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Return-to-Work Outcomes Among Social Security Disability Insurance Program Beneficiaries

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Abstract

We follow a sample of working-age Social Security Disability Insurance (DI) program beneficiaries for five years after their first benefit award to learn how certain factors help or hinder achievement of four return-to-work milestones: (1) enrollment for employment services provided by a state vocational rehabilitation agency or employment network, (2) start of trial work period (TWP), (3) completion of TWP, and (4) suspension or termination of benefits because of work. We find that younger beneficiaries are more likely than older beneficiaries to achieve the milestones and that substantial variation exists across impairment types. In addition, black beneficiaries and beneficiaries with higher levels of education have a greater probability of achieving the milestones, everything else equal. Also, such achievement is more probable if state unemployment is low at the time of the award. The probability of achieving the milestones is reduced by having a higher DI benefit amount at award, an award decision made at a higher adjudicative level, and by receiving Supplemental Security Income or Medicare benefits at the time of DI award. Finally, we find large variation in the relationships between state of residence and return-to-work outcomes and between award month and return-to-work outcomes. We attribute these variations to unobserved factors at the state level, policy changes over time, and trends in unobserved beneficiary characteristics.

Introduction

Social Security Disability Insurance (DI) is the largest federal income support program for working-age people with disabilities, providing support to 9.8 million disabled workers and other disabled adults in 2011 (Livermore, Stapleton, & O'Toole, 2011; Social Security Administration, 2012). Given that the number of people receiving DI benefits doubled over the last two decades and that the DI Trust Fund is projected to be exhausted in 2016 (Social Security Administration, 2012; Congressional Budget Office, 2010), there is strong interest in promoting employment among DI beneficiaries. Employment rates among DI beneficiaries have remained consistently low over the years (Mamun, O'Leary, Wittenburg, & Gregory, 2011). However, research suggests that a longitudinal perspective on return-to-work outcomes among DI beneficiaries provides a more positive picture of such outcomes than do cross-sectional statistics (Liu & Stapleton, 2011; Schechter, 1997; Muller, 1992). In this paper, we take a longitudinal view of the relationship between DI beneficiaries' individual characteristics and return-to-work outcomes as well as at the relationship between the outcomes and the local economic conditions the beneficiaries faced.

Until recently, most research on return-to-work outcomes among DI beneficiaries was based on cross-sectional data on beneficiaries in a given year. Estimates from cross-sectional analyses indicate that the overall employment rate among DI beneficiaries remained low in the recent past—from 14.1 to 15.7 percent between 1996 and 2007 (Mamun et al., 2011). However, benefits are withheld because of work for less than one-half of one percent of DI beneficiaries in any given month, and benefits are terminated because of work for another one-half of one percent in a typical year (SSA, 2012). The cross-sectional literature also showed that employment rates were relatively higher among younger beneficiaries, and that there are large variations by state of residence (SSA, 2012; Mamun et al., 2011; Livermore et al., 2009).

Recent longitudinal analyses of employment and use of work incentives by DI beneficiaries, however, provide a more comprehensive and positive outlook of the work-related outcomes among DI beneficiaries. Liu and Stapleton (2011) found that 10 years after their entry into the DI program, 28 percent of beneficiaries entering in 1996 had returned to work, 6.5 percent had their benefits suspended for work in at least one month, and 3.7 percent had their benefits terminated for work. The corresponding percentages are much higher for those who were younger than age 40 when entering the DI program. Liu and Stapleton (2011) also found large cross-state variation in employment-related outcomes. For a cohort of DI beneficiaries covered by the New Beneficiary Survey, Schechter (1997) found that 22 percent of the cohort was employed in the 10 years following entitlement. In an earlier longitudinal study of DI beneficiaries covered by the New Beneficiary Survey, Muller (1992) found that 10.2 percent of DI beneficiaries had worked after entitlement (the duration of the follow-up period is unclear, but it was shorter than 10 years), 6.1 percent completed the trial work period (TWP)—a DI work incentive that will be described in the next section, and 2.8 percent had their benefits terminated for work. Although much literature exists on employment rates for allowed and denied DI applicants in which applicants are followed for many years after filing for benefits (Bound, 1989; Chen & van der Klaauw, 2008; French & Song, 2011; Maestas, Mullen, & Strand, 2013; von Vachter, Song, & Manchester, 2011), this literature does not include an examination of the use of DI work incentives or suspensions and terminations for work.

In this paper, we build on the longitudinal assessment of employment-related outcomes among DI beneficiaries by following a group of working-age beneficiaries over a five-year period after their benefit award. We use linear probability models to estimate how individual and environmental factors are associated with achieving return-to-work milestones. In particular, we look at four return-to-work milestones for DI beneficiaries: enrollment for employment services,

TWP start, TWP completion, and achievement of nonpayment status following suspension or termination for work (STW). The analysis contributes to a growing body of literature by examining how various beneficiary characteristics (such as gender, age, impairment type, and education) and local economic conditions promote or inhibit attainment of these employment-related outcomes. We use linked administrative data from the Social Security Administration's (SSA) Disability Analysis File (DAF, previously known as the Ticket Research File) and the Rehabilitation Services Administration's (RSA) RSA-911 files for the period covering 1996 to 2009.

We next provide a brief description of the DI program and the work incentives offered by SSA under the program, followed by a discussion of the four return-to-work milestones analyzed in this paper. We then describe the data and methods, present summary statistics on key variables, and discuss our results.

The DI Program and Work Incentives

DI is a social insurance program designed to replace the loss of wages of adult workers following the onset of a long-term disability. To qualify for DI, beneficiaries must have a sufficient work history. The program uses an administrative disability determination process to assess (1) whether an applicant has a medically determinable impairment that has lasted or is expected to last for at least 12 months or result in death, and (2) whether the applicant is unable to engage in substantial gainful activity (SGA). SGA was defined in 2009 as the equivalent of the ability to earn more than $980 per month in unsubsidized employment for non-blind disability applicants and $1,640 per month for blind applicants. The non-blind SGA was fixed at $500 from January 1990 through June 1999. In July 1999, the SGA amount for non-blind applicants was increased to $700 and is adjusted annually based on the national average wage

index. The SGA for blind applicants, which was $960 in 1996, has always been adjusted annually based on the national average wage index.

