Physically Demanding Occupations, Health, and Work After Retirement: Findings From the New Beneficiary Survey

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This article uses data on a recent cohort of Social Security retired-worker beneficiaries to examine the predictors of work after initial receipt of benefits. It focuses on two factors: an analysis of the effects of ill health and of employment in a physically demanding occupation in the year preceding receipt of benefits. Based on responses received during the Social Security Administration's New Beneficiary Survey, the employment of men in a physically demanding occupation is associated with a lower probability of work in retirement; the existence of a work-limiting health condition also lowers their probability of work. Full-time, full-year workers in 1979 who had changed jobs in the years just preceding the receipt of Social Security benefits were more likely to work after they became beneficiaries. It may be that workers anticipate constraints on their ability to continue working on a job and reduce the effect of those constraints through earlier job changes. The finding that the work effort of women beneficiaries is not affected by previous employment in occupations identified as physically demanding may signify the failure of customary physical demand indices to measure stress on those jobs in which women are most likely to be employed.

A major accomplishment of social security policy over the past decades has been a more economically secure retirement. In part, because of higher assured retirement incomes, the percentage of individuals receiving retired-worker benefits before age 65 has steadily increased (Burkhauser and Quinn, 1987) and the percentage of Social Security beneficiaries who report earnings has fallen (Vroman, 1985). Nevertheless, partial retirement—defined as work after a major drop in earnings or after the receipt of pension or Social Security retired-worker benefits—remains an important labor-force phenomenon (Gustman and Steinmeier, 1984). For example, about one-third of male respondents in the Retirement History Study (RHS)—a sample of individuals interviewed at 2-year intervals during the 1970's—worked at some time after retirement for an estimated average duration of 2-3 years (Honig and Hanoch, 1985). In 1984, 22 percent of all men and 12 percent of all women aged 65 or older reported working at some time during that year (Social Security Administration, 1986, table 11).

The 1983 Amendments to the Social Security Act, which will eventually lower the benefit amounts paid to beneficiaries under age 69, were designed, in part, to reverse this trend toward early retirement among eligible workers.[1] Whether or not individuals will extend their

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[1] In the year 2000, the age of eligibility for unreduced benefits will gradually begin to rise, reaching age 67 for persons who attain age 62 in 2021 or later. Although retired-worker benefits will continue to be paid as early as age 62, the actuarial reduction will change from the current 20 percent at that age to 30 percent. The 1983 amendments also increased the delayed retirement credit from its current 3 percent to 8 percent, but the age at which this credit is effective will increase with the rise in the retirement age. The combination of these changes will lower average benefit amounts paid to persons retiring at ages 62-65, reduce benefit amounts somewhat for those retiring at ages 66-68, and increase benefits for those delaying benefit receipt to age 69 or later (Sammartino, 1987).

work lives is uncertain, but for those who choose to do so, lower retirement benefits can be offset, in part, by additional earnings. The extension of working years can take two forms: Workers may delay the age at which they first receive Social Security retired-worker benefits and thereby increase the annual benefit amount they will eventually receive under the revised program; or, they may choose not to delay receipt of retired-worker benefits but rather to supplement Social Security benefit income with additional earnings.[2] Although the additional earnings of these working beneficiaries during the early years of retirement may move their annual incomes closer to what they would be under the current system, their Social Security benefits will still be lower when they cease work entirely.

In the process of debating the 1983 amendments, members of Congress expressed concern that raising the age of eligibility for unreduced retired-worker benefits would adversely affect individuals employed in physically demanding occupations and those in ill health. It was feared that these workers would be disproportionately affected by the higher retirement age if physical-performance requirements made it more difficult for them than for workers in other occupations to extend employment. A study of this issue was undertaken for Congress by the Social Security Administration (SSA) (Podoff, 1986).[3] The results indicated that workers whose last job was in a physically demanding occupation (PDO) or who were in ill health before they received retired-worker benefits had lower median retirement incomes and depended on Social Security benefits for a slightly higher percentage of their total income than did other beneficiaries. Consequently, assuming no change in work effort, the 1983 amendments could result in a larger percentage decline in the retirement income of these workers than in the income of workers who were neither in ill health nor in a physically demanding occupation. This finding and studies that predict very small labor-force responses to the 1983 amendments are cause for concern about the effect of benefit changes on the economic well-being of this group of beneficiaries.[4]

The 1986 SSA study, however, did not examine the independent influence of the two conditions—ill health and work in a physically demanding occupation—on subsequent work effort. Thus, the results do not indicate that when the 1983 amendments become fully effective, beneficiaries with these characteristics will be more constrained than other workers in their ability to supplement their income with earnings during their early retirement years.

This article extends the 1986 SSA analysis by examining the factors associated with the probability of work after the receipt of Social Security benefits. The data are from SSA's New Beneficiary Survey (NBS), the source used by Podoff, and comparable measures of health and PDOs are used in both studies. These data are limited to a sample of new Social Security beneficiaries. Individuals of the same age who decided to postpone receipt of retired-worker benefits to a later age are not included; therefore, it is not possible to investigate the determinants of benefit receipt.

Despite this shortcoming, these data provide the most recent information on employment behavior after receipt of Social Security benefits and the factors associated with total versus partial labor-force withdrawal by beneficiaries. Although recent research has established the importance of partial retirement as a distinct and important retirement state, most of the information on work after retirement is derived either from SSA data that provide limited demographic details on each individual or from the RHS, which followed individuals whose retirement took place in the 1970's.[5]

Data from the NBS can be used to examine the probability that a retired-worker beneficiary will work **conditional** on the decision to enter Social Security benefit status. This study focuses on two variables that are hypothesized to influence the postbenefit work decision: An indicator of the physical demands of a respondent's prebenefit-receipt occupation and a measure of whether a respondent changed employers in the years immediately preceding Social Security benefit receipt. These variables—their motivation and construction described more fully below—attempt to capture if workers in some jobs are unable to alter their employment contract freely as they age and the extent to which some workers are able to adjust to these market constraints by changing employers. The degree to which workers are able to do

[2] A later retirement avoids the actuarial reduction in benefits imposed for early retirement. If during the additional year of work covered earnings are relatively high, average indexed monthly earnings from which the Social Security benefit amount is derived may increase as that year's earnings are substituted for a year with lower indexed earnings. If workers delay retirement for the full 2-year increase in the "normal" retirement age, their **annual** benefits may be identical to those under the current system. However, the present value of their lifetime Social Security benefits will be smaller (Sammartino, 1987).

