The Reservation Wages of Social Security Disability Insurance Beneficiaries

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Summary

There exists a lot of research on the reservation wages of the unemployed as a determinant of unemployment duration. Little is known about the reservation wages of those who are not in the labor force but might be potential labor force returnees, such as Social Security Disability Insurance (DI) beneficiaries. The main objective of this article is to assess what can be learned from the subjective reservation wages of DI beneficiaries. Using the New Beneficiary Data System (NBDS), the article assesses the magnitudes of reservation wages compared to the last wage earned and the benefit amount, as well as the determinants of reservation wages in a regression framework. The NBDS is unique in that it provides the reservation wages and the work history of DI beneficiaries before and after joining the DI rolls.

The article has several noteworthy results and policy implications:

- Data show that a significant portion of beneficiaries report being likely to accept a job if offered one. Based on the NBDS, 13 percent of DI beneficiaries who did not work since joining the rolls in 1981–1982 reported in 1991 that they would be willing to work if offered a job and provided their reservation wages.

- DI beneficiaries do not appear to price themselves out of the labor market. Half of them would want a wage that is 80 percent or less of the last wage earned before receiving DI. It is estimated that approximately 7 percent of long-term DI beneficiaries may potentially return-to-work if they search for jobs and have a wage offer distribution with a mean at 80 percent of their last wage.

- The nonlabor income in addition to the benefit is positively and significantly associated with the reservation wage, while the benefit amount per se is not. However, this result needs to be treated with caution given that nonlabor income is endogenous to the model.

- Heterogeneity exists between persons still under the DI program and those that have moved to the Old-Age program. The subsamples of persons who have shifted to the Old-Age program and those who are still under the DI program have median reservation wage to the last wage ratios of 0.69 and 0.93, respectively. A significantly lower reservation wage for persons who have moved to the Old-Age program was also found in a regression framework. This heterogeneity between the two groups may result in part from the different program characteristics both groups face,

for instance, in terms of benefit termination and Medicare eligibility rules.

- Subjective reservation wage data can be useful to study populations that are out of the labor force. This article is innovative in that it focuses on a group of persons who are typically considered as being out of the labor force, and therefore are not asked reservation wages in general household surveys such as the Current Population Survey. It would be of great interest to collect more reservation wage data for DI beneficiaries in a longitudinal data set to expand this analysis, for instance, to assess conclusively the effects of changing program characteristics on reservation wages and return-to-work outcomes as beneficiaries transition to the Old-Age program or as new return-to-work programs are put in place.

Introduction

The objective of this article is to examine the reservation wages of Social Security Disability Insurance (DI) beneficiaries, and derive implications for return-to-work policy. In labor economics, in the labor leisure choice model, the reservation wage is a fundamental aspect of the decision to work or not to work. The reservation wage is the amount an individual would need to earn at work in order to accept a job. For a beneficiary to return to work, the market wage would need to exceed the reservation wage. Reservation wages of DI beneficiaries are important in the context of return-to-work policies for the DI program. Since the establishment of the DI program in 1956, return to work has been an integral component of the program. On August 1, 1956, as President Eisenhower signed the legislation establishing the DI program, he was quoted as saying (SSA 2003), "We will endeavor to administer the disability [program] efficiently and effectively, [and]…to help rehabilitate the disabled so that they may return to useful employment." However, until recently, modest return-to-work policies were implemented and their ineffectiveness was demonstrated (Hennessey and Muller 1994). DI benefit terminations due to return to work are rare: in 2005, the percentage of all beneficiaries that were terminated from the rolls due to return to work stood at 0.6 percent (SSA 2005). After the passage of the Ticket to Work and Work Incentives Improvement Act of 1999, several return-to-work programs and experiments were launched (Green, Eigen, Lefko, and Ebling 2006). This recent interest in return to work is not limited to the United States (Block and Prinz 2001), nor to disabil-

ity programs. Several welfare programs around the world have changed in recent years so as to encourage employment and self-reliance among recipients.[1] In the United States, effective return-to-work policies may be a way to contain the growth of the disability rolls. The potential savings of return-to-work policies to the Social Security trust fund are large. According to GAO (1999), if an additional 1 percent of the DI and Supplementary Security Income (SSI) working age population were to leave the rolls due to return-to-work, lifetime disability cash benefits would be reduced by $3 billion.

If return-to-work is rare among beneficiaries, it may be because beneficiaries are unable to work or because the wages they would earn in the labor market are well below their reservation wages. This article characterizes the reservation wages of persons on DI. To inform return-to-work policies, the article answers three questions. Is there a pool of DI beneficiaries who have work capabilities and are potential labor force returnees? If so few beneficiaries return to work, is it because these beneficiaries have high reservation wages? Finally, what influences their reservation wages?

One may wonder why beneficiaries would have a reservation wage if they are considered unable to work. DI beneficiaries have passed the Social Security Administration's disability test that demonstrates their inability to work above a given earnings limit, the substantial gainful activity level. For disability programs, reservation wages and generally return-to-work policies make sense under the assumption that there is a pool of beneficiaries who have work capabilities and represent potential labor force returnees. In the DI program, disability is defined as: "*the inability to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment which can be expected to result in death or which has lasted or can be expected to last, for a continuous period of not less than 12 months*" (SSA 2005). It is inherently difficult to determine whether or not a person is able to engage in any substantial gainful activity. Two persons may have the same impairment but end up with different work capabilities because of differences in the environments they live in and differences in unobservables (for example, motivation). Classification errors are therefore made. Some studies have found that a significant portion of DI beneficiaries are not disabled while others who are rejected are disabled (Benitez-Silva, Buchinsky, and Rust 2004; Nagi 1969). For these reasons, an investigation of the determinants

of the return-to-work behavior of beneficiaries is warranted, and an analysis of their reservation wages is part of this effort.

This article is related to two separate literatures. The first literature deals with the labor market participation of persons with disabilities and the implications of disability benefit programs.[2] Interest was in part generated following the passage of the Americans with Disabilities Act in 1990 and by the steady rise of the rolls of the disability benefit programs despite the strong labor demand in the United States in the 1990s (Hotchkiss 2003; Autor and Duggan 2003). Much of the research on disability benefit programs was focused on benefit levels, exits from the labor force, and screening stringency at the entry into the program. However, growth in the DI rolls can also be affected by changes in exit rates, including return-to-work rates, which are affected by reservation wages. Only a few studies have dealt with return to work and have generally focused on worker's compensation (Butler, Johnson, and Baldwin 1995). The second is related to the extensive literature on reservation wages and their determinants: this literature has mainly dealt with the reservation wages of the short-term unemployed, particularly unemployment insurance beneficiaries (Feldstein and Poterba 1984; Haurin and Sridhar 2003). Reservation wage data are typically not available for DI beneficiaries. Surveys such as the Current Population Survey and the Survey of Income and Program Participation collected reservation wage data for unemployed persons. DI beneficiaries and more generally, persons who report being unable to work due to a disability, are counted as not in the labor force and therefore would not typically be asked to report their reservation wages. This article uses a unique data set, the New Beneficiary Data System (NBDS), which has reservation wage data for DI beneficiaries.

Background

In the economics literature, the term "reservation wage" has been used with two different meanings. In the job search literature, the term refers to the lowest wage a person would accept if the person has to pay a positive sum to gain another job offer from a wage distribution (Mortensen 1986). In the labor supply literature (Killingsworth 1983), it has been used as the lowest wage at which a person will work, which has also been referred to as the "asking wage." In this article, the reservation wage is not used within the context of the job search literature given that most DI beneficiaries do not search for jobs (Hennessey and

Muller 1994). Instead, the reservation wage is used in the same sense as that of the labor supply literature, as detailed below.

In the standard labor leisure choice model of the labor supply literature, individuals select the combination of the numbers of hours of work and leisure to maximize utility (Kaufman and Hotchkiss 2006). Leisure includes the amount of time spent on nonlabor market activities, whether housework, self-care, school, or pure leisure. The slope of the budget constraint reflects the value of the offered wage rate. The slope of the indifference curve is the marginal rate of substitution, the subjective value a person places on time spent on work versus leisure. The slope of the indifference curve at the point of zero hours of work is of particular significance and is called the reservation wage: it measures the amount of money that will induce a person to work the first hour.

It is important to note that for DI beneficiaries, the labor leisure choice model of the labor supply literature is relevant only for those beneficiaries who have work capabilities. As noted earlier, beneficiaries may have work capabilities because the DI definition does not require beneficiaries to be completely unable to work: beneficiaries may be able to work below the substantial gainful activity level. In addition, as a result of tagging errors at the entry into DI, persons able to work above SGA may be included in the rolls.[3] For those beneficiaries with no work capabilities, hours of leisure are perfectly inelastic thus leading to an infinite reservation wage: whatever the wage, the person is unwilling to work.

