then to estimate, among those who worked, the level of earnings. For this analysis, the SSI population was divided into three distinct groups based on their diagnosis: the nondevelopmentally disabled, the developmentally disabled (other than the mentally retarded), and the mentally retarded.

The analysis provides information about the impact that individual characteristics (such as age, education, diagnosis, and so forth) play in the decision to work and in determining the level of earnings. The analysis also addresses yearly variations in labor-force participation and earnings.

*Mr. Muller is with the Disability Research Staff, Office of Research and Statistics, Social Security Administration; Mr. Scott is with the Office of Program Benefits Policy, Division of Program Management, Research, and Demonstrations, Social Security Administration. Mr. Bye is formerly of the Division of Earnings Statistics and Analysis, Office of Research and Statistics, Social Security Administration.

The Supplemental Security Income (SSI) program provides benefits to aged and disabled persons whose incomes and resources are below specified limits. The program began in 1974 with the conversion of certain recipients of State welfare and other programs into the new federally administered SSI program. In December 1994, more than 6 million persons received SSI benefits. More than two-thirds of these recipients were disabled recipients under the age of 65.

The SSI program's definition of disability is very strict, requiring the demonstration of both a severe impairment and a resulting inability to work. Specifically, applicants must be unable to engage in "substantial gainful activity" (SGA) by reason of a medically determinable physical or mental impairment that can be expected to result in death, or that has lasted or can be expected to last for a continuous period of at least 1 year. In 1994, earnings over \$500 per month constituted SGA.

Despite the severity of their disabilities, some recipients either continue to work, or return to work after they are awarded benefits. In September 1995, about 8 percent of all SSI disability recipients ages 18-64 were working.¹

Since the program's inception, the Social Security Administration (SSA) has been exploring methods for encouraging SSI recipients to return to work or to increase their work efforts. The efforts have been supported by various provisions of the law that permit SSI recipients to keep their earnings while maintaining eligibility for partial cash benefits that have been reduced for earnings, and to retain Medicaid coverage even when SSI payments stop. These provisions include income exclusions for blind work expenses, plans for achieving self-support, student earned income, impairment related work expenses, and Section 1619 (Public Law 96-265).

Section 1619(a) provides special cash benefits to disabled individuals who would otherwise lose eligibility for SSI payments because they have earnings at the level that is considered to represent SGA. Section 1619(b) provides special SSI recipient status for Medicaid purposes to working disabled or blind individuals when their

earnings make them ineligible for cash payments. In September 1995, about 73,000 SSI recipients were participating in Section 1619(a) or (b). Of these recipients, about 10,500 were covered by a program to achieve self-support, and over 14,000 had income exclusions for blind work expenses or impairment related work expenses.²

SSA has publicized these provisions and has been searching for other means of identifying and encouraging potential workers. Identification of potential workers is very useful at this time when both the number of persons on the SSI disability rolls and program costs themselves are rising dramatically and funding for social programs is undergoing considerable scrutiny by the Congress. SSA sees an opportunity for a win-win solution to program growth by encouraging as many recipients as possible to find suitable employment and work their way off the rolls.

Very little is currently known about SSI recipients who work and how recipients can be identified as potential workers. Scott (1992) examined earnings records of SSI recipients to ascertain the characteristics of those who work.³ In addition, SSA has conducted a number of demonstration projects aimed at returning beneficiaries to work. A return to work initiative recently conducted by SSA, Project NetWork, promises to yield some data on the types of SSI applicants who benefit from various case management approaches, but those data will not be available for some time.⁴ To date there has been no analysis of work among SSI awardees using a cohort approach, that is, tracking work behavior of individuals over time.

The purpose of this research is to use SSI awardee cohorts and appropriate models of labor-force participation and earnings, to identify the types of awardees most likely to work after they are awarded benefits, and the level of earnings they receive. The analysis, by extension, should help to identify the most promising areas for an Agency focus on encouraging SSI recipients to work.

Data

To conduct this research, it was necessary to assemble a data set including records of individuals who were awarded SSI disability benefits at some time after program inception in 1974. These records were assembled based on the year of first award and contained a complete history of entitlement to benefits. The data permitted the creation of a longitudinal record of entitlement and eventually the pooled cross-sectional/time series data across individuals. Data for this analysis came from three sources: (1) the Supplemental Security Record (SSR) from which relevant SSI recipients were identified; (2) SSA Disability Application files (831 files), which provided information on the medical condition and education of the recipients, and (3) the Continuous Work History Sample (CWHS), which contained information on posted earnings and on Disability Insurance (DI) benefit status. The data system and matching operation are discussed below.

The source that was used to define the annual cohorts of awardees in this study was the SSR, the main computer file

used to administer the SSI program. A random 1-percent sample of all individuals who had ever received 1 or more months of SSI payments was extracted from the SSR in September 1992. The sample was based on the terminal digits in the awardees' Social Security numbers. This data extract contained data on age, gender, and alien status, and complete monthly SSI eligibility histories for each awardee. The CWHS provided data on race, receipt of concurrent DI benefit payments, and annual Social Security taxable earnings before and after the point of award. The 831 files provided information on the diagnosis of the underlying disabling condition, the regulation basis code (which was employed as a measure of impairment severity), and the individual's level of educational attainment.

The SSR extract contained 143,859 sample records of persons awarded SSI benefits since the program began in January 1974. This sample represents the population of about 14,385,900 persons awarded SSI benefits from program inception through September 1992.

To better define the population of interest, or because of data limitations, several selection criteria were applied and groups of cases were removed from the original extract for this study. First, because this research focuses on disabled recipients, aged awardees (those aged 65 years or older) were removed. Second, because it was desirable to allow each cohort sufficient time to return to work after being awarded benefits, first time awards occurring after 1988 were not included in the analysis. Third, cases that were conversions to the SSI program due to prior eligibility for State programs were eliminated from the analysis. This exclusion was made for two reasons: (1) important data for this project, such as date of application, diagnosis, severity, and education were rarely available and (2) the conversion cases did not necessarily meet the same stringent decision process as the "new" SSI awards. Finally, because some early SSI awards were found to be also lacking key variables, all cases entitled before 1976 were eliminated.

Original sample	143,859
Less: aged awardees	51,702
Less: awards after 1988	14,479
Less: converted cases	16,634
Less: 1974-75 awards	10,874
Interim study file	50,170

The result was an interim study file of 50,170 awardees. To permit the analysis of work and earnings, an additional selection criterion was applied: Cases in which the SSI recipient has less than a full calendar year of eligibility were dropped. This was done for two reasons. First, the SSI program provides only interim or temporary support for many people (for example, providing benefits only during the 5-month waiting period for the DI program) and it was intended that the focus of the research be on those individuals who would have a substantial attachment to the SSI program, and for whom entry or reentry to the work force would have the greatest impact on the program vis-a-vis reduction in benefit costs. Second, this se-

lection was necessary to assure that the individual earnings were associated with work performed while the individual was receiving SSI disability benefits. Since 1978 earnings have been reported to Social Security on an annual (calendar year) basis, only if the individual was entitled for the entire calendar year can it be assumed that the earnings were received while the person was receiving SSI benefits.

Interim study file	50,170
Less: those with less than 1 full SSI year	16,315
Final study file	33,755

The final study file contains 33,755 persons who were awarded benefits during the years 1976-88 who had at least 1 full calendar year in the SSI program.

This selection decision, that is, to exclude individuals without a full year on the SSI rolls, is not without its consequences. Among those removed from the analysis by this selection criterion are the following groups:

- Persons who medically recovered in their first year;
- Persons who attained 65 years of age in their first year;
- Persons who died in their first year;
- Persons who converted from SSI to DI after the 5-month waiting period; and,
- Persons who returned to work and left the rolls due to earnings in the first year.

The first three groups are of little consequence to the analysis, as none stay on the rolls long enough to represent a cost to the program or a group to be targeted for return to work.⁵ The fourth group, DI waiting period cases, are quite different from other SSI cases (and even concurrent cases), because of their past work history of both significant attachment to the labor force and relatively high earnings. Inclusion would bias the results for other long-term SSI recipients, and thus the exclusion can be viewed as eliminating a bias in the analysis.

It is the last group, those returning to work and leaving the rolls within the first calendar year, that can be viewed as a very small, but a potentially significant exclusion. Clearly, eliminating these individuals understates the propensity to work and overlooks the characteristics of these individuals as a potential factor in decisionmaking for early intervention or other return to work efforts.

It was, however, the lack of earnings data for periods of less than a calendar year, not a decision to pursue a particular analytic approach, that led to this exclusion. The alternative was to include the calendar year of entitlement in the analysis for all SSI recipients and attribute earnings that were most likely received prior to receiving benefits to work while in benefit status, a bias that would clearly be much greater than the bias associated with eliminating the small number of first year terminations due to early return to work. Furthermore, the exclusion of these early return-to-work cases makes the analysis of change over time, specifically in context of Section 1619 provisions, more conservative.⁶ The enactment of Section 1619

actually resulted in a class of persons who would have been early terminations in the absence of Section 1619 remaining on the rolls, thus potentially biasing upwards the measurement of work and earnings for years after the implementation of Section 1619.

Methodology

The major goal of this analysis is to assess year-by-year post-award employment and to identify SSI recipient characteristics that are associated with work attempts while on the rolls. An appropriate methodology for this study is a pooled cross-sectional/time series analysis employing individual (micro-level) earnings histories. To facilitate this analysis, it was necessary to create a data set with the appropriate data format. The required data format is a person-year file, which involves a separate record for each individual for each full calendar year the individual had continuous SSI eligibility and the amount of posted earnings in each of those years.

The Person-Year File

For each SSI recipient in the final study file, the CWSHS provided annual earnings from 1951 to 1989. The earnings data from 1977 to 1989 were used to construct the two dependent variables—a dichotomous variable representing the presence of earnings in a given year and another for the level of earnings in that year (expressed as the logarithm of earnings after indexing to 1989).⁷ If the SSR showed that the individual was on the SSI rolls for the entire calendar year, then earnings data for that year were used to compute the dependent variables for that year. For years in which the recipient was not in SSI recipient status, or changed SSI recipient status, no dependent variables were computed and that person-year was excluded from the analysis. Again, anyone not having at least 1 full calendar year of SSI eligibility was dropped from the analysis.

Table 1 shows the sample distribution of the number of years on the rolls and the number of years during that period in which SSI awardees had earnings. The table includes all persons in the study. The table demonstrates the relationship between sample individuals and the person-year records,⁸ as well as showing the distribution of years of labor-force participation for individuals according to their length of stay on the rolls.

Having identified the person-year outcomes that would be the observational units of the analysis, the next step was to assemble the independent variables for each outcome observation. The independent variables could be either constant or changing over time. Examples of independent variables that are constant over time include race, gender, education, and alien filing status. Variables that changed, or could change over time, included age in the observation year, DI reciprocity, and diagnosis.

The resulting data file had one or more observations for each 1-percent sample SSI recipient who had a full calendar

year, or more, on the SSI rolls. In fact, the final study file of 33,755 SSI disability recipients yielded a total of 133,539 person-year records for the analysis. Each observation consisted of the earnings obtained from the CWHs and a number of predictor variables obtained from either the SSR, the CWHs, or the SSA 831 file.