[3] **Increasing the Social Security Retirement Age: Effect on Older Workers in Physically Demanding Occupations or Ill Health—The Study**, was designed and prepared by staff of the Office of Research, Statistics, and International Policy in the Social Security Administration, under the direction of David Podoff. The report to Congress consists of an executive summary, four technical appendices that describe the data bases and techniques used to derive the estimates in the report, and three background papers prepared by outside authors to supplement the study. In this article, it is referred to either as SSA's 1986 study or Podoff (1986). The executive summary was reprinted in the **Social Security Bulletin**, October 1986, pages 5-23.

[4] See, for example, Fields and Mitchell (1984) and Gustman and Steinmeier (1985).

[5] See Gustman and Steinmeier (1984), Honig (1985), Honig and Hanoch (1985), and Vroman (1985).

so will reduce the influence of employer prohibitions against continued work by these older employees on overall labor-force participation and earnings. This article examines the probability of working after benefit receipt but excludes the examination of total hours worked and earnings received.[6]

Data and Sample Selection

In 1982, NBS interviews were conducted with a sample of women and men who first received Social Security retired-worker benefits in June 1980-May 1981.[7] Retrospective work-history data were provided by respondents and, if they were married, by their spouses. This history includes start and stop dates for each employer for whom the individual worked for 1 year or more after 1950. Data from the SSA's Master Beneficiary Record (MBR) were linked to the interview data for each respondent and spouse.[8]

The NBS represents a single cross-sectional sample of new retired-worker beneficiaries. Because retired-worker benefits can be elected at any time after an eligible worker attains age 62, NBS respondents are members of different birth cohorts. It is important that special features of the NBS be described in detail because of the way in which the full NBS sample was selected, and the questions asked at the time of the interview determined both the sample selected for this study and the variables included.

Although respondents were asked to give the start and stop dates for each employer, detailed characteristics were asked only about (1) the job at which they had worked the longest, (2) the job held in May 1980 or most recently before that date, and (3) the job held at the time of the interview. These jobs are termed, respectively, the longest, last, and current jobs. The questions about job characteristics dealt with occupation, industry, weeks per year and hours per week usually worked, and earnings in the last year the person worked for an employer. The calendar year to which these data refer differs across respondents. Fortunately, the NBS was designed so that hours of work and characteristics of the job held in 1979 could be estimated.[9] This design provides a single calendar period, 6-18 months before initial benefit receipt, for which job data and hours of work are available.[10]

The sample for this study was selected by excluding NBS respondents who were self-employed in 1979 and were aged 70 or older at the time of the interview in 1982. Also excluded were individuals who had received survivor, spouse, or disability benefits before their receipt of retired-worker benefits.[11] Persons self-employed in 1979 were excluded because they were not asked about hours or weeks worked in 1979;[12] however, respondents who became self-employed after 1979 are included in the sample. The age restriction was imposed to retain comparability with the retired-worker sample used by SSA in 1986 [13] and also because the maximum age at which the current earnings of beneficiaries are subject to the Social Security earnings test was lowered from age 71 to age 69 in 1981 (effective after December 31, 1982). The change in the earnings test may have had a one-time influence on the current earnings status of respondents aged 70-72 around the time of the interview.

Table 1 shows the percentage of this NBS subsample of retired-worker beneficiaries employed at some time during 1969, 1974, or 1979 [14]—the last calendar year during which no person in the full NBS sample received Social Security benefits. Nevertheless, for 1979, only 87 percent of the men and 65 percent of the women

[6]The NBS data are not well-suited to the examination of post-retirement earnings and hours worked because information is consistently available only on whether or not a job was held. Weeks and hours of work and earnings are not available for all years worked. In contrast, the RHS included the Social Security Summary Earnings Record (SER) data, which provided a measure of annual covered earnings. The SER data for NBS respondents has not been released for public use.

[7]The NBS also includes a sample of individuals who first received disabled-worker benefits, spouse benefits, and widow or widower benefits during the same period. A sample of individuals enrolled for Medicare only (aged 65 or older) also is included in the NBS sample. See Holden and Iams (1987) for a description of the NBS sample.

[8]These administrative records provide information on the primary insurance amounts and the Social Security benefits paid to beneficiaries. The earnings on which the respondent benefits are based are not included in this administrative file.

[9]Respondents were asked about the characteristics of the job they held in May 1980 (defined as their "last" job). If the respondent was still employed on that job, hours of work and weeks worked in 1979 were asked. For the few respondents who changed jobs between the end of 1979 and May 1980 and whose 1979 job was not their longest, there is no information on the 1979 job. This affects fewer than 1 percent of the retired-worker beneficiaries.

[10]Although wages of the current, last, and longest job were asked, it is not possible to obtain a wage for the 1979 job because those who continued in their 1979 job were not asked (as they were for hours of work) about the wage in that year.

[11]Individuals whose status was converted at age 65 from disabled-worker to retired-worker status were not considered by the NBS to be new retired-worker beneficiaries. Some retired-worker beneficiaries had received disability insurance benefits in an earlier year, but their payments had ceased by the time they applied for retired-worker benefits. Individuals who received widow or widower benefits before their conversion to retired-worker status are included in the NBS sample of retired workers but are excluded from the sample analyzed here.

[12]Because self-employed men are more likely to continue working after benefit receipt, the percentage of employed beneficiaries will be somewhat lower than the total labor-force data might suggest.

[13]An age restriction (defined by age at the time of benefit receipt) was imposed in that study to select a sample representative of the age group that will eventually be affected by the rise in the age of eligibility for unreduced Social Security retired-worker benefits from age 65 to age 67.

[14]Data are available to plot job histories as far back as 1951. The more distant the recall period, however, the less accurate will be the reported start and stop dates.