As the slope of the indifference curve at the point of zero hours of work, the reservation wage is a function of the individual's nonlabor income and variables that affect the tastes of individuals for leisure versus income. The assumption that leisure is a normal good in the labor leisure choice model implies that the reservation wage increases as nonlabor income increases (Borjas 2000, p. 42). Nonlabor income may include the DI benefit, other benefits, a spouse's earnings, and the value of the health insurance coverage provided through DI (Medicare) and/or through a spouse's employment. Intuitively, as the nonlabor income increases, workers want to consume more leisure and therefore a larger wage is required to induce the person to work. In addition to the nonlabor income, there are several possible sources for differences in tastes that may influence the reservation wage (Kaufman and Hotchkiss 2006). First, there are personality differences that, for instance, differentiate a workaholic

from a laid-back person. These personality differences are typically not observed through household surveys. Second, the type of work people do also influences the taste for leisure versus work. Other factors remaining constant, persons in disagreeable jobs are expected to have higher reservation wages. Variables representing working conditions (for example, whether a person has suffered an accident on the job), or job insecurity (for example, whether the person lost her last job), are therefore expected to be positively associated with the reservation wage. Third, the use of leisure time is a determinant of the tastes for work and therefore the reservation wage. A person with a relatively more valuable use for leisure time, for example, due to an activity limitation or a health condition requiring time for self-care, will have a higher reservation wage. It is important to note that the labor leisure choice model yields no indication of the expected relation of age per se and the reservation wage, everything else held constant. However, because age is generally associated with the prevalence of health conditions and activity limitations, age may be observed to be positively related to the reservation wage in raw reservation wage data. Other variables (gender, marital status, race, human capital (education, vocational rehabilitation)) may also affect the reservation wage but there is not a priori expectation of the direction of their effect. Finally, other than nonlabor income, tastes, and individual characteristics, public policies may have an effect on reservation wages. This has been demonstrated with regard to minimum wage policies. In a laboratory experiment, Falk, Fehr, and Zehnder (2006) show that the temporary introduction of a minimum wage leads to a rise in subjects' reservation wages, which persists even after the minimum wage has been removed.

The empirical literature on the determinants of the reservation wages for unemployment compensation beneficiaries provides results that are generally consistent with the predictions previously mentioned, especially with regard to the positive association between nonlabor income and the reservation wage. Feldstein and Poterba (1984), Gorter and Gorter (1993), Bloemen and Stancanelli (2001), and Ryscavage (2002) found that the larger the unemployment compensation benefit, the higher the reservation wage. They also found the same positive association between other nonlabor income and the reservation wage. Results are mixed for human capital and demographic variables. Feldstein and Poterba (1984) found that age, race, gender, and education had no significant effect on the reservation wage. Gorter and Gorter (1993) found that age and having a high educational level were positively associated with the reservation wage, while being a male and being married had no significant effect. Jones (1989) found that age, being a male, being married, and the log of past wages have positive and significant coefficients, while the log of unemployment benefit and education variables have coefficients close to zero.

Finally, two remarks are in order regarding the application of the reservation wage concept in the context of the DI program. First, it is important to note, in the context of DI beneficiaries, that the concept of reservation utility may be more pertinent than that of reservation wage. Instead of demanding a lowest wage in order to accept a job offer, a beneficiary would demand an expected utility that is at least as high as the reservation utility provided by being on the DI rolls and not working. Besides the wage, a variety of factors would influence the reservation utility including working conditions, number of hours worked, job location, availability of accommodations for the disability while on the job, income security, and access to health insurance. The concept of a reservation utility, as opposed to a reservation wage, has received very little attention in the labor supply literature. Second, the "reservation wage" used in consistency with the labor supply literature (Killingsworth 1983) as previously described is relevant for return-to-work policy. If a DI beneficiary has work capabilities, there exists a wage rate (w^*) for which the person would go back to work. That is, the person would accept jobs paying w^* or more. Based on Burdett and Mortensen (1978), the return-to-work probability for a given beneficiary i is

$$p_{i,1} = s_i \alpha_i (1 - F_i(w_i^*)) \quad (1)$$

where α_i is the offer arrival rate, and s_i the time allocated to job search $0 \leq s_i \leq 1$. A job is characterized by a wage $\tilde{w}$, which is a random draw from the cumulative wage distribution function F. If person i is unable to work, whatever the job and working conditions, then $(1 - F_i(w_i^*))$ is null and the return-to-work probability is null. If person i is able to work for a wage w_i^*, then $(1 - F_i(w_i^*)) > 0$. In this case, $p_{i,1}$ may be null if the person does not search for a job ($s_i = 0$), or if the labor market is such that he or she has little chance to find a job at a wage rate equal or beyond the reservation wage ($\alpha_i(1 - F_i(w_i^*)) = 0$).[4] The above formulation illustrates how the reservation wage is a determinant of return-to-work and exit probabilities of a beneficiary and how it is an important variable in the context of return-to-work policies. The data here do

not make it possible to assess the relation between the reservation wage on the one hand, and return-to-work and exit probabilities, on the other. Instead, the magnitude and determinants of the reservation wage are the focus of the rest of the article.

Data

The data source is a panel survey of the Social Security Administration's New Beneficiary Data System (NBDS). The NBDS is a data set with a wealth of information on the postentitlement work efforts of DI beneficiaries. The data set is unique in that it provides reservation wages and work history of a sample of DI beneficiaries. Reservation wage data have never been utilized for disability beneficiaries, but instead have been used to study unemployment duration for unemployment insurance beneficiaries. The NBDS is based initially on a nationally representative cohort of new beneficiaries who joined DI in 1980 and 1981, and were interviewed in 1982 as part of the New Beneficiary Survey (NBS). NBS respondents were reinterviewed as part of the National Beneficiary Followup (NBF) survey in 1991. The analysis is focused on beneficiaries who responded to both the NBS in 1982 and to the NBF in 1991 and is based on data from the three different parts of the data system: the NBS, the NBF, and administrative records. Administrative records include Social Security earnings and benefit records and records from the then Health Care Finance Administration.

All NBF respondents were asked if they "*worked for pay either part time or full time*" after the month they started receiving Social Security DI benefits. Those beneficiaries who reported that they never worked since joining the rolls were asked the following: *"If you were offered a job by some employer in this area, how likely would you be to take it?"* Individuals had to answer yes or no to the following: '*yes, definitely*,' '*yes, if it were something you could do*,' '*yes, if the wages were satisfactory*,' '*yes, if the location was satisfactory*,' '*yes, if the hours were satisfactory*,' and finally '*yes, for some other conditions*.' Individuals who gave at least one yes answer to the above conditions were then asked to provide their reservation wages: "*What would the smallest wage or salary have to be for you to take a job offered by some employer?*" Respondents had to give a dollar amount and specify the time unit the amount referred to (year, month, week, day, or hour).

The focus of the analysis is on beneficiaries with work capabilities. Persons with work capabilities are identified through self-reports of whether they worked since joining the rolls, and if not, whether they would be willing to take a job if offered one.[5] Out of 2,490 DI beneficiaries who joined the rolls in 1980–1981, responded to the NBF in 1991, and were still on the DI rolls or had moved onto the Old-Age program, 147 reported that they worked for pay either full time or part time since joining the rolls.[6] The remaining 2,343 did not work for pay, and 332 of them reported that they would likely accept a job if they were offered one and reported their reservation wages. So 13.33 percent of the cohort who joined the rolls in 1980–1981 and answered the NBF in 1991, reported a willingness to work and gave their reservation wage. This fraction stands at 16.01 percent for persons who are still under the DI program and at 10.20 percent for persons who have shifted to the Old-Age program.

After removing 15 individuals with missing data on selected variables, the sample of reservation wage respondents includes 317 individuals. Seventy-three percent of respondents provided a reservation wage on an hourly basis and 10 percent, 8 percent, and 9 percent on a weekly, monthly, and annual basis, respectively (Table 1). Only two respondents provided a daily reservation wage, $10 and $20, respectively. Table 1 gives the number of persons whose last job before receiving DI was a full-time job. More than 90 percent of reservation wage respondents were full-time workers before getting onto DI, which will be useful to know while calculating the reservation wage relative to the last wage earned ratio. Table 2 has monthly reservation wages based on 40 hours of work per week, 4.3 weeks per month, and 20.5 working days per month. The mean monthly reservation wage stands at $1,175 and the median at $860. Answers to the conditions under which reservation wage respondents would accept a job if offered one can be found in Table 3. It is important to understand that the answers are not mutually exclusive. In particular, a person can answer positively to both "*yes, definitely*" and also "*yes, if it were something you could do or any other condition.*" In fact, only 0.6 percent of reservation wage respondents would be willing to accept a job unconditionally, that is, would definitely accept a job if offered one and do not require that any condition be met. This result shows that the DI beneficiaries who have reported their reservation wages have largely done so based on certain conditions being met in the work place. Compared to persons who are still on DI, persons who have transitioned to the Old-Age program are less likely to report they would definitely accept

Table 1.