Characteristics

A series of tables showing the characteristics of SSI awardees in the person-year file are presented below. These tables not only provide a description of the three groups under study (the nondevelopmentally disabled, the developmentally disabled (except the mentally retarded), and the mentally retarded), but also permit comparisons between those with 1 or more complete calendar years on the rolls with those who had less than 1 complete calendar year.

Tables 2 through 5 show the distribution of characteristics of SSI awardees who received 1 or more full years of SSI benefit payments. The tables also show the number and percent of persons with earnings, the mean number of years of earnings among those who had earnings, and the average amount of earnings during years of earnings. Overall, among the individuals in the study spending at least 1 full calendar year in benefit status, 23.5 percent had earnings in at least 1 year while on the rolls. The proportion of SSI recipients who worked depended greatly on their diagnostic categories, with almost 45 percent of the developmentally disabled and nearly 40 percent of the mentally retarded working, compared with only 17 percent of the nondevelopmentally disabled. Average annual earnings for all SSI recipients who worked, indexed to 1989 levels, were \$2,075, well below the level of SGA on an annualized basis. The amount of earnings varied dramatically by the diagnosis of the recipient: The developmentally disabled who were not mentally retarded had the highest average earn-

ings at \$2,448, compared with \$2,167 for the nondevelopmentally disabled and \$1,372 for the mentally retarded.

Table 6 presents the same distribution of characteristics among SSI recipients who were not included in the sample because they were not on the SSI rolls for a full calendar year after award. There may be many reasons for not remaining in payment status for a full year including: attainment of age 65 before a full calendar year has expired, receipt of DI benefits after the 5-month waiting period, recovery for medical reasons or return to work with earnings above break-even level, other changes in earned or unearned income, or due to death. The noticeable difference between those who remain on the rolls for more than a year and those who do not is the distribution across the developmental/nondevelopmental disability breakout. Although mentally retarded individuals are represented at about the same rate in both groups, the nondevelopmentally disabled are overrepresented (72.8 percent compared with 63.4 percent) and the nonretarded developmentally disabled are underrepresented (14.2 percent compared with 24.0 percent) among those on the rolls for more than a full calendar year. The result is a bit surprising, since one might presume that the developmentally disabled would have, in general, much longer stays on the SSI rolls. Those who stay less than a year also tend to be older at the time of award.

Table 1, which was presented earlier, shows the joint distribution of years on the SSI rolls by the number of years worked for all individuals in the sample. The table shows not only that more than three-quarters of the SSI recipients never worked while on the rolls, but also allows one to compute the frequency of work. Of the person-years represented by these SSI cohorts, work took place in about 1 in 8 (13.3 percent) of the person-years. This indicates that, among those who worked, on average they worked during about half the years of their tenure on the SSI rolls.

Table 1.—SSI awardees with 1 or more full years of payment, by number of years with benefit payment and with earnings

Years with SSI	Years with earnings														
	All	0	1	2	3	4	5	6	7	8	9	10	11	12	13
All persons....	33,755	25,837	3,992	1,621	853	489	337	222	136	95	72	36	35	14	16
1.....	10,128	8,545	1,583												
2.....	5,269	4,188	629	452											
3.....	3,898	3,001	384	274	239										
4.....	3,329	2,463	344	237	150	135									
5.....	2,452	1,757	248	141	125	86	95								
6.....	1,888	1,341	178	118	67	59	59	66							
7.....	1,472	1,014	134	81	64	59	37	37	46						
8.....	1,165	800	108	75	37	38	26	25	24	32					
9.....	1,111	738	110	60	52	26	36	25	18	18	28				
10.....	882	590	79	51	38	21	23	18	16	17	17	12			
11.....	815	547	72	47	24	19	24	15	13	13	16	7	18		
12.....	698	447	65	45	30	22	16	16	9	11	5	11	9	12	
13.....	581	362	52	37	24	22	20	15	9	4	5	6	8	2	15
14.....	67	44	6	3	3	2	1	5	1	0	1	0	0	0	1

Table 2.—All SSI awardees with 1 or more full years of payment, by selected characteristics

Characteristic	Number	Percent	With earnings	Percent with earnings	Mean years with earnings ¹	Mean earnings ²
All persons.....	33,755	100.0	7,847	23.2	2.3	\$2,075
Diagnostic group:						
Missing.....	1,997	5.9	483	24.2	3.2	1,850
Infectious.....	402	1.2	78	19.4	2.0	3,500
Neoplasms.....	939	2.8	174	18.5	1.4	2,861
Endocrine.....	1,760	5.2	213	12.1	1.6	1,997
Psychiatric.....	4,845	14.4	1,565	32.3	2.1	1,691
Nonpsychiatric.....	2,566	7.6	736	28.7	2.4	1,815
Retardation.....	4,374	13.0	1,673	38.2	3.2	1,372
Nervous.....	2,903	8.6	883	30.4	2.3	3,135
Circulatory.....	4,442	13.2	497	11.2	1.4	2,267
Respiratory.....	1,472	4.4	129	8.8	1.5	1,984
Digestive.....	621	1.8	96	15.5	1.7	2,661
Genitourinary.....	390	1.2	101	25.9	1.9	2,571
Musculoskeletal.....	4,000	11.9	550	13.8	1.7	2,457
Congenital.....	362	1.1	121	33.4	2.5	2,515
Ill defined.....	650	1.9	131	20.2	2.0	2,263
Injury.....	1,736	5.1	417	24.0	1.7	3,022
Other.....	296	.9	71	.0	2.1	2,546
Education:						
Incomplete ³	1,673	5.0	742	44.4	2.7	1,632
Missing.....	5,575	16.5	1,844	33.1	3.1	1,682
0-8 years.....	10,216	30.3	1,197	11.7	2.0	1,830
9-11 years.....	7,177	21.3	1,483	20.7	1.8	1,824
12 or more.....	9,114	27.0	2,652	29.1	2.0	2,722
Age at application:						
Under 18.....	1,673	5.0	742	44.4	2.7	1,632
18-24.....	5,544	16.4	2,844	51.3	2.9	2,178
25-29.....	2,516	7.5	960	38.2	2.1	2,093
30-39.....	4,903	14.5	1,240	25.3	2.0	2,146
40-49.....	5,725	17.0	929	16.2	1.8	2,188
50-59.....	9,654	28.6	942	9.8	1.6	1,942
60-64.....	3,740	11.1	261	7.0	1.2	1,882
Gender:						
Female.....	17,651	52.3	3,379	19.1	2.3	1,818
Male.....	16,104	47.7	4,539	28.2	2.3	2,266
Alien status:						
Alien.....	1,369	4.1	176	12.9	1.8	2,465
Citizen.....	32,386	95.9	7,742	23.9	2.3	2,066
Pre-application earnings.....						
Yes.....	26,925	79.8	5,925	22.0	2.1	2,233
No.....	6,830	20.2	1,993	29.2	3.1	1,603
Race:						
White.....	22,082	65.4	5,334	24.2	2.4	2,165
Black.....	9,620	28.5	2,095	21.8	2.1	1,815
Other.....	1,511	4.5	309	20.5	2.2	2,212
Unknown.....	542	1.6	180	33.2	3.0	2,196

¹ Mean number of post-award years in which there were earnings.

² Post-award annual indexed earnings in years in which there were earnings.

³ Person applied before age 18; therefore, education may be incomplete.

Table 3.—Developmentally disabled (except mentally retarded) SSI awardees with 1 or more full years of payment, by selected characteristics

Characteristic	Number	Percent	With earnings	Percent with earnings	Mean years with earnings ¹	Mean earnings ²
All persons.....	4,794	100.0	2,134	44.5	2.6	\$2,448
Diagnostic group:						
Missing.....	545	11.4	225	41.3	3.2	1,695
Psychiatric.....	774	16.1	401	51.8	2.4	1,521
Nonpsychiatric.....	700	14.6	337	48.1	3.1	1,677
Nervous.....	1,549	32.3	649	41.9	2.5	3,176
Congenital.....	167	3.5	83	49.7	2.7	2,643
Injury.....	275	5.7	122	44.4	2.1	3,455
Other.....	784	16.4	317	40.4	2.3	3,039
Education:						
Incomplete ³	759	15.8	352	46.4	2.5	1,971
Missing.....	1,061	22.1	548	51.6	3.1	1,780
0-8 years.....	616	12.8	128	20.8	2.6	1,745
9-11 years.....	993	20.7	435	43.8	2.3	2,359
12 or more.....	1,365	28.5	671	49.2	2.4	3,435
Age group:						
Under 18.....	759	15.8	352	46.4	2.5	1,971
18-24.....	2,970	62.0	1,564	52.7	2.7	2,581
25-29.....	158	3.3	66	41.8	2.4	2,586
30-39.....	298	6.2	72	24.2	2.6	1,528
40-49.....	240	5.0	43	17.9	1.8	2,499
50-59.....	277	5.8	29	10.5	1.9	1,618
60-64.....	92	1.9	8	8.7	1.1	7,306
Gender:						
Female.....	2,133	44.5	819	38.4	2.6	2,124
Male.....	2,661	55.5	1,315	49.4	2.6	2,649
Alien status:						
Alien.....	99	2.1	33	33.3	2.5	2,608
Citizen.....	4,695	97.9	2,101	44.7	2.6	2,445
Pre-application earnings:						
Yes.....	2,794	58.3	1,259	45.1	2.4	2,698
No.....	2,000	41.7	875	43.8	2.8	2,088
Race:						
White.....	3,239	67.6	1,504	46.4	2.6	2,536
Black.....	1,163	24.3	466	40.1	2.5	2,125
Other.....	270	5.6	110	40.7	2.7	2,524
Unknown.....	122	2.5	54	44.3	3.1	2,624

¹ Mean number of post-award years in which there were earnings.

² Post-award annual indexed earnings in years for which there were earnings.

³ Person applied before age 18; therefore, education may be incomplete.

Regression Analysis

The person-year observations were used in a cross-section, time-series regression analysis.⁹ Two equations were estimated: one predicting a dichotomous variable indicating one or more dollars of earnings in a year (that is, as a proxy for work/no work); and the other a logarithm of indexed earnings, wage indexed to 1989. Logistic regression analysis was chosen for the first equation, and the coefficients were obtained by maximizing the classical likelihood function. A log-linear equation was chosen for the second equation, and the coefficients were obtained by ordinary least squares methods. The equations were estimated using SAS procedures LOGISTIC and REG, respectively. The standard errors of the coefficients reported in this article were corrected for possible dependence¹⁰ of observations within the time series for each person.

The models were estimated separately for three distinct SSI diagnostic subpopulation: the nondevelopmentally disabled, the developmentally disabled (other than mentally retarded), and the mentally retarded. The decision to estimate the models separately for the three groups was based on a priori expectations that the groups would behave differently. It was presumed that for those recipients with developmental disabilities, particularly mental retardation, the lack of significant predisability work experience and characteristically low levels of educational attainment might adversely impact their ability to work after receipt of benefits. Despite the absence of substantial work histories for SSI recipients in general, it was felt that the developmentally disabled were, other things held constant, less likely to be able to perform substantial work. The retarded, in particular, who have less education, might be likely to work in a sheltered environment, having a relatively high probability of work with low earnings.

