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Abstract

The rate of application for Social Security Disability Insurance (SSDI) benefits, as well as the number of beneficiaries has been increasing for the past several decades, threatening the solvency of the SSDI program. One possible remedy is to promote continued employment amongst those experiencing the onset of a work limiting disability through the provision of workplace accommodations. Using the Health and Retirement Study data linked to Social Security administrative records and a state fixed effects model, we find that the provision of workplace accommodation reduces the probability of application for SSDI following disability onset. We estimate that receipt of an accommodation reduces a worker's probability of applying for SSDI by 30 percent over five years and 21 percent over 10 years. We then attempt to control for the potential endogeneity of accommodation receipt by exploiting exogenous variation in the implementation of state and federal anti-discrimination laws to estimate the impact of workplace accommodation on SSDI application in an instrumental variables (IV) model. While our coefficients continue to indicate that accommodation reduces SSDI application, we obtain implausibly large estimates of this effect. Overall our results imply that increasing accommodation is a plausible strategy for reducing SSDI applications and the number of beneficiaries.

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Rising Social Security Disability Insurance (SSDI) program costs have resulted in calls for major disability policy reforms (Autor and Duggan 2010; Burkhauser and Daly 2011) aimed at encouraging employers to provide greater accommodations for their workers following the onset of a work limitation and hence slow down their movement onto the SSDI program rolls. But there is little empirical evidence that past government efforts to increase accommodation have been successful in doing so or even that employer accommodation slows the movement of workers onto SSDI. In this paper, we use the most current data from the Health and Retirement Study (HRS) linked to Social Security Administration (SSA) administrative records on application for SSDI to estimate the effects of employer accommodation on the speed at which workers apply for SSDI benefits following the onset of a work limitation.

SSDI is the primary income replacement program for working age Americans whose health-based work limitations prevent them from performing any substantial gainful activity. But in most cases the onset of work limitation does not result in an immediate movement onto the SSDI rolls. Burkhauser, Butler, and Gumus (2004) using data from the Health and Retirement Study (HRS) show there is on average a seven year window between the onset of a work limitation and application for benefits. This timing varies by the severity of the impairment, but it also varies by the social environment the worker faces, including whether the employer provides the impaired worker with an accommodation.

When a worker experiences the onset of a work limitation—whether it is employment related or not—the employer may be able to facilitate continued employment with the provision of some form of workplace accommodation. Typical accommodations provided include altering the employees’ work environment, job type or schedule, retraining, and the provision of special tools or special transportation. Policy makers have encouraged employers to make such accommodations with the implementation of various state and federal laws preventing discrimination against those with disabilities, and in some

cases mandating workplace accommodations for them. While the most prominent of these laws was the Americans with Disabilities Act of 1990 (ADA), numerous state anti-discrimination and accommodation laws had been implemented prior to the passage of the ADA, starting with Wisconsin in 1965 and ending with Delaware and Idaho in 1988 (Jolls and Prescott 2004).

Burkhauser, Butler, Kim, and Weathers II (1999) and Burkhauser, Butler, and Gumus (2004) estimate that workplace accommodations significantly extended the duration before a worker applied for SSDI benefits. However, these studies were unable to control for important but unobserved worker characteristics. Employers are more likely to accommodate workers whose unobserved characteristics make them more likely to continue working if accommodated, suggesting that these previous studies overstated the impact of accommodation. This paper attempts to overcome this limitation by using state and federal laws as instrumental variables (IV) for accommodation. Previous research has demonstrated that state and federal anti-discrimination and reasonable accommodation laws increased the likelihood that workers were accommodated following the onset of a work limitation (Burkhauser, Schmeiser, and Weathers II Forthcoming).

Using a standard state fixed effects model, consistent with the previous literature, we find that the provision of workplace accommodation reduces the probability of application for SSDI following disability onset. However, the magnitude of the effect we estimate is somewhat smaller than that found in past studies focused on earlier cohorts of workers. We further attempt to control for the potential endogeneity of accommodation receipt to SSDI application by exploiting exogenous variation in the implementation of state and federal anti-discrimination laws to estimate the impact of workplace accommodation on SSDI application; however, we obtain implausibly large estimates of this effect, likely due to a problem with weak IVs.