Distribution of raw reservation wages based on hourly, weekly, monthly, and annual pay ranges

Hourly		Weekly		Monthly		Annual	
Range	Number	Range	Number	Range	Number	Range	Number
$1–$3	11	Less than $100	0	Less than $400	2	Less than $10,000	3
$4–$5	133	$100–$200	6	$400–$799	1	$10,000–$19,999	8
$6–$7	36	$200–$300	12	$800–$1,199	9	$20,000–$29,999	11
$8–$9	11	$300–$400	10	$1,200–$1,599	8	$30,000–$39,999	2
$10–$11	22	$400–$500	2	$1,600–$1999	0	$40,000–$49,999	2
$12–$24	19	$500 or more	2	$2,000 or more	4	$50,000 or more	1
N	232	--	32	--	24	--	27
Mean	6.35	--	285	--	1,243.96	--	21.870.37
N full time	217	--	25	--	24	--	24

SOURCE: The data are from the New Beneficiary Data System.

NOTES: Full time includes working more than 35 hours a week and more than 47 weeks a year.

-- = not applicable.

a job, and more likely to report that the job should involve something the person could do (Table 3).

In this article, subjective reservation wage information is used in a way that is consistent with prior research in the reservation wage literature (Bloemen 1996). A lot of caution is needed while using such data. Indeed, while the reservation wage is a simple concept, measuring it is difficult. One may wonder if reported reservation wages are reliable. The population under study includes individuals who were judged to be disabled when they applied for DI and who have not worked since joining the rolls 10 years earlier, in 1980 and 1981. Most investigations on the reservation wage have used reported reservation wages for the short-term unemployed, typically beneficiaries of unemployment insurance (Jones 1988). Before proceeding with the analysis of the determinants of the reservation wage, it is important to check the consistency of the data of those persons not in the labor force. The reservation wage is first compared to the minimum federal wage in 1991, that is, $4.25 per hour.[7] Thirty-one percent of reservation wage respondents had a reservation wage below the federal minimum wage. A large portion of the respondents who reported a reservation wage on an hourly basis had a reservation wage close to the minimum wage: 31 percent at $4, 25 percent at $5, and 11 percent at $6. This was not the case for respondents who used other time units and who mostly had reservation wages above the federal minimum wage.

Reservation wages are also compared to benefit amounts. The means of the reservation wage and of

the monthly family benefit amount are compared. The cumulative distribution of the reservation wage to benefit ratio is given in Table A-1 in the appendix. The mean and median reservation wage to benefit ratio stand at 1.64 and 1.35, respectively, and 70.66 percent of the entire sample have a ratio of more than one. Because individuals would primarily expect to have a higher income while they work than when they do not, the reported reservation wages seem to be reasonable.

This data set with reservation wages is unique and yet presents several limitations. One caveat of the data set is that respondents were not asked to report the *desired* number of hours or working days. One possibility would be to use observed working hours in the

Table 2.

All reservation wages expressed on a monthly basis, by pay range, number, and percentage distribution

Pay range	Number	Percentage
Less than $400	5	1.58
$400–$799	94	29.97
$800–$1,199	104	32.81
$1,200–$1,599	49	15.46
$1,600–$1,999	34	10.73
$2,000 or more	31	9.78
N	317	--
Mean	1,174.83	--
Median	860	--

SOURCE: The data are from the New Beneficiary Data System.

NOTE: -- = not applicable.

Table 3.
Conditions for working among reservation wage respondents (in percent)

Conditions for working	Entire sample	Still on DI	Now on Old-Age
Yes, definitely [a]	21.45	16.67	16.67
Yes, if it was something I could do	88.33	87.57	91.24
Yes, if the wage is satisfactory	62.78	64.94	64.18
Yes, if location is satisfactory	59.62	61.49	61.19
Yes, if hours are satisfactory	60.88	62.64	62.69
Yes, for some other condition	23.66	28.25	18.66

SOURCE: The data are from the New Beneficiary Data System.

NOTE: DI = Disability Insurance.

a.   The answer "Yes, definitely" is not mutually exclusive from the other conditions.

last job or in the longest employment before getting onto DI rolls: however, this number of hours worked is likely to have been affected by the onset of a disability. One implication of this caveat is that the interaction between the reservation wage and the number of hours worked, that is, the potential endogeneity of hours, cannot be accounted for as has been done elsewhere (Bloemen 1996).

Another caveat of the data set is that it suffered from a significant attrition between 1982–1991. Antonovics, Haveman, Holden, and Wolfe (2000) showed that at the 1991 reinterview, 39 percent of the DI beneficiaries had been reduced from the sample due to attrition, and 30.8 percent of attritions can be attributed to death. They also found that being male, older, and the number of health conditions are positively associated with the likelihood of attrition due to death and other reasons, while being married is negatively associated with the probability of attrition. The sample of workers who may have answered the reservation wage question in 1991 may therefore no longer be representative of the initial cohort of new beneficiaries and the results of the analysis below may be affected by a nonrandom attrition bias.

In addition, the reservation wage data may well overestimate the reservation wages of all beneficiaries with work capabilities because the reservation wage question was not asked among persons who worked at some point since joining the rolls. These beneficiaries might have had work capabilities at the time of the survey in 1991 and it would have been of interest to know their reservation wages.[8] In the appendix, Table A-2 gives the descriptive characteristics of persons who did not answer the reservation wage question, either because they had worked since joining the rolls or reported not being willing to take up a job if offered one. Column (1) of Table A-3 gives the result of a

probit model of the probability of responding to the reservation wage question. The probit model shows that reservation wage respondents are younger and more likely to have received vocational rehabilitation services compared to nonrespondents. In this article, in the reservation wage equation analysis, the nonresponse by beneficiaries who worked while on the rolls will be controlled for through the Heckman procedure. It can be argued that the sample of reservation wage respondents is the group of beneficiaries who are of much interest from a return-to-work policy perspective: these are long-term beneficiaries with work capabilities who have not worked since becoming beneficiaries. If the return-to-work rate of DI beneficiaries is to increase, this group is certainly where there is potential for improvement in return-to-work outcomes.

Despite the important limitations of the reservation wage data at hand, a first study of the reservation wages of DI beneficiaries can be informative and may lead to improved data collection and analysis of reservation wages in the future.

Distribution of the Reservation Wage Ratio

Of particular interest in the analysis below is the ratio of the reservation wage and the last wage earned before getting onto the DI rolls. The ratio ranges from 0.03 to 21.27. The data for the last wage earned before tax prior to receiving DI was collected in 1981 as part of the NBS and was converted into 1991 dollars. The analysis below builds upon past analysis of the ratio developed by Feldstein and Poterba (1984) and used by Jones (1989, 2000) and Ryscavage (2002).

For the entire sample, the median ratio is 0.79 and the mean is 1.11 with some strong variations by subsample (Table 4). Persons who are still on DI, females, and those who lost their jobs have the highest median ratios—0.93, 0.9, and 0.9, respectively.