Table 1.—Percent employed at any time in three prebenefit years, by sex: Persons who first received retired-worker benefits in June 1980-May 1981[1]

[Full sample]

Year	Men	Women
1969	95.9	77.5
1974	94.7	76.8
1979	86.6	65.4

[1]Excludes previous beneficiaries and those self-employed in 1979. Data are weighted. See text page 5 for description of this sample.

reported any employment during the entire calendar year. This gender difference in employment near retirement is consistent with differences in the earnings patterns of women and men throughout their lives.

Of those employed in 1979, 75 percent of the women and 87 percent of the men reported full-time, full-year work. From these data, it is not possible to determine if and when respondents who were less involved in paid work changed from full- to part-year (or part-time) employment. By following the first group from 1979 into beneficiary status, it is possible to observe with these data how ill health and occupations held in 1979 were associated with work status after receipt of Social Security benefits.[15] For this reason, the sample is further restricted to those who reported full-year, full-time (wage and salary) work in 1979.

Work Transitions of Full-Time, Full-Year Workers

The results of the process of labor-force withdrawal and labor-force activity after initial receipt of Social Security benefits are shown in table 2. Because 1982 extends only to the month in which the respondents were interviewed—which ranged from October to December—some responses may actually cover only the first three-fourths of a year. Working at the time of interview indicates that a job was held on that day.[16]

[15]The data on hours of work come from information on usual hours of work per week and usual number of weeks worked. Full-year work is defined as at least 1,780 hours per year. Variations in the cutoff did not affect the results reported here. The implicit assumption is that hours of work in 1979 for full-year, full-time workers were typical of the preretirement experience. To make a comparable assumption for part-time workers is not reasonable. Some individuals may be lifetime part-time workers, but others may have recently shifted to part-time hours and it is impossible to ascertain from the NBS that they did so. Note that some of the individuals working full-year, full-time may have made a transition to lower earnings—the retirement definition used by Honig and Hanoch (1985)—if a reduction in wages accompanied a change to less demanding but still full-time work before 1979.

[16]The interviewers were specifically instructed not to consider as currently working those respondents who had a job on the previous day but not when interviewed. This definition of currently employed is different from that used in the Current Population Survey or the decennial censuses.

Table 2.—Percent of full-time, full-year workers in 1979 and subsequent work patterns, by sex

[Weighted sample]

Employment status and year	Men	Women
Full time in 1979		
Total	100.0	100.0
Worked in 6th month—		
Before benefit receipt	81.9	80.6
After benefit receipt	24.2	31.9
Worked in 1982	21.9	26.8
Working at time of interview	17.6	22.9
After benefit receipt:		
Ever worked[1]	25.8	33.0
Months worked[2]	13.5	14.0
Percent of months worked[3]	76.1	77.8

[1]Worked during the period beginning 6 months after first benefit receipt and ending with interview date.

[2]Months reported with a job in period beginning 6 months after first benefit receipt by those reporting a job.

[3]Employment in relation to maximum possible number of months individual could have worked in the period beginning 6 months after benefit receipt by those reporting a job.

Comparing the percentage of the sample who reported working at some time in the sixth month before benefit receipt with their employment status in the sixth month after benefit receipt indicates the association between retired-worker benefit receipt and the reduction in labor-force participation. Again, these months do not refer to the same calendar period for all individuals; but, between the sixth postbenefit month and the NBS interview date, one-third of the women and one-fourth of the men reported having worked at some time and were employed, on average, for the greater share (three-quarters) of the potential work days in that period. Although the majority of men and women do not work at all in the initial years after receipt of Social Security retired-worker benefits, a large minority do work. The predictors of employment among retired-worker beneficiaries, especially the influence of previous job and health conditions on the probability of continued employment, are the focus of this article.

Workers in Physically Demanding Occupations

As described above, this article extends Podoff's analysis by examining the relationship between the physical demands of the occupation in which a new beneficiary worked in 1979, preceding benefit receipt, and his or her subsequent decision to work. The NBS identifies the detailed (three-digit) Census occupational

category for the last, longest, and current job of each survey respondent. From this information, characteristics of the 1979 job may be inferred. In the 1986 retirement age study, alternative indicators of the physical demands of each of these jobs were developed—by means of data from the **Dictionary of Occupational Titles** (DOT) on physical demand characteristics matched to detailed Census occupational codes (see the Appendix to Podoff (1986) for a discussion of the derivation of these indicators).

The distribution of workers in a PDO across broad occupation categories is shown in table 3. Four PDO measures are compared. The two "strength" indicators take into account the amount of time spent walking or standing; the amount of time spent lifting, carrying, pulling, or pushing objects; the weight of those objects; and the intensity, duration, and body position required in moving objects. The "narrow" strength category includes jobs that require workers to lift heavier objects than the jobs in the "broad" strength category.[17] A second pair of measures includes those occupations identified as physically demanding by the strength characteristics but also includes occupations that require considerable stooping, crawling, balancing, and climbing. These are the "composite" measures.

The advantage of this classification rests in its use of information on the physical requirements of very specific jobs. This provides a better indicator of the effect of employment in a PDO than is possible, for example, when respondents were identified only by major occupational groups.[18] The results produced with this more detailed classification scheme should provide a measure of PDO effects that is less likely to reflect the influence of other occupational attributes on employment behavior after benefit receipt.

By definition, these narrow PDO measures must identify a smaller percentage of workers as workers in a PDO than do the broad PDO measures. According to the narrow measures, men in PDOs in 1979 worked primarily in service and craft occupations. Half were janitors and cleaners or construction workers. Men in the broad PDOs worked in these occupations and as operators and fabricators.

A very small percentage of women who were in PDOs (according to any measure) worked in craft or repair

[17]The "narrow strength" measure was used in the 1986 SSA study to identify persons whose last job was in a physicallly demanding occupation.

[18]Gustman and Steinmeier (1986), for example, consider all craftsmen, foremen and kindred workers, operatives, and laborers as employed in a physically demanding occupation, and all professionals, managers, clerical and service workers as holding less demanding jobs.