Table 4.—Developmentally disabled (not retarded) SSI awardees with 1 or more full years of payment, by selected characteristics

Characteristic	Number	Percent	With earnings	Percent with earnings	Mean years with earnings ¹	Mean earnings ²
All persons.....	4,374	100.0	1,673	38.2	3.2	\$1,372
Diagnostic group:						
Retardation.....	4,374	100.0	1,673	38.2	3.2	1,372
Education:						
Incomplete ³	914	20.9	390	42.7	2.9	1,325
Missing.....	1,582	36.2	780	49.3	3.6	1,322
0-8 years.....	1,144	26.2	218	19.1	2.9	1,063
9-11 years.....	435	9.9	141	32.4	2.4	1,436
12 or more.....	299	6.8	144	48.2	3.1	2,175
Age group:						
Under 18.....	914	20.9	390	42.7	2.9	1,325
18-24.....	1,738	39.7	910	52.4	3.6	1,326
25-29.....	406	9.3	146	36.0	2.8	1,645
30-39.....	492	11.2	128	26.0	2.5	1,740
40-49.....	352	8.0	63	17.9	2.6	1,177
50-59.....	352	8.0	30	8.5	2.5	1,031
60-64.....	120	2.7	6	5.0	1.7	628
Gender:						
Female.....	2,095	47.9	694	33.1	3.2	1,280
Male.....	2,279	52.1	979	43.0	3.2	1,437
Alien status:						
Alien.....	74	1.7	20	27.0	1.9	1,142
Citizen.....	4,300	98.3	1,653	38.4	3.2	1,375
Pre-application earnings						
Yes.....	1,882	43.0	719	38.2	3.0	1,677
No.....	2,492	57.0	954	38.3	3.3	1,142
Race:						
White.....	2,829	64.7	1,146	40.5	3.3	1,395
Black.....	1,236	28.3	406	32.8	2.8	1,198
Other.....	174	4.0	56	32.2	2.8	1,868
Unknown.....	135	3.1	65	48.1	3.5	1,619

¹ Mean number of post-award years in which there were earnings.

² Post-award annual indexed earnings in years for which there were earnings.

³ Person applied before age 18; therefore, education may be incomplete.

Table 5.—Nondevelopmentally disabled SSI awardees with 1 or more full years of payment, by selected characteristics

Characteristic	Number	Percent	With earnings	Percent with earnings	Mean years with earnings ¹	Mean earnings ²
All persons.....	24,587	100.0	4,111	16.7	1.8	\$2,167
Diagnostic group:						
Infectious.....	373	1.5	62	16.6	1.7	3,435
Neoplasms.....	846	3.4	121	14.3	1.2	2,567
Endocrine.....	1,525	6.2	170	11.1	1.5	2,157
Psychiatric.....	4,071	16.6	1,164	28.6	2.0	1,750
Nonpsychiatric.....	1,866	7.6	399	21.4	1.8	1,981
Nervous.....	1,354	5.5	234	17.3	1.9	3,023
Circulatory.....	4,388	17.8	474	10.8	1.3	2,266
Respiratory.....	1,451	5.9	119	8.2	1.4	1,811
Digestive.....	604	2.5	86	14.2	1.6	2,737
Genitourinary.....	325	1.3	65	20.0	1.5	2,140
Musculoskeletal.....	3,885	15.8	491	12.6	1.6	2,259
Ill defined.....	614	2.5	113	18.4	1.9	2,248
Injury.....	1,461	5.9	295	20.2	1.6	2,838
Other.....	1,824	7.4	318	17.4	2.8	2,008
Education:						
Missing.....	2,932	11.9	516	17.6	2.5	2,121
0-8 years.....	8,456	34.4	851	10.1	1.6	2,040
9-11 years.....	5,749	23.4	907	15.8	1.6	1,627
12 or more years.....	7,450	30.3	1,837	24.7	1.8	2,505
Age group:						
18-24.....	836	3.4	370	44.3	2.2	2,569
25-29.....	1,952	7.9	748	38.3	1.9	2,136
30-39.....	4,113	16.7	1,040	25.3	1.9	2,239
40-49.....	5,133	20.9	823	16.0	1.7	2,250
50-59.....	9,025	36.7	883	9.8	1.6	1,983
60-64.....	3,528	14.3	247	7.0	1.2	1,737
Gender:						
Female.....	13,423	54.6	1,866	13.9	1.8	1,884
Male.....	11,164	45.4	2,245	20.1	1.8	2,402
Alien status:						
Alien.....	1,196	4.9	123	10.3	1.6	2,642
Citizen.....	23,391	95.1	3,988	17.0	1.8	2,152
Pre-application earnings:						
Yes.....	22,249	90.5	3,947	17.7	1.8	2,187
No.....	2,338	9.5	164	7.0	2.9	1,693
Race:						
White.....	16,014	65.1	2,684	16.8	1.8	2,285
Black.....	7,221	29.4	1,223	16.9	1.8	1,901
Other.....	1,067	4.3	143	13.4	1.6	2,107
Unknown.....	285	1.2	61	21.4	2.3	2,433

¹ Mean number of post-award years in which there were earnings.

² Post-award annual indexed earnings in years for which there were earnings.

Table 6.—SSI awardees with no full years of payment, by selected characteristics

Characteristic	All awardees	Developmentally disabled		Nondevelopmentally disabled
		Nonretarded	Retarded	
All persons.....	16,315	3,916	2,052	10,347
Diagnostic group:				
Missing.....	737	263	0	474
Infectious.....	330	26	0	304
Neoplasms.....	1,907	249	0	1,658
Endocrine.....	852	179	0	673
Psychiatric.....	1,354	200	0	1,154
Nonpsychiatric.....	799	334	0	465
Retardation.....	2,052	0	2,052	0
Nervous.....	1,914	1,388	0	526
Circulatory.....	2,042	65	0	1,977
Respiratory.....	697	109	0	588
Digestive.....	297	27	0	270
Genitourinary.....	238	41	0	197
Musculoskeletal.....	1,410	91	0	1,319
Congenital.....	582	530	0	52
Ill defined.....	291	141	0	150
Injury.....	588	110	0	478
Other.....	225	163	0	62
Education:				
Incomplete ¹	4,670	3,160	1,510	0
Missing.....	1,401	103	158	1,140
0-8 years.....	3,708	121	208	3,379
9-11 years.....	2,589	191	90	2,308
12 or more.....	3,947	341	86	3,520
Age group:				
Under 18.....	4,670	3,160	1,510	0
18-24.....	875	468	182	226
25-29.....	830	50	72	708
30-39.....	1,692	57	87	1,548
40-49.....	2,075	67	60	1,948
50-59.....	3,584	56	97	3,430
60-64.....	2,589	58	44	2,487
Gender:				
Female.....	6,955	1,678	770	4,507
Male.....	9,360	2,238	1,282	5,840
Alien status:				
Alien.....	604	61	33	510
Citizen.....	15,711	3,855	2,019	9,837
Pre-application earnings:				
Yes.....	10,756	652	411	9,693
No.....	5,559	3,264	1,641	654
Race:				
White.....	10,446	2,362	1,130	6,954
Black.....	4,466	947	698	2,821
Other.....	1,025	424	159	442
Unknown.....	378	183	65	130

¹ Person applied before age 18; therefore, education may be incomplete.

Dependent Variables

The models were estimated using the person-year records, which required creating appropriate dependent variables. For each person-year, two dependent variables were specified: one a dichotomous variable chosen to represent work versus no work and the other a continuous measure of the earnings of the individual. Both variables were created from the individual's taxable Social Security earnings, which are available from employer's annual wage reports and reports of self-employment income. The variable representing work while on the SSI rolls was constructed based on whether the individual had earnings reported to SSA during a year that the individual was an SSI recipient.¹¹

The dependent variable representing the amount of earnings was specified as the natural log of the annual earnings reported on the individual's earnings record. The appropriateness of a log-linear specification for this model has been well-documented in the literature.¹² Annual earnings were indexed to account for wage changes using the Social Security wage series index to avoid trending over time simply due to wage increases attributable to inflation or productivity gains. The base year chosen was 1989.

Independent Variables

The models estimating the probability of work and annual earnings both include variables chosen to reflect a mix of human capital, demographic, and health variables, with time-effect variables added. With few exceptions (for example, the diagnostic categories), the same variables were included for each of the three population groups.

Education.—Education was included as a human-capital variable, with higher educational levels being expected to increase both the probability of working and the level of earnings. Education represents both higher earnings potential and an ability to adjust to different jobs, particularly those that can accommodate impairments. Education was entered as a series of dummy variables representing categories of educational attainment, rather than as a continuous measure of years of schooling.

Age.—This variable was included in the regression as the age, in years, attained in the year of the person-year record. Age has a number of potential impacts on work behavior. Younger individuals tend to find it easier to adapt to impairments, have a longer time horizon to recoup investments in training and vocational rehabilitation, and are further from retirement—all factors that increase the probability of their working. Younger SSI recipients also tend to fall into the developmental disability categories, among whom a greater proportion work. This effect has been taken into account by conducting the analysis separately for the developmentally disabled and the retarded. Analysis of lifecycle earnings among the general population has shown an earnings curve where earnings increase with age to a point and then begin to

decline. The effect of age on earnings for SSI recipients is not known, a priori, although advances in educational opportunities and training for the developmentally disabled in recent years may show a cohort effect with the young, who are better trained for jobs, earning more than their older counterparts.

Age was entered as a series of dummy variables based on age categories under the assumption that the relationship of age to the probability to work and to the level of earnings might be nonlinear. The age reference category applied to individuals under age 30 for the nondevelopmentally disabled and under age 25 for the developmentally disabled and retarded groups.

Age at entitlement.—This variable was included only for the two developmentally disabled categories. This variable is intended to pick up the effects of coming on the rolls at a young age, for example, as a childhood disability beneficiary. It was anticipated that younger, particularly childhood beneficiaries, might be more severely disabled and be less likely to work and/or to have lower earnings, even among other developmentally disabled recipients.

Years on the SSI rolls.—This variable was included in the models to control for the length of time on the rolls and thus the attachment to the SSI program. This is above and beyond the effect of age, but may pick up a cohort effect, since greater numbers of years on the rolls must be associated with earlier entitlement cohorts. Past research among DI beneficiaries has shown a lower propensity to work the longer one is on the rolls, and this variable is expected to find a consistent effect—a lower probability of working among the SSI recipients. Clearly, as time passes, individuals get sicker or, as they spend more time away from work, are less likely to go back. However, it is unclear how time on the rolls might affect the level of earnings among those who do work. If those who work stay at work, one might expect to observe some earnings growth. Alternatively, as one ages and the propensity to work declines, so might one's earnings.

Concurrent SSI and DI Benefits.—A dichotomous dummy variable was specified to reflect whether the individual was concurrently receiving DI benefits. This variable will pick up two effects. First, concurrents face a disincentive associated with the potential loss of DI and Medicare benefits, if earnings exceed SGA level after completion of the trial work period. Second, concurrent beneficiaries have had an attachment to the labor force prior to becoming disabled that is significant enough to yield a work history that provides DI insured status.¹³ It is hypothesized that receiving DI payments might discourage work effort, but will surely encourage the individual to limit their earnings to a level below the SGA amount. On the other hand, the stronger attachment to the labor force may encourage continued work and result in higher earnings. The two effects are countervailing and the net impact is unknown a priori.