Table 4.
Cumulative distribution of reservation wage ratio based on self-reported last wage

Group	N	Mean	Median	Share with reservation wage ratio less than or equal to—					
				0.6	0.8	1.0	1.2	1.4	1.6
Entire Sample	317	1.11	0.79	33.44	50.16	63.09	72.56	82.02	86.80
Still on Disability Insurance rolls	178	1.32	0.93	25.84	42.13	53.93	67.42	77.53	82.58
Moved to the Old-Age program	139	0.85	0.69	43.17	60.43	74.82	79.14	87.77	89.93
Lost job	40	1.07	0.90	25.00	37.50	52.50	65.00	77.50	82.50
Left job	277	1.11	0.76	34.66	51.99	64.62	73.65	82.67	86.28
Accident on job	73	1.08	0.77	39.73	49.32	64.38	75.34	83.56	84.93
Females	101	1.26	0.90	24.75	41.58	56.44	63.37	70.30	78.22
Males	216	1.04	0.74	37.50	54.17	66.20	77.78	87.50	89.35

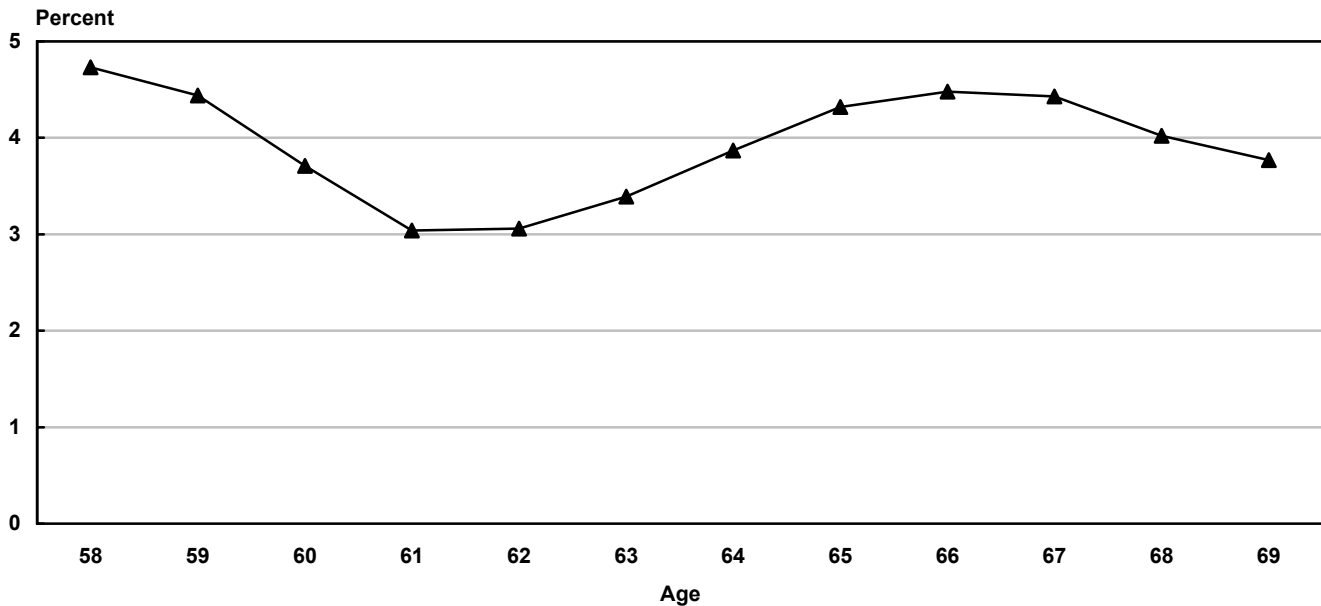SOURCE: Author's calculations based on the New Beneficiary Data System.

The subsample with the lowest median ratio (0.69) is that of individuals who have moved to the Old-Age program. Overall, almost two-thirds of the entire sample are ready to accept a wage reduction. This is shown as the cumulative portion of 63.09 percent who are ready to work at a wage equal to or less than their last wage earned before getting on DI. The subsamples of persons who have moved to the Old-Age program and those who are still on DI show strong differences. Indeed, 43.17 percent of individuals now on the Old-Age program are ready to work for 60 percent or less of the last wage earned compared with 25.84 percent of the persons who are still receiving DI. This result is surprising given that older persons, because they are more likely to have activity limitations and health conditions, are expected to have relatively higher reservation wage ratios. Such disparity between the two subsamples may result from different personal characteristics (for example, gender) and from different program characteristics. The Old-Age and DI programs have different Medicare eligibility conditions and termination rules, which may affect the reservation wage. Persons on the Old-Age program (hereafter "Old-Age pensioners") are entitled to Medicare irrespective of their work status, whereas persons who are still on DI would lose Medicare after going back to work above the earnings limit. In addition, in 1991, at the time of the survey, DI beneficiaries who worked were more likely to be labeled as work able and subject to a continuing disability review, which might have lead to a termination of benefits due to earnings above the earnings disregard.[10] Old-Age pensioners are not subject to continuing disability reviews and possible termination due to work. An Old-Age pension might stop if earnings exceed the breakeven point, but would be reinstated automatically if earnings dropped below such point. A DI beneficiary terminated due to work would

have to reapply for DI. Therefore, to a risk-averse individual, working while on DI is associated with the risk of losing the DI benefit and Medicare. There is no such risk for the Old-Age pensioner. It may therefore be that DI beneficiaries have higher reservation wages in order to compensate for the risk associated with working while receiving DI.

In addition, the DI and Old-Age programs have different earnings limit and benefit reduction rates, which affect the offered wage distribution.[11] Because the earnings disregard is higher and the benefit reduction rate is lower for the Old-Age program than for DI, any wage offered above the substantial gainful activity (SGA) will be reduced by a greater amount for a DI beneficiary compared to an Old-Age pensioner. An expected higher reservation wage due to program characteristics, all else held constant, and a reduced wage distribution also due to program characteristics, may explain the growth in the percentage of DI beneficiaries with positive earnings as they transition to the Old-Age program at preretirement age (age 62) and at full retirement age (age 65) as shown in Chart 1.

One could argue that the self-reported last wage earned reported as part of the NBS in 1980–1981 might suffer from recall bias and noise. Administrative earnings records for 1979 were therefore used instead of the self-reported wage to estimate the reservation wage ratio. Out of the 317 reservation wage respondents, 299 had positive earnings as per administrative records, and the monthly wage was estimated for them assuming that persons worked full time in 1979. Results in Table A-4 in the Appendix are very close to those obtained in Table 4, with a median ratio of 0.71 and 64.88 percent of the sample willing to work for a wage equal or less than the last wage earned.

Chart 1.
Percent of beneficiaries with positive work earnings, by age

SOURCE: Author's calculations based on the New Beneficiary Data System.

Do DI beneficiaries price themselves out of the labor market? They do not appear to, given that close to one-third of beneficiaries have a reservation wage below the minimum wage. Another way to answer this question is to compare the results on the distribution of the reservation wage ratio with those from the literature on unemployment insurance beneficiaries. Feldstein and Poterba (1984) and Jones (1989) found that 62 percent and 56.5 percent of the unemployed have reservation wages that are lower or equal to their last wages earned in the United States and in the United Kingdom, respectively, compared with 63.09 percent for DI beneficiaries. The share of persons with the reservation wage ratio below one for the subsample of DI beneficiaries now under the Old-Age program (74.82 percent) is higher than in the unemployment insurance studies, while the reverse is true for persons still on DI (53.93 percent).[12] About 50 percent of the entire sample has reservation wages less than 80 percent of their last wage. In Jones (1989), based on a sample of short term unemployed in the United Kingdom, almost 30 percent of respondents have reservation wages at least 20 percent below their last wage. In Feldstein and Poterba (1984) 24 percent have reservation wages less than 90 percent below their last wage. It then appears that, compared with the short term unemployed, DI beneficiaries have lower reservation wage ratios.

One can gauge the return-to-work probability of a beneficiary by comparing the reservation wage to the person's wage offer distribution, which is unknown here, and assuming that the beneficiary is searching for a job[13] ($s_i > 0$). If the last wage earned before getting onto DI is used as a proxy for the mean of the current wage offer distribution, then the reservation wage ratio distribution given in Table 4 provides estimates of the wage offer distribution ($1 - F_i(w_i^*)$). One may expect that DI beneficiaries would have to suffer a wage reduction if they go back to work. The impairment itself can be the cause of a wage reduction. Past research has shown that wage reductions following the onset of a disability can be substantial. Burkhauser and Daly (1996) showed that the median drop in earnings between one year before the onset of a disability to 2 years afterward was 31 percent for men and 61.7 percent for women. Baldwin, Zeager, and Flacco (1994) showed that wage losses following a disability onset vary substantially by gender and by type of impairment: depending on the nature of the impairment for impaired males, estimated wage offers range from 97 percent to 74 percent of the unimpaired benchmark, while for females they range from 101 percent to 85 percent. In addition, persons on DI have been out of the labor force for some time, the beneficiary's skills and productivity may have deteriorated, and there may have been a change in production methods

that makes remaining skills less valuable. Together with the possible perception of reduced productivity and discrimination among potential employers with respect to persons with disabilities, this would suggest that the mean wage offer would lie below the last wage earned. Based on these grounds and on previous literature, it is assumed that the expected mean wage offer stands at 80 percent of the last wage earned. As shown in Table 4, 50.16 percent of the entire sample has a reservation wage below the expected mean wage offer, and results vary greatly across subsamples. In addition, 42.13 percent of the subsample of beneficiaries who are still on DI and willing to work have a reservation wage that is less than the mean wage offer, compared with 60.43 percent for those who have transitioned to the Old-Age program.