The typical application process is long. According to the Social Security Advisory Board (2012), initial disability determinations take, on average, 120 days. Moreover, most initial determinations result in denials, and although many of them are appealed and eventually allowed, that can lengthen the application process to several years for some individuals. Despite the long process, there is strong incentive for workers with disabilities to apply for benefits, as they provide not only an important source of income but access to medical coverage. Almost all DI beneficiaries must complete a two-year waiting period to become eligible for Medicare, which provides a vital means of health care coverage to offset potentially expensive medical costs. For uninsured beneficiaries with high health care needs, the medical benefits can be more valuable in dollar terms than the actual cash benefits from DI.

Once an individual is awarded DI benefits, the program rules offer several employment-support provisions commonly referred to as work incentives to encourage beneficiaries to return to work. The DI work incentive relevant for this paper is the TWP, during which beneficiaries are permitted to work and earn at any level without loss of benefits, provided that they continue to meet medical-eligibility requirements. The TWP consists of nine months, which need not be consecutive—any nine months in a 60-month rolling window are counted. In 2009, a beneficiary was considered to be in a "TWP month" if he or she had monthly earnings of at least $700 or was working at least 80 self-employed hours. The TWP income limit increased from $200 in 2000 to $530 in 2001 and has been indexed to SSA's average wage index since.

After completing the TWP, beneficiaries enter an extended period of eligibility (EPE). Except for a three-month grace period, individuals who engage in SGA in any month after the EPE starts face a "cash cliff," meaning that they lose their entire cash benefit for that month (but

remain eligible for Medicare). During the first 36 months of this period, the beneficiary is entitled to full benefits in any month when he or she is not engaged in SGA, provided that benefits have not been terminated for medical recovery or some other reason. After the 36th month and any remaining grace-period months, DI cash benefits are terminated in the first month of SGA. Termination for work can occur after month 36, even if there is no suspension during the prior months. For those not terminated for work or any other reason, the EPE continues indefinitely. The prospect of DI benefit termination due to sustained earnings above SGA has been suggested as one explanation for the historically low levels of employment among the DI beneficiaries (see, for example, Gettens, Henry, Laszlo, & Himmelstein, 2012). (This theory is currently being tested in SSA's Benefit Offset National Demonstration [BOND], which reduces the extent of benefit loss when earning above SGA [Stapleton, Bell, Wittenburg, Sokol, & McInnis, 2010].)

DI beneficiaries are also eligible to enroll for employment services for which SSA will pay the service provider conditional on the beneficiary achieving sufficient earnings over a specified period. Ticket to Work (TTW), which was rolled out over a three-year period starting in 2002, is the current version of this work-incentive program. At award, the beneficiary receives a "ticket" that he or she may present to any qualified provider, called an employment network (EN), to obtain services. ENs include all state vocational rehabilitation agencies (SVRAs) and other private and public vocational service providers that meet criteria set by SSA and that have agreed to accept tickets.

Return-to-Work Milestones

In general, the path from DI award month to the termination for work month must pass the following markers in this order: month beginning TWP, TWP completion month, the first suspension month, and the first termination month. Beneficiaries need not enroll for employment

services along the way to termination for work; if that marker is passed, it may be passed at any month during the process. Benefits might be terminated for other reasons at any point—most commonly because of mortality or reaching the federal retirement age (at which point retirement benefits replace DI benefits), and less commonly because of medical recovery and other reasons.

In this paper, we focus on four return-to-work milestones: first enrollment for employment services, the beginning of TWP, TWP completion, and STW. The first return-to-work milestone is the month in which the beneficiary enrolled for employment services for the first time. The second return-to-work milestone is the first TWP month, which we term the "TWP start month." The third return-to-work milestone is the ninth TWP month, which we term the "TWP completion month." The EPE begins after TWP is completed. The fourth return-to-work milestone, termed the "first STW month," is achieved either when DI benefits are suspended because of work during the first 36 months of EPE or when they are terminated because of work after the 36th month of the EPE.

Data and Methodology

Data Sources and Study Population

Most of the data used in this study come from a set of analytic administrative data files constructed for the TTW evaluation, collectively called the Disability Analysis File, or DAF. We use the 2009 version of the DAF, which contains current and historical information on more than 22 million DI or Supplemental Security Income (SSI) beneficiaries who received a benefit in at least one month from January 1996 through December 2009 (Hildebrand et al., 2011). For the purpose of this study, annual cohort files were constructed for each annual DI award cohort from 1996 through 2004 to facilitate a fixed follow-up period of five years after the year of award. Cohort assignment is based on the month of a beneficiary's first DI award—defined as the month in which SSA first sent a payment to the beneficiary. The first month in which a payment is

actually made (that is, the award month) is usually after the first month for which the beneficiary is entitled to a benefit, which is often used in SSA's statistics to classify beneficiaries by entry year (for example, SSA 2012). We use the award month because our focus is on the activities of beneficiaries once they become informed of their award and are entitled to use the DI work incentives. Although it is possible for an individual to have multiple entitlements, he or she is assigned to just one cohort, according to the year of the *first* payment. All analyses are conducted using pooled data from all cohorts.

Although data are available for all annual cohorts through 2009, we restrict the analysis to cohorts with complete data for the five years (or 60 months) after the first DI award. We use a five-year follow-up period because previous research indicates that most first suspensions of benefits due to work occur within five years after award (Liu & Stapleton, 2011). In addition, allowing for varying follow-up periods for different annual cohorts would have given beneficiaries from earlier cohorts more time to achieve the return-to-work milestones than those from later cohorts, and that would have made it difficult to interpret results from analyses of pooled data across cohorts.

Because we are interested in return-to-work outcomes among working-age beneficiaries, we exclude beneficiaries who were younger than age 18 as of December 31, 2004, had died before January 1, 1996, or had passed full retirement age (FRA) as of the month of initial entitlement or by January 1, 1996. We also exclude from the study those who died or reached age 65 within five years of award. In addition, following Liu and Stapleton (2011), we exclude individuals from the analysis if their month of first entitlement was more than 12 years before the first observed payment. Disabled widows/widowers and disabled adult children who otherwise met the above criteria are treated the same as disabled workers in each cohort. Finally, to facilitate shorter processing times, we use a 10 percent sample instead of the full sample. The final

analytic sample includes 417,238 individuals representing more than four million DI beneficiaries who met our sample selection criteria.

We supplemented the DAF data with matched data on cases closed by SVRAs as reported in RSA-911 data for fiscal years 1998–2009, under an inter-agency agreement between SSA's and RSA's parent agency, the Department of Education. These data contain information on closed SVRA cases only, as the state agencies report information on individual cases only when the cases are closed. In addition, we used state-level unemployment rates (not seasonally adjusted) from the Local Area Unemployment Statistics (LAUS) database of the Bureau of Labor Statistics.