Table 3.—Percentage distribution of full-time, full-year workers in 1979, by occupation, physical demand measure, and sex

[Weighted sample]

Occupation and sex	All workers	Physical demand measure			
		Narrow strength	Broad strength	Narrow composite	Broad composite
Men					
Total	100.0	100.0	100.0	100.0	100.0
Managerial and professional specialty	17.1	0	0	1.1	1.1
Technicians and related support	3.0	0	.3	.4	.4
Sales	5.6	0	0	0	0
Administrative support	8.7	8.0	4.0	3.0	3.8
Service	10.6	39.6	16.2	19.3	14.6
Farming, forestry, and fishing	2.0	7.6	4.0	5.6	3.6
Precision production, craft, and repair	28.0	21.7	6.8	51.1	35.8
Operators, fabricators, and laborers	20.3	3.7	29.0	11.5	32.3
Handlers, equipment cleaners, and helpers	4.5	19.2	9.4	7.9	8.4
Women					
Total	100.0	100.0	100.0	100.0	100.0
Managerial and professional specialty	18.3	0	11.2	1.3	10.3
Technicians and related support	2.9	0	5.2	11.8	4.6
Sales	6.3	0	0	0	.2
Administrative support	32.7	10.0	2.4	2.8	5.0
Service	15.4	54.7	34.8	49.5	35.6
Farming, forestry, and fishing	.5	4.4	.6	1.3	.5
Precision production, craft, and repair	4.1	6.4	4.9	10.7	5.4
Operators, fabricators, and laborers	16.7	17.6	30.2	17.9	29.0
Handlers, equipment cleaners, and helpers	3.1	6.9	10.7	4.8	9.4

occupations; the vast majority of women in PDOs were in services and in operator/fabricator occupations. The detailed PDO occupational categories with the largest number of women were janitors and cleaners, stock and inventory clerks, punching and stamping press machine operators, practical nurses, and nurses aides or orderlies.

Employer Change Before Benefit Receipt

The second relationship examined in this article is that of job changes made just before retirement to work after retirement. According to Gustman and Steinmeier (1983, 1984), older workers may face serious constraints against moving to part-time work in their career jobs. Along with Honig and Hanoch (1984), they found that the majority of men in the RHS who continued to work after retirement did so outside their main lifetime job.[19] This was the case even among RHS respondents who were not subject to a mandatory retirement age. (Mandatory retirement does not affect the NBS sample analyzed in this study.) Gustman and Steinmeier (1984) conclude:

> An implication of this observation is that the individual who is thus constrained must decide whether to retire fully, to keep working full-time on the main job, or to retire partially outside of that main job.

This pattern persisted among the more recent NBS retirees. Table 4 shows, for those who were full-time, full-year workers in 1979, the percentages working in each year who were working for a different employer than the 1979 employer. (Because the NBS identified jobs by employer, occupational changes for persons who continued to work for the same employer are not indicated.) Among the NBS respondents who were working at the time of the interview, a large proportion (but fewer than one-half by 1982) had changed employers since 1979.[20] However, job changes were not just a postretirement phenomenon for this sample because even in 1979, when all individuals in the sample by definition must have reported full-time, full-year work, almost one-third of the men (who also worked in 1969) had changed employers since 1969.

Earlier job changes may have occurred for a variety of reasons. Preretirement job changes for some workers may have continued a normal pattern of career growth associated with particular occupations. For others, a change of employer may have been involuntary due to such events, for example, as plant closing, reductions in force, or layoffs. For others, a voluntary change to a new full-time, full-year job may have been a means of avoiding anticipated constraints on their ability to continue working at reduced hours on their previous job. Note that this preretirement job shift occurs between two full-time jobs with different employers; at some time after the shift, the worker then reduces hours of employment. The analytic importance of this type of change is that workers in this way may partially overcome the labor-market costs of working in physically difficult jobs, their own deteriorating health, deteriorating employment conditions, or employer prohibitions against flexibility of hours.

Table 4.—Percent of full-time, full-year workers in 1979 who changed employers, by selected dates and sex[1]

[Weighted sample]

Date	Men	Women
1969	31.0	33.1
1974	20.5	15.9
Six months before benefit receipt	.8	.5
Six months after benefit receipt	18.8	7.3
1982	37.4	22.3
At interview	42.4	24.5

[1] Percentages are for respondents working both in 1979 and the comparison year.

Job Changes, Job Type, and Work After Benefit Receipt

Individuals are identified as working after benefit receipt if they reported holding a job at any time during the period that began 6 months after Social Security payments were initially received. (The 6-month lag is to avoid counting as employed those retirees who were unable to precisely coordinate initial receipt of benefits and employment change.) Among the men, 26 percent worked at some time during the benefit receipt period; among the women, 33 percent did so (table 2).

The probability that an individual will work while receiving benefits is expected to be associated with demographic and economic characteristics that reflect the work preferences of these individuals and the gains from and costs of employment. Ideally, the value of these characteristics would be ascertained in the period just before benefit receipt. This is possible for the job change and PDO variables previously described but not for other key variables for which information comes from the 1982 interview (when the lag may be 30 months after benefits were first received). For some variables (such as birth date and race) this lag poses no problem. For most job-related variables, the appropriate

[19] The main lifetime job is defined in various ways by different investigators. Honig and Hanoch define this job as the one held when reported Social Security covered earnings peaked.

[20] For individuals who changed employers in 1979, the most recent employer in that year was identified as the one for whom they worked.

values for the 1979 job can be inferred from the respondents' retrospective data. The potential discrepancy between 1979 and current values is more serious in the case of income and assets for which it is necessary to assume that their real values did not change over the intervening years. Fortunately, the important Social Security variable—the present discounted value of the expected stream of Social Security retired-worker benefits—can be estimated precisely from the Master Beneficiary Record data available in the NBS.

