The employment effects of terminating disability benefits

Timothy J. Moore

George Washington University, United States
NBER, United States

ABSTRACT

Few social security disability insurance (DI) beneficiaries return to the labor force, making it hard to assess their likely employment in the absence of benefits. Using administrative data, I examine the employment of individuals who lost DI eligibility after the 1996 removal of drug and alcohol addictions as qualifying conditions. Approximately 22% started working at levels that would have disqualified them for DI, an employment response that is large relative to their work histories. Those who received DI for 2-3 years had the largest response, suggesting that a period of public assistance may maximize the employment of some disabled individuals.

1 Introduction

Governments in many industrialized countries are trying to reduce the size of their disability insurance programs and increase the employment of disabled individuals. In the United States, where four percent of 18 to 64 year olds receive social security disability insurance (DI) and a further two percent receive federal disability benefits through the supplemental security income (SSI) program, recent efforts include providing beneficiaries with work incentives and employment support services through the “Ticket to Work” program and mandating funds for medical reassessments of current beneficiaries (Social Security Administration (SSA), 2013a). In the United Kingdom, where the fraction of the working-age population receiving disability benefits is similar to the US, reforms have resulted in reduced benefits, vocational support, and time limits for beneficiaries judged capable of working (Berthoud, 2011). Many other European countries have also recently introduced policies to reduce the number of disability beneficiaries.

A growing literature has estimated how many individuals would work if they were not eligible for disability insurance. Starting with Bound (1989), most of these studies have used the employment of denied applicants to estimate the likely employment of accepted applicants (e.g., Chen and van der Klaauw, 2008; von Wachter et al., 2011; Maestas et al., 2013; French and Song, 2014). The relationship between disability benefits and labor force participation has also been estimated using variation in benefit generosity in the United States (Autor and Duggan, 2003) and Canada (Gruber, 2000), differences in disability insurance rejection rates in the United States (Gruber and Kubik, 1997), and changes in disability eligibility criteria in Austria (Staubli, 2011). All of these studies focus on employment before or at the time of

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1 Other recent reforms include tightening eligibility criteria in Sweden (Karlström et al., 2008); removing restrictions on work activity in Norway (Kostøl and Mogstad, 2014); and comprehensive reforms in the Netherlands that included stricter eligibility criteria and widespread reassessments of younger beneficiaries (Borghans et al., 2014).
application, and as a result they provide good estimates of how employment might change as a result of limiting entry into these disability programs.

Studies examining policies that affect labor force participation during or after the receipt of disability insurance are far less common. There is recent evidence that beneficiaries do respond to work incentives, such as increasing their labor supply after the reduction of earnings penalties in Norway (Kostol and Mogstad, 2014), the introduction of higher earning limits in Canada (Campolieti and Riddell, 2012) and decreases in benefit payments in the Netherlands (Borghans et al., 2014). However, research on the employment of individuals after exiting disability insurance is largely limited to documenting the number and characteristics of those who exit (e.g., Hennessey, 1996; Schimmel and Stapleton, 2011).

In this paper, I partly address that gap by examining the employment effects resulting from a reform in the United States that resulted in a large number of individuals losing their eligibility for DI. In March 1996, the congress removed alcohol and drug addictions as eligible conditions, including for those who did not have it as their primary disability. At the time, approximately two percent of DI beneficiaries had an alcohol or drug addiction that had contributed to their eligibility. Affected individuals could apply for continued eligibility on the basis of their other disabilities, and approximately 90% did so. Around half were judged to be re-eligible for DI, and continued to receive benefits. The remaining 65,000 individuals had their DI cash payments and benefits terminated in January 1997 (Stapleton et al., 1998).2

This is the only large-scale termination of DI eligibility since major reforms to the program in 1984. Fig. 1 shows the annual DI exit rates between 1985 and 2012. Approximately one percent of beneficiaries exit annually due to no longer being disabled. The sole exception is in 1997, when the rate more than doubled due to the terminations examined here. Fig. 1 also shows that the rate at which beneficiaries return to labor force has remained relatively constant, even as exit rates due to death or reaching normal retirement age have been declining, as beneficiaries have become younger and more likely to have low-mortality conditions (Autor and Duggan, 2003).

Using SSA administrative data that cover most of the DI beneficiaries affected by the policy change, I first show that there was a large employment response after the removal of disability benefits. This is estimated using difference-in-differences models with affected beneficiaries who remained on DI as the comparison group, as they have similar pre-treatment employment histories to terminated beneficiaries. Employment is primarily measured in terms of having wage income above the 1996 “substantial gainful activity” (SGA) threshold ($8602 per annum in 2013 dollars),3 which is the level at which capacity for work is assessed. I find the fraction of terminated DI beneficiaries with annual earnings above this threshold increased by 22 percentage points following the termination of disability benefits, which is large relative to these individuals’ work histories. It is also far higher than the base SGA employment of the control group, which is typically one percent per annum. The employment effects decline after four years, primarily because some individuals regain eligibility for disability benefits. Varying the earnings thresholds at which employment is assessed suggests that terminated beneficiaries who started working generally earned more than annualized SGA levels, although not much more.

There is considerable heterogeneity in the employment response. There are large and statistically significant differences related to an individual’s age at termination, with the employment effects among 30–39 year olds of 25 percentage points being much higher than the estimate of 16 percentage points for 50–61 year olds. Terminated beneficiaries also had a higher employment response if they had higher wage earnings prior to getting onto DI or if they applied for DI when the unemployment rate was lower. There are not large differences by type of addiction, and the employment effects are similar for individuals whose primary disability had been an addiction, a mental disorder, or a musculoskeletal condition.

Individuals who received DI for different lengths of time to prior to the terminations. After showing that cohorts of beneficiaries had similar employment and health characteristics prior to receiving DI, I examine how the employment effects vary as a function of time receiving disability benefits. I find that there is an inverted-U shaped relationship between the size of the employment effects and time spent on DI. The employment response is highest among those who received benefits for approximately 2.7 years prior to termination, and is 50% larger than the employment response of individuals who received benefits for nine months (the shortest period of receipt for anyone in the sample) and 31% higher than those who received benefits for six years. This inverted-U relationship is strongest among younger individuals.