Methods

We use descriptive and multivariate analysis techniques in this study, using SAS 9.2. For each of the four return-to-work milestones, we calculate the cumulative percentage of beneficiaries that had achieved a milestone as of month t after award (up to $t = 60$), by age group and impairment group, using nonparametric Kaplan-Meier estimation.

We use linear probability models to produce estimates of the relationship between the explanatory variables and the likelihood that a milestone was reached within the first five years after DI award. Given the dichotomous nature of the dependent variables, one could use a nonlinear estimation model, such as logistic regression. We use the linear probability model because it provides a convenient approximation of outcome probability around the mean values of the covariates (see, for instance, Wooldridge, 2010), while allowing for a more direct and intuitive interpretation of the results. For each return-to-work milestone, we estimate an equation of the following form

Equation (1) $$Y_i = \alpha_i + \beta' X_i + \gamma' State_i + \delta' Month_i + \varepsilon_i$$

where: Y_i is a dummy variable for whether the return-to-work milestone was reached by beneficiary i, X_i is the vector of explanatory variables, $State_i$ is the vector of indicators for state of residence at DI award, $Month_i$ is the vector of indicators for month of DI award, and ε_i is a random disturbance. We estimate a separate model for each return-to-work milestone. In these models, each coefficient can be interpreted as the percentage change in the probability of achieving the milestone associated with a unit change in the explanatory variable. The standard errors for all estimated parameters are adjusted for clustering at the state level.

Because the data on the beneficiaries' return-to-work outcomes are inherently censored unless they had achieved the outcome during the observation period, application of a duration analysis method would be quite appropriate. Recognizing this, we also analyzed the data using the Cox proportional hazard model, which allows us to hold other observable characteristics equal while we examine the influence of a particular characteristic on beneficiary outcomes in a framework that accommodates the censored nature of the observed outcomes. The results from the hazard models are qualitatively similar to the linear probability model estimates we present in this paper. We focus on the linear probability model estimates because they allow for a more direct and intuitive interpretation of the results.

Variables

The outcome variables used in our analysis are binary indicators for the achievement of a particular return-to-work milestone within the first five years after DI award. We identify first-time service enrollment when beneficiaries assign their tickets to an EN, according to DAF data, or are determined eligible for vocational rehabilitation services, according to RSA-911 data—whichever happens earlier. We identify "TWP start" when the first recorded TWP month is observed, "TWP completion" when the ninth recorded TWP month is observed, and "first STW

month" when the first month in which DI benefits are suspended or terminated because of work is observed.

We consider several beneficiary characteristics at the time of DI award. These include gender, age, impairment type, race/ethnicity, years of education, whether they were recipients of SSI, whether they were eligible for Medicare, the state of residence at award, and the month of award. We constructed six age groups: 18–24, 25–29, 30–39, 40–49, 50–57, and 58–59. (We constructed separate groups for ages 58 to 59 at award and ages 50 to 57 at award because the former reach SSA's early retirement age of 62 within the five-year follow-up period applied in our analysis.) We also constructed seven primary impairment groups: affective disorders, other psychiatric disorders, intellectual disability, sensory impairments, back disorders, other musculoskeletal disorders, and other physical disorders (the categorization scheme used to classify SSA impairment codes into the impairment groups is available from the authors on request).

In addition, we look at measures more specifically related to the DI program: the DI benefit amount at award (adjusted for inflation), adjudicative level for the DI award decision (initial review at the Disability Determination Service [DDS] office, reconsideration at DDS, and after appeal at the administrative law judge [ALJ] level), number of dependent beneficiaries, disabled adult child (DAC) status, and disabled widow(er) beneficiary (DWB) status. A DAC receives benefits on the basis of a parent's entitlement as a primary beneficiary—a parent who is a disabled worker, retirement beneficiary, or deceased worker, and must be deemed unable to work as of the age of 22 under the same medical criteria applied to disabled workers. A disabled widow(er) receives benefits on the basis of a deceased spouse's entitlement as a "primary beneficiary" and must be age 50 or older and deemed unable to work under the same medical criteria applied to disabled workers. (See SSA [2012] for further details.)

In estimating the linear probability models, we include all the beneficiary characteristics mentioned above as covariates. To account for varying economic conditions that may affect a beneficiary's decision to seek employment and chances to find a job, we also include as covariates the state unemployment rate at month of award as well as the percentage change in the state unemployment rate between the month of award and the end of the five-year follow-up period. We also include fixed effects for the state of residence at award and for the month of DI award (for the 108 months from January 1996 through December 2004). The award month fixed effects capture variation in outcomes related to the economic and policy environment at that month but not captured by the state fixed effects and unemployment variables.

Summary statistics on beneficiary characteristics, state economic conditions, and outcome measures included in our analysis are discussed in the next section.

Summary Statistics

Descriptive Statistics on Beneficiary Characteristics and State Economic Conditions

In Table 1, we summarize the characteristics of the more than 4 million DI beneficiaries represented in our analytic sample. Slightly less than half (49 percent) of the beneficiaries in our sample are female. About 45 percent were age 50 or older at the month of award; 27 percent were between ages 40 and 49; and about 28 percent were ages 18 to 39. The beneficiaries had a wide range of impairments. About 27 percent had affective or other psychiatric disorders, 26 percent had back disorders or other musculoskeletal disorders, and 39 percent were classified as having other physical disorders. The remaining beneficiaries were classified as having an intellectual disability percent (5 percent) or a sensory impairment (about 3 percent with severe visual, hearing, or speech impairment). A large majority of the beneficiaries (71 percent) were non-Hispanic white, 18 percent were non-Hispanic black, and about 7 percent were Hispanic. Data on the level of education is missing for about 23 percent of the beneficiaries. About

77 percent of beneficiaries with non-missing data (and 60 percent overall) had completed 12 or fewer years of education at the time of DI award.