Work-Related Characteristcs

Four employer-related variables are included in an equation predicting work among the retired-worker beneficiaries (table 5). The index of employment in a PDO tests the concern expressed by Congress that employment in a PDO on the verge of Social Security benefit receipt would, all else being equal, reduce work after retirement and hence reduce economic well-being. That is, a finding that employment in a PDO reduces the probability of work by beneficiaries would support this hypothesis and suggest that these workers are now and will in the future be less likely to supplement relatively low retirement income with part-time earnings. It is important to note that it is the effect of the job held immediately preceding benefit receipt that is of interest, not if these individuals ever worked in a PDO.[21]

This hypothesis has received mixed support in the retirement research literature. Quinn (1977) found no significant effect of a PDO on work behavior among men in the RHS; however, Burtless (1987) and Filer and Petri (1986) suggest that the effect of occupation may be indirect, operating through the channels of health and pensions. Burtless found that the industry and occupation in which RHS respondents were employed affected their subsequent health status that, he argues, was the more direct cause of earlier retirement. Filer and Petri concluded that pensions covering workers in PDOs are more likely to provide relatively generous early retirement benefits than are pensions in other occupations, thus financially compensating these workers for shorter worklives and accounting for the average earlier retirement ages in these occupations. In contrast, Gustman and Steinmeier (1986) found that among white male workers, employment in a PDO had an independent effect on the probability of full-time work. They point out, however, that the PDO classification

[21]There are two reasons for this: First, Congress was concerned that workers who faced a higher eligibility age could not extend their working lives. Some workers had already adjusted to a PDO by a job shift, and the relevant issue is whether or not they could continue working in their current job. Second, the NBS does not provide occupational data on all jobs held. For the last, longest, and current employers, it provides job characteristics only for the last year on that job.

Table 5.—Mean of variables for full-time, full-year workers in 1979, by variable and sex

[Unweighted sample]

Variable	Men	Women
Ever worked after benefit receipt	29.2	39.2
Work-related characteristics		
Narrow strength measure	12.8	2.1
Broad strength measure	51.0	27.8
Narrow composite measure	33.4	14.0
Broad composite measure	45.4	30.6
Work-limiting health condition	28.2	21.3
Pension eligible, 1979 job	62.6	59.3
Changed jobs after 1974	10.3	7.6
Wealth characteristics (in thousands of 1979 dollars)		
Social Security	$69.0	$68.0
Pension	25.0	19.3
Financial assets	27.0	23.0
Net house value	32.8	26.8
Personal characteristics		
Age at benefit receipt:		
62	24.0	20.3
63	12.2	10.9
64	19.0	22.6
65	32.3	31.9
66	8.3	10.3
67	3.7	3.6
68	.4	.4
Race (black = 1)	8.6	9.5
Not married	13.5	53.4
Married, spouse employed 1979	35.4	26.6
Control variables		
Potential working months	17.4	17.8
Relative work experience to 1979	97.9	95.8
Number of jobs held through 1974	2.4	2.2
N	2,326	1,343

Note: The variables are described more fully in the text; see pages 9-10.

allowed by the RHS data was a crude one. In this article, the effect of employment in a PDO is separated from that of pension and health effects by including variables that measure pension eligibility and work-limiting health conditions. In addition, the NBS occupational data, when matched with physical requirement data, provide a more precise identification of PDOs.

The pension-eligibility variable indicates if the respondent was eligible for a pension from the 1979 employer. Because by law employers can restrict employment of pensioners only in jobs covered by that pension, the pension from the job held just before benefit receipt may have an effect that is different from that of pensions from earlier jobs. Hence, eligibility for a pension from that job is distinguished.

Almost two-thirds of the men were eligible for a

pension from their 1979 employer (table 5). The percentage of eligible women is surprisingly close to that of men—but it should be recalled that the percentages of both women and men in this sample were full-time, full-year workers in 1979.

The health variable indicates the existence of a work-limiting health condition at the time of the interview—a condition that had existed at least since 1979.[22] More than 20 percent of the women and nearly 30 percent of the men reported a long-term work-limiting health condition. Restricting the definition of ill health only to those conditions that existed before receipt of Social Security benefits may not entirely reduce the bias resulting from a respondent's justification of retirement based on ill health because some respondents may have exaggerated the length of time since the onset of their health condition or the degree to which preretirement health conditions did in fact limit their ability to continue working (Bazzoli, 1985). These percentages are, however, less than those among the RHS respondents for whom a measure of preretirement health conditions could be obtained (Honig and Hanoch, 1985).[23] A health condition that limits work is expected to reduce the probability of a person ever working after benefit receipt because it both limits the ability of the individual to continue working for the 1979 employer and reduces the relative advantage of seeking employment elsewhere.

Finally, the job change variable indicates whether or not the respondent reported a different employer in 1979 than the one reported in 1974. The rationale for the inclusion of this variable, described above, is that a switch to another full-time, full-year job in the years just before Social Security benefit receipt is one way for workers to adjust to the barriers raised by some employers to changes in hours and work conditions. For these workers, the job change is predictive of longer work lives.

Wealth Variables

The Social Security wealth variable measures the present value of the stream of benefits payable to the respondent over his/her remaining lifetime. This benefit amount, unreduced for actual earnings but reflecting any actuarial adjustments, is based on the Primary Insurance Amount (PIA) that is nearest the benefit receipt date.[24] The pension wealth variable measures the present value of the stream of pension benefit where the benefit is equal to that reported by the respondent at the interview; it is assumed that these benefits were payable from the time of Social Security benefit receipt and will continue throughout the respondent's remaining lifetime.[25] These wealth measures are an indicator of the work-related retirement resources available from a source other than current earnings and are expected to reduce the probability of postretirement work.

The financial-wealth variable is the sum of the value of savings, checking, and money market accounts, the face value of bonds, the market value of stocks, and the total value of Individual Retirement Accounts of the respondent and the spouse, if married. A variable equal to the equity value in a home is also included because the home represents an additional source of wealth and reduces the need for income to cover rents. All wealth values are in 1979 dollars.

Other Variables

The age variables are introduced as controls for unobserved taste differences between workers who receive benefits relatively early and those who postponed receipt until a later age. The determinants of the benefit-acceptance decision cannot be directly observed and the subsequent earnings behavior of this sample will reflect the fact that these respondents have already chosen partial or full withdrawal from paid employment. Thus, it may be that Maxfield's (1985) findings—that older respondents in the NBS had higher incomes, greater assets, and were more likely to report earnings in 1982—can be explained, in part, by these late retirees' stronger preferences for work. They had rejected the financial incentives in Social Security and pensions for earlier retirement. Although the reason for this choice is unknown, younger beneficiaries were attracted by those

[22]This is similar to the health variable used in the 1986 SSA study, except that in the 1986 study the work-limiting health condition must have lasted or be expected to last for at least 12 months. Thus, not all disability conditions existed before benefit receipt.