I. Background

A. History of Accommodation-

Employment protection laws make discrimination against qualified individuals with a disability illegal and may also require employers to provide “reasonable accommodation” to them. The first federal law affecting persons with disabilities was the Rehabilitation Act of 1973, which included antidiscrimination standards for public employers. The Americans with Disabilities Act of 1990 (ADA) was the first federal disability based anti-discrimination law covering all workers. The ADA was intended to “establish a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities” and hence to minimize the barriers faced by people with disabilities to participate in all aspects of American society. The ADA consists of four titles, with Title I focused on disability-based discrimination on the part of employers. Title I requires employers to provide “reasonable accommodation” to their employees with disabilities. The law defines discrimination as:

“...not making reasonable accommodations to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or an employee, unless such covered entity can demonstrate that the accommodation would impose an undue hardship on the operation of the business of such covered entity.” (Americans with Disabilities Act, 1990)

Title I provides several examples of “reasonable accommodation.” The examples include: making facilities used by employees readily accessible to and usable by individuals with disabilities; job restructuring; part-time or modified work schedules; reassignment to a vacant position; acquisitions or modifications of examinations, training materials or policies, the provision of qualified readers or interpreters; and other similar accommodations for individuals with disabilities. Finally, Title I defines “undue hardship” as an action requiring significant difficulty or expense.

However, even before the implementation of the ADA in 1992, most states had in place some type of disability employment protection law and several, like the subsequently implemented ADA, included reasonable accommodation requirements (Jolls and Prescott 2004; Hotchkiss 2003). Figure 1 presents a

map of state anti-discrimination laws in place at the time the ADA was implemented. By 1990 only three states—Arkansas, Mississippi, and Alabama—and the District of Columbia had no form of anti-discrimination law in place. Amongst the remaining states, 29 had anti-discrimination laws in place that did not include reasonable accommodation provisions, and 18 states had anti-discrimination laws that included reasonable accommodation provisions. There is also substantial variation across time in the introduction of the state-level anti-discrimination laws. Figure 2 shows that 28 states introduced some type of anti-discrimination legislation before 1975, another 9 introduced them between 1975 and 1980, and 10 introduced them after 1980. Figure 3 shows the 9 states introduced reasonable accommodation provisions between 1977 and 1983 and the 9 states introduced reasonable accommodation provisions after 1983.

B. Incidence of Workplace Accommodations

A significant body of research has examined the incidence of workplace accommodation for disabled workers under a variety of disability policy regimes. Prior to the 1990 passage of the ADA, a substantial minority of workers who experienced the onset of a disability received a workplace accommodation from their employer at onset. Using data from the 1978 Survey of Disability and Work, Burkhauser, Butler, and Kim (1995) show that prior to the passage of the ADA, about 30 percent of men with work limiting disabilities received a workplace accommodation. This estimate is robust across studies and data sources; prior to the implementation of the ADA about 27 percent of male and female HRS respondents who experienced the onset of a disability while employed received a workplace accommodation (Daly and Bound 1996; Burkhauser, Butler, and Weathers II 2002).

There is also evidence that employer accommodation increased after the passage of the ADA. Charles (2004) uses the HRS cohort of people aged 51-61 who were first interviewed in 1992 and subsequently interviewed in 1994 and 1996 to show that the incidence of workplace accommodation

increased after passage of the ADA. Employer accommodation was 28 percent for those whose disability onset was before the ADA. It was 33 percent for those whose disability onset was afterward, an effective increase of 5 percentage points.

More recent work by Burkhauser, Schmeiser, and Weathers II (Forthcoming) also used data from the HRS, but included subsequent cohorts and waves of the HRS, and examined the effect of pre-existing state laws on accommodation, as well as the incremental effect of the ADA on accommodation. Moreover, they examined the differential effect of these laws on workers who were injured on the job, and therefore potentially subject to Workers' Compensation laws, and workers who were not injured on the job. They find that prior to the implementation of these state laws employers were more likely to accommodate workers if their disability onset was work related and hence likely to be covered by State Workers' Compensation laws. After States implemented their anti-discrimination laws, the probability of receiving a workplace accommodation increased, but only for workers whose work limitations were not work related. Implementation of the ADA further increased the likelihood of accommodation for all workers.