Given that 16.01 percent of persons who are still on DI reported their reservation wages, and 42.13 percent of these reservation wage respondents have a reservation wage that is less than the expected mean wage offer, one can estimate that among long-term DI beneficiaries 6.78 percent may potentially return to work if they search for jobs and have a mean wage offer at 80 percent of their last wage. This represents more than 10 times the actual return-to-work termination rate at 0.6 percent (SSA 2005). Despite relatively low reservation wages, actual return-to-work termination rates may be so low because of the conditions beneficiaries may place upon accepting a job offer, job location, hours, and type of work. To better understand the reservation wage data presented so far, the rest of this article includes an analysis of the determinants of the reservation wage in a regression framework.

The Reservation Wage Equation

This section deals with the determinants of the reservation wage. The specification of the reservation wage equation is described below. Of particular importance is the amount of DI benefits and the amount of other nonlabor income received. A well-known prediction of the labor-leisure choice model is that the reservation wage increases with nonlabor income. The dependent variable is the natural log of the reservation wage $\ln RW_i$ for person i.

$$\ln RW_i = \alpha_1 + \sum_{j=1}^{k} \delta_j X_{j,i} + \varepsilon_{1,i} \tag{2}$$

where α_1 is the intercept, $X_{1i} \ldots\ldots X_{ki}$ are the explanatory variables, $\delta_1 \ldots \delta_k$ are the coefficients of the $X_{j,i}$ variables and $\varepsilon_{1,i}$ is the error term for person i.

Reservation wages are relevant only for beneficiaries with work capabilities. However, reservation wages are available only for a selective subsample of the cohort of beneficiaries with work capabilities, which can lead to the biased estimation of coefficients. It is not available among beneficiaries who worked since joining the rolls, that is, among those who had work capabilities at some point while on the rolls and may still do at the time of the 1991 survey round. Of course it is possible that individuals who have worked since joining the rolls in 1981–1982 may have had work capabilities at one point but may no longer have capabilities in 1991. The data are thus "selected" by a systematic process that is accounted for through the well-known technique developed by Heckman (1979). For inferences from estimating equation (2) on a subsample of persons reporting their reservation wages to be generalizable to the entire cohort of beneficiaries *with* work capabilities, the estimation needs to take into account a beneficiary's propensity to report their reservation wages. A probit model that explains the response or absence of response to the reservation wage question is first estimated:

$$I_i = \alpha_2 + \sum_{j=1}^{k} \delta'_j X'_{j,i} + \varepsilon_{2,i} \tag{3}$$

where α_2 is the intercept, $X'_{1,i} \ldots\ldots X'_{k,i}$ are the explanatory variables, $\delta'_1 \ldots \delta'_k$ are the coefficients of the $X'_{j,i}$ variables and $\varepsilon_{2,i}$ is the error term for person i.

The system (2) and (3) is identified if at least one variable is included in (3) that is not in (2). Among persons with work capabilities, the challenge is to have a variable that influences whether a person worked while on the rolls but does not influence the reservation wage. In this application, this exclusion variable is the natural logarithm of the last wage earned prior to joining DI. The last wage earned is assumed to influence the expected mean wage offer, and thus the budget constraint as per the labor leisure choice model, but not the tastes for leisure versus work as represented in the reservation wage (slope of the indifference curve at zero hours of work). A sample correction variable (the inverse Mills ratio) is created to account for the fact that the sample of respondents is not random. This variable is then included as an explanatory variable in the reservation wage equation (2) to correct for sample selection bias. Equation (2) was also estimated through simple ordinary least square without sample selection correction and the results were unchanged.

The independent variables to be included in equations (2) and (3) can be inferred based on the labor supply model described earlier in the background. The model includes independent variables on the beneficiary's nonlabor income. The log of the benefit is the log of the family benefit amount, which includes payment to the beneficiary and dependents. A variable is used for self-reported nonlabor income other than the DI benefit. Beneficiaries in the NBF are eligible for Medicare, since they have been on DI for more than 2 years. A dummy indicates whether the person reports having health insurance coverage in addition to Medicare[14] in order to assess the potential impact that health insurance coverage may have on return to work. Other health insurance may include Medicaid, Champus, a military coverage, or any other health insurance coverage. It also includes measures of the health of the beneficiary through a binary variable for the prevalence of an activity limitation and a continuous variable for the number of health conditions. Variables related to human capital (educational level variables, vocational rehabilitation) as well as job separation (accident on the job, job loss) are also included. Finally, the model has demographic variables (age, white, male, marital status) without any clear a priori expectation on the direction of their effect on the reservation wage. This data set does not include information on the states or the regions where respondents live.[15]

Descriptive statistics are given in Table 5 for the variables used for the entire sample, the subsamples of persons who are still on DI, and those who have transitioned to the Old-Age program. All variables were collected in 1991 as part of the NBF and administrative data except for race and information on the last job held (lost job, accident on the job, and the last wage), which were collected in 1982 as part of the NBS. Results of the first stage probit selection model are presented in Table A-3 of the Appendix, while results of the reservation wage equation are presented in Table 6. Sample size for the probit estimation is 453, of which 317 individuals have responded to the reservation wage question. Beneficiaries who were in the younger age group, lost their last job, had more than a high school educational level, and did not have any limitation in activity of daily living nor any health insurance coverage besides Medicare were found to be more likely to respond to the reservation wage question among those with work capabilities. Column (a) of Table 6 includes the results of a first specification. The coefficients of the log of the monthly benefit

amount (0.08) and the other health insurance binary variable (0.02) are not significantly different from zero, while that of the log of the other nonlabor income (0.27) is significant. A 10-percent increase in the other nonlabor income is associated with a 2.7 percent increase in the reservation wage. As expected, the accident on the job variable has a positive and significant coefficient, however, this is not the case for the variable representing whether the separation for the last job was a job loss. The older than age 64 binary variable has a negative and significant coefficient, while the age 45 to 64 variable does not. After controlling for observed characteristics, beneficiaries who have transitioned to the Old-Age program do have significantly lower reservation wages than those still on DI. This extends the descriptive result reached earlier for the reservation wage ratio. Finally, being married is significantly associated with a lower reservation wage. When being married is interacted with being male, the net effect of being married is found to be a lot lower for males compared to females.[16] In addition, the sample selection bias variable has a coefficient that is not significantly different from zero, which indicates that the model does not suffer from selection bias.

In columns (b), (c), and (d) of Table 6 alternative specifications are tested. First, the results in (a) may suffer from an omitted variable bias given that in the descriptive statistics presented earlier, persons with reported hourly reservation wages had lower reservation wages than respondents using other reporting units. In (b), variables are therefore included to control for the reporting unit of the reservation wage. Persons with annually reported reservation wages are found to have a statistically significant higher reservation wage, and the main results from specification (a) hold. However, a limitation of specification (b) is the potential endogeneity of the reporting unit. The selected reporting unit may depend on past job characteristics, which may be influenced by several factors accounted for in the model, including human capital. Secondly, the results in (a) may not reflect the variety of conditions alongside the wage that beneficiaries take into account while considering whether to accept a job. Binary variables are included in (c) to account for the conditions placed by reservation wage respondents on the type of work done, the wage, and some other condition. It is important to note that answers to three of the conditions are highly correlated: the wage, the location, and the hours. Conditions related to the location, and the hours are therefore left out of the model. Persons who condition the acceptance of a job on the type of work

Table 5.
Descriptive statistics on reservation wage respondents

Variable	Entire sample	Still on DI rolls	Now on Old-Age rolls	Source in NBDS NBS	Source in NBDS NBF	Source in NBDS Administrative records
Log monthly reservation wage	6.928	6.959	6.888		x	
	(0.504)	(0.530)	(0.468)			
Log DI benefit amount	6.449	6.379	6.540			x
	(0.348)	(0.375)	(0.288)			
Log monthly other income	6.946	6.911	6.990		x	
	(0.654)	(0.734)	(0.535)			
Health insurance besides Medicare	0.713	0.697	0.734		x	
Lost job	0.126	0.152	0.094	x		
Accident on the job	0.230	0.185	0.288	x		
Less than high school education	0.517	0.444	0.612		x	
High school diploma	0.287	0.337	0.223		x	
More than high school education	0.196	0.219	0.165		x	
Vocational rehabilitation	0.309	0.382	0.216		x	
Limitation(s) in activities of daily living	0.587	0.634	0.525		x	
Number of health conditions	4.183	4.073	4.323		x	
	(2.089)	(2.134)	(2.030)			
White	0.773	0.758	0.791	x		
Male	0.681	0.652	0.719	x		
Married	0.543	0.534	0.554		x	
Younger than age 45	0.151	0.270	. . .			x
Ages 45–64	0.410	0.730	. . .			x
Aged 65 or older	0.438	. . .	1.000			x
Health condition						
Blindness or serious problem seeing	0.347	0.343	0.331		x	
Conditions affecting eyes	0.246	0.188	0.324		x	
Hearing conditions	0.255	0.174	0.360		x	
Missing hand, arm, foot or leg	0.032	0.028	0.036		x	
Bone or muscle conditions	0.735	0.699	0.784		x	
Stiffness or deformity, limbs	0.483	0.472	0.496		x	
Nervous system conditions	0.114	0.163	0.050		x	
Other paralysis	0.088	0.135	0.029		x	
Respiratory system conditions	0.246	0.225	0.273		x	
Urinary system conditions	0.208	0.219	0.194		x	
Cancer	0.060	0.067	0.050		x	
Mental conditions	0.369	0.444	0.273		x	
Heart conditions	0.584	0.687	0.683		x	
N	317	178	139			

SOURCE: Author's calculations based on the New Beneficiary Data System.