The monthly DI benefit amount at award was, on average, $848. More than 13 percent of beneficiaries had been receiving SSI benefits when they were awarded DI benefits and about 14 percent were Medicare-eligible at the time of award. DI beneficiaries must wait 24 months after their first month of entitlement to benefits before they are eligible for Medicare (except for the very small number who have amyotrophic lateral sclerosis [ALS] or end-stage renal disease) and are entitled to Medicare already in the DI award month if the DI entitlement month is at least 24 months prior to award. For a large majority (86 percent) of the beneficiaries, award decisions were adjudicated by the DDS office—either at the initial determination or through a reconsideration conducted by the DDS after the applicant appealed an initial denial of benefit. For about 11 percent of the beneficiaries, the application was allowed at the ALJ level or higher, after one or more additional appeals, usually involving an in-person hearing, and often assisted by an attorney. Most of the beneficiaries (about 70 percent) had no dependent beneficiaries at the time of award, 12 percent had one dependent beneficiary, and 13 percent had two or more dependent beneficiaries. We also found that about 4.5 percent of the beneficiaries in our analytic sample received benefits as DAC of disabled, retired, or deceased Social Security beneficiaries; about 1.5 percent received disabled widow(er) benefits.

On average, the beneficiaries in our sample experienced worsening economic conditions in their state of residence at award during the five-year follow-up period. The mean state unemployment rate at the month of award was 5.2 percent, and state unemployment increased on average by 16.9 percent between the month of award and the end of the five-year period observed.

Achievement of Return-to-Work Milestones

In Table 2, we show the percentages of DI beneficiaries who achieved the return-to-work milestones as well as the median and mean times (in months) in which those milestones were achieved, conditional on reaching each milestone. Statistics are shown for the overall analytic sample and for the age and impairment groups. Overall, 7.5 percent of the DI beneficiaries in our sample enrolled for employment services for the first time within five years after award, 9.8 percent began a TWP within five years after award, 8.0 percent had completed a TWP, and 5.2 percent achieved at least one STW month. For each of the four milestones, the mean duration is somewhat larger than the corresponding median duration, indicating that a minority of beneficiaries achieve the milestones in durations that are longer than the mean. Consistently across the four return-to-work milestones, the percent of beneficiaries achieving a milestone is highest among the youngest age group and declines with age. Using TWP completion as an example, 19.4 percent of beneficiaries ages 18–24 at award complete the TWP within 60 months of award, compared to 12.2 percent of those ages 30–39 at award and 4.4 percent of those ages 50–57 at award. Duration to milestone, among those who did reach that milestone, appears to have an inverse-U-shape with respect to age: those younger than age 30 and those age 50 or older at award achieved all three return-to-work milestones slightly sooner, on average, than those ages 30 to 49 at award.

The percentage who reached each milestone varied considerably across impairment groups. Beneficiaries with sensory impairments had the highest return-to-work percentages for each of the milestones: 22.2 percent had enrolled for employment services, 14.7 percent had started the TWP, 16.5 percent had completed the TWP, and 9.0 percent had achieved at least one STW month. Also consistent across all four return-to-work milestones: beneficiaries with back and other musculoskeletal disorders had the lowest and second-lowest percentages achieving a

milestone, respectively. Interestingly, beneficiaries with intellectual disabilities had the second-highest percentage completing TWP (11.5 percent) but only the fifth-highest percentage with at least one STW month (4.5 percent), implying that a relatively high fraction of beneficiaries in this group do not move from completing TWP to suspension or termination of benefits because of work.

The conditional median and mean durations (in number of months) to reaching a return-to-work milestone also varied considerably across impairment groups. Consistent across all four milestones, beneficiaries with back disorders had the highest median and mean durations until any milestone. For three of the four milestones (TWP start, TWP completion, and STW), beneficiaries with intellectual disability and sensory impairments had the two lowest conditional median and mean durations until reaching each milestone. It appears that larger fractions of beneficiaries with sensory impairments achieved these return-to-work milestones, and those who did reach a milestone had reached it sooner relative to the other impairment groups. The opposite is true for beneficiaries with back disorders: a smaller fraction of them achieved these return-to-work milestones, and those who did reach a milestone reached it later relative to the other impairment groups.

Note that the administrative data are incomplete with respect to the TWP start month, which explains how, for certain groups, the estimated percentage for TWP completion is higher than the estimated percentage for TWP start. Our understanding is that the TWP start date is often missing because there is no administrative reason to record it if the TWP completion date is determined at the same time, as is often the case for beneficiaries with missing TWP start month.

Additional analysis (not shown) suggests that the five-year horizon for analyzing return-to-work milestones is quite appropriate. In the first five years after award, there is some fluctuation in the ranking of impairments groups in their progression over time to the milestones. By the end

of the fifth year, however, the relative ranks across age and impairment groups had largely stabilized for all outcomes. This implies that we are unlikely to arrive at misleading conclusions by focusing on a five-year observation period instead of on a longer one. Although we could observe return-to-work outcomes for a longer window of time for earlier DI award cohorts, we would lose the ability to analyze data for more recent cohorts. It is reassuring that by focusing on a five-year horizon we are able to include more recent new awardees in the analysis without losing critical information about the dynamics of their attaining the milestones.

The differences across impairment groups in the percentage who reached each milestone might be driven by differences in the age distribution across impairment groups, and vice versa. The multivariate analyses we present below allow us to estimate the association between age and achievement of the milestones, keeping the impairment type constant. The analyses also allow us to estimate the association between impairment type and achievement of the milestones, keeping the age group constant. In the next section, we begin by taking a look at the rate at which beneficiaries in different age and impairment groups have attained each milestone over the five-year period following DI award. This descriptive analysis is followed by a multivariate analysis of the relationship of return-to-work outcomes and various individual, economic, and other factors.

Results

In Table 3, we present estimates from linear probability models of the relationship between beneficiary characteristics and achievement of the four return-to-work milestones—service enrollment, TWP start, TWP completion, and STW. The multivariate analysis allows us to examine the relationship between the outcome and a beneficiary characteristic or a measure of the state's economic condition, while holding other observable characteristics constant. We account for state fixed effects in the models by including a dummy variable for the beneficiary's

state of residence at award. We also account for award-month fixed effects by including a dummy variable for each award month. As noted above, we also ran a duration analysis version of these models (specifically, Cox proportional hazard models) and obtained similar results. We present the linear probability results here for ease of interpretation.