C. The Effect of Workplace Accommodation on Job Tenure and SSDI Application

Several previous studies have examined the effect of workplace accommodation on job tenure and time to SSDI application. Burkhauser et al. (1999) used data from the 1978 Survey of Disability and Work and the 1992 wave of the HRS in a continuous time hazard model to examine the time it takes employed men to apply for SSDI benefits following the onset of a work limitation. They estimated that workplace accommodation reduces the probability of SSDI benefit application by 27 percent within 10 years. Burkhauser, Butler, and Weathers II (2002) extended this analysis by adding variation in state level SSDI program administration to the model and found that accommodation reduces SSDI applications within 10 years by 28 percent.

One limitation of these studies is that they both relied on data from 1992 or earlier, and focused on the cohort of individuals born prior to the Second World War. As the nature and type of occupations has changed considerably over the past 50 years, focusing exclusively on an older cohort may yield unrepresentative estimates of the effectiveness of accommodation in preventing SSDI application. The use of pre-1992 data also omits any secular changes in accommodation or SSDI application resulting from the implementation of the ADA. We thus extend the set of cohorts examined to those born through 1953 to capture a broader segment of the population. Moreover, we use longitudinal data on these individuals spanning 1992 to 2008, allowing us to capture not only retrospective reports of disability onset and accommodation, but also current onset and accommodation post-ADA.

II. Data

A. Health and Retirement Study Data

We use data from three successive HRS cohorts who enter the study when the respondent or spouse is between age 51 and 61. The HRS is a nationally representative panel study that collects information on a wide variety of topics including demographics, health, employment, income, wealth, disability and program participation. A detailed discussion of the HRS data can be found in Juster and Suzman (1995). The original HRS cohort consists of 9,802 persons born between 1931 and 1941 or married to someone born during those years. Members of the cohort were first interviewed in 1992 and have been re-interviewed once every two years. To remain representative of older adults, successive cohorts have been added including the War Babies cohort (2,701 respondents added in 1998, 1942 - 1947 birth cohort and spouses) and the Early Boomers (added in 3,256 respondents added in 2004, 1948 - 1953 birth cohort and spouses). Combined, these cohorts provide information on the receipt of

workplace accommodations before and after implementation of all state employment protection laws, as well as the ADA.

The HRS asks sample members, “Do you have any impairment or health problem that limits the kind or amount of paid work you can do?” Those who say yes are then asked, “Is this a temporary condition that will last for less than three months?” Those who respond that their condition is not temporary are considered persons with a disability. Over 50 percent of persons in each cohort who report a disability also report that they were employed at the time that their work limitation began. Those employed at the time of disability onset were asked, “At the time your health started to limit your ability to work, did your employer do anything special to help you out so that you could stay at work?” We use responses to this question to construct our indicator variable for receipt of workplace accommodation. Overall our data sample consists of 3,538 males aged 18 to 62 when they first experienced a work limitation (see Table 1). These work limitations occurred from 1948 to 2008. Of these individuals that experienced a work limitation while employed 28 percent were provided with workplace accommodations by their employer.

The summary statistics largely conform to expectations regarding the likely recipients of a workplace accommodation. As shown in the column labeled Accommodated relative to the column labeled Not Accommodated, those accommodated were more likely to be white, have a college degree, and have been injured on the job. The accommodated were also less likely to have comorbidities and experienced onset when unemployment rates were lower.

We use respondents’ state of residence and the year that their work limitation occurred to classify the state and federal accommodation policies that were in effect at disability onset. At the time of their disability onset, 13 percent resided in a state with no disability employment protection law, and 31 percent of our sample were covered by some form of state law (whether an anti-discrimination,

accommodation law or both) when their work limitation began. Federal laws encapsulated by the ADA came into effect in 1992 and 56 percent of our sample experienced the onset of their disability post 1992 when the ADA superseded all state laws (or lack thereof).