NOTES: Standard deviations are in parenthesis. DI = Disability Insurance; NBDS = New Beneficiary Data System; NBS = New Beneficiary Survey; NBF = New Beneficiary Followup.

. . . = not applicable; X = presence of variable in source.

Table 6.
Determinants of the reservation wage

Variable	(a)	(b)	(c)	(d)	(e) Still on DI rolls	(f) Now on Old-Age rolls
Log DI benefit amount	0.078	0.076	0.073	0.057	0.145	0.069
	(0.100)	(0.100)	(0.100)	(0.100)	(0.127)	(0.185)
Log monthly other income	0.267 ***	0.236 ***	0.291 ***	0.254 ***	0.266 ***	0.232 *
	(0.064)	(0.064)	(0.063)	(0.064)	(0.078)	(0.124)
Health Insurance besides Medicare	0.022	0.021	0.01	-0.008	0.106	-0.093
	(0.065)	(0.065)	(0.066)	(0.066)	(0.088)	(0.105)
Lost job	-0.02	-0.024	-0.012	-0.017	-0.024	0.044
	(0.082)	(0.081)	(0.081)	(0.083)	(0.105)	(0.140)
Accident on the job	0.125 *	0.131 *	0.132 *	0.152 **	0.173 *	0.089
	(0.066)	(0.066)	(0.067)	(0.068)	(0.096)	(0.092)
High school diploma	0.049	0.057	0.04	0.058	0.016	0.119
	(0.066)	(0.066)	(0.066)	(0.066)	(0.087)	(0.106)
More than high school education	0.049	-0.04	-0.013	-0.005	0.005	-0.068
	(0.066)	(0.077)	(0.078)	(0.078)	(0.100)	(0.128)
Vocational rehabilitation	-0.016	-0.012	-0.032	-0.011	-0.084	0.133
	(0.063)	(0.063)	(0.063)	(0.064)	(0.083)	(0.104)
Limitation(s) in activities of daily living	0.058	0.050	0.021	-0.077	0.022	0.090
	(0.059)	(0.059)	(0.060)	(0.061)	(0.079)	(0.101)
Number of health conditions	0.0002	0.000	0.005		0.022	-0.042 *
	(0.014)	(0.014)	(0.014)		(0.018)	(0.021)
White	-0.054	-0.066	-0.069	-0.027	-0.005	-0.054
	(0.066)	(0.066)	(0.066)	(0.067)	(0.091)	(0.103)
Male	-0.005	-0.039	-0.002	-0.047	-0.108	0.094
	(0.080)	(0.081)	(0.082)	(0.082)	(0.113)	(0.128)
Married	-0.402 ***	-0.384 ***	-0.394 ***	-0.413 ***	-0.446 ***	-0.289
	(0.119)	(0.119)	(0.119)	(0.121)	(0.150)	(0.208)
Ages 45–64	-0.075	-0.047	-0.084	-0.104		
	(0.084)	(0.084)	(0.083)	(0.087)		
Aged 65 or older	-0.182 *	-0.139	-0.161 *	-0.209 **		
	(0.088)	(0.088)	(0.087)	(0.097)		
Male * Married	0.389 ***	0.399 ***	0.385 ***	-0.416 ***	0.495 ***	0.205
	(0.126)	(0.125)	(0.126)	(0.127)	(0.166)	(0.207)
Inverse Mills ratio	-0.534	-0.512	-0.583	-0.472	-0.967 *	0.191
	(0.386)	(0.384)	(0.389)	(0.392)	(0.515)	(0.697)
Intercept	5.118 ***	5.292 ***	5.187 ***	5.365 ***	5.226 ***	3.963 **
	(0.701)	(0.706)	(0.699)	(0.709)	(0.896)	(1.584)
Reported annual reservation wage		0.268 **				
		(0.102)				
Reported monthly reservation wage		-0.006				
		(0.103)				
Reported weekly reservation wage		0.092				
		(0.089)				
Would work if it was something I could do			-0.223 **			
			(0.094)			
Would work if the wage is satisfactory			0.079			
			(0.058)			
Would work if other condition is met			0.057			
			(0.066)			

Continued

Table 6.
Continued

Variable	(a)	(b)	(c)	(d)	(e) Still on DI rolls	(f) Now on Old-Age rolls
Health condition						
Blindness or serious problem seeing				0.046		
				(0.059)		
Conditions affecting eyes				0.033		
				(0.067)		
Hearing conditions				-0.034		
				(0.064)		
Missing hand, arm, foot, or leg				-0.034		
				(0.064)		
Bone or muscle conditions				-0.139 **		
				(0.067)		
Limb stiffness or deformity				0.024		
				(0.058)		
Nervous system conditions				0.116		
				(0.089)		
Other paralysis				-0.047		
				(0.100)		
Respiratory system conditions				-0.073		
				(0.063)		
Urinary system conditions				-0.074		
				(0.068)		
Cancer				0.061		
				(0.114)		
Mental conditions				-0.066		
				(0.056)		
Heart conditions				0.143 **		
				(0.057)		
Age					-0.006	0.012
					(0.005)	-0.017
R square	0.197	0.218	0.231	0.242	0.281	0.158
F Statistic	4.32	4.11	4.25	3.16	3.92	1.43

SOURCE: Author's calculations based on the New Beneficiary Data System.

NOTES: Standard deviations are in parenthesis.

DI = Disability Insurance.

* indicates significance at the 10-percent level; ** indicates significance at the 5-percent level; *** indicates significance at the 1-percent level.

done are found to have significantly lower reservation wages. Again the major results in (a) hold in (c). However, this specification may also suffer from an endogeneity bias as the conditions on accepting a job may well be formulated in simultaneity with the reservation wage. Finally, in (d) the number of health conditions used in (a) is replaced by binary variables for specific health conditions. The number of health conditions in (a) has a coefficient that is close to zero, which might be due to the inability of this variable to account for the possible varying time and self-care constraints, and hence, the taste for leisure, resulting from differ-

ent health conditions. In (d), having a bone or muscle condition is found to be negatively associated with the reservation wage, while having a heart condition is positively associated with the reservation wage. However, when the health binary variables are introduced in (d), the overall fit of the model is reduced compared to (a).[17]

Specification (a) is therefore the preferred specification for the model. Given the heterogeneity between beneficiaries still on DI and Old-Age pensioners found in the descriptive statistics and in (a), specification (a) is run on the two subsamples in columns (e) and

(f) and a continuous age variable is introduced. The results in (a) hold for the subsample still on DI in (e), with the exception that the coefficient of the log of the benefit amount is higher (0.15) but remains imprecisely estimated. The coefficient of the age variable is negative and close to zero. However, the coefficient of the sample selection variable is significantly different from zero, which indicates that results from this regression need to be used with caution. The results in (f) also need to be treated with caution given that the equation is overall poorly estimated (F=1.43).

Overall, the results are consistent with the predictions of the labor leisure choice model, with regard to the positive association of the reservation wage with other nonlabor income and an accident on the job history. The coefficient on the benefit amount close to zero in specifications (a) through (d) above is surprising and adds to the reservation wage literature. As noted earlier, most studies on unemployment compensation found a positive relationship between reservation wages and benefits. An advantage of this study is the use of administrative data for the benefit amount while earlier studies on the reservation wage relied on self-reported benefit data. However, great caution is needed in interpreting the coefficients of the benefit amount and the other nonlabor income given the endogeneity of these variables in the model. The benefit amount and the other nonlabor income indeed depend on age, past experience, and earnings, which depend on demographic and human capital characteristics. In this case, an instrumental variable approach may be a more appropriate estimation method than OLS. The challenge is to find an instrument with a high correlation with the benefit amount and the other nonlabor income and a low correlation with the reservation wage. In the absence of a credible instrument in the available data set, simple OLS estimates are to be interpreted with caution.