It is surprising that the employment effects do not monotonically decline with time on DI, given the widespread evidence that healthy individuals become less able to work the longer they are out of the labor force (e.g., Mincer and Opek, 1982; Kroft, Lange and Notowidigdo, 2013). To better understand the role of initial health, I compare the employment effects for those immediately awarded DI to those awarded DI after successfully appealing an initial denial. Hu et al. (2001) and von Wachter et al. (2011) find that beneficiaries who were initially denied DI are healthier and more able to work than other beneficiaries. Among those who had spent less than 1.5 years on DI, the employment response for immediately-accepted beneficiaries is lower than for initially-denied beneficiaries, which is consistent with this prior evidence. However, the employment response for the immediately-awarded group increases sharply with time on DI, so much so that those who had received DI for between two and four years had a larger employment response than the initially-denied group. These results suggest that assessments of health and work capacity made at the time of application do not necessarily hold over time. They also indicate that health changes while on DI may have affected terminated beneficiaries’ ability to work, although it is not possible to quantify that effect. It is also not possible to attribute any changes to the cash and medical

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2 These changes also affected beneficiaries on the means-tested disability benefit program, supplemental security income (SSI). I focus on DI because they have much higher labor force participation than SSI recipients, and Campbell et al. (2003) and Chatterji and Meara (2010) have previously examined the employment of SSI recipients.

3 All dollars are in 2013 values, unless otherwise noted. Conversions are based on the CPI-U.
benefits that come with DI eligibility, as mean reversion in health is also possible. This study complements previous research examining the employment effects of this policy, which does not use SSA administrative data and has primarily focused on SSI recipients. Chatterji and Meara (2010) use pooled cross-sections of the 1994–2002 National Survey of Drug Use and Health and a triple-difference interaction between the probability of SSI usage, likely substance abuse and an indicator for the post-policy change to estimate the effects of the terminations. They found increases in labor force participation and employment in a group with a broad definition of substance abuse, but not among a more narrowly-defined group. Campbell et al. (2003) analyzed the formal and informal employment of 661 participants in a study that interviewed former SSI beneficiaries across nine cities. Around half were employed two years after their terminations, and 12% were earning more than the cash benefits they lost. Finally, Orwin et al. (2004) used employment records of affected DI and SSI beneficiaries in Washington State. They found that employment increased by 10 percentage points after these terminations, although they could not distinguish between terminated and reclassified beneficiaries. While these studies convincingly establish that the terminations did increase labor force participation, the administrative data used here allows me to better understand the nature of these employment effects.

The employment effects estimated here complement existing studies of the labor disincentive effects of disability benefits. The aggregate employment effects are similar to those of Maestas et al. (2013). Given that the treatment effect is the combined effect of losing cash and medical benefits, and no longer being subject to DI work rules – the same consequences rejected DI applicants face – the results are relevant to this and other studies that use rejected applicants to estimate work capacity. This study also provides insights into how recent studies of the labor supply responses among current DI beneficiaries may translate into employment after exiting DI. The employment effects are much larger. For example, the relatively high employment effects among younger terminated beneficiaries and terminated beneficiaries from areas with low unemployment rates are largely consistent with the findings of Kostel and Mogstad (2014) in a very different context. Furthermore, examining the heterogeneity in the employment effects by time on DI supplements the findings by Borghans et al. (2014), who show that the employment of long-term DI beneficiaries increase in response to the cut in benefits, but do not have sufficient statistical power to examine heterogeneity in the effects by duration.

The findings in this paper speak to several policy issues. First, the large employment response among a group who rarely exited DI prior to the removal of addictions as eligible conditions provides strong evidence of latent work capacity among DI beneficiaries, even if they had been on the program for several years. Second, information on the heterogeneity of the effects may be useful for improving the efficiency of return-to-work efforts, which have had limited success in returning beneficiaries to the labor force partly because there is little evidence on which beneficiaries should be targeted (SSA, 2012; Maestas et al., 2013). Third, differences by time on DI highlight the importance of considering dynamic effects when evaluating the likely employment of current beneficiaries. Judgments about the severity of disabilities may not hold over time. These dynamic effects, and the relatively high employment among those receiving benefits for two to three years, also raise questions about whether temporary benefits are appropriate for some individuals. In efforts to stem the growth of these programs, temporary awards may lead to better employment outcomes than more restrictive eligibility criteria.

Given that DI beneficiaries with drug or alcohol addictions were the only ones removed, it is difficult to know how the findings would generalize to other beneficiaries. The findings are likely to be most relevant to the 19% of current DI beneficiaries with a history of substance abuse problems. They are also likely to be especially helpful for understanding the work capacity of DI beneficiaries with mental disorders and musculoskeletal conditions, as the employment effects are similar for subgroups with these conditions as their primary disabilities as for the overall samples. Currently, over half of all DI beneficiaries have a mental disorder and musculoskeletal condition as their primary disability (SSA, 2013b).

2. Policy background and sample description

2.1. The removal of addictions as disabling conditions

Alcohol and drug addictions became eligible conditions for social security disability insurance (DI) in the 1970s. Those with severe addictions could potentially obtain benefits on that basis alone, or addictions could be included as a contributing factor for applicants with other disabilities. People receiving benefits because of an addiction were subject to the same rules as other DI beneficiaries: they needed to have been in employment covered by social security for at least five of the previous ten years; medical eligibility was based on disabilities that prevented work above “substantial gainful activity” (SGA) levels, a standard that is currently just above $1000 per month; payments were based on beneficiaries’ past earnings and a progressive formula that replaces a larger share of the earnings of low wage workers; benefits were provided five months after documented disability onset and Medicare was provided two years after documented onset. DI beneficiaries with addictions among their disabilities, known as “drug addict and alcoholic” (DA&A) beneficiaries, were also required to participate in treatment and be paid through responsible agents who could manage their money for them (Hunt and Baumoehl, 2003; SSA, 2013a).6

These DA&A DI beneficiaries were subject to the same earnings restrictions as other DI beneficiaries, which generally prevent work above SGA levels. In practice, few DI beneficiaries work, and their wage earnings rarely approach SGA levels. In December 2012, for example, 0.3% of DI beneficiaries had benefits withheld because of substantial work (SSA, 2013b). Relative to the overall DI beneficiary population, DA&A beneficiaries did not display any greater capacity to work (Hunt and Baumoehl, 2003).

The same medical standards for DI apply to supplemental security income (SSI), a federal disability program that provides benefits to disabled individuals with limited assets. It provides cash benefits and immediate eligibility for public health insurance through state-based Medicaid programs. Approximately 28% of DI beneficiaries receive SSI at some stage, most commonly during the waiting period for DI payments (Rupp and Riley, 2011). The majority of the DA&A DI beneficiaries also qualified for SSI, and therefore had access to cash and medical benefits while waiting for DI payments (Stapleton et al., 1998). I consider whether the employment response differs by SSI status in Sections 4 and 5.

The number of DI and SSI beneficiaries gaining eligibility because of an alcohol or drug addiction grew after reforms in 1984 made it easier to qualify on the basis of multiple disabilities. The number of DA&A beneficiaries increased from approximately 5000 in 1985 to 100,000 by early 1990s.7

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6 The policy change meant that, while applicants to DI could no longer count addictions among their disabilities, they could still apply on the basis of other disabilities. Moreover, many disability insurance systems in other countries still allow addictions to be considered as disabilities when it comes to gaining eligibility.