Race.—Race is included as a demographic characteristic that determines labor supply. Three dummy variables were constructed representing blacks, other races, and a category for those of unknown race. The reference category was whites. Among the general population, blacks, Hispanics, and many

other minority groups have lower rates of labor-force participation and lower average earnings than whites.

Alien Status.—This variable is included as a demographic characteristic that may determine labor supply. Aliens may have language difficulties, educational differences, and other factors that adversely impact their ability to participate in the labor force and reduce earnings potential.

Average Predisability Earning.—This variable is intended to measure both the individual's attachment to the labor force and the level of earnings prior to becoming disabled. The variable offers an additional measure of human capital, and higher predisability earnings might be expected to be associated with both a greater probability of working and a higher level of earnings. Earnings for each predisability year were wage indexed to 1989 level.

Diagnosis.—This variable is measured by body system and is included to account for differences in the propensity to work and earnings associated with different impairment types. Note that for this analysis the SSI population was divided into three subpopulations based on diagnosis: nondevelopmentally disabled, developmentally disabled (except mentally retarded) and mentally retarded. The specification of diagnosis (body system) was altered in the model specifications, as appropriate, for each subpopulation. The reference diagnostic group chosen for the nondevelopmentally disabled was circulatory, while the reference group for the developmentally disabled was the category of "other" diagnoses.

Severity.—This variable was indicated by the Regulation Basis Code, which represents the step in the sequential evaluation process in which the case was allowed. For the purpose of this model, the severity measure is a dummy variable reflecting whether the case met or equaled Social Security's medical listings. It is presumed that cases meeting, or equivalent to, the listings are more severe than those that consider vocational factors. Greater severity is expected to reduce the probability of working and result in lower earnings among those who work.

Year dummy variables.—These variables were included in the models to account for differences in work and earnings from year-to-year. These differences may be caused by fluctuations in labor-market conditions affecting employment and real wages (for example, unemployment, variation in job creation, changes in the minimum wage, and so forth) or by changes in the way the program is administered including changes in policy (for example, changes to work incentive provisions, changes in the SGA level, and so forth). While it is not possible to determine precisely which of the many factors that change in a given year are causing the fluctuations, it is important to account for changes over time. A series of dummy variables representing each intervening year was chosen over other possible specifications to avoid forcing any particular fit to the time pattern. The last year under study, 1989, was chosen as the reference year.

Logit Model of Labor-Force Participation of SSI Recipients

The logit model of labor-force participation described above was estimated separately for three groups of SSI recipients: the nondevelopmentally disabled, the developmentally disabled (excluding the mentally retarded), and the mentally retarded. The results are shown in table 7.

For all three groups of SSI recipients, increasing age was, as expected, associated with a lower probability of working. The reference age group for each of the three subpopulations was the youngest age group. For the nondevelopmentally disabled the coefficients on age were statistically significant and declined monotonically across age groups. The same result was found for the developmentally disabled and the retarded with the following exceptions: The coefficients on the age 25-29 group were not significant for either SSI recipient group, and the coefficient on the 60-64 age group was insignificant for the developmentally disabled. The latter finding indicates that the effect of age on probability of work may not be a strictly monotonically declining function of age for the developmentally disabled.

Age at entitlement was included in the labor supply models for the developmentally disabled and for the retarded to account for differences in severity and, perhaps, in educational attainment among those entering the rolls as younger children. For the retarded, the relationship was as hypothesized: The younger one's age at entitlement, the lower the probability of working. There was no significant relationship detected for the developmentally disabled subpopulation.

Higher levels of education were generally found to increase the probability of working. For all three subpopulations (nondevelopmentally disabled, developmentally disabled, and retarded) the reference group was individuals with an eighth grade education or less. Within each subpopulation there was no significant difference in the probability of working between persons with 9 to 11 years of education and those with 8 or fewer years. Persons with a high school education or greater were more likely to work than the reference group, and the result was true within each subpopulation under study. Only the nondevelopmentally disabled showed a greater propensity to work among those with some college education as compared with those graduating from high school.

The severity variable, a dummy variable indicating whether the individual met or equaled one of SSA's medical listings, was intended to measure a potentially greater severity of impairment. For the nondevelopmentally disabled and the retarded, the variable had the anticipated effect and lowered the probability of working. The variable was not a significant determiner of work patterns among the developmentally disabled.

SSI recipients who were aliens were less likely to work than nonaliens and the result held for all three subpopulations. For the nondevelopmentally disabled and the developmentally disabled subpopulations the result was significant only at the 0.10 level.

Concurrent status, that is, beneficiaries who qualified for

Table 7.—Logit regression of work by SSI recipients

Variables	Non-developmental	Developmental (except retarded)	Retarded	Variables	Non-developmental	Developmental (except retarded)	Retarded
Intercept.....	-1.88* (.11)	-0.39* (.12)	-0.23* (.09)	1984.....	-0.52* (.06)	-0.47* (.07)	-0.35* (.06)
Age group:				1985.....	-0.28 (.05)	-0.37* (.07)	-0.30* (.06)
'25-29.....	... ...	-.03 (.07)	.09 (.07)	1986.....	-.17* (.05)	-.27* (.06)	-.29* (.05)
'30-39.....	-.43* (.06)	-.27*** (.14)	-.37* (.12)	1987.....	-.15* (.04)	-.12* (.05)	-.22* (.04)
40-49.....	-.89* (.07)	-.80* (.29)	-.53* (.21)	1988.....	-.11* (.04)	-.02* (.04)	-.09* (.03)
50-59.....	-1.45* (.07)	-.90*** (.47)	-.97* (.31)	Black.....	-.01 (.05)	-.12*** (.07)	-.35* (.08)
60-64.....	-1.85* (.09)	-.38* (.49)	-1.20* (.41)	Other race.....	-.26*** (.13)	-.11 (.18)	-.38*** (.21)
Age at entitlement...	... ...	-.18 (.16)	-.53* (.20)	Unknown race.....	.13 (.16)	.11 (.18)	.37** (.17)
Education years:				Average earnings....	.05* (.01)	.03 (.02)	-.08 (.03)
9-11.....	.03 (.07)	-.01 (.31)	.50 (.41)	Infectious.....	.39** (.18)	... ...	... ...
12.....	.38* (.07)	2.00* (.44)	1.86* (.35)	Neoplasm.....	.20 (.12)	... ...	... ...
12 or more.....	.70* (.08)	1.77* (.20)	... ...	Endocrine.....	-.02 (.11)	... ...	... ...
Unknown.....	.44* (.09)	-.16 (.18)	.24 (.21)	Psychiatric.....	.59* (.08)	-.02 (.10)	... ...
Severity (regulation basis code).....	-.08*** (.05)	.02 (.07)	-.15** (.08)	Nonpsychiatric.....	.44* (.09)	.04 (.13)	... ...
Alien.....	-.25*** (.13)	-.43*** (.23)	-1.07* (.31)	Congenital.....	... ...	-.12 (.14)	... ...
Concurrent.....	.33* (.05)	.56* (.10)	1.14* (.11)	Genitourinary.....	.38** (.18)	... ...	... ...
Years on rolls.....	-.04* (.01)	-.05* (.01)	-.03* (.01)	Nervous.....	.37* (.11)	.07 (.10)	... ...
1976.....	.21 (.19)	.02 (.45)	-.86** (.42)	Respiratory.....	-.25*** (.13)	... ...	... ...
1977.....	.04 (.08)	-.55* (.14)	-.38* (.13)	Digestive.....	.20 (.17)	... ...	... ...
1978.....	-.01 (.08)	-.27* (.11)	-.27* (.10)	Musculoskeletal.....	.16*** (.09)	... ...	... ...
1979.....	-.05 (.07)	-.44* (.10)	-.39* (.09)	Ill-defined.....	.51* (.16)	... ...	... ...
1980.....	-.21* (.07)	-.57* (.10)	-.51* (.09)	Injury.....	.22** (.11)	-.46* (.13)	... ...
1981.....	-.32* (.07)	-.46* (.09)	-.45* (.08)	Other diagnosis.....	.51* (.10)	... ...	... ...
1982.....	-.54* (.07)	-.65* (.09)	-.51* (.08)	Unknown diagnosis.	... ...	-.23*** (.13)	... ...
1983.....	-.62* (.07)	-.65* (.08)	.53* (.07)				

Note: The table presents the logit coefficients and, in parenthesis, the standard error. The statistical significance of the logis coefficients are: * = .01 level, ** = .05 level, *** = .10 level.

Social Security benefits as well as SSI payments, were more likely to work, and the result was highly significant for each of the three groups. The fact that many concurrent beneficiaries had a work history and earned enough Social Security quarters of coverage to qualify for benefits would be expected to increase the probability of work. On the other hand, concurrents may also qualify as disabled adult children of disabled, retired, or deceased parents, which may have no connection to past work. Finally, the fact that Social Security benefits are not reduced for earnings, but are terminated if earnings after a trial-work period exceed the established SGA level, does not appear, on balance, to deter these individuals from working.¹⁴

The variable representing the number of years the individual had been on the SSI rolls was highly significant and reduced the probability of work for all three SSI subpopulations. Research has shown that the longer one has been on the rolls, the lower the probability of making a work attempt. Aging effects may be more pronounced among the disabled, making work more difficult the longer one is disabled. Some diagnoses that are progressive in nature, are associated with increasing severity, and thus may make working more difficult as time passes. Furthermore, the longer one remains on the rolls without working, the harder it is to enter, or reenter, the labor force.

Race was entered into the model as a series of three dummy variables representing blacks, other races, and unknown

racers. Whites were the reference group. Blacks had a lower probability of working among the retarded and developmentally disabled subpopulations, although the result for the developmentally disabled was significant only at the 0.10 level. Other races had a lower probability of working among the retarded and nondevelopmentally disabled subpopulations, however both results were significant only at the 0.10 level. Unknown race, included only to control for a fairly large group of persons missing this key characteristic, was found to increase the probability of working among the retarded subpopulation.

Average annual predisability earnings, included to control for the SSI recipients' predisability labor force attachment, and hence their human capital or job skills, showed mixed results. It increased the probability of work for the nondevelopmentally disabled, reduced the probability of work for the retarded, and had no significant effect on the developmentally disabled. The seemingly counter-intuitive result for the retarded may actually reflect results peculiar to a special group within this subpopulation. Those persons with strong predisability earnings may be a group that functioned successfully in the labor market despite the limitation imposed by their retardation until some other problem adversely impacted their ability to work. Thus, those retarded individuals who had worked prior to becoming disabled may be less likely to work while on the rolls than the retarded who came onto the rolls without predisability work experience. For example, individuals who came on the rolls right after completing school and/or attaining age 18 may work at a greater frequency, but perhaps only at noncompetitive employment, such as sheltered or supported work.