[23]See, also, Sammartino (1987) and Yeas (1987) for a discussion of why this bias may not be serious in empirical studies, and SSA's 1986 study and Sherman (1985) for a discussion of the smaller percentages of retirees in the NBS than in earlier samples who reported health as a reason for leaving a job.

[24]The benefit amount on the MBR file could not be used to estimate Social Security benefits because, for working beneficiaries, the reported amounts may reflect reductions due to earnings. There is no easy way to ascertain when benefits during that year of benefit receipt were reduced as a result of excess earnings. For this reason, the benefit amount was estimated using the PIA and, if applicable, a reduction factor appropriate for the early retiree. If married, the respondent's spouse may be eligible for a supplemental benefit. When the spouse is not yet a beneficiary, the size of this supplemental benefit is not known and is therefore not included in the wealth calculations. The effect of these benefits will be reflected in the coefficient on marital status.

[25]In calculating the present value of Social Security and pension benefits, discount rates of 3 percent and 5 percent were used respectively, the first being lower to reflect the full price adjustments provided in that program. The difference implies an assumed rate of inflation of 2 percent.

incentives and, all else being equal, their taste for leisure is likely to encourage total retirement rather than partial withdrawal from the labor force.

The marital-status variables capture the influence on the respondent's work effort of both the expected retirement resources of the spouse and the joint work decisions of husbands and wives. A spouse's Social Security benefits and pension income are not included in the respective wealth variables because the potential size of those benefits is known only if the spouse has already retired.

To capture unmeasurable (non-age-correlated) differences across individuals in their tastes for work, a relative work-experience variable that measures the fraction worked among all months the respondent possibly could have worked, beginning with the first reported job after 1950 and ending with 1979, is used. If a worker is continuously employed, the fraction equals one. Potential working months controls for differences across individuals in the time period between benefit receipt (in this case, 6 months after) and the NBS interview, so that behavioral differences rather than the length of that period explain observed variations in the probability of postretirement employment.[26]

The final control variable is equal to the number of jobs held since 1971, up to and including the one reported in 1974. Individuals who changed employers between 1974 and 1979 may be those who switched jobs at frequent intervals throughout their working years. This variable is included to reduce the possibility that the results will reflect the histories of frequent job changers—whose lower earnings and interrupted work histories are associated both with a 1974-79 job change and earnings after benefit receipt.

Table 6.—Logit estimates of probability of work after benefit receipt, by variable and sex

[Unweighted sample]

Variable	Men	Women
Constant	[1]0.112	[1]-0.854
Work-related characteristics		
Physical demand measure[2]	[1]-.257	-.149
Work-limiting health condition	[1]-.849	[1]-.688
Pension eligible, 1979 job	[1]-.819	[1]-.823
Changed job after 1974	[1].481	.216
Wealth characteristics		
Social Security	[1]-.014	[1]-.014
Pension	[1]-.015	[1]-.012
Financial assets	.001	.000
Net house value	.000	.000
Personal characteristics		
Not married[3]	[4]-.314	[1].421
Married, spouse employed 1979[3]	[5].149	[5].364
Age at benefit receipt:[6]		
62	[1]-.931	[1]-1.508
63	[1]-.934	[1]-1.115
64	[4]-.253	[4]-.378
66	.041	-.180
67	-.122	-.415
68	-.782	[5]-1.714
Race (black = 1)	.138	[4]-.460
Control variables		
Potential working months	[1].083	[1].086
Relative work experience to 1979	-.410	[5]1.086
Number of jobs held through 1974	[5].050	[5].070

[1]Significant at less than 0.01 level.
[2]Narrow composite measure.
[3]Excluded group are married individuals, spouse not working in 1979.
[4]Significant at less than 0.05 level.
[5]Significant at less than 0.10 level.
[6]Excluded group are persons receiving benefits at age 65.

Statistical Results

Because the dependent variable is bivariate (equal to one if an individual worked at some time in the postbenefit period, zero otherwise), a logit transformation of the probability of being employed is used to predict if an individual will be employed during the postreceipt period. The logit transformation is necessary to confine predicted values to the probability range of zero to one.[27] The logistic regression results are presented in table 6.

The control variables for a variety of characteristics, described above, will be discussed first. As expected, the more potential working months available (that is, the longer the interval between benefit receipt and the interview), the more likely the individual was to report employment. Some beneficiaries reenter the work force after a period of full retirement, and the longer the time between the interview and first receipt of benefits, the more likely their employment was to be observed. The number of jobs held before 1974—a measure of the frequency of job changes throughout the working life—was positively associated with postbenefit-receipt work, a result that suggests that for some beneficiaries continued work is simply a continuation of a relatively unstable and flexible employment history.

The relative-experience variable was not a significant predictor of work among men and was only marginally so for women, perhaps because respondents failed to report breaks in employment with the same employer, thus obscuring the effect of this variable. Alternatively, the selection of those who were full-time, full-year

[26]Work experience before benefit receipt is truncated at 1951 because the NBS asked only about employment after that date. Some individuals gave information on earlier years, but it was ignored in this study. The work experience variable counts only months employed and does not double count months when more than one job was reported.

[27]The function estimated is $\log[P(t)/1-P(t)]=bX$ where P(t) is the probability of being employed at any time over the postbenefit period and X is a vector of independent variables (including a constant term).

workers in 1979 may have eliminated from the sample most individuals with relatively short and discontinuous work histories.

Demographic variables are important predictors of postbenefit work. Not being married has a significant but opposite effect among women and men: It reduces the probability of postbenefit-receipt work among men relative to that probability for married respondents whose spouses were not working in 1979 but increases the probability for women. For both, however, having an employed spouse increases the probability of continued work. This pattern suggests that for some Social Security beneficiaries, total labor-force withdrawal occurs simultaneously with that of their spouse. Finally, the pattern of coefficients on the age variables conforms to the hypothesized taste effects: Both women and men who elect benefits at ages 62 and 63 are significantly less likely to work than those who delay benefits to age 65 or later.[28]

Wealth variables, known to be major determinants of when individuals begin to receive retirement income or decide to retire completely, also influence whether or not individuals continue some labor-market involvement after benefit receipt. This, of course, reflects the effect of these variables on partial versus total retirement. Greater Social Security and pension wealth have the expected negative—and significant—effects on the probability of postreceipt work. The effects of the two other wealth variables are not significant.