Another limitation of the analysis above is that self-reports were used for work activity over the 1982–1991 period to identify persons who worked while on the rolls and who have had work capabilities. These individuals together with those who report being willing to work and give their reservation wages constitute the overall sample within which the correction for sample selection bias was made for reservation wages. Given that administrative earnings records are available in the NBDS, one can check the work history of beneficiaries while on the rolls. This is done in Table 7. Among those who reported that they did not work while on the rolls and gave their reservation

wages, 21.14 percent had positive earnings for at least a year. Among those who did not report their reservation wages and reported not working while on the rolls, 13.25 percent had positive earnings for at least a year. For both of these subgroups, most of those who reported not working but did have positive earnings had positive earnings for 1 or 2 years. In contrast, a large majority of the persons who did report that they worked had positive earnings for more than 2 years: a small percentage of this group (6.61 percent) did not have any earnings records, which might be explained by the fact that only earnings subject to Social Security payroll taxes are recorded. The sample selection bias correction was conducted again based on the broader sample of persons with work capabilities including reservation wage respondents as well as the 393 persons with positive earnings during 1982–1991. Results of the regression analysis remained unchanged and are available from the author.

Conclusion

Based on a unique data set, the primary objective of this article is to examine the reservation wages of DI beneficiaries with work capabilities and derive implications for return-to-work policies. The first result of interest is that a significant portion of beneficiaries have work capabilities and report being likely to accept a job if offered one. Based on the NBDS, 13 percent of a cohort of DI beneficiaries who joined the rolls in 1981–1982 and answered the NBF survey in 1991 reported that they would be willing to work if offered a job and reported their reservation wages.

The second result of interest is that DI beneficiaries do not appear to price themselves out of the labor market: the reservation wages of DI beneficiaries are relatively low compared to the last wage earned before joining DI. About half of them would want a wage that is 80 percent or less of the last wage earned before getting onto DI. It is estimated that approximately 7 percent of long-term DI beneficiaries may potentially return to work if they search for jobs and have a mean wage offer at 80 percent of their last wage. Actual return-to-work rates are very low in the order of 0.6 percent for a variety of possible reasons including conditions placed on accepting a job offer beside the wage such as the type of work done, the location, and hours of the job as well as income security. The lack of accommodations on the job, at least in the pre-ADA period of the NBDS, may also constitute a barrier to return to work.

A third important result of this study is the heterogeneity between persons still on DI and those that have moved to the Old-Age program. The subsamples of persons who have shifted to the Old-Age program and those who are still on DI have mean ratios of 0.91 and 1.38 respectively, and the former has a more dispersed distribution. This result was also reached in a regression framework. This heterogeneity between the two groups may result in part from the different program characteristics both groups face in terms of benefit termination rules and Medicare eligibility. Longitudinal data is not available to investigate the impact of changes in the program characteristics on the reservation wage as beneficiaries transition to the Old-Age program.

A fourth result of interest is that in the regression analysis, the nonlabor income beside the benefit is positively associated with the reservation wage while the DI benefit amount has a coefficient that is not significantly different from zero. However, this result needs to be interpreted with caution given the endogeneity of the benefit amount and other nonlabor income variables.

Finally, this article shows that subjective reservation wage data can be useful to study populations that are out of the labor force. Reservation wages have typically been used to assess the behavior of the unemployed and the determinants of unemployment duration. The analysis above is innovative in that it focuses on a group of persons who are typically considered as being out of the labor force, and therefore are not asked reservation wage questions in general household surveys such as the Current Population Survey. However, it is important to note that the analysis was constrained by caveats of the data set at hand. A major caveat of this data set is that reservation wages were collected only at one point in time in 1991, which limits the scope of research that may be conducted based on this data set. Currently, the NBDS is the only source of reservation wage data for DI beneficiaries. It would be very valuable to collect further reservation wage data in the post-ADA period when accommodations in the work place have become more common and with improvements in survey design as the Social Security Administration expands its return-to-work programs. It would be of great interest to collect more reservation wage data for DI beneficiaries in a longitudinal data set to expand this analysis, for instance to assess conclusively the effects of changing program characteristics on reservation wages and return-to-work outcomes as beneficiaries transition to the Old-Age program or as new return-to-work programs are put in place. With improved reservation data, another important next step would be to explore the link between reservation wages and return-to-work experiences for DI beneficiaries.

Table 7.
Responses to reservation wage question, work self-reports, and administrative earnings records

Administrative earnings record 1982–1991	Response to the reservation wage question—					
	Yes		No			
			Work self-report		No work self-report	
	Number	Percent	Number	Percent	Number	Percent
Total earnings record	317	100.00	136	100.00	2,023	100.00
Total without earnings record	250	78.86	9	6.61	1,755	86.75
Number with positive earnings						
Total	67	21.14	125	93.39	268	13.25
1	36		16		152	
2	18		18		62	
3	4		22		18	
4	6		20		14	
5	0		12		8	
6	2		9		2	
7	1		7		6	
8	0		10		3	
9	0		4		2	
10	0		9		1	

SOURCE: Author's calculations based on the New Beneficiary Data System.

Table A-1.
Cumulative distribution of reservation wage to benefit ratio

				Percentage share with reservation wage to benefit ratio less than or equal to—						
Group	N	Mean	Median	0.6	0.8	1.0	1.2	1.4	1.6	1.8
Entire Sample	317	1.64	1.35	8.83	20.19	29.34	41.01	53.00	58.99	66.88
Still on DI rolls	178	1.86	1.56	4.49	14.61	21.91	30.34	43.82	49.44	57.87
Moved to the Old-Age	139	1.35	1.15	14.39	27.34	38.85	54.68	64.75	71.22	78.42
Lost job	40	1.58	1.35	2.50	10.00	17.50	30.00	52.30	60.00	67.50
Left job	277	1.65	1.35	9.75	21.66	31.05	42.60	53.07	58.84	66.79
Accident on job	73	1.68	1.37	12.33	19.18	24.66	39.73	49.32	57.53	67.12
Females	101	1.65	1.41	8.91	16.83	26.73	63.37	70.30	78.22	80.20
Males	216	1.63	1.33	8.80	21.76	30.56	43.98	55.09	60.65	67.59

SOURCE: Author's calculations based on the New Beneficiary Data System.

NOTE: DI = Disability Insurance.

Table A-2.
Characteristics of the reservation wage nonrespondents

Variable	Worked Mean	Did not work Mean
Log DI benefit amount	6.468	6.470
	(0.371)	(0.350)
Log monthly other income	7.049	7.056
	(0.735)	(0.621)
Health insurance besides Medicare	0.694	0.741
Lost job	0.221	0.107
Accident on the job	0.235	0.208
Less than high school education	0.287	0.556
High school diploma	0.272	0.296
More than high school education	0.441	0.149
Vocational rehabilitation	0.426	0.214
Limitation(s) in activities of daily living	0.375	0.637
Number of health conditions	3.485	4.107
	(1.790)	(1.952)
Log of the last wage	6.865	6.752
	(0.604)	(0.711)
White	0.776	0.812
Male	0.633	0.661
Married	0.537	0.626
Younger than age 45	0.272	0.067
Ages 45–64	0.338	0.354
Aged 65 or older	0.39	0.579
Health condition		
Blindness or serious problem seeing	0.243	0.320
Conditions affecting eyes	0.228	0.255
Hearing conditions	0.221	0.286
Missing hand, arm, foot, or leg	0.014	0.034
Bone or muscle conditions	0.603	0.726
Limb stiffness or deformity	0.390	0.469
Nervous system conditions	0.103	0.091
Other paralysis	0.074	0.086
Respiratory system conditions	0.189	0.304
Urinary system conditions	0.169	0.250
Cancer	0.059	0.074
Mental conditions	0.412	0.479
Heart conditions	0.551	0.682
N	136	2,023

SOURCE: Author's calculations based on the New Beneficiary Data System.

NOTES: Standard deviations are in parenthesis.

DI = Disability Insurance.