Holding other characteristics constant, younger age at award is associated with a higher probability of achieving each outcome within the five years after DI award. For instance, compared to beneficiaries in age group 50–57, beneficiaries in the 18–24 age group are 20.4 percentage points more likely to have started the TWP; the estimated probability of achieving TWP start declines monotonically for successively older groups. The pattern of estimates across the age categories is similar for service enrollment, TWP completion, and STW. In addition, the difference between younger and older beneficiaries appears to be smaller for STW than for the other three milestones. These estimates reinforce the descriptive findings from the cumulative percentages presented above, as they show that even after controlling for other beneficiary characteristics, the economic condition in their state of residence, and the month of award, younger beneficiaries are likely to achieve service enrollment, TWP start, TWP completion, and STW at a much higher rate over the five-year follow-up period. The reason they are more likely to attain these milestones than older awardees is not due simply to differences in impairments or characteristics other than age. Comparison of results from bivariate and multivariate analyses (comparison results not shown) indicates that except for service enrollment, the negative relationship between age and each milestone is stronger after we account for impairments and other characteristics in the regression. These results are consistent with recent findings from other studies showing that DI beneficiaries younger than age 40 were more likely to have achieved employment than those who were age 40 and older, viewed from both a cross-sectional perspective (Mamun et al., 2011) or a longitudinal perspective (Liu &

Stapleton, 2011). Earlier work (Hennessey & Muller, 1995) also showed higher return-to-work outcomes for younger DI beneficiaries than for older beneficiaries.

Results from the linear probability models for the relationship between impairment type and return-to-work outcomes are also similar to the findings from the descriptive cumulative percentages reported above. Compared to beneficiaries identified as having other physical disorders, those with sensory impairment have a higher probability of achieving service enrollment, TWP start, TWP completion, and STW, whereas those with back disorders, other musculoskeletal disorders, and other psychiatric disorders have a lower probability of achieving these outcomes. Beneficiaries with affective disorders and intellectual disabilities have a greater probability of completing the TWP relative to those with other physical disorders (estimated coefficients of 0.004 and 0.022, respectively), but at the same time, beneficiaries in these groups have a lower probability of attaining STW (estimated coefficients of -0.008 and -0.031, respectively). The negative estimates for beneficiaries with back disorders and other musculoskeletal disorders are consistent with cross-sectional results on employment presented in Mamun et al. (2011).

We also looked at the relationship of a range of other covariates with the four return-to-work outcomes analyzed here. We found that for all four outcomes, estimated probabilities are lower for females compared to males (and especially so for service enrollment), substantially higher for blacks compared to whites, and they increase with years of education. Beneficiaries with 16 or more years of education are 5.5 to 7.0 percentage points more likely to achieve the three return-to-work milestones compared to those with 0 to 11 years of education. The results for female and years of education are consistent with earlier studies of DI beneficiaries (such as Hennessey & Muller, 1995). The results for blacks are consistent with those from the cross-sectional analysis of employment in Mamun et al. (2011). A possible explanation for the higher estimates among

blacks is that black beneficiaries might be more driven or inclined to work than white beneficiaries. Further, black beneficiaries might have less external resources and family support they can rely on than do white beneficiaries, and, therefore, have stronger incentives to return to work. Alternatively, the mix of skills, occupations, and impairment severity among beneficiaries who are black may differ from those who are white in ways that increase the former's likelihood of returning to work.

In addition, a higher DI benefit amount at award was negatively related to all four outcomes, as a $100 increase in benefit reduced the probability of achieving the four outcomes by 0.1 to 0.3 percentage points (the DI benefit amount was divided by 100 for the regression analysis compared to the measure presented in Table 1). We also found that the level of adjudication of the DI award decision is predictive of the achievement of outcomes among these beneficiaries, with higher probabilities for those awarded benefits initially than for those awarded benefits only after one or more appeals. Compared to beneficiaries whose award decisions were made through the initial review at the DDS, beneficiaries whose award decisions were made through DDS reconsiderations or at the ALJ level through the appeals and hearing process had substantially lower probability of achieving any of these outcomes. This finding is somewhat counterintuitive if we assume that, on average, awards at the initial DDS level are to beneficiaries with more severe impairments than those denied at the initial DDS level. However, beneficiaries whose award decisions were made after an initial denial faced longer processing times and had gone through more involved processes to establish their disability as well as their inability to engage in SGA. A recent study shows that longer processing time reduced post-application employment for both denied and allowed applicants (Autor, Maestas, Mullen, & Strand, 2011); our results are consistent with findings from this study.

Receipt of SSI benefits and Medicare eligibility at the time of DI award as well as DAC rather than disabled worker status are each associated with lower probabilities of achieving the return-to-work milestones (except for the statistically insignificant estimate for receipt of SSI benefits in the service enrollment regression). For SSI receipt and Medicare eligibility, a possible common explanation for lower probabilities of achieving the return-to-work outcomes is that beneficiaries might perceive that by returning to work they will risk losing the substantial benefits they receive from these programs. There are, however, other possible explanations. Those eligible for Medicare already at award had to wait a long time for their SSDI award; those on SSI at award did not have established work histories prior to benefit receipt and likely worked themselves onto SSDI with low levels of earnings. DAC have had significant impairments since age 22 at the latest, and often since birth; they might also be receiving support from a parent, and, therefore, have less incentive to work.

In addition, we found that local economic conditions at the time of award play an important role in determining beneficiary outcomes. Our estimates suggest that a one percentage point increase in the state unemployment rate reduces the probability of achieving TWP start, TWP completion, and STW by 0.4 to 0.5 percentage points (the estimated coefficient for state unemployment at award in the service enrollment regression is also positive but not statistically significant). Thus, beneficiaries first awarded benefits at a time when unemployment in their state was high were substantially less likely to achieve TWP start, TWP completion, and STW than those who were first awarded benefits at a time when state unemployment was low, holding everything else equal. We also found that, after accounting for local economic conditions at the time of DI award, the month of award and the state fixed effects, changes in the unemployment rate from the month of award through the end of the five-year follow-up period did not have any statistically significant relationship with the likelihood of achieving any of the milestones. A

clear implication is that the condition of the state economy at the time of award influences the beneficiaries' likelihood of successful labor market participation more than how the state economy evolves over the subsequent years.

We also found that, after controlling for other factors, there is large variation in return-to-work outcomes across state of residence at award. As noted earlier, each of the estimated linear probability models included indicators of state of residence at award. The state fixed effects for the four return-to-work milestones maintain roughly the same rank order, with considerably more variation in service enrollment compared to the other three milestones (the state fixed effect estimates are available from the authors on request). The District of Columbia, Vermont, Alaska, Massachusetts, and Minnesota have the five highest state fixed effects for STW. Georgia, North Carolina, Tennessee, South Carolina, and Alabama have the five lowest state fixed effects for STW. Some of these results appear to be different from what we would expect based on estimates presented for DI award cohorts in Liu and Stapleton (2011). This might be because we controlled for various beneficiary characteristics, the state economic conditions, and the month of award, whereas Liu and Stapleton (2011) controlled for only differences in age and gender.