Diagnostic categories were included in the models for the nondevelopmentally disabled and developmentally disabled subpopulations. For the nondevelopmentally disabled, the diagnosis of circulatory problems was chosen as a reference group. Only a diagnosis of respiratory problems reduced the probability of working relative to those with a circulatory problem. A diagnosis of a mental impairment (including psychiatric, nonpsychiatric, and nervous condition categories) increased the probability of working, as did having a diagnosis of an infectious disease, genitourinary, musculoskeletal, ill-defined, injury, or an impairment falling into the "other" diagnosis category. Among the developmentally disabled, the group of individuals with an impairment in the "other" diagnostic category was chosen as the reference group. Only those with a diagnosis of injury or "unknown" diagnosis had significantly different probability of

Chart 1.—Probability of work

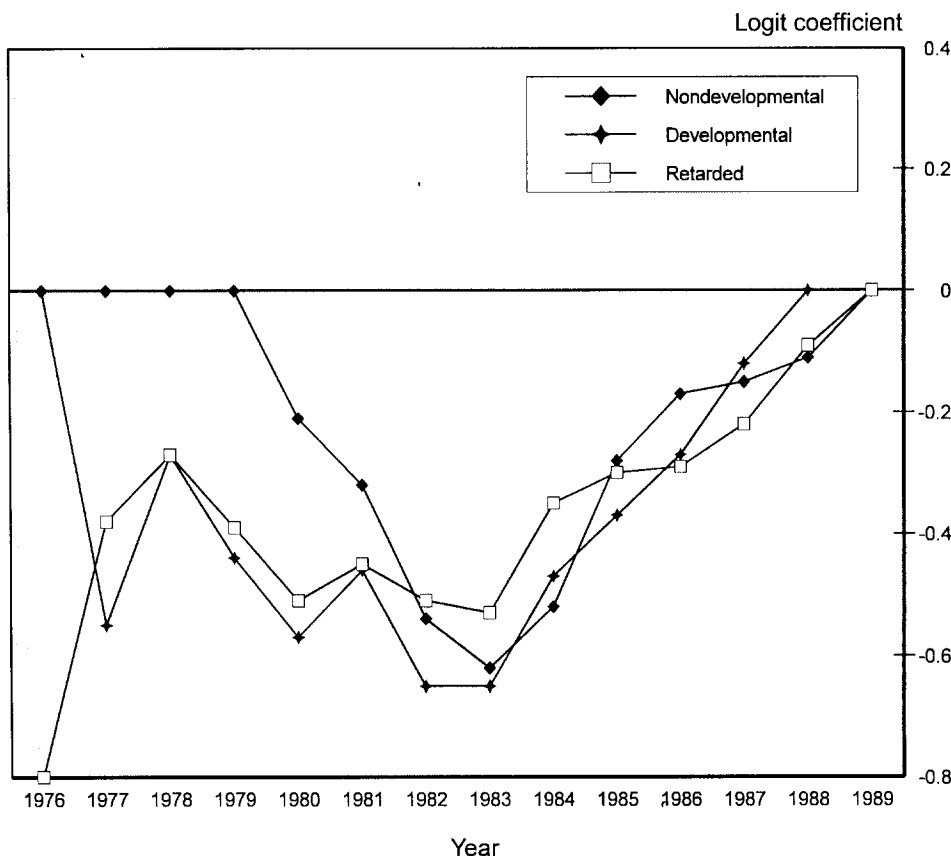
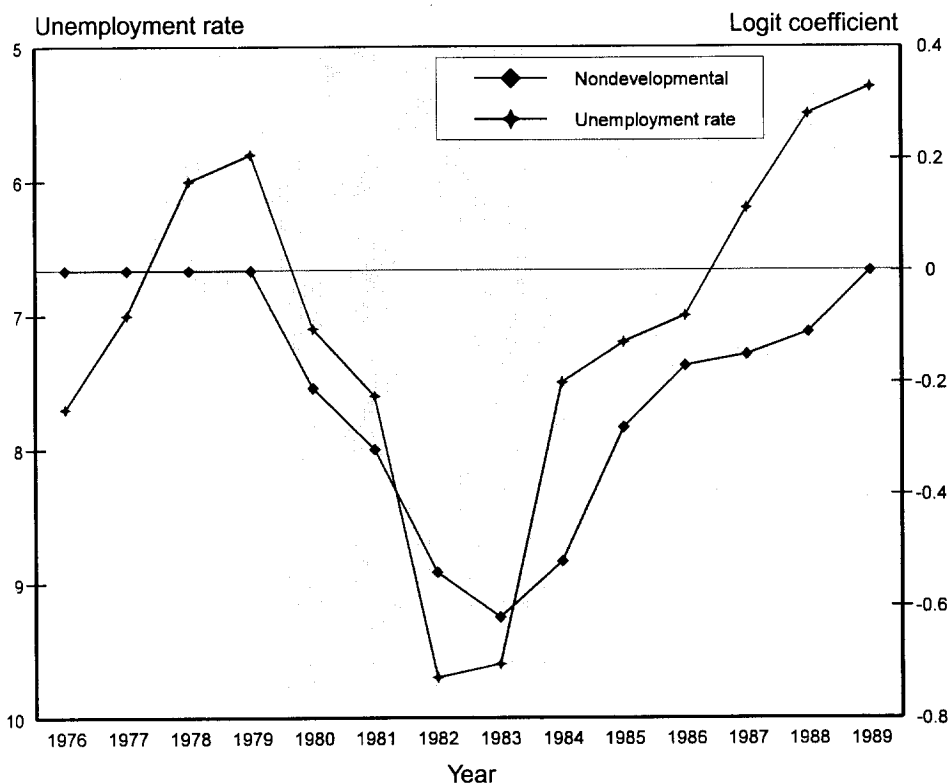


Chart 2.—Probability of work by unemployment for the nondevelopmentally disabled



work, and both probabilities were lower than that for the reference group.

Changes in work patterns over the period under study were measured by including a series of dummy variables for each of the years covered by the study. As demonstrated by the changing coefficients, the probability of working varied considerably from year to year. The coefficients on the dummy variables for the years in the study, which are a measure of the probability of working in each year, are graphed for each SSI subpopulation in chart 1 to show the patterns of work over time.¹⁵ Each of the three subpopulations show roughly the same pattern of work—gradual declines in the probability of work until 1983 and, thereafter, a consistent and pronounced increase in the probability of work.

Year-to-year changes can reflect a number of things including: changes in the population over time, policy changes, and economic factors affecting job opportunities. One goal of the study was to specifically assess how changes in these factors may have affected employment among the SSI population. The analysis has attempted to control for changes in the population by including characteristics that influence the decision to work. Therefore, to the extent that the characteristics have been adequately captured in the model, changes in the cohorts over time should not affect the estimated probabilities of working in each year. The yearly variables would appear to account mainly for economic and policy changes over the period.

Directly assessing the extent to which policy changes and the economic climate contribute to changes in employment is

difficult, even with the best data. For the purposes of this article, it was only possible to compare the annual effects, as estimated in the model, to the dates of major policy changes and global measures of economic performance, such as the unemployment rate.

Economic factors, and the associated demand for labor, were examined as a possible explanation for year-to-year changes in the probability of work. A number of economic factors may influence the work patterns of SSI beneficiaries including the unemployment rate, job growth or creation, and economic growth as measured by changes in real gross national product. All three measures showed the same general cyclical pattern over the 14-year period under study, and the unemployment rate was chosen as a representative measure of the demand for labor. Conventional wisdom dictates that marginal workers, such as the disabled and persons with lower levels of education and fewer job skills, are subject to work patterns that show declines that precede economic contraction and lag

economic expansion as the economy goes through cyclical changes. This phenomenon, described as “last hired, first fired,” is shown to apply fairly well to the three subpopulations under study.

Charts 2 through 4 show graphically the relationship between the probability of work (the logit coefficient) and the unemployment rate for each year. For each of the three SSI subpopulations, the pattern of work generally follows the trends in the unemployment rate, although the evidence of “last hired, first fired” seems evident as decreases in the probability of work occurring slightly preceded the contraction in overall employment, and increases in the probability of work slightly lagged the expansion in overall employment. Among the nondevelopmentally disabled (chart 2), the probability of work seems to decline in advance of increases in the unemployment rate for the general population for years beginning into the recession, although the bottom does not appear to be quite so low. The probability seems to rise only after the unemployment rate has begun to decline for the general population.

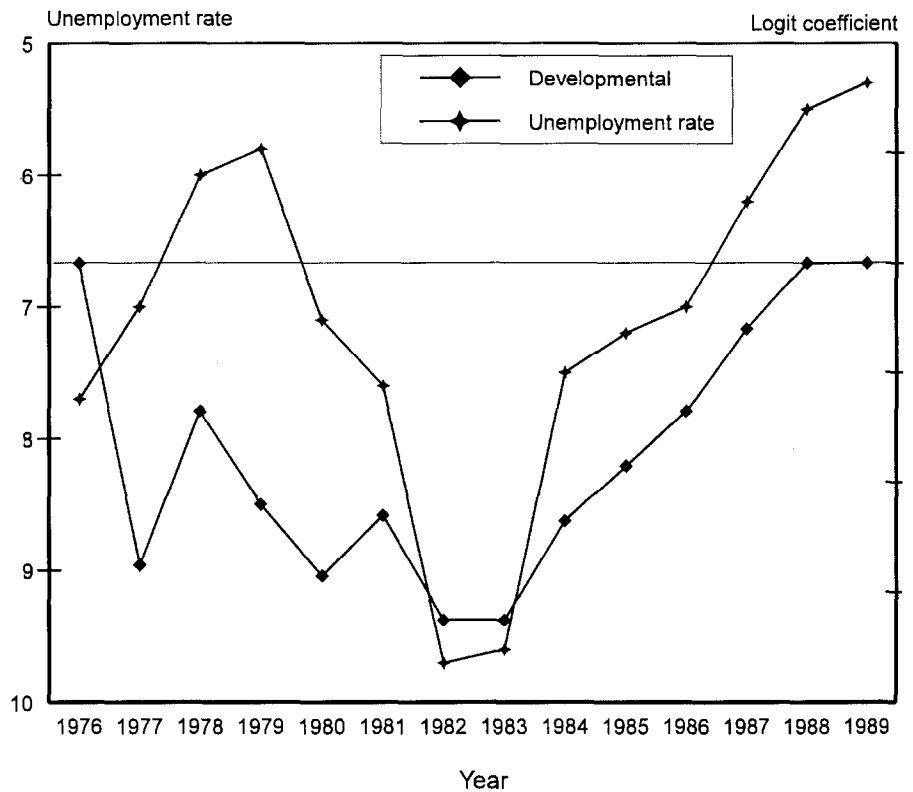
The pattern of the developmentally disabled (chart 3) also appeared to track traditional pattern of “last hired, first fired,” although the changes in the probability of working seem to begin a decline considerably earlier in the economic cycle than was the case for the nondevelopmentally disabled population. Increases in the probability of work also seemed to lag a bit further behind decreases in the unemployment rate than appears to be the case for the nondevelopmentally disabled.

The graph for the retarded SSI recipients (chart 4) is somewhat more complex, although it also shows a similar pattern. There is a general decline in the probability of work associated with the recession of the early 1980's, but the work pattern starts at a lower level, does not decline as dramatically during the recession, and rises to relatively higher levels. It appears that there is a general trend towards a greater probability of work for the retarded throughout most of this period. Deinstitutionalization, accompanied by increased opportunities for day programs, sheltered work, and supported work, and perhaps enhanced work incentives, may contribute to the trend towards more work among the retarded.