Demographic and health information on an individual are also sourced from the HRS. State unemployment rates are used to capture the labor market conditions in each state and are sourced from the Bureau of Labor Statistics¹.

B. Social Security Administrative Data

The HRS has been linked to Social Security Administration records on earnings history, application for SSDI or Social Security Old-Age benefits, and receipt of these benefits. These data allow for the identification of the exact date in which an individual first applied for SSDI benefits. We thus calculate the exact time period elapsed between when an individual reports the onset of their work limitation and when they file for SSDI benefits. We focus on the decision to apply for benefits rather than acceptance onto the SSDI rolls as the application decision is within the worker’s control, whereas numerous factors beyond the worker’s control interact to determine the timing of the decision on their application and whether they are accepted or rejected for benefits.

III. Empirical Approach

To analyze the effect of workplace accommodation on subsequent application for SSDI benefits following the onset of a work limitation, we use a linear probability model (LPM) to estimate application for SSDI within 1, 3, 5, and 10 years of onset. Specifically, we estimate:

$$DI_{ist} = \alpha + \beta X_i + \delta A_i + \sigma S_{st} + \gamma_1 T_t + \gamma_2 T_t^2 + \varepsilon_{ist}, \quad (1)$$

¹ State unemployment data starts in 1976. For data prior to 1976 we use the national unemployment rate as this allows us to extend our sample back to 1948.

where DI is alternately an indicator for application to the SSDI program within 1, 5 and 10 years of onset, X is a vector of individual specific characteristics, A is an indicator that takes the value of one if an individual received an accommodation from their employer and zero otherwise, S is the state unemployment rate at the time of disability onset used to capture how underlying economic conditions affect the amount of time to SSDI application, as we expect that higher unemployment rates to lead to faster application for SSDI, T is year of onset, and ϵ is the error term. Model (1) is also estimated with the inclusion of state fixed-effects to control for any state specific factors that may affect both accommodation and SSDI application.

The X vector captures individual specific economic, health, and demographic characteristics consistent with previous research using the HRS. In particular, to account for variations in health in our sample, we include a measure of co-morbidity, as around one third of the respondents in our sample have more than one health condition. A priori we expect individuals with multiple conditions to leave the workforce more quickly. The most common health conditions among SSDI recipients are arthritis, cardiovascular disease, back problems, and other musculoskeletal conditions. We include an indicator variable for each of these three specific health conditions to capture differences in terms of how chronic and acute they are, and their potential effect on SSDI application.² Previous research by Burkhauser, Schmeiser, and Weathers (Forthcoming) has demonstrated that whether or not a disability is the result of a work related injury has a significant effect on the likelihood of receiving an accommodation. Thus, an indicator variable capturing whether the work limitation was a result of a work accident is also included in the model. In terms of demographics we include variables on age at onset, race and education. The average person in our sample is a white male aged 50 to 54 who has completed high school.

² The data sample excludes individuals who had either cancer, tumors, paralysis or stroke given the debilitating nature of these conditions. The exclusion of individuals with these conditions from our sample had no significant effect on our estimates.

The coefficient we are primarily interested in is δ , as this tells us how the provision of a workplace accommodation affects an individual's decision to apply for SSDI benefits. However, the coefficient on accommodation may be biased by individual specific unobserved determinants of both receipt of an accommodation and subsequent SSDI application. It is likely that employers are strategic in their provision of accommodation in ways that are unobservable in the data. These unobserved characteristics resulting in accommodation for certain employees may also be related to subsequent application for SSDI. For example, employers may be more willing to provide accommodation to workers who are more motivated to work. Independent of accommodation, those with work limiting conditions who are more motivated to work will also be less likely to apply for SSDI. We would expect the exclusion of these unobserved characteristics to bias our coefficients upward in magnitude, towards finding a greater reduction in subsequent SSDI application as a result of a workplace accommodation than is accurate. To address this concern, we attempt to implement a two-stage least squares (2SLS) estimation strategy by exploiting exogenous variation in accommodation driven by variation in the presence of state and federal employment protection laws at the time of onset of a work limitation.