Finally, Figure 1 is a plot of the estimated coefficients for each month of award from all four regressions (January 1996 is the reference month). Because the regression models also accounted for the state of residence and state unemployment rate at award, these coefficients (award-month fixed effects) are explaining variation in the beneficiaries' likelihood of achieving each outcome that was left unexplained by the business-cycle status of the state economy at award (as measured by the unemployment rate variables), or the state policies that did not change during the analysis period. The award-month fixed effects likely capture any effects of changes in program policy, including the 1999 SGA increase, the 2001 increase in the minimum TWP

amount, and the TTW rollout. Those awarded benefits well before a certain policy change would not be affected by that policy, and those awarded benefits close to or after the policy change will be affected. Because the unemployment rate variables are imperfect measures of labor-market strength in each state, the award-month effects likely also capture national-level effects of the business cycle not captured by the state unemployment rates.

Another possible factor that might be captured by the award-month fixed effects is changes in the unobserved characteristics of new beneficiaries who enter the DI program over time. Notably, the award-month fixed effects for TWP start, TWP complete, and STW all trend downward between January 1996 and January 2001; from February 2001 through June 2003, the award-month fixed effects for these three outcomes show a slightly upward trend, followed by a steadily falling trend through December 2005. In contrast, the trend in the award-month fixed effects for service enrollment remains fairly stable between January 1996 and January 2001, but it declines steadily from February 2001 through December 2005. A possible explanation for these divergent trends in the estimated award-month fixed effects is that those awarded new DI benefits during a period of economic expansion (early 1996 through early 2001) were, in some unobserved ways, progressively less able and/or less inclined to work (irrespective of whether they enrolled for services). Similarly, after the recession of 2001, those awarded new DI benefits were, for a while at least, progressively more able and/or more inclined to work, and consequently the rates of TWP start, TWP complete, and STW began to rise again.

Conclusion

By following a group of working-age DI beneficiaries over the five years after their benefit award, we gained a longitudinal view of beneficiaries' achievement of four important return-to-work milestones—enrollment for employment services, TWP start, TWP completion, and STW.

We were also able to establish how achieving those outcomes varies with beneficiary characteristics and the economic environment.

We used descriptive analyses and linear probability models to identify the role of different factors that help or hinder new DI beneficiaries' return-to-work outcomes. Our estimates for the cumulative percentage achieving each milestone highlight the strong relationships of age at DI award and impairment type with achievement of the return-to-work milestones. We found that younger beneficiaries are more likely than older beneficiaries to enroll for employment services, start TWP, complete TWP, and attain STW; there are, in fact, substantial differences between beneficiaries who were under age 40 at award and those who were age 40 and above. Differences in the achievement of return-to-work outcomes are less pronounced across impairment type than age, and they are not consistent across the milestones. Beneficiaries with sensory impairments show the highest likelihood of achieving any of the milestones, and those with back and other musculoskeletal disorders show the lowest two likelihoods, but the rank of the other impairment groups changes across the milestones.

Results from the linear probability models indicate that differences across age and impairment groups in achievement of the four return-to-work milestones persist even after accounting for other beneficiary characteristics and local economic conditions that may affect a beneficiary's decision to seek employment and the chance of finding a job. We found that the probability of achieving the return-to-work milestones increases with years of education, being black, and facing more favorable economic conditions at the time of award (lower unemployment). We also found attaining milestones decreases with a higher DI benefit amount at award, an award decision made at a higher adjudicative level, receipt of SSI or Medicare benefits at the time of DI award, and being a DAC.

We also found large variation in the relationship between state of residence and return-to-work outcomes. Because we accounted for observed beneficiary characteristics as well as state unemployment rates at award and the change in the rate after award, we can attribute the remaining differences across states only to unobserved factors. Such factors may include, among other things, the availability and generosity of other benefits and services for people with disability; the industrial composition within the state; other labor market factors not captured by the unemployment rate; population density, income per capita, and relative cost of living; cultural differences; or unobserved beneficiary characteristics that differ across states. Finally, we found considerable variation in the relationship between award month and return-to-work outcomes. We attribute this variation to policy changes (which we did not account for in our models) and trends in unobserved beneficiary ability and/or inclination to work.

The findings have important implications for SSA's efforts to help beneficiaries return to work. One is that it might be more efficient to direct such efforts to recent awardees under the age of 40, as they are the most likely to return to work and might otherwise remain on the rolls for several decades. Perhaps these same groups should be targeted by early-intervention efforts designed to help workers with disabilities stay in the labor force rather than enter DI. It would also be worthwhile to conduct more research on how various DI program policies differentially affect the return-to-work outcomes of different groups of beneficiaries, how these impacts are influenced by the concurrent availability of benefits and services other than DI, and what factors explain the variation across states and time.

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Table 1. Descriptive Statistics for Beneficiaries First Awarded Benefits in 1996 to 2004

Beneficiary characteristic	Mean	Standard deviation
Gender		
Female	48.9	50.0
Male	51.1	50.0
Missing	0.0	1.5
Age at award		
18–24	5.9	23.5
25–29	5.1	22.0
30–39	17.1	37.6
40–49	27.1	44.4
50–57	35.5	47.8
58–59	9.4	29.2
Impairment		
Affective disorders	15.3	36.0
Other psychiatric disorders	11.3	31.6
Intellectual disability	5.4	22.5
Sensory impairments	2.7	16.1
Back disorders	14.9	35.6
Other musculoskeletal disorders	11.3	31.7
Other physical disorders	39.2	48.8
Race/ethnicity		
White, non-Hispanic	70.5	45.6
Black, non-Hispanic	18.3	38.7
Hispanic	6.8	25.1
Other/unknown	4.3	20.4
Education at award		
0 to 11 years	21.9	41.4
12 years	37.7	48.5
13 to 15 years	11.9	32.3
16 years or more	5.9	23.6
Missing	22.7	41.9
Monthly DI benefit at award (2004 dollars)	848.0	391.8
SSI at award	13.4	34.1
Medicare eligibility at award		
Yes	14.2	34.9
No	84.4	36.3
Missing	1.4	11.8
Adjudicative level		
Initial DDS decision	59.8	49.0
Reconsideration DDS decision	26.4	44.1
ALJ in Office of Hearing and Appeals	10.5	30.6
Missing	3.4	18.1
Number of dependent beneficiaries at award		
0	69.8	45.9
1	11.5	31.9
2 or more	12.6	33.2
Missing	6.1	24.0
Disabled adult child (DAC)		
Yes	4.5	20.7
No	81.6	38.8
Missing	13.9	34.6
Disabled widow(er)		
Yes	1.5	12.0
No	98.5	12.0
State unemployment at award	5.2	1.5
Percent change in state unemployment during the five years after DI award	16.9	38.4
Sample size	417,238	

Note: Table shows percentages unless otherwise noted.