The four variables of central interest—employment in a PDO, presence of a work-limiting health condition, pension eligibility (based on the 1979 job), and a change in employers after 1974—have highly significant effects in the hypothesized direction for male beneficiaries. The results are mixed for women. The presence of a work-limiting health condition and eligibility for a pension for the job held in 1979 predict a lower probability of postretirement work among both women and men. It is only among men that employment in a PDO and the job change variable have the expected significant effect, although they are of the anticipated sign for women.

The narrow composite PDO measure used in the estimated model reports the strongest influence for both women and men; the broad measures had considerably smaller and insignificant effects for them. The fact that the narrow strength measure had an effect of similar size and significance for men, as did the narrow composite measure, suggests that it is the occupations included in both measures that have the greatest constraining effect on later work efforts.[29]

Wages and Work Among Beneficiaries

Among men, the observed effects of health and PDOs may, however, be due in part to wage effects, which are not included in the logit regressions. That is, lifelong health problems may lead to lower wages, and PDOs may be those in which low wages predominate. The observed influence of health and employment in a PDO may thus reflect the influence of the omitted wage variable, which has an indirect effect through these variables on partial versus full labor-force withdrawal.

Unfortunately, the NBS did not question respondents about their earnings in 1979—or in any other given calendar year—but asked only about earnings from their current job or earnings during the last year of employment on their longest and last job. Thus, wage data on the job held in 1979 must be for the year that job terminated and is unlikely to reflect potential labor-market earnings or even the wage on that job under different retirement conditions. This is because the wage of persons who continued to work for their 1979 employer will reflect subsequent reductions in hours or changes in work performed. Although a somewhat better measure may be the highest of the three wages reported, this measure as well will be a poor measure of the market wage for individuals who continued to work at reduced hours on their long-time job and also for workers whose wages fell just before employment separation.

Nevertheless, it is interesting to note the effects of adding the highest wage as a variable in the logit regression (results for males are presented in table 7). The wage coefficient is highly negative and significant, indicating that the higher the wage, the less likely Social Security beneficiaries are to work. Although this result is contrary to that expected from the labor supply theory, it is consistent with the bias inherent in the NBS earnings measures. Consider two full-time workers, both with an identical (unobserved) hourly wage in 1979 on their longest job. Upon receipt of Social Security benefits, one ceases work entirely while the other negotiates a different job with the same employer and is permitted to continue working at reduced hours but at a

[28] The observed age effects are also consistent with an effect of the earnings test, which imposes a lower earnings limit for individuals under age 65. However, the mean level of earnings at which all benefits would have been withheld for this sample was $14,604 for men and $11,346 for women (in 1979 dollars)—a level far above the earnings reported by the vast majority of working respondents. Because substantial earnings are permitted, the earnings test is less likely to affect labor-force participation than it is to affect earnings or hours worked.

[29] The lack of significance of the other PDO measures for men is probably due to the high percentage of men that are reported in PDOs when the "broad strength" measure is used. The "narrow strength" measure had too few women in it to achieve statistical significance for females and the insignificance of the broad PDO measure may reflect the same problem that affected men.

lower real wage.[30] Because the second worker did not change employers, the reported wage will reflect the effect of the partial retirement job, whereas the first worker's wage will be the actual 1979 wage. The negative relationship between continued work and the wage rate thus reflects a causality that runs from work to the wage rate, rather than the reverse.

The inclusion of the wage variable does not alter by much the size or significance of the influence of health, job change, or PDO variables on the probability of postbenefit employment. It does reduce the significance of the Social Security wealth variables, but this is not surprising because this variable will be highly correlated with past wages. It can, therefore, be concluded, with some caution, that the effects of health and PDO reflect these characteristics rather than omitted wage effects.

Interpretation of Results

Because a logistic function is nonlinear, it is difficult to directly estimate from the data presented in table 6 the magnitude of the effect of each variable on the probability of continued work. The effect of a change in one variable depends on the value of all others. Table 8 shows the relative impact of a change in selected variables by evaluating the logit at specific values for the independent variables. These values are for a married, retired-worker beneficiary who first received benefits at age 62, is not black, whose spouse is not working, and who is not eligible for a pension from any job (that is, was not eligible for a pension from the 1979 job and did not report any pension income at the 1982 interview). The values of other variables are equal to the gender-specific means for the sample. The result of interest is not the probability for this base-case individual, but rather the difference between that value and the probability for an individual if one of the values was different.

In the case of male retired workers, for the base case, the probability of postreceipt work is .355. That probability is increased substantially for a person who is identical in all other respects but who delayed benefit receipt to age 65 (.583). The effect of employment in a PDO, although significant, is not very large and lowers the probability of postreceipt work only to .299. The presence of a work limitation in 1979 reduces the probability of later work by almost one-half—to .191. If the worker changed employers some time after 1974 but before 1979, the effect is quite large; that change alone would raise the probability of postbenefit receipt employment among men to .472. Finally, reporting the mean pension wealth and having at least a portion of

[30] Wages are in 1979 dollars. Thus, if part-time workers forego wage increases, real wages will decline.

Table 7.—Logit estimates including wage variable

[Men only]

Variable	Men
Constant	[1] 0.116
Work-related characteristics	
Highest reported wage (constant$)	[1] -.513
Physical demand measure[2]	[1] -.307
Work-limiting health condition	[1] -.884
Pension eligible, 1979 job	[1] -.845
Changed job after 1974	[1] .578
Wealth characteristics	
Social Security	[1] -.008
Pension	[1] -.011
Financial assets	.002
Net house value	.001
Personal characteristics	
Not married[3]	[4] -.276
Married, spouse employed 1979[3]	[5] .139
Age at benefit receipt:[6]	
62	[1] -.910
63	[1] -1.001
64	[5] -.328
66	.081
67	-.255
68	-.643
Race (black = 1)	.127
Control variables	
Potential working months	[1] .083
Relative work experience to 1979	[5] -.450
Number of jobs held through 1974	[5] .078

[1] Significant at less than 0.01 level.
[2] Narrow composite measure.
[3] Excluded group are married individuals, spouse not working in 1979.
[4] Significant at less than 0.10 level.
[5] Significant at less than 0.05 level.
[6] Excluded group are persons receiving benefits at age 65.