7 Respondents to the National Survey of Drug Use and Health are asked about Medicare eligibility, which is a reasonable proxy for DI receipt when the respondent is under 65 years of age. Among 22–64 year old respondents, 19% of Medicare beneficiaries had substance abuse problems in the previous 12 months and/or had received substance abuse treatment. Author’s population-weighted tabulations of the public-use data file (Substance Abuse and Mental Health Services Administration, 2009).
Like the overall DI beneficiary population, few returned to the labor force after entering DI; for example, less than one percent of the DA&A beneficiaries entering DI in 1990 had exited because of recovery or medical disqualification by 1994 (U.S. Department of Health and Human Services, 1994). In response to the growing numbers, the congress passed changes in late 1994 to better monitor treatment and introduced a three-year time limit on receiving benefits. Numbers continued to grow and, before most of these changes had been implemented, legislation was passed on March 29, 1996, removing alcohol and drug addictions as eligible conditions.

This change affected approximately 100,000 DI beneficiaries, which constituted around two percent of all DI beneficiaries. These beneficiaries were invited to apply to be reclassified on the basis of their other disabilities; those not reclassified would have their DI eligibility terminated at the beginning of 1997. Approximately 90% applied for reclassification, and decisions were made in the latter half of 1996. Around half were reclassified and kept receiving DI benefits, while unsuccessful reapplicants and those who did not reapply had their benefits terminated on January 1st 1997. A further 110,000 SSI-only recipients were also subject to this policy; approximately half of those recipients had their benefits terminated (Stapleton et al., 1998; Hunt and Baumohl, 2003).

There have been several studies of the effects of the DA&A terminations. As discussed in the introduction, Campbell et al. (2003), Orwin et al. (2004) and Chatterji and Meara (2010) convincingly demonstrate that the terminations led to an increase in employment, although lack the necessary statistical power to demonstrate that the terminations led to an increase in employment, and mental health services, while Swartz et al. (2003) found no change as a result of the terminations. Chatterji and Meara (2010) also finds that the terminations were not associated with any changes in health care usage. Several studies, including Campbell et al. (2003), use data from interviews with 1800 former DA&A SSI beneficiaries in nine cities between 1996 and 1998. Podus et al. (2003) finds decreases in the utilization of medical and mental health services, while Swartz et al. (2003) finds moderate increases in drug-related crime. It is difficult to generalize these findings, however, as the sample is not nationally representative of former SSI DA&A beneficiaries (Wittenburg et al., 2003).

There is evidence that initial DI eligibility decisions do vary across disability examiners (Maestas et al., 2013). Examiners’ judgments were probably even more variable during the reclassification of DA&A beneficiaries, as examiners were required to determine how severe an individual’s other disabilities would have been if the beneficiary did not have an alcohol or drug addiction. This is especially difficult because there is a lot of uncertainty about how substance abuse affects mental disorders (Grant et al., 2004) and musculoskeletal conditions (Diamond et al., 1989). There was also a variety of issues related to quickly implementing this one-off policy change. In a study commissioned by SSA, Stapleton et al. (1998) reported: (1) significant variation across offices in the effort to explain the reclassification process to affected beneficiaries; (2) a lack of medical documentation for determining eligibility; (3) the use of temporary disability examiners to cope with the increased examination workload; (4) claims that the examinations were too brief; and (5) claims that some examiners held strong views about substance abuse that influenced their decisions. In the next section, I show that terminations and reclassifications had similar employment histories. The challenges associated with determining who should remain on DI and who should be terminated likely contributed to these similarities.

2.2. Data and sample

Former DI DA&A beneficiaries were identified using historical extracts of SSA administrative data. SSA data systems no longer identify who had been a DA&A beneficiary (as the variable is no longer relevant to program management). Fortunately, DA&A records were periodically extracted from the Supplemental Security Record, the system used to manage SSI, and the March and June 1996 extracts were located for this project. Comparisons with Stapleton et al. (1998) indicate that approximately 75% of DI DA&A beneficiaries can be tracked using the June extract. While the missing beneficiaries are presumably those unlikely to have met the SSI asset restrictions, there are DI beneficiaries who never received SSI (applicants are sometimes entered into both the DI and SSI data systems before eligibility is determined). In Section 4, I separately analyze the employment effects for those who only ever received DI, those who had initially received SSI and those who continued to receive SSI.

SSA staff used social security numbers in the June 1996 extract to produce up-to-date extracts of the Supplemental Security Record, Master Beneficiary Record, 831 File and Master Earnings File. In combination, these provide a complete history of an individual’s receipt of SSA program activity, taxable wage earnings, impairments, and various demographic characteristics, such as sex, age and education. Descriptions of the data and data preparation are provided in the online appendix. Information from the 831 File is available from 1989, while the other data is available from 1981 or earlier. All of the datasets track these individuals through 2008.

A sample was created of individuals who were aged 30 to 61 years on January 1st 1997, the date the terminations took effect. The lower age limit restricts the sample to those who were at least 22 years old in 1989, when education and other time-varying information were first recorded, while the upper limit removes those eligible for social security retirement insurance at age 62. The sample was also limited to those who first received benefits between January 1st 1989 and April 1st 1996, and those receiving DI payments in the second quarter of 1996.

The characteristics of the 51,274 individuals who met these criteria are provided in Column 1 of Table 1. Approximately 80% of the sample is male. The only information on addiction is whether the beneficiary was addicted to alcohol, drugs, or both alcohol and drugs. Approximately 58% have only an alcohol addiction, 15% have only drug addictions, and 27% have both alcohol and drug addictions. Detailed information about the addiction is not available, but Stapleton et al. (1998) reported that the most common drug addictions were cocaine and heroin. The most common primary disabilities were alcohol/drug addictions (46%), mental disorders (22%), and musculoskeletal conditions (15%). The average time receiving DI payments before 1997, which includes periods of SSI payments if those were received during the DI waiting period, was 2.9 years. The average disability benefits paid in 1996 was $10,859. In 1996, males comprised 60% of all DI beneficiaries and the average age of DI beneficiaries was 49 years, so DA&A DI beneficiaries were slightly younger than the general DI beneficiary population and disproportionately male (SSA, 1997).

The sample is divided into those terminated as a result of the policy and those reclassified based on other disabilities. Memos to social security offices in California indicate that disability beneficiaries terminated as a result of this policy should have been assigned a disability cessation code in January 1997; these memos are shown in the online appendix. Tabulations confirm that these rarely-used codes are used extensively in January 1997. A person is considered terminated as a result of the policy if, in January 1997, they had a newly-assigned cessation code and received no disability payments. A person is considered to have been successfully reclassified if, in January 1997, they were in current payment status and received disability payments. Approximately nine percent of the sample did not meet either definition; these are probably a mix of people who exited for other reasons, had an unusual program status in January 1997, or were terminated as a result of the policy but were assigned a rare termination code instead of the right code.7

7 As shown in the online appendix, the main results are similar if I assume that those assigned rare codes in January 1997 are terminated beneficiaries.
difference in the mean earnings of the two groups is $296, or two percent of average earnings over this period. Fig. 2B also shows average earnings conditional on being above 1996 SGA levels. The average absolute difference in conditional mean earnings across the two groups is $604, or two percent of average conditional earnings.