Source: Authors' calculations based on 10 percent sample of all first time DI awardees (including DAC and disabled widow[er]s) between 1996 and 2004 from SSA's 2009 DAF data. The sample excludes those who died or reached age 65 within 5 years of award as well as individuals whose month of first entitlement was more than 12 years before the first observed payment.

Table 2. Percentage of Beneficiaries Who Achieved Return-to-Work Milestones Within Five Years of Award and Median and Mean Times to Achieve Milestones in Months, by Age and Impairment

	Service enrollment				TWP start				TWP complete				STW			
	%	(SE)	Median time (month)	Mean time (month)	%	(SE)	Median time (month)	Mean time (month)	%	(SE)	Median time (month)	Mean time (month)	%	(SE)	Median time (month)	Mean time (month)
All	7.5	(0.04)	20.0	22.8	9.8	(0.05)	20.0	22.8	8.0	(0.04)	25.0	26.7	5.2	(0.03)	28.0	29.9
Age at award																
18–24	25.3	(0.28)	19.0	22.1	21.9	(0.26)	18.0	21.5	19.4	(0.25)	24.0	26.0	12.6	(0.21)	29.0	30.1
25–29	18.0	(0.26)	21.0	23.4	19.9	(0.27)	18.0	22.1	17.0	(0.26)	24.0	26.6	11.9	(0.22)	28.0	30.4
30–39	12.0	(0.12)	21.0	23.5	15.2	(0.13)	20.0	23.2	12.2	(0.12)	26.0	27.5	8.6	(0.11)	29.0	30.6
40–49	7.1	(0.08)	20.0	23.3	9.7	(0.09)	20.0	23.4	7.5	(0.08)	25.0	27.2	5.1	(0.07)	28.0	29.9
50–57	2.7	(0.04)	18.0	21.5	5.4	(0.06)	20.0	22.7	4.4	(0.05)	23.0	26.1	2.3	(0.04)	26.0	28.4
58–59	1.4	(0.06)	14.0	18.9	4.2	(0.10)	19.0	22.5	3.5	(0.09)	21.0	25.2	1.6	(0.06)	23.0	27.8
Impairment																
Affective disorders	10.5	(0.12)	21.0	23.6	13.6	(0.14)	21.0	23.9	9.9	(0.12)	28.0	29.3	6.4	(0.10)	31.0	32.1
Other psychiatric disorders	12.6	(0.15)	19.0	22.6	12.7	(0.15)	19.0	22.4	9.9	(0.14)	24.0	26.5	5.7	(0.11)	29.0	30.7
Intellectual disability	14.5	(0.24)	20.0	23.3	10.2	(0.20)	17.0	20.8	11.5	(0.21)	17.0	21.7	4.5	(0.14)	26.0	27.6
Sensory impairments	22.2	(0.39)	18.0	21.3	14.7	(0.34)	15.0	19.4	16.5	(0.35)	19.0	23.0	9.0	(0.27)	25.0	27.8
Back disorders	3.2	(0.07)	22.0	23.9	6.2	(0.10)	25.0	26.9	4.5	(0.08)	30.0	30.5	3.0	(0.07)	33.0	32.6
Other musculoskeletal disorders	3.3	(0.08)	20.0	22.7	7.0	(0.23)	22.0	24.3	5.5	(0.10)	26.0	27.4	3.4	(0.08)	30.0	31.1
Other physical disorders	5.7	(0.06)	19.0	19.0	9.4	(0.07)	18.0	21.6	7.7	(0.00)	23.0	26.1	5.7	(0.06)	26.0	28.4

Source: Authors' calculations based on 10 percent sample of all first time DI awardees (including DAC and disabled widow[er]s) between 1996 and 2004 from SSA's 2009 DAF data. The sample excludes those who died or reached age 65 within 5 years of award as well as individuals whose month of first entitlement was more than 12 years before the first observed payment.