Table 8.—Logit estimates of probability of work after benefit receipt: Independent effects of variables, by variable and sex

Variable	Men	Women
Base case[1]	0.355	0.373
Work in physically demanding occupation in 1979[2]	.299	.339
Work-limiting health condition in 1979	.191	.230
Employer change (1975-79)	.472	.425
Eligibility for pension and mean pension wealth	.143	.156
Mean pension + $10,000	.126	.141
Age 65 at benefit receipt	.583	.729

[1] Base case: married, spouse not working, not black, benefit receipt at age 62, no work limitation in 1979, no pension eligibility from any job, no change in employer after 1974 but before 1979.
[2] PDO defined by narrow composite measure.

Note: Numbers equal estimated probabilities of postreceipt work for individuals with base case characteristics but with indicated additional characteristics.

that pension based on work in the last prereceipt benefit year lowers the probability of work by beneficiaries to only .143. This relatively small effect is probably due to the sample's including only individuals who have already received Social Security benefits and reflects a marginal effect beyond the employment effect of that decision. Greater pension wealth further reduces the probability of work. An additional $10,000 in wealth lowers the probability of employment by .017. For women, the effect of changing one variable, with the exception of age at benefit receipt, is far smaller (and in some cases not statistically significant) than for men.

Discussion

This analysis was motivated in part by the concern expressed by Congress, in the 1983 Amendments to the Social Security Act, that workers in physically demanding occupations would be adversely affected by an increase in the age at which unreduced Social Security benefits could be paid. This article has attempted to distinguish the effects of job conditions and other characteristics on the work behavior of Social Security beneficiaries by using a sample of recent Social Security beneficiaries and PDO measurements developed in a previous study for Congress.

For men, work in a PDO had a statistically significant but relatively small effect on the probability of postreceipt work, and that effect was significant only when the narrow PDO measures were used. For women, no significant effects were found. It may be that the job characteristics identified in the **Dictionary of Occupational Titles** (DOT) do not distinguish among those job tasks that are particularly relevant to the postreceipt work behavior of women. Also, the DOT characteristics may be imperfectly captured by the necessary translation of DOT occupational categories to Census categories. However, the evidence is also consistent with the following explanations.

The distinguishing characteristic of male workers in PDOs (according to the narrow composite measure) was their concentration in precision, production, craft, and repair occupations and in a few service occupations (table 3). Perhaps only in these occupational groups is work effort constrained by physical demands, and women are rarely employed in these jobs. Additional research is needed to indicate what particular characteristics of these jobs may limit postbenefit receipt employment.

It may also be that the effect of a PDO is indirect, operating through pension and health conditions. The findings here provide some support of that thesis. It is true that workers in PDOs in this sample are much more likely than others to report a work-limiting health condition, but less than one-third of women and men in PDOs reported such a limitation. However, although both pension eligibility and pension amounts have a strong and negative effect on work effort, workers in PDOs are no more likely than individuals in other occupations to report eligibility for a pension. The NBS data do not, however, permit an investigation of the benefit structure of pensions, and consequently the findings of Filer and Petri (1986) are not necessarily inconsistent with those reported here.

Finally, perhaps by the beginning of 1979—the year for which preretirement job characteristics were measured—the selective attrition of workers moving from PDOs into either early but full retirement or into other jobs at which they expected to be able to continue working reduced differences between workers remaining in PDOs and those employed in other occupational categories. Workers who remained in PDOs through 1979, therefore, would be those persons least constrained by their jobs because either their health or their ability and willingness to continue working were well above average. The fact that the job change variable performs as expected suggests that this is the case—that is, considerable mobility prevails in the years before "retirement," and jobs into which workers on the verge of retirement move may be those that are more compatible with their employment expectations after benefit receipt.

Conclusion

The most recent cohort of Social Security beneficiaries sampled in the NBS were less likely to be employed than were retired-worker beneficiaries in the RHS (Honig, 1985; Honig and Hanoch, 1985). This finding is consistent with Social Security Administration data that show a continuing decline in the percentage of beneficiaries who reported earnings, despite periodic liberalization of the earnings test (Vroman, 1985). Those beneficiaries who continued to work were individuals with lower retirement income from both Social Security and pensions, a finding consistent with previous studies of work and retirement behavior. Although those studies look at the influence of economic factors on the decision to retire or to accept retirement benefits, the present study shows that these factors continue to influence work even after that initial benefit-receipt decision is made.

One purpose of this study was to investigate how work in a physically demanding occupation before receiving Social Security benefits affected subsequent employment. The NBS does not have data on the characteristics of jobs held in all years. This study, therefore, used the job in which the respondent worked in 1979 to indicate if the respondent worked in a PDO before benefit receipt. Only for males, and only for the narrow measures of physical demands, was a significant

effect found. This finding suggests that if some workers are hindered in terms of physical ability by the types of jobs they hold, they are primarily workers in jobs included in the narrow strength measure. Although such jobs also command relatively low wages, the exclusion of a wage variable does not appear to bias the results.

The significant effect of the job change variable suggests that, at least for men, some labor-market adjustments take place in the years before retirement. For some workers this change—whether voluntary or involuntary—is likely to reduce the costs of employer-imposed constraints on continued work.

The results for women suggest that their different lifetime work patterns lead to different patterns of work when they become Social Security beneficiaries. Certainly some of the results are due to the greater likelihood that women, because of lower preretirement wages, are able to continue working a substantial number of hours annually without losing their Social Security benefits entirely. Thus, beneficiary status for women may not be as closely linked with labor-force withdrawal as it is for men, and the independent variables have a smaller effect.

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