Trends in wage income that are based on calendar years are shown for 1981–2008 in Fig. 3A. Terminated and reclassified beneficiaries have similar trends up to 1996, the year the policy change was announced. This is the case even though there are large declines in earnings over this period as individuals steadily stop working and apply for DI. The average difference in earnings across the two groups is $709 in 1990, approximately seven percent of average for that year. This gap increases by roughly $100 between 1990 and 1995, while the average earnings of both terminated and reclassified beneficiaries decline by around $9000 over the same period.

As shown in the next section, pre-treatment trends of terminated and reclassified beneficiaries become even more similar once controlling for sex-specific age differences. The similarity of their pre-DI labor market histories motivates the use of a difference-in-differences approach to estimate the employment effects of the DI terminations and using reclassified beneficiaries as the control group. These similarities are likely due to the unusual and complex nature of the reclassification process, where reasonably similar individuals received different judgments about their continued DI eligibility.

A second feature of the mean annual earnings plotted in Fig. 3A is the large increase in the earnings of terminated beneficiaries from 1996, while there is little change in the earnings of reclassified beneficiaries. The difference in the mean earnings of terminated and reclassified DI beneficiaries is $4817 in 1997, peaks at $6766 in 2000, and declines to $3597 by 2008. The continued interaction between earnings and the disability programs helps to explain the decline in terminated beneficiaries’ average earnings after 2000. The fractions of terminated and reclassified individuals who received a disability payment before and after the end of the DA&I category are shown in Fig. 3B. Vertical lines are drawn at the end of 1996, when the last pre-termination disability payments were made. Terminated beneficiaries steadily re-enter DI or SSI throughout the 1997 to 2008 period, and 52% of terminated beneficiaries receive post-1996 social security payments by 2008.8 As will be shown in the next section, the decline in the employment effects after 2000 is mainly due to this re-entry, as individuals are again subject to DI work rules and earnings limits.

### 3. Estimating the employment effects

I estimate the aggregate employment effects due to the termination of disability benefits using a difference-in-differences linear probability model, where the employment of those who lost their disability benefits is judged relative to those who retained them. Binary employment outcomes are used, as we are primarily interested in how the terminations affected how many individuals were working.9 The main threshold used to define employment is the annualized 1996 SGA level, which is equal to $8908 in 2013 dollars. An added benefit of using this level is that it is close to the average DI payments made in 1996, and so provides some idea of how many individuals “replaced” their benefits via wage earnings. Results using alternative employment thresholds are discussed below.

Data from 1989 to 2008 are used, which includes seven years of data before the terminations were announced (1989–1995), the year that

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8 Two percent of terminated beneficiaries first reappear from receiving retirement insurance or old-aged SSI.

9 Using earnings is also complicated by the large number of observations with zero earnings. Using earnings as the dependent variable, which should lead to consistent estimates, leads to similar results to those presented using employment outcomes in terms of the similarity of the pre-treatment trends, a large post-termination response, and how the treatment effects vary by time spent on DI. These results are provided in the online appendix.
Letting $y_{it}$ denote the employment outcome for the $i$th person in the $t$th year, the equation estimated is:

$$y_{it} = \alpha + \theta_t + X_{it}\lambda + \sum_{t=1989}^{2008} D_tTERM_i\beta_0 + \sum_{t=1995}^t D_tTERM_i\beta_t + u_{it}. \quad (1)$$

The constant is represented by $\alpha$, and $\theta_t$ is a complete set of time fixed effects that capture common annual employment shocks. The vector $X_{it}$ contains time-varying individual characteristics and initially represents two sex-specific cubic functions in age that control for age-related changes in employment. The variable $TERM_i$ is a dummy variable equal to one if an individual had their DI benefits terminated and zero otherwise; it absorbs permanent employment differences between terminated and reclassified beneficiaries as measured by the difference in 1995, the year before the policy change was announced. Time-varying differences between terminated and reclassified beneficiaries are identified by the interaction of $TERM_i$ with time dummy variables $D_t$, which are equal to one in year $t$ and zero otherwise. The reference year is 1995, the year before the terminations were announced. Terminated beneficiaries may have responded to the policy change in 1996 if they decided not to reapply or sought work once they found out that their application to be reclassified had been unsuccessful. There are 19 $\beta_0$ coefficients of interest that measure the annual differences in the probability of employment of terminated and reclassified beneficiaries, relative to 1995. I estimate standard errors allowing for heteroskedasticity and an arbitrary correlation in errors for each individual.

The 19 $\beta_t$ coefficients (and 95% confidence intervals) measuring the annual employment probabilities of terminated beneficiaries relative to reclassified beneficiaries are plotted in the gray dashed line in Fig. 4. Annual differences in employment during the pre-treatment period are small, with an annual difference of one percentage point or less between 1989 and 1994. These coefficients are precisely estimated, with standard errors of 0.5% age points or less. In 1996, the year the policy change was announced, the relative fraction of terminated beneficiaries who are employed rises to 3.2 percentage points. Once disability payments ceased in 1997, the difference increases to 17.8 percentage points. The difference in employment probabilities increases to 22.8 percentage points in 1999 and remains similar in 2000, then steadily declines to 8.8 percentage points by 2008. All of these post-termination employment differences are statistically significant at the one percent level.

As shown in the black bold line in Fig. 4, the coefficients remain similar with the addition of more time-invariant controls for demographic characteristics (race, sex, state of residence, age at termination); health characteristics (primary disability, addiction type); DI program activity

![Fig. 2. Employment and wage earnings in relation to DI entry, terminated vs. reclassified.](image)

![Fig. 3. Mean annual earnings and program entry, terminated vs. reclassified, 1981–2008.](image)
the employment response. In Panel A, I plot the 19 sample with different characteristics from the overall DI bene-
population, the receipt of DI for some time may have affected the em-
to a decrease in annual wage earnings above SGA of 18
employment estimates are similar to recent estimates based on rejected
population and averaged less than one percent per annum. The em-
line appendix, exit rates were similar to the overall DI bene
termination exit rates among DA&A bene-
gathered with similar results that come from a logit speci-
tables. They represent 63% of the full sample. These coef-
cients of interest by more than 0.4 percentage points. Both
sets of results are presented in tabular form in the online appendix; to-
gethers with similar results that come from a logit specification.