Table A-3.
Probit estimates for reservation wage response among those with work capabilities

Variable	(1)	(2)
Log DI Benefit amount	0.052	-0.091
	(0.139)	(0.194)
Log monthly other income	0.108	0.059
	(0.080)	(0.140)
Health insurance besides Medicare	0.032	-0.367 **
	(0.076)	(0.158)
Lost job	-0.042	0.543 **
	(0.102)	(0.180)
Accident on the job	0.091	0.117
	(0.080)	(0.117)
High school diploma	-0.015	0.277
	(0.079)	(0.168)
More than high school education	0.048	0.747 ***
	(0.096)	(0.183)
Vocational rehabilitation	0.191 **	0.190
	(0.076)	(0.151)
Number of health conditions	-0.026	-0.028
	(0.016)	(0.034)
Limitation(s) in activities of daily living	-0.080	-0.587 ***
	(0.070)	(0.148)
White	-0.079	-0.054
	(0.084)	(0.168)
Male	0.049	-0.153
	(0.105)	(0.206)
Married	-0.165	0.376
	(0.144)	(0.268)
Ages 45–64	-0.172	-0.370 **
	(0.115)	(0.188)
Aged 65 or older	-0.383 ***	-0.188
	(0.117)	(0.180)
Male * Married	0.119	-0.424
	(0.154)	(0.296)
Log of last wage	-0.003	0.253 *
	(0.061)	(0.146)
Intercept	-0.288	-2.907 **
	(0.702)	(1.243)
log-likelihood	-931.036	-238.376
N	2,159	453

SOURCE: Author's calculations based on the New Beneficiary Data System.

NOTES: Standard deviations are in parenthesis.

DI = Disability Insurance.

* indicates significance at the 10-percent level; ** indicates significance at the 5-percent level; *** indicates significance at the 1-percent level.

Table A-4.
Cumulative distribution of reservation wage ratio based on last wage from administrative earnings data

Group	N	Mean	Median	Share with reservation wage ratio less than or equal to—					
				0.6	0.8	1.0	1.2	1.4	1.6
Entire sample	299	6.08	0.71	41.14	52.17	64.88	70.57	75.92	77.93
Still on DI rolls	165	10.27	0.90	30.91	41.82	56.97	64.24	70.91	71.52
Moved to the Old-Age program	134	0.92	0.58	53.73	64.93	74.63	78.36	82.09	85.82
Lost job	38	16.78	1.23	31.58	34.21	44.74	47.37	55.26	55.26
Left job	261	4.52	0.68	42.53	54.79	67.82	73.95	78.93	81.23
Accident on job	69	1.55	0.60	49.28	59.42	69.57	73.91	78.26	78.26
Females	95	4.03	0.82	34.74	47.37	58.95	65.26	71.58	75.79
Males	204	7.03	0.67	44.12	54.41	67.65	73.04	77.94	78.92

SOURCE: Author's calculations based on the New Beneficiary Data System.

NOTES: The last wage is estimated based on 1979 administrative earnings record expressed on a monthly basis and in 1991 dollars.

DI = Disability Insurance.

Notes

[1] For instance, Gilbert and Parent (2003) provide an analysis of French and U.S. experiences.

[2] A review of this literature can be found in Bound and Burkhauser (1999).

[3] If the tagging system were perfect, a beneficiary may still be willing and able to work below the earnings limit, but would be unable to work above the limit. The exercise of assessing the reservation wages would still be important in the context of return-to-work policies. Of course, the objective of a return-to-work policy would then change. It would no longer fulfill the objective of reducing the size of the program through terminations of beneficiaries due to return to work. However, it would continue to serve the purpose of encouraging the participation of persons with disabilities in society through employment.

[4] The person may return to work but stay on the rolls if his or her work earnings are below the earnings limit (g). The reservation wage (expressed here on a monthly basis) can be below g, in which case the person could accept a job below g and stay on the roll, or above g and leave the rolls. A reservation wage above g would indicate that the person would only accept a job that would ultimately make her ineligible for DI. The probability that person i exits the rolls is as follows:

$$p_{i,2} = \alpha_i s_i (1 - F_i(g))$$

If $w_i^* \geq g$, $p_{i,1} = p_{i,2}$. If $w_i^* < g$, then $p_{i,1} > p_{i,2}$, and the probability of returning to work while staying on the DI roll is $p_{i,1} - p_{i,2}$. According to the above formulation, the DI exit probability is a function of the following parameters $(\alpha_i, s_i, F_i, w_i^*, g)$, where α_i and F_i reflect conditions of the labor market. Some of the above parameters can be influenced through public policy, directly (g) or indirectly $(\alpha_i, s_i, F_i, w_i^*)$. First of all, whether or not the reservation wage is finite (in other words whether or not the person has work capabilities) depends on the disability tagging system in place and how frequently classification errors occur. In addition, policies that encourage beneficiaries to participate in return-to-work services, as in the recently implemented Ticket to Work program, can have an impact on s_i by encouraging persons to search for a job through services like job counseling. Such services can also improve the person's wage offer distribution F_i if they enhance the human capital of the beneficiary and thus give prospects for improved wages. They can also increase the person's offer arrival rate (α_i) through job search coaching services. In this context, return-to-work policies may be evaluated in their ability to boost α_i, s_i and F_i for those beneficiaries who have work capabilities. A return-to-work policy will aim to increase the reemployment probability and the DI roll exit probability of every person who is on the roll with some work capabilities.

[5] Another question in the NBDS that can be used to identify persons with work capabilities is: "are you limited in the kind and amount of work that you can do?," 80.37 percent persons who report that they worked since joining DI or would be willing to accept a job if offered one also answered that they do not have a work limitation.

[6] The characteristics of this group and the determinants of whether or not a beneficiary worked was analyzed in detail in Muller (1992).

[7] The author uses $180, $774, and $9,288 for the equivalent weekly, monthly, and annual minimum wages, respectively.

[8] Wage data is available for persons who have worked since joining the rolls. It would be of interest to compare these wages to the reservation wages of persons who have not worked since becoming beneficiaries. However, this wage data is not used in this article due to missing values.

[9] As of October 2000, DI beneficiaries who work above the earnings limit could receive Medicare Part A premium-free coverage for 93 months after the trial work period (SSA (2003)).

[10] This changed recently. The Ticket to Work and Work Incentives Improvement Act of 1999 (section 111) provided that effective January 1, 2002, a return to work alone cannot trigger a continuing disability review for DI beneficiaries who have received benefits for at least 2 years.

[11] Among Old-Age pensioners, persons aged 65–70 have their benefits reduced by $1 for every $3 earned above $9,720 per year, and persons aged 70 or older are not subject to any earnings limit (SSA 2003). DI beneficiaries whose work earnings are above the earnings limit of $500 per month in 1991 have their benefits terminated. To be more precise, if work earnings are above the earnings limit, beneficiaries are not immediately terminated from the DI program, without meeting certain conditions. First, beneficiaries can test their ability to work above the earnings limit without affecting their eligibility for benefits during a 9-month long trial work period. After the trial work period ends, there is a 3-year period, the so-called extended period of eligibility (EPE), during which benefits are withheld for those months in which earnings exceed the earnings limit (SSA (2003)). Once the EPE is over, and the person continues to exceed the limit, the person's DI benefit is terminated.

[12] In addition, an interesting finding is that for DI beneficiaries the mean of the reservation wage ratio (1.32) is higher than that of unemployment insurance recipients: 1.07 (Feldstein and Poterba 1984), 1.045 (Jones 1989), 0.85 in Jones (2000), and 0.83 (Ryscavage 2002). This may be explained by the fact that persons receiving DI receive it as a permanent benefit, whereas persons on unemployment insurance receive it only temporary. However, the mean of the reservation ratio for the subsample that have transitioned to the Old-Age program (0.85) is within the range of estimates for unemployment insurance recipients.

[13] Persons who have a job search history while on the rolls between 1981–1982 and 1991 account for 17.03 percent of reservation wage respondents.

[14] Beneficiaries become eligible to receive Medicare 2 years after joining the DI rolls, and coverage continues after they transition to the Old-Age program.

[15] If disability is understood as resulting from environmental factors, among others, then changes in the environment such as the passage of antidiscrimination laws, the availability of accessible transport system, and physical environment could affect the reservation wages of persons with disabilities. This cannot be captured with the data set at hand.

[16] Using the coefficients estimated in (a), the net effect on the reservation wage of being married for a male is given by $\delta_{Married} + \delta_{Male} + \delta_{Married \times Male} = -0.40 - 0.01 + 0.39 = -0.02$. For females, the net effect of being married is $\delta_{Married} = -0.40$.

[17] $F_{(a)} - F_{(d)} = 4.32 - 3.16 = 1.16$, which is below the critical value of 2.18 for the F distribution with 12 degrees of freedom for the denominator (based on the difference in the number of independent variables between models (a) and (d), ∞ degrees of freedom for the denominator based on the sample size.

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