Although there were many SSI policy changes that could have influenced the work behavior of SSI recipients, the predominate policy changes involved the enactment and emphasis of the Section 1619 work incentive provisions, discussed earlier in this article. The provisions were enacted on a temporary basis as part of the 1980 Social Security Disability Amendments (Public Law 96-265) and were made permanent in 1986. An educational campaign was also begun in 1986 to help SSI recipients understand and utilize these provisions. Clearly the only way to directly test the proposition that the 1619 provisions result in increased labor-force participation by SSI recipients is to conduct a randomized experiment employing a control group that is not afforded the advantage of Section 1619. However, if enhanced work incentives were to significantly increase labor-force participation by SSI recipients, one would anticipate a shift in the probability of work associated with the implementation of the provisions or, if the behavioral response was slower, an increase in the slope of the line denoting the probability of work over time. After the recession of 1982-83, the probability of work turns upward, clearly tracking reductions in the unemployment rate (at a lag and lower slope than the unemployment rate, consistent with theories of last hired-first fired).

The apparent strength of the influence of the labor market on the probability of work for SSI recipients, coupled with no obvious change in the probability of work coincident with, or following the enactment of the Section 1619 provisions, appears to leave little room for a large impact on the probability of work associated with the implementation of these provisions. While this research cannot separate the impact of the many factors that influence the probability of work over time and thus directly test for an impact of policy changes, such as those associated with Section 1619 provisions, the lack of a shift or change in slope provides little evidence to support the proposition that there have been large structural changes in the probability of work for SSI recipients. There could conceivably have been some effect of Section 1619 on the probability of

Chart 3.—Probability of work by unemployment for the developmentally disabled



work occurring over a number of years, but this analysis can only suggest that this effect would be relatively small.

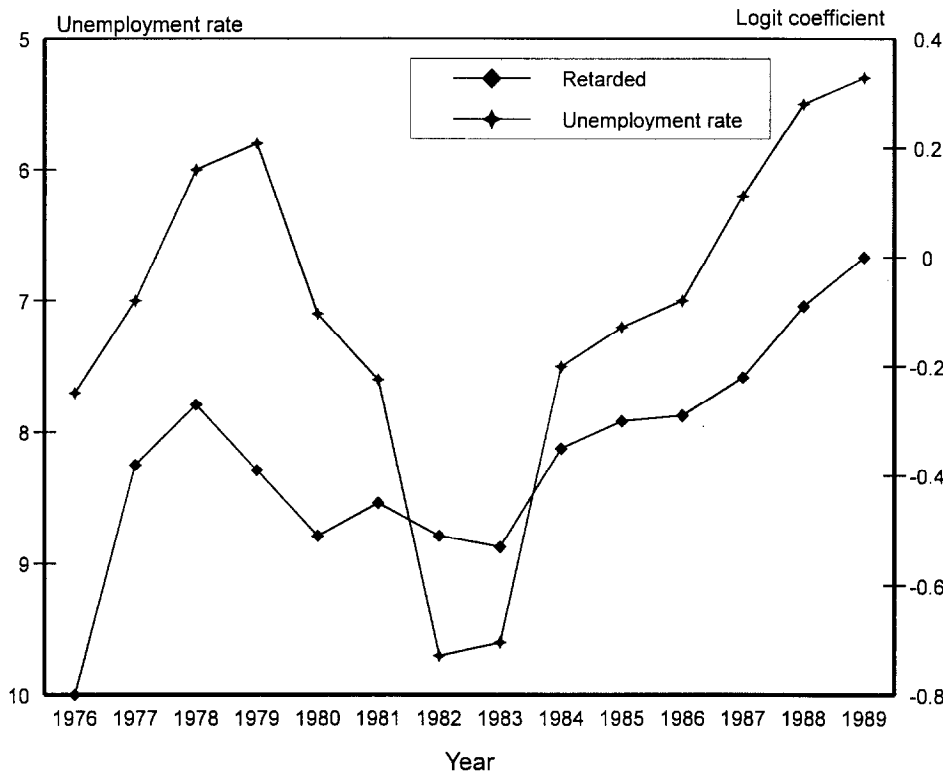
Regression Model of Earnings Among SSI Recipients Who Work

For those SSI recipients who worked, that is, who had posted earnings, a second model was estimated to assess patterns of earnings and the characteristics that determine the level of earnings. The earnings model was estimated separately for the three subpopulations: the nondevelopmentally disabled, the developmentally disabled (excluding the mentally retarded), and the mentally retarded. The results for the earnings models are shown in table 8.

Increasing age was generally associated with decreasing earnings, although the relationship was not strictly monotonic. For the developmentally disabled the coefficient on age declined consistently across the age groups. For the nondevelopmentally disabled and retarded there was a general decline, although the coefficients were not statistically significant for the youngest age group as compared with the slightly younger reference group. For both groups the coefficients showed persons aged 60-64 earning slightly more than those aged 50-59. The variables measuring age at entitlement for the developmentally disabled and retarded subpopulations were not statistically significant.

Education did not have the hypothesized affect on earnings. In fact, there did not appear to be any clear relationship between education and earnings. Few of the coefficients on

Chart 4.—Probability of work by unemployment for the mentally retarded



nondevelopmentally disabled concurrent beneficiaries. Among the developmentally disabled and the retarded, both groups that generally have little predisability work experience, concurrent status may be determined not on predisability work, but based on work done while an SSI recipient which resulted in entitlement to a Social Security disability benefit. Thus the positive coefficient on the concurrent variable for these groups may reflect past earnings, while an SSI recipient, that are indicative of current work with significant earnings.

The longer the SSI recipient had been on the SSI rolls, the higher their earnings. That result held regardless of whether the individual was nondevelopmentally disabled, developmentally disabled, or mentally retarded. Although the earlier model showed that increasing years on the rolls led to a lower probability of working, it appears that among those who work, earnings tend to rise with increasing years. This may reflect some real earnings growth

educational levels were significant, and some showed a negative impact on earnings associated with higher levels of education. There are several possible explanations for the lack of the anticipated relationship. It is possible that education was so intertwined with severity of impairment that the hypothesized relationship was not detected, that is, higher educated individuals are more severely disabled. It is also possible that earnings history differences associated with education may result in different rates of concurrent benefit receipt (DI as well as SSI) with higher rates being found among those with higher levels of education. Although concurrent status was controlled for in the equation, the education variable may still reflect a propensity among concurrents to hold down earnings to protect DI eligibility.

The regulation basis code, as a measure of impairment severity, produced mixed results. The variable increased earnings among the nondevelopmentally disabled, reduced earnings for the retarded, and was not statistically significant for the developmentally disabled.

Alien status was not significant in determining earnings levels for any of the three subpopulations. Concurrent status, that is those persons receiving Social Security benefits as well as SSI payments, produced lower earnings among the nondevelopmentally disabled, while earnings were higher among the developmentally disabled and retarded subpopulations. Concurrent beneficiaries have an incentive to hold down their earnings because earnings above SGA level (currently \$500 per month) can result in termination for a work recovery. This effect may be reflected in the result obtained for the

for disabled SSI recipients who continue to work over time.

Race had little impact on earnings. For all three subpopulations, insignificant coefficients showed no differences in earnings between blacks or those of unknown race and whites, the reference group. Among the developmentally disabled and mentally retarded, SSI recipients from the "other" race category had higher earnings than the reference group.

Higher average predisability earnings were found to significantly increase earnings for SSI recipients in two subpopulations: the nondevelopmentally disabled and the developmentally disabled. It had no significant effect for the mentally retarded. The highly significant relationship on this variable, coupled with the lack of an anticipated effect of education on earnings may indicate that this variable represents a strong measure of one's human capital or earning ability.

Few diagnostic categories were found to have a differential effect on earnings. Among the nondevelopmentally disabled, SSI recipients with a diagnosis in the categories of infectious diseases, nervous conditions, and musculoskeletal conditions were found to have higher earnings than the reference group, which was circulatory problems. Individuals with a psychiatric diagnosis earned less than the reference group, but the level of significance was only at the 0.10 level. For the developmentally disabled, persons with a diagnosis of psychiatric, nonpsychiatric, or "unknown" earned less than the reference group which included "other" diagnosis.

The series of annual dummy variables was included to capture trends in the annual earnings of SSI recipients over time and to examine the relationship between earnings and policy

Table 8.—Regression of earnings by SSI recipients

Variables	Non-developmental	Developmental (except retarded)	Retarded	Variables	Non-developmental	Developmental (except retarded)	Retarded
Intercept.....	6.56* (.16)	6.75* (.14)	6.53* (.10)	1984.....	-0.04 (.10)	-0.20*** (.11)	-0.35* (.09)
Age group:				1985.....	-.17*** (.09)	-.25** (.10)	-.29* (.08)
25-29.....	...	-.19*** (.10)	-.01 (.08)	1986.....	-.04 (.08)	-.03 (.09)	-.29* (.07)
30-39.....	-.11 (.08)	-.54* (.19)	-.33** (.14)	1987.....	-.05 (.08)	-.03 (.08)	-.20* (.07)
40-49.....	-.19** (.09)	-2.40* (.52)	-.66** (.29)	1988.....	.02 (.07)	.03 (.07)	-.08 (.06)
50-59.....	-.33* (.10)	-2.69* (.72)	-1.27* (.44)	Black.....	-.09 (.06)	-.01 (.09)	.05 (.09)
60-64.....	-.27** (.11)	-3.59* (.74)	-1.22*** (.63)	Other race.....	-.14 (.22)	.30** (.13)	.62* (.21)
Age at entitlement....	...	.18 (.21)	-.43* (.30)	Unknown race.....	.31 (.24)	.27 (.21)	.05 (.20)
Education years:				Average earnings....	.06* (.01)	.11* (.02)	.03 (.03)
9-11.....	-.28* (.09)	.33 (.29)	.92** (.47)	Infectious.....	.57** (.23)	...	...
12.....	-.04 (.09)	.07 (.34)	.82 (.54)	Neoplasm.....	.03 (.18)	...	...
12 or more.....	.15 (.10)	-1.45* (.26)	...	Endocrine.....	.10 (.15)	...	...
Unknown.....	-.17 (.11)	-.21 (.23)	.50*** (.30)	Psychiatric.....	-.19*** (.11)	-.93* (.12)	...
Severity (regulation basis code).....	.16* (.06)	.07 (.09)	-.34* (.08)	Nonpsychiatric.....	.01 (.13)	-.39* (.15)	...
Alien.....	.29 (.22)	-.38 (.26)	-.33 (.30)	Congenital.....	...	-.28 (.18)	...
Concurrent.....	-.22* (.06)	.25* (.09)	.75* (.08)	Genitourinary.....	.32 (.25)	...	...
Years on rolls.....	.02** (.01)	.06* (.02)	.03** (.01)	Nervous.....	.44* (.14)	.04 (.11)	...
1976.....	-.35 (.27)	.52 (.60)	-.32 (.30)	Respiratory.....	-.01 (.18)	...	...
1977.....	.29** (.12)	-.27 (.21)	-.38** (.17)	Digestive.....	.24 (.20)	...	...
1978.....	.17 (.11)	.01 (.15)	-.15 (.13)	Musculoskeletal.....	.32* (.13)	...	...
1979.....	.45* (.10)	.06 (.15)	.04 (.12)	Ill-defined.....	-.14 (.23)	...	...
1980.....	.18*** (.10)	-.12 (.14)	-.13 (.12)	Injury.....	.12 (.14)	-.20 (.18)	...
1981.....	-.00 (.10)	-.26*** (.14)	-.06 (.10)	Other diagnosis.....	-.15 (.15)	...	...
1982.....	.09 (.11)	-.38* (.13)	-.27* (.10)	Unknown diagnosis	...	-.58* (.15)	...
1983.....	-.15 (.11)	-.26** (.12)	-.38* (.10)				

Note: The table presents the logit coefficients and, in parenthesis, the standard error. The statistical significance of the logis coefficients are: * = .01 level, ** = .05 level, *** = .10 level.

changes and economic conditions. It is important to bear in mind that this analysis does not assess solely wage (or rate of pay) changes, but also includes some labor-force participation effects, such as changes in hours of work or weeks worked among those who worked over the year. The estimated coefficients were plotted (chart 5) to show changes in earnings over time.