The employment effects are much higher than suggested by pre-
termination exit rates among DA&A beneficiaries. As shown in the
online appendix, exit rates were similar to the overall DI beneficiary
population and averaged less than one percent per annum. The em-
ployment estimates are similar to recent estimates based on rejected
applicants by Maestas et al., (2013), who estimate that DI receipt leads to a decrease in annual wage earnings above SGA of 18–19 percentage
points two years after the DI allowance decision. In addition to being a
sample with different characteristics from the overall DI beneficiary
population, the receipt of DI for some time may have affected the em-
ployment response. I consider this possibility in Section 5.

Fig. 5 provides more information about the nature and intensity of
the employment response. In Panel A, I plot the 19 β 1 coefficients (and
95 percent confidence intervals) from Eq. (1) using a sample that I
know definitely applied to be reclassified on the basis of their other dis-
abilities. They represent 63% of the full sample. These coefficients are
similar to those for the full sample in all years except for 1996, where
the employment response in this sample is lower than for the overall
sample.

I next present estimates of the employment effects without ter-
minated beneficiaries who regained eligibility for a SSA program and
without individuals who died in the post-termination period. These
results are shown in Fig. 5B. The employment response is larg-
er without those who regained eligibility: the peak employment re-
sponse in 1999 of 30 percentage points is seven percentage points
higher than for the full sample. It is also more persistent: the em-
ployment response in 2008 is 20 percentage points, compared to
eight percentage points for the full sample. Mortality also seems to
account for some of the decline in the employment effects over time.
Without those who died or returned to SSA, the estimated em-
ployment effect is 35 percentage points in 1999 and 26 percentage
points in 2008. These differences are statistically significant at the
one percentage level. Given that it is difficult for SSA to track mortality
among non-beneficiaries, the role of mortality is likely to be under-
stated in this analysis.11 It is difficult to interpret these patterns, as
the re-eligibility of terminated beneficiaries may be due to poor
happiness, limited employment prospects, or a combination of both.
Fur-
thermore, mortality may be affected by the policy change. These re-
results are especially helpful, however, in explaining why the earning
effects start to dissipate four years after the terminations.

Next, in order to understand the intensity of the employment re-
sponse, different thresholds related to 1996 SGA levels are used to de-
finite employment. These results are presented in Fig. 5C. Halving the
threshold to annual earnings above $4454 results in a peak employment
response of 27 percentage points in 1999 and a response of 7.6 per-
centage points in 2008. Doubling the threshold to $17,816 results in a peak
employment response of 14.3 percentage points in 2000 and a response of
6.9 percentage points in 2008. Tripling the threshold to $26,724 re-
results in a peak employment response of 7.0 percentage points in 2000,
which declines to 4.2 percentage points by 2008. These results suggest
that terminated beneficiaries who started working generally earned
more than annualized SGA levels, although not a lot more. They also in-
dicate that the employment effects are more persistent at higher earn-
ings thresholds.

The results using different earnings thresholds provide some infor-
mation about the quality of employment found by those who lost DI el-
igibility. Another set of results provide more information about this;
specifically, how individual’s post-termination earnings compare to
his or her pre-DI earnings. In Fig. 5D, I provide employment results
using individual-specific thresholds based on each individual’s earnings
at two and five years before applying for DI. Over the period when the
employment effects are largest (1996–2000), the estimate employment
effect is 23 percentage points if employment is defined in terms of earn-
ings two years before applying for DI and 18 percentage points if em-
ployment is defined in terms of wage earnings five years before
applying for DI. In both cases, the declines in the employment effects
are qualitatively similar to those in the main results.

Another informative measure is the fraction of terminated beneficia-
ries that had higher earnings after termination than before entering the
DI program. In the online appendix, I report that 30% of terminated
beneficiaries had a year of earnings in the post-termination period
(1996–2008) that was higher than in the eight years prior to applying
for DI. By comparison, approximately six percent of reclassified benefi-
ciaries had their highest earnings year in the post-termination period.
Among terminated beneficiaries who had at least one year of post-
termination earnings that was above the 1996 SGA threshold, 53% had
their highest earnings year in the post-termination period. Among
terminated beneficiaries who had earnings above SGA in any year
from 2001 to 2004, 61% had their highest earnings year in the post-
termination period, while 66% of terminated beneficiaries with above-
SGA earnings between 2005 and 2008 had their highest earnings year in
the post-termination period. These fractions suggesting that the em-
ployment response in Fig. 4 mostly represents individuals who earned
more after termination than before entering DI, especially if they
employed several years after the terminations.

In summary, the results suggest many terminated DI beneficiaries
could earn at levels that would have disqualified them from the pro-
gram. The employment effects are large relative to these individuals’
work histories, although many terminated beneficiaries do not report
taxable wage earnings after 1996. Taxable wage earnings are likely to
understate employment, as Campbell et al. (2003) did find that ter-
nated SSI beneficiaries had informal earnings. The decision to reapply
did not strongly affect the employment response.

11 For non-beneficiaries, the only SSA dataset with date of death is the Numident File. Mortality information in the Numident File comes from a wide variety of sources, like fu-
neral homes, hospitals, federal government agencies, and state governments. Several gov-
ernment reports, including the SSA Office of Inspector General (2012), find that the
Numident File misses many deaths.

10 When individuals apply for DI a record is generated in the 831 File, which is one of the
datasets used in this study. A new record was only generated in this dataset some of the
time during this unusual reclassification process, as many reclassified beneficiaries do
not have a new record on the 831 File during the reclassification period (April to December
1996). This explains why the fraction I can identify as having reapplied is lower than the
90% estimated by Stapleton et al. (1998).
4. Heterogeneity in the employment response

I now examine how the employment effects differed depending on terminated beneficiaries’ demographic and health characteristics, as well as their previous earnings and other factors that could affect labor force participation. As discussed in the introduction, it has been difficult for SSA to target return-to-work policies because there is limited information about who is best able to work.

The examination of heterogeneity is done by re-estimating Eq. (1) for different subsamples and presenting the 19 coefficients (and 95% confidence intervals) that measure the employment differences between terminated and reclassified beneficiaries relative to 1995. This is done in Fig. 6, where the panels provide information about whether the employment effects differed by sex; age at termination; wage earnings prior to DI; state unemployment at the time of termination; addiction type; and primary disability. As discussed at the end of this section, some additional heterogeneity analysis is also provided in the online appendix.

It is important to separately examine the employment effects for males and females, particularly because welfare reform occurred in the late 1990s and affected the options available to single mothers. The results for males and females are shown in Fig. 6A. The employment response for females is higher than for males: on average, the 1998–2000 coefficients are 1.9 percentage points higher for the female sample than the male sample (23.8 vs. 21.9 percentage points), a difference that is statistically significant at the one percent level. This difference persists throughout the post-termination period. These differences do not necessarily reflect relatively higher work capacity among females, however, as they could be explained by their termination rate being lower than for males (42.3% vs. 37.4%). This is the only case where a difference in the termination rates is at odds with the differences in the employment effects; as shown in the online appendix, in the other cases the termination rates are either similar across or reinforce any employment differences.