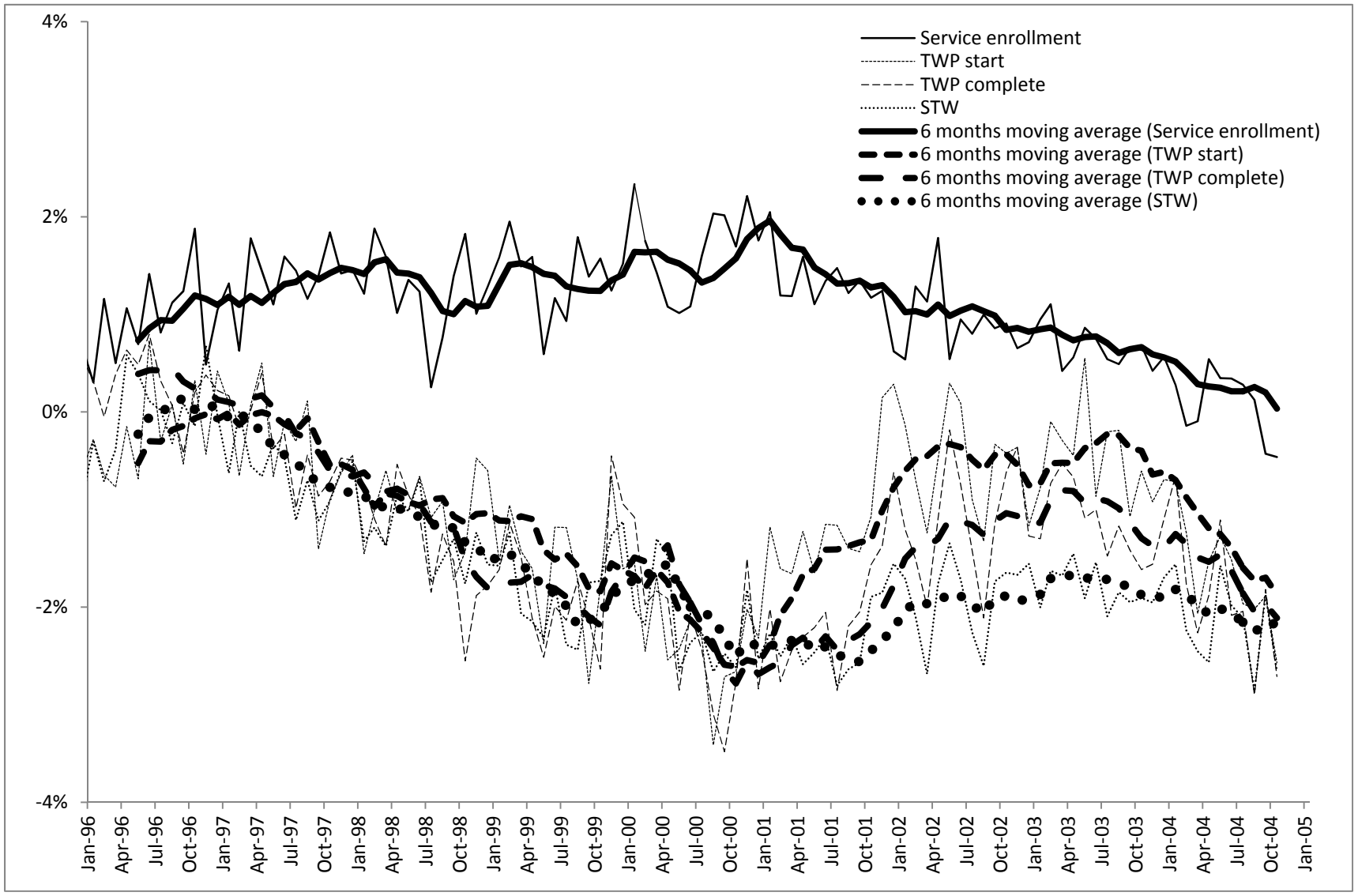
Notes: Because of incomplete data on the TWP start month, for certain groups, the estimated percentage for TWP completion is higher than the estimated percentage for TWP start.

The median and mean time to achieving a return-to-work milestone are each conditional on reaching that milestone.

Table 3. Coefficients from Linear Probability Model Regressions

	Service enrollment		TWP start		TWP completion		STW	
Variable	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Age (reference group is 50–57)								
18–24	0.203	0.000	0.204	0.000	0.185	0.000	0.145	0.000
25–29	0.128	0.000	0.148	0.000	0.127	0.000	0.107	0.000
30–39	0.081	0.000	0.099	0.000	0.081	0.000	0.071	0.000
40–49	0.038	0.000	0.042	0.000	0.032	0.000	0.030	0.000
58–59	-0.010	0.000	-0.013	0.000	-0.010	0.000	-0.009	0.000
Impairment (reference group is other physical disorders)								
Affective disorder	0.029	0.000	0.021	0.000	0.004	0.017	-0.008	0.000
Other psychiatric disorders	0.025	0.000	-0.007	0.000	-0.011	0.000	-0.026	0.000
Intellectual disability	0.013	0.068	-0.021	0.000	0.022	0.000	-0.031	0.000
Sensory impairment	0.135	0.000	0.025	0.000	0.064	0.000	0.014	0.000
Back disorders	-0.005	0.002	-0.005	0.033	-0.007	0.001	-0.010	0.000
Other musculoskeletal disorders	-0.006	0.000	-0.004	0.002	-0.005	0.000	-0.009	0.000
Female	-0.013	0.000	-0.004	0.004	-0.003	0.003	-0.005	0.000
Race/ethnicity (reference group is white)								
Black	0.014	0.000	0.026	0.000	0.023	0.000	0.020	0.000
Hispanic	-0.008	0.045	-0.005	0.200	-0.006	0.029	0.002	0.089
Other	-0.011	0.000	-0.005	0.209	-0.002	0.666	0.003	0.225
Education level (reference group is 0–11)								
12	0.022	0.000	0.016	0.000	0.016	0.000	0.010	0.000
13–15	0.048	0.000	0.044	0.000	0.041	0.000	0.031	0.000
16+	0.055	0.000	0.070	0.000	0.069	0.000	0.055	0.000
Missing	0.025	0.000	0.028	0.000	0.036	0.000	0.024	0.000
Monthly DI benefit at award	-0.003	0.000	-0.001	0.000	-0.002	0.000	-0.001	0.000
Adjudicative level (reference group is initial DDS)								
Reconsideration DDS	-0.013	0.000	-0.027	0.000	-0.027	0.000	-0.018	0.000
Hearing and appeals	-0.023	0.000	-0.036	0.000	-0.041	0.000	-0.029	0.000
Other	-0.003	0.222	-0.007	0.021	0.004	0.287	-0.005	0.031
Number of dependents at award (reference group is 0)								
1	-0.006	0.001	0.004	0.015	-0.005	0.000	-0.005	0.000
2 or more	-0.012	0.000	0.010	0.001	-0.002	0.252	-0.001	0.580
Missing	-0.009	0.035	-0.035	0.000	-0.046	0.000	-0.025	0.000
SSI at award	0.001	0.492	-0.005	0.024	-0.014	0.000	-0.010	0.000
Medicare at award (reference group is no Medicare)								
Yes	-0.015	0.000	-0.040	0.000	-0.029	0.000	-0.013	0.000
Missing	-0.001	0.669	-0.023	0.000	-0.029	0.000	-0.014	0.000
DAC status (reference group is not DAC)								
DAC	-0.031	0.000	-0.106	0.000	-0.119	0.000	-0.082	0.000
Missing	-0.009	0.000	-0.006	0.002	-0.006	0.001	-0.003	0.028
Disabled widow(er)	0.002	0.531	0.014	0.038	0.026	0.000	0.014	0.000
State unemployment rate at award	0.002	0.239	-0.005	0.000	-0.005	0.000	-0.004	0.000
Percent change in state unemployment rate	0.003	0.375	-0.001	0.642	0.003	0.399	0.000	0.877
State fixed effects	Yes		Yes		Yes		Yes	
Award month fixed effects	Yes		Yes		Yes		Yes	
Sample size	417,148		417,148		417,148		417,148	

Figure 1. Award-Month Fixed Effects from Linear Probability Model Regressions



Note: Reference month is January 1996.

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