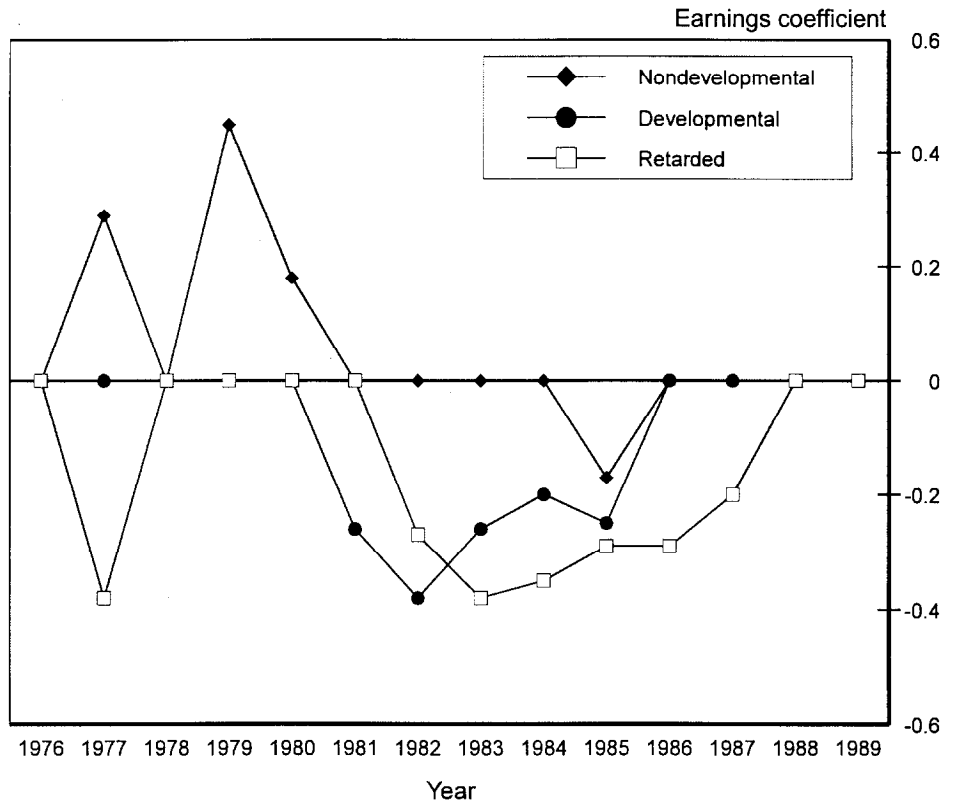
Chart 5 shows earnings for all three subpopulations having fairly large declines coinciding with the recession of the early 1980's. The chart also shows that levels of earnings at the end of the study period (1989) were, in real terms, only at the levels they had been at the beginning of the study period (1976), and the result holds for each of the three subpopulations. The lack of earnings growth over the period is not inconsistent with findings for other groups in the labor force over this time period; many groups of workers saw no growth in real wages and some even saw their wages decline after adjusting for inflation.

Chart 5 shows modest earnings growth for the nondevelopmentally disabled during the late 1970's, followed by a decline in earnings during the recession of the early 1980's. Beginning in 1981, earnings remained relatively flat at levels that were, in real terms, about the same as those observed in the mid 1970's. For the developmentally disabled and mentally retarded, earnings had not shown the wage growth in the late 1970's that the nondevelopmentally disabled had witnessed, so the declines in earnings appeared more dramatic. For both these groups earnings showed modest, but fairly consistent growth through the mid- and late 1980's until earnings recovered to the levels observed in 1976. Earnings appear to have recovered more quickly for the developmentally disabled than for the retarded.

As mentioned above, earnings can change over time either due to changes in wages or changes in the amount of time one works, or both. SSI recipients are marginal workers in the labor force and whether working for the minimum wage or not, their earnings may be influenced by changes in the minimum wage. Chart 6 shows the change in earnings over time along with the real minimum wage. The minimum wage remained fairly constant, in real terms, from 1976 to 1981, and then began a consistent decline through the end of the study period. The pattern of decline of the minimum wage does not resemble the pattern of change in earnings of the SSI recipients who work. The inability to separate wage and labor-force participation effects make it impossible to determine the contribution of minimum wage changes to the earnings of SSI recipients.

Charts 7 through 9 show earnings patterns for the three subpopulations graphed against the unemployment rate.

Chart 5.—Earnings

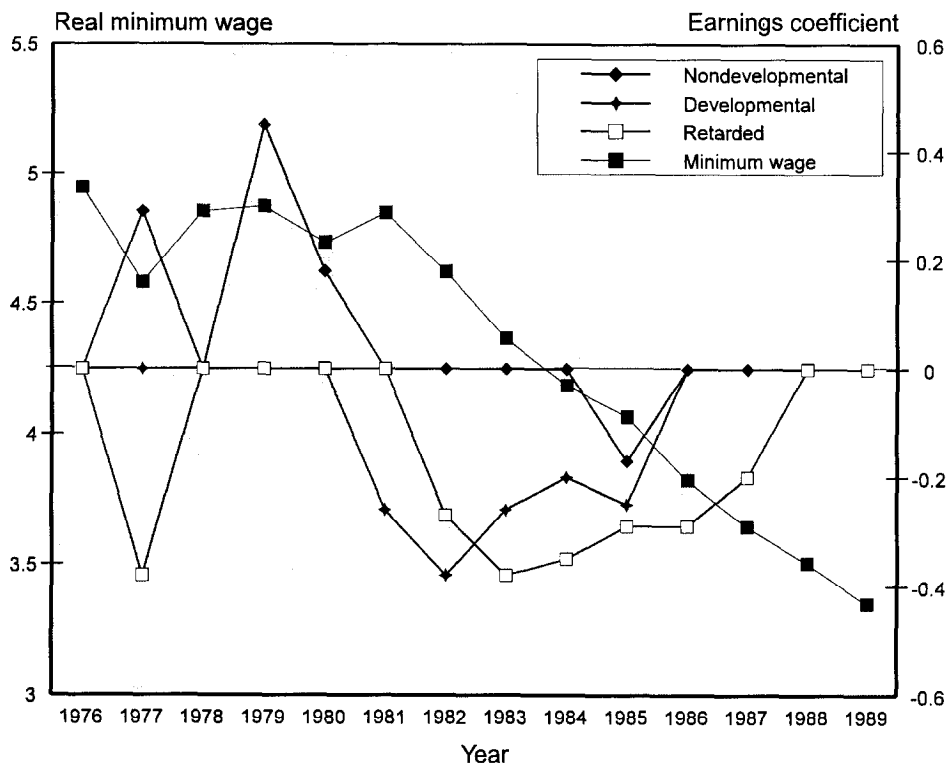


Earnings patterns for each of the three groups appear to more closely follow the employment trend than the minimum wage trend. Chart 7, for the nondevelopmentally disabled, shows increases and decreases in earnings coincident with the expansion and contraction of the late 1970's and early 1980's, although the growth and decline in earnings lagged behind changes in employment. Real earnings growth has remained flat since 1981, despite significant recovery in employment. This, again, has been true for many persons in less skilled, lower paid occupations.

Charts 8 and 9 for the developmentally disabled and mentally retarded both show earnings trends that closely track the employment trends over time, with earnings growing as employment increases and declining as employment drops. For the mentally retarded, earnings tended to lag behind changes in employment, that is, earnings declined after employment dropped and only began to increase after employment prospects improved. It is not uncommon for wage growth to lag behind job growth during a recovery.

As discussed in the section on labor-force participation, it is not possible to directly measure the impact of the Section 1619 provisions on labor-force participation or on earnings. Further, a large impact on earnings would likely appear as a shift in the coefficients or as a dramatic increase in the slope of the coefficient line. However, earnings, as was the case with labor-force participation, can be observed to follow changes in the national unemployment rate, with a propensity for earnings to decline before the general labor market declines and to recover after the general labor mar-

Chart 6.—Earnings by real minimum wage



ket has recovered. The apparent strength of the influence of the labor market on earnings for SSI recipients, coupled with no obvious change in earnings coincident with, or following the enactment of the Section 1619 provisions, appears to leave little room for a large impact in earnings associated with the implementation of these provisions. While this research cannot separate the impact of the many factors that influence earnings over time, and thus directly test for an impact of policy changes such as those associated with Section 1619 provisions, the lack of a shift or change in slope provides little evidence to support the proposition that there have been large structural changes in work behavior and earnings of SSI recipients.¹⁶ There could conceivably have been some effect of Section 1619 on earnings occurring over a number of years, but the analysis can only suggest that this effect would be relatively small.

Summary and Conclusions

The research undertaken shows that relatively large numbers of SSI recipients work, especially compared with persons receiving DI benefits.¹⁷

Although not a directly comparable number, earlier research has shown that over a 10-year period, only about 10 percent of DI beneficiaries worked while in benefit status. The current research shows that, among individuals entering the SSI rolls after 1976 and spending at least 1 full calendar year in benefit status, nearly one-fourth (23.9 percent) had earnings in at least 1 year while on the rolls. The proportion of SSI recipients who worked depended greatly on their diagnostic category, with over 40 percent of the developmentally disabled and mentally retarded working, compared with only 17 percent of the nondevelopmentally disabled. Of the person-years represented by these SSI cohorts, work took place in about 1 in 8 (13.3 percent) of the person-years, that is, among those who worked, on average they worked half the years of their tenure on the SSI rolls during the period under study.