Younger disabled workers likely experience different health trajectories to older disabled workers, and also have different incentives to develop “disability-specific human capital” (Charles, 2003). The results for different groups based on age at the start of 1997 are shown in Fig. 6B. The employment effects decrease with age: the average of the 1998–2000 coefficients measuring the employment effects is 25.1 percentage points for those aged 30–39 years, 21.3 percentage points for those aged 40–49 years and 16.2 percentage points for those aged 50–59 years.

\[ \text{Employment effects decrease with age.} \]

Fig. 5. Examining the employment effect.

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12 Given the rates at which reclassified beneficiaries work above SGA levels is close to zero, the combined fraction of terminated and reclassified beneficiaries who earn above the 1996 SGA threshold during 1998–2000 is approximately nine percent for both females (employment response of 23.8 percentage points × termination rate of 37.4%) and males (employment response of 21.9 percentage points × termination rate of 42.3%).
points for those aged 50–61 years. These differences are statistically significant at the one percent level, as are the differences later in the post-termination period. The fraction of each age group that has their highest year of wage earnings in the post-termination period also decreases with age; this is presented in the online appendix. Higher employment rates among younger DI beneficiaries are consistent with employment estimates from studies of rejected DI applicants (e.g., von Wachter et al., 2011) and of current DI beneficiaries (e.g., Kostøl and Mogstad, 2014).

Individuals whose labor force attachment were relatively high before applying for DI may be able to return to the workforce more easily than other terminated beneficiaries. To examine whether this was the case, I divide the sample into three groups based on average annual wage income in the 3–5 years before applying for DI13:

- those with average earnings that are above the 1996 SGA threshold,
- those with average earnings that are between half and one of the threshold, and
- those with average earnings that are less than half of the threshold. Results for these groups are presented in Fig. 6C.

Higher pre-DI earnings are associated with larger employment effects: the average of the 1998–2000 coefficients is 26.0 percentage points for those with average pre-DI earnings above the 1996 SGA threshold, 21.4 percentage points for those with average pre-DI earnings between half and one of 1996 SGA, and 16.8 percentage points for those with average pre-DI earnings of half 1996 SGA or less. These differences are statistically significant at the one percent level and persist throughout the post-termination period. Despite this, only 23 percent of terminated beneficiaries with above-SGA pre-DI wage earnings had their highest earnings year in the post-termination period, compared to 36% for the group with average pre-DI earnings 0.5–1 of SGA and 37% for the group with average pre-DI earnings less than half of the SGA threshold.

13 This is the definition used by Maestas et al. (2013).
employment rates are similar across the cohorts: the fraction employed
were pre-existing differences in the employment and health character-
before applying for DI, where the cohorts had between less than one year
where unemployment was above 5.5% ("high unemployment"). The em-
where DI and six years on DI before the terminations took effect.14 The em-
work incentives (Kostøl and Mogstad, 2014). Average state-level unem-
earned more than the 1996 SGA threshold two years and
conditions, as they have been found to affect entry into DI (Autor and
on DI. Individuals had entered the DI program at different points in time,
level. This effect declines in the later years; beyond 2001, the relative
4.9 years). The results for the different disability-based subgroups,
that is approximately 25% lower than the other three groups during
magnitudes nor persistent throughout the sample period.
employment of terminated beneficiaries in the high unemployment
group is actually higher than in the other two groups beyond 2001. As
as shown in the online appendix, there are not noticeable differences
in the fraction of each group that records their highest wage earnings in
in the post-termination years.
employment rate across the peak years of 1998–2000 is
11–12% smaller in the high unemployment sample than in the other
two groups, a difference that is statistically significant at the one percent
level. This effect declines in the later years; beyond 2001, the relative
employment of terminated beneficiaries in the high unemployment
group is actually higher than in the other two groups beyond 2001. As
shown in the online appendix, there are not noticeable differences
in the fraction of each group that records their highest wage earnings in
in the post-termination years.

The final two panels of Fig. 6 provide results by type of addiction
(Panels E) and primary disability (Panel F). Even though there are dif-
ferences, the results by addiction type do not suggest a consistent
difference between alcohol-vs.-drug addictions because there are
small and statistically insignificant differences between the employ-
ment responses of the “alcohol only” and “drug only” groups during
the first seven years after the terminations were announced. The em-
ployment response is relatively higher in the drug-only subsample
beyond that, although may be because they are younger (aver-
age age of 41.0 years) than the alcohol-only group (average age of
44.9 years). The results for the different disability-based subgroups,
which are shown in Panel F, demonstrate that the employment re-
sponse is similar for those with alcohol/drug addictions, mental dis-
orders, and musculoskeletal conditions as their primary disability.
Those with other physical disabilities have an employment response
that is approximately 25% lower than the other three groups during
the first few years after the terminations, and their employment re-
mains relatively low throughout the sample period.

In the online appendix, I provide further results by race, educational
attainment and the DI beneficiaries’ involvement in the SSI program.
Even when there are differences in the employment response that are
statistically significant at conventional levels, they are neither large in
magnitude nor persistent throughout the sample period.

5. The role of time spent receiving disability benefits

I now examine how the employment effects differ by the time spent
on DI. Individuals who entered the DI program at different points in time,
and therefore had received disability benefits for different lengths of
time to prior to the terminations. As discussed in the introduction,
there is lack of evidence on how work capacity changes while on DI.

It is important to recognize that, because the terminations occurred
at the same time, an individual’s DI duration is correlated with when
they applied for DI. This creates the potential for any pre-existing dif-
fences across beneficiary cohorts to be attributed to the role of time on
DI. The first step in addressing this concern is to assess whether there
were pre-existing differences in the employment and health character-
istics of DI DA&A beneficiaries. In order to assess pre-existing employ-
ment differences, in Fig. 6A I present the fraction of each cohort that
earned more than the 1996 SGA threshold two years and five years be-
fore applying for DI, where the cohorts had between less than one year
on DI and six years on DI before the terminations took effect.14 The
employment rates are similar across the cohorts: the fraction employed
five years before applying for DI is between 41 and 48% and the fraction
employed two years before applying for DI is between 19 and 24%. Fur-
thermore, there is not a consistent pattern in the differences: those on
DI for one year had the highest fraction employed using the five-year
pre-DI measure, while those on DI for five years had the highest fraction
employed using the two-year pre-DI measure.

The cohorts also look similar in terms of their initial health, as mea-
sured by average mortality rates during the first year on DI. This is
shown in Fig. 7B. The overall average mortality rate in the first year of
DI receipt is 2.4%, and each year of DI entrants have an average mortality
rate that is within 0.3 percentage points of that figure. In combination,
these figures show that time on DI is not strongly correlated with initial
measurements of health and work capacity. The potential influence of
pre-DI differences is considered further after I estimate the role of
time on DI.

So far, the employment effects have been allowed to vary each year
in the post-termination period. Now, in order to make it easier to exam-
mine how the employment effects differ by time on DI, I impose a func-
tional form on the post-termination employment response. The results
presented so far show that the employment effects generally fol-

\[
y_t = \alpha + \beta_1 T + \beta_2 T_{1995} + \beta_3 T_{1996} + \beta_4 T_{1997} + \beta_5 \text{TREND}_t + \epsilon_t
\]

The main coefficients of interest are now \( \beta_1 \), which measures the post-termination employment effects across 1998 to 2000, and \( \beta_2 \), which measures the trend in the employment effects from 2000 to

The estimates for these two coefficients are presented in Col-
umn 1 of Table 2. The \( \text{TREND}_t \) coefficient is 22.0% age points, close to
the peak employment response using the more flexible specification.
The \( \text{DECLINE}_t \) coefficient is ~1.6 percentage points, reflecting the annual
decay in the employment effects from 2000 to 2008. Both coefficients
are statistically significant at the one percent level. The average of the six coefficients resulting from the interactions be-
tween \( \text{TREND} \) and the 1989–1994 dummy variables is 0.3 percentage
points, with a standard error of 0.3 percentage points, which shows
that terminated and reclassified beneficiaries have similar pre-
treatment employment trends in this specification. As shown in the
online appendix, the estimated coefficients on \( \text{TREND}_t \) and \( \text{DECLINE}_t \)
are similar in plausible alternative specifications, such as allowing
\( \text{DECLINE}_t \) to start in 1999 or in 2001.

Eq. (2) is then adapted to allow the employment effects to vary by
time on disability benefits, \( \text{DI}_t \), which is the length of time be-
tween the month when an individual first received benefits and
when the terminations occurred in January 1997. Square and cubic terms
of \( \text{DI}_t \) are used to allow the employment effects to vary nonlinearly

14 For this exercise, annual earnings are converted into 2013 dollars using the National
Wage Index, which measures the average changes in wages in the United States and so
takes account of wage growth.

15 Jacobson et al., (1993) imposed a functional form on the post-policy changes in earn-
ings of displaced workers to get a better idea of the evolution of the differences across de-
ographic groups. von Wachter, Song and Manchester (2011) uses a similar approach. I
tested plausible alternative specifications, such as estimating \( \text{DECLINE}_t \) starting from
1999 or 2001. The differences across groups are similar in these alternate regressions.

16 Differences across groups in the 1996 and 1997 coefficients are hard to interpret, as
they may reflect timing differences of the recategorization process rather than just differ-
ences in the timing of the employment response.

\[ y_t = \alpha + \beta_1 T + \beta_2 T_{1995} + \sum_{t=1995}^{1997} D_t \text{TREND}_t \beta_4 + \sum_{t=1995}^{1997} D_t \text{DECLINE}_t \beta_5 + \epsilon_t \]
with time on DI. These three variables are interacted with all of the variables identifying employment differences between terminated and reclassified beneficiaries throughout the sample period. That is,

\[
y_{it} = \theta_t + X_{it}\lambda + Z_{it}\phi_0 + \text{DI}_t\text{TIME}_iZ_{it}\phi_1 + \text{DI}_t\text{TIME}_i^2Z_{it}\phi_2 + u_{it}
\]

where:

\[
Z_{it}\phi_n = \alpha_{n(0)} + \text{TERM}_i\beta_{n(0)} + \sum_{t=1989}^{1997} \text{DI}_t\text{TERM}_i\beta_{n(1)} + \text{SHIFT}_i\delta_{n(1)} + \text{DECLINE}_i\phi_{2(0)}
\]

**Fig. 7.** Employment response by time on disability benefits.
In addition to the coefficients on $\text{SHIFT}_0$ and $\text{DECLINE}_0$, the primary coefficients of interest are those resulting from the interactions between $\text{SHIFT}_0$ and $\text{DECLINE}_0$ and the three cubic terms of $\text{DI}_\text{TIME}$. Estimates of these eight coefficients for the full sample are presented in Column 2 of Table 2. The coefficient (standard error) on $\text{SHIFT}_0$ is 0.069 (0.022), which can be interpreted as the estimated employment effect before receiving any disability benefits. All three coefficients from the interactions between $\text{SHIFT}_0$ and the $\text{DI}_\text{TIME}$ terms are statistically significant at the one percent level, suggesting that the increase in post-termination employment varies nonlinearly with DI receipt. In contrast, the three coefficients from the interactions between $\text{DECLINE}_0$ and the $\text{DI}_\text{TIME}$ terms are not jointly significant at the five percent level.

Together, these results suggest that the time on disability benefits affected the number of terminated beneficiaries who became employed but not the subsequent decline in the employment effects. For this reason, I focus on how the maximum employment response varies as a function of time on DI by calculating the nonlinear combination of the four coefficients related to the $\text{SHIFT}_0$ variable at different values of $\text{DI}_\text{TIME}$, and calculating standard errors using the delta method. This is plotted in Fig. 7C for values of $\text{DI}_\text{TIME}$ between nine months, which is the shortest period of DI receipt in this sample, and six years, beyond which the confidence intervals become wide and uninformative. There is an inverted-U relationship between the employment effects and time spent on DI. For those who received DI for nine months, the maximum employment response is estimated to be 16.3 percentage points. The maximum employment response then increases with DI receipt up to 2.7 years of time on DI, when the total shift in employment peaks at 24.6 percentage points, or 50 percent higher than those on DI for nine months. The employment effects are smaller for those who received DI for longer than 2.7 years, and the maximum employment response is 18.8 percentage points for terminated beneficiaries who were on DI for six years. The 95% confidence intervals show these differences to be statistically significant at conventional levels. Given the evidence that capacity to work generally declines with time out of the labor force, it is surprising that the employment effects are initially increasing with time on DI. I conduct a number of additional exercises to understand the source of these differences.

In order to understand whether this pattern is concentrated among a particular disability type, results for the four disability-based groups used previously (alcohol/drug addictions, mental disorders, musculoskeletal, and other physical conditions) are presented in the online appendix. An inverted-U relationship between the employment effects and time on DI is present in all groups except for those with non-musculoskeletal physical conditions as their primary disability.