Chart 7.—Earnings by unemployment rate for the nondevelopmentally disabled

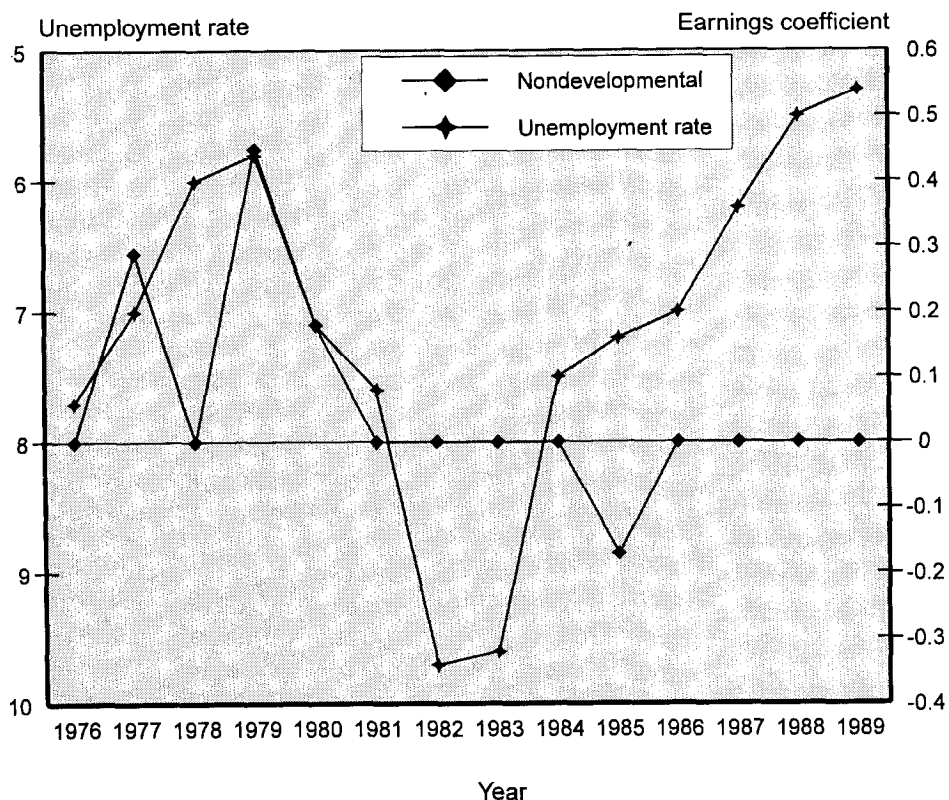
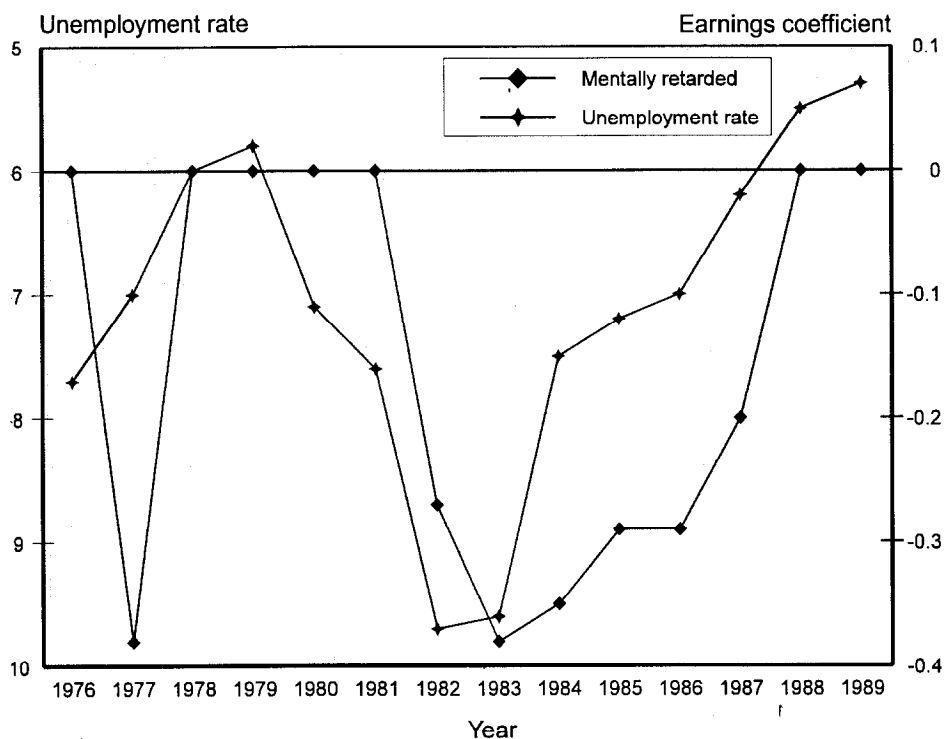


Chart 8.—Earnings by unemployment rate for the developmentally disabled



Chart 9.—Earnings by unemployment rate



Patterns of work and earnings varied over time. The trends in the probability of work and in the level of earnings among those who worked were compared to measures of economic conditions. They were also considered in relation to major policy changes that might influence work, such as the Section 1619 provisions. Changes in the probability of working and levels of earnings seem to most closely mirror economic trends, as measured by the unemployment rate. While the impact of policy changes could not be directly measured, no evidence was found to support the proposition that there were major changes in either the probability of work or the level of earnings associated with the implementation of the temporary Section 1619 provisions in 1980 or their permanent enactment in 1986. There could conceivably have been some effect of Section 1619 on the probability of working, earnings, or both that occurred over a number of years, but this analysis can only suggest that the impact of these effects would be relatively small.

The characteristics of SSI recipients do tend to influence the decision to work and the level of earnings. Certain variables were found to have clear patterns in determining who works and how much they earn. Increasing age was associated with both a lower probability of working and with lower earnings levels. Those recipients with higher levels of education were more likely to work, however education had no clear connection to the level of earnings. More years on the SSI rolls translated into a lower probability of work, although those who had been on the rolls for a longer period had higher earnings, if they did work. Concurrent beneficiaries were more likely to work than those who received only SSI benefits, but earnings levels varied by the subpopulation. Concurrent beneficiaries with nondevelopmental disabilities earned less than their SSI-only counterparts, but concurrents who were either developmentally disabled or mentally retarded earned more than those receiving only SSI benefits.

Noncitizens were less likely to work than U.S. citizens, but alien status was found to have no impact on earnings among those who did work.

Notes

¹ Office of Supplemental Security Income, *Quarterly Report on SSI Disabled Workers and Work Incentive Provisions: September 1995*. Working is defined as having current earned income shown on SSA administrative records for the month of September 1995.

² Office of Supplemental Security Income. *Quarterly Report on SSI Disabled Workers and Work Incentive Provisions: September 1995*.

³ Scott, "Disabled SSI Recipients Who Work," *Social Security Bulletin*, Vol. 55, No. 1 (Spring), 1992.

⁴ For a description of Project NetWork see: Rupp, Kalman and others, "Design of the Project NetWork Return to Work Experiment for Persons with Disabilities," *Social Security Bulletin*, Vol. 54, No. 2 (Summer), 1994.

⁵ Furthermore, those medically recovering in the first year may not meet the definition of disability—that is, that the impairment must be expected to last 12 months or end in death. Although SSI recipients are not converted to SSI's old age program at age 65, as in the case with DI beneficiaries, acceptance of age 65 as the retirement age makes these individuals inappropriate for inclusion in the current analysis.

⁶ Labeling the analysis of change over time, specifically as it relates to section 1619, as "conservative" simply means that section 1619 can be expected increase the amount of work by SSI recipients by virtue of maintaining additional workers in reciprocity status who would otherwise leave the rolls. Thus, the result suggested later in this article—such as that there was little change in work patterns after the enactment of section 1619—can be viewed as conservative due to the expectation that this exclusion will result in higher probabilities of work and levels of earnings after enactment of section 1619, even in the absence of a direct increase for other SSI recipients.

⁷ An independent variable representing predisability earnings was also created using the CWHS earnings data from 1951 to 1989, as appropriate to the individual's work history. The computation of this variable is discussed more thoroughly later in this article.

⁸ If one were to sum up all the years on the rolls for these individuals, one would obtain the number of person-year records.

⁹ See Dielman, "Pooled Cross-section and Time Series Data: A Survey of Current Statistical Methodology," *The American Statistician*, Vol. 37, No. 2, 1983.

¹⁰ In the context of these regression analyses, observations for an individual's person-years may not be independent. The arbitrary division of periods with and without earnings into calendar year snapshots will often result in dependence between one observation and the next, even controlling for a large number of independent variables. While the usual approaches to coefficient estimation provide statistically consistent estimates, the estimates of the standard errors are not consistent. (See Liang and Zeger, "Longitudinal Data Analysis for Discrete and Continuous Outcomes," *Biometrika*, Vol. 73, No. 1.

¹¹ This does not represent a pure measure of whether an individual is working or not, as certain wages are not creditable for Social Security purposes, and other reportable wages may not represent earned income from current work effort. There are some sources of earned income that are not reportable as Social Security earnings, for example, earnings under some State or Federal employment.

Additionally, an individual may work, but have no earnings if, for example, a business fails to make any money. On the other hand, certain payments may appear on the earnings record that have nothing to do with current work. Examples may be deferred compensation such as commissions, sick pay, and so forth. It is not known the extent to which measurement error is present in this work variable, but any error is expected to be small given the lack of work history among the SSI population and the relatively small potential for deferred compensation or work in noncovered employment. An alternative measure could have been created from countable earned income as reflected in the Supplemental Security Record (SSR). The countable earnings measure was not chosen as the source of this important dependent variable because in many instance earnings are not reflected on the SSR wither because they were too low to be countable, or perhaps were disregarded due to participation in a program to achieve self-support. The decision to use posted earnings, rather than the countable earnings from the SSR, reflects a desire to include all levels of work and to not systematically exclude work activity.

¹² See, for example, Mincer, *Schooling, Experience and Earnings*, National Bureau of Economic Research. New York: Columbia University Press, 1994.

¹³ To be insured in the event of disability, an individual must have fully insured status and be currently insured. Fully insured status requires at least one quarter of coverage earned for each elapsed year after 1950, or the year of attainment of age 21, whichever is later. For currently insured status, the individual must have earned at least 20 quarters of coverage in the previous 40 quarters or, for a worker disabled prior to age 31, at least one-half the quarters elapsed since the year of attainment of age 21, but not fewer than 6 quarters of coverage.

¹⁴ The substantial gainful activity (SGA) test may, in fact, affect work decisions. The effect of the SGA test may be to influence the level of earnings, rather than the decision to work. As will be seen in the earnings equation, concurrents among the nondevelopmentally disabled earned less than their SSI-only counterparts. Additionally, the reduction in total benefits from the loss of Social Security payments is negligible as the SSI benefit will increase, in many cases, to make up dollar-for-dollar the loss of Social Security income. However, Medicare coverage will end leaving Medicaid or private health insurance coverage to provide for health care costs.

¹⁵ Coefficients that were not statistically significant, or that were not found to be statistically different from zero, were graphed as zero. This did not make much difference in the graphs, as the magnitude of the insignificant coefficients was always small. This was done in all graphs.

¹⁶ The incentive effects of section 1619 provisions if they were found to be present, would not necessarily be unambiguously positive on earnings. Clearly, there may be incentives to increase earnings because there is no longer the risk of losing eligibility for benefits if earnings approach SGA level. Additionally, high earnings (that is, those earnings above SGA level) would remain on the rolls directly increasing earnings levels, although this effect should be captured by the human capital and other variables in the model. On the other hand, to the extent that the model does not include all the determiners of earnings, it is conceivable that a positive impact of section 1619 provisions on the probability of work (that is, more persons, ceteris paribus, working after the implementation of section 1619) could result in more SSI recipients with lower earnings potential entering the labor force and depressing earnings levels. (A properly and completely specified model would eliminate this bias, as well as the "high earner" bias above.)

¹⁷ Muller, "Disability Beneficiaries Who Work and Their Experience Under Program Work Incentives," *Social Security Bulletin*, Vol. 55, No. 2 (Summer), 1992.