Next, I further assess the potential role of compositional differences in explaining the inverted-U relationship by estimating the relationship between time on DI and the employment effects for different age groups. As shown in the online appendix, few DA&A beneficiaries exited DI prior to the terminations: exit due to recovery (i.e., after two or three regressions results for those aged 30–39, 40–49, and 50–61 years at termination are presented in Columns 3–5 of Table 2 and in Fig. 7D. The inverted-U pattern is strongest among the youngest group, further suggesting that the inverted-U relationship is not due to pre-existing
differences between beneficiaries. It also remains in additional exercises aimed at limiting the role of beneficiary cohort effects, which are presented in the online appendix.\textsuperscript{17} Additional training while on DI is also not a plausible explanation. There is no evidence of vocational training in Stapleton et al. (1998) or any other report, and the mean years of education reported during the reclassification process in 1996 is the same as the mean years of education reported when applying for DI (in both cases, the average is 11.0 years). There are also no differences in termination rates that could explain the relationship.\textsuperscript{18}

5.1. Differences by initial health

One possible explanation for the larger employment effects after 2.5–3 years of DI receipt is that health improvement initially dominates any negative effects of being out of the labor force. While the SSA administrative data do not contain direct measures of individuals’ health status, there is information about how easily individuals gained eligibility for disability benefits that can serve as a measure of initial health. Hu et al. (2001) finds that individuals judged to be disabled at earlier stages of the DI determination process have, on average, more severe disabilities than those awarded eligibility at later stages. Such health differences do seem to affect employment. von Wachter et al. (2011) estimates that, prior to receiving DI, those awarded eligibility at earlier stages are less able to work than those awarded DI at later stages.

Information from the 831 File can be used to identify those awarded eligibility at three stages: (1) after their initial determination by medical examiners in state-level disability determination services (DDS) offices; (2) after reconsideration by a different set of DDS disability examiners; and (3) by an Administrative Law Judge or at a higher-level hearing.\textsuperscript{19} In this sample, 44% were awarded DI at the initial stage, 11% were awarded DI after reconsideration, and 45% were awarded DI at the hearings level.

Eq. (3) is used to estimate the role of time on DI in the “Initial Award” and “Hearings Award” groups. These results are presented in Columns 5–6 of Table 2 and Fig. 7E. The coefficient (standard error) on $\text{Shift}_{t}$ for Initial Award group is 0.003 (0.032), compared to 0.117 (0.037) for the Hearings Award group. This suggests that employment prior to DI would have been higher for those awarded eligibility at later stages, which is consistent with von Wachter, Song and Manchester (2011). Fig. 7E shows that the employment effects are also larger at nine months of DI receipt for the Hearings Award group than the Initial Award group, a difference that is statistically significant at the one percent level. However, the employment effects rise with DI receipt at a faster rate in the Initial Award group than in the Hearings Award group, so much so that the peak employment response for the Initial Award group is two percentage points higher than the peak for the Hearings Award group. DAA& termination rates further support health improvement being behind these patterns; they are higher for initial awardees (44%) than hearings awardees (31%). Those most readily defined as disabled when they applied for DI were least likely to be defined as disabled when reassessed some time later.

These differences suggest that the most clearly disabled individuals at the time of application improved the most, so much so that their employment is higher than those initially denied benefits after a period of benefit receipt. This could be due to the effects of the program or mean reversion in health, as those in the poorest health when applying for DI may have suffered from the largest health shocks. Initial access to Medicaid does not seem to account for the pattern: as shown in the online appendix, the inverted-U pattern is present among DI beneficiaries with initial access to SSI who were eligible for Medicaid, and also among DI beneficiaries who had to wait for Medicare eligibility for access to public health insurance. It is not possible to further distinguish the role of Medicare from other aspects of the program.

6. Conclusion

Reducing the fiscal burden associated with disability insurance requires policies that decrease the inflow into these programs, increase the outflow, or decrease the generosity of the benefits provided. Understanding the employment implications of different policies requires knowledge of disabled workers’ ability to work before, during and after the receipt of DI. Direct evidence is particularly important in this context, as DI applicants and beneficiaries have incentives to understate their true work capacity in order to gain or maintain their program eligibility. The widespread loss of DI eligibility studied here provides a rare opportunity to understand how work capacity does change by observing the work activity of disabled individuals once they no longer receive benefits. Approximately 22% of terminated beneficiaries started working at levels above “substantial gainful activity” earnings standard used by SSA to judge eligibility for DI. This level of labor force attachment is large relative to their work histories, and especially surprising given that they received no formal vocational support to help them re-enter the labor force (Stapleton et al., 1998).\textsuperscript{20} It is also well above the levels suggested by the exit rate from DI due to medical recovery, which was less than one percent per annum. The employment response declines over time, largely through terminated beneficiaries requalifying for DI or social insurance programs managed by SSA.

There is substantial heterogeneity in the employment response, with age and prior wage earnings strongly related to the magnitude of the employment response. In addition, there is heterogeneity in the employment response by time on DI, with the largest employment response among terminated beneficiaries who had received DI for 2.5–3 years prior to the terminations. There is suggestive evidence that changing health may account for some of this pattern, although more needs to be done to establish the mechanisms underlying the role of DI duration.

While there is a possible interaction between cash payments and addiction, the fact that the estimates are similar across individuals addicted to alcohol and to drugs suggests that the response did not result from a strong interaction between substance abuse and disability payments, as the cash required to sustain a heavy alcohol addiction is very different to heavy heroin or cocaine addictions (Rhodes et al., 2000). Moreover, the similarity of the employment effects across those with addictions, mental disorders and musculoskeletal conditions as their primary disability suggests that there are large and identifiable groups of current beneficiaries for whom the findings are likely to be informative.

The findings suggest ways in which current return-to-work initiatives may be made more effective in the United States and elsewhere. DI beneficiaries are currently scheduled to have medical reassessments (called “continuing disability reviews”) every one, three or seven years, depending on the severity and likely improvement of their disability. In order to deal with resource constraints
2.5% of cases, while the full reassessments themselves generate terminations in approximately three percent of cases (SSA, 2012). While there is some profiling in terms of who is sent a mailer and who is subject to a full reassessment, the findings here suggest a more focused role for medical reassessments. For example, comprehensive reassessments after two or three years of benefit receipt may have better chances of terminations than earlier and later reviews and be a sensible way to allocate scarce resources.

A relationship between time receiving disability benefits and capacity to work has important implications for interpreting studies that use the earnings histories of rejected applicants to estimate the likely employment of those who successfully become beneficiaries (e.g., Bound, 1989; von Wachter et al., 2011; Maestas et al., 2013). While these studies provide precise estimates of the employment potential of accepted applicants at the point they are applying for DI, the dynamic effects identified here suggest we should be cautious about using that design to identify the potential employment of all disability beneficiaries.

The findings also speak to fundamental questions about how disability insurance programs might be reformed. Most are structured as permanent disability programs. This puts the onus on examiners performing the medical reassessments to show beneficiaries no longer meet the eligibility standard, which creates legal and political issues that may explain why relatively few individuals ever lose eligibility. Likewise, the low take-up of vocational support likely reflects the risks involved in giving up a relatively certain stream of disability benefits (Autor and Duggan, 2003). The employment effects identified here suggest that providing public assistance through an acute period of poor health may be an effective way to maximize labor force participation of some disabled individuals.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/jjpubecono.2015.02.004.

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