The basis for our identification strategy is the finding by Charles (2004) that the passage of the ADA increased the probability that a worker received an accommodation, as well as the finding by Burkhauser, Schmeiser, and Weathers (Forthcoming) that the state anti-discrimination and accommodation laws increased the probability of workplace accommodation, and the ADA increased the probability of accommodation above and beyond the effect of these state laws. Our primary source of identifying variation is the pre-ADA implementation of the various state level anti-discrimination laws. As previously discussed, there was substantial variation in the dates of implementation of state level anti-discrimination laws, as well as variation in the nature of the law (whether or not the law contained a reasonable accommodation provision).

In the first-stage, whether or not an individual is provided with a workplace accommodation is estimated using the legal regime in their state of residence at the time of their disability onset, with indicators for state anti-discrimination laws, workplace accommodation laws, or the ADA used as instruments³. The vast majority of workers in our sample were covered by some form of state anti-discrimination or accommodation law at the time of their work limitation. Around half of the workers had their disability onset post-1992, and thus were covered by the ADA. As shown in Table 1, simple sample averages suggest that a worker was more likely to be accommodated when state laws or the ADA was in force; only 13 percent workers received an accommodation when no law was in place, 24 percent received an accommodation under state laws and 31.9 percent received an accommodation in the presence of the ADA.

IV. Effects of Workplace Accommodation on SSDI Application

Given that a significant body of literature has previously estimated the impact of workplace accommodation on SSDI application using data from the HRS and a variety of non-IV strategies, we first estimate our model using a LPM in order to verify that our estimates are consistent with the previous findings. Our LPM results excluding state fixed-effects are presented in Table 2, while those with state fixed-effects are presented in Table 3.

Our initial findings are similar to those of previous research, as we find that the provision of workplace accommodation reduces the probability of application for SSDI following disability onset. As shown in the first column of results in Table 2, receipt of a workplace accommodation reduces the probability of SSDI application within the subsequent year by 4.5 percentage points. As 17.1 percent of

³ Here we combined state anti-discrimination and accommodation laws into a single variable to measure whether the state had any laws in place at the time an individual experienced a work limitation. We also tried specifications where we disaggregated state laws into accommodation and anti-discrimination laws and included these separately in the regressions. However measuring state laws through a single combined variable, as we do above, or through two separate anti-discrimination and accommodation law variables made very little difference to the results.

our sample applied for SSDI within one year, this finding implies a 26 percent reduction in applications. The magnitude of the effect of workplace accommodation on SSDI application increases with time, as it decreases the probability of SSDI application within three years by 6.2 percentage points and within five years by 7.3 percentage points. With application rates of 22.9 percent and 25.4 percent, these estimates imply a 27 percent and 29 percent reduction in applications, respectively. However, the effect of accommodation of SSDI application appears to moderate over an extended period of time, as it reduces the probability of SSDI application within ten years by only 5.7 percentage points, or 20 percent, based on an application rate of 29 percent.

With the addition of state fixed-effects to our model in Table 3, the magnitude of the coefficient estimates becomes marginally larger, with the provision of workplace accommodation decreasing the probability of SSDI application by 4.6, 6.4, 7.5 and 6.0 percentage points within 1, 3, 5, and 10 years, respectively. These estimates imply reductions in applications of 27, 28, 30 and 21 percent, respectively. While our five year estimates are substantially consistent with those found in Burkhauser et al. (1999) who estimate that workplace accommodation decreases the probability of SSDI application within five years by 33 percent using HRS data. However, they estimate that accommodation results in a reduction in SSDI application of 27 percent within 10 years of onset, relative to our estimate of 21 percent. They observe an increasing reduction in the probability of SSDI application out to ten years, whereas our estimated effect declines in magnitude after more than five years post-onset.

In an attempt to address the potential endogeneity of accommodation to SSDI application we estimate a 2SLS model using the variation in state accommodation and anti-discrimination laws, as well as the ADA, as a plausibly exogenous source of variation in receipt of accommodation. Unfortunately, our sample has relatively few observations on disability onset prior to 1992, and thus we are unable to generate sufficient variation in accommodation from the variation in state laws to obtain a valid first-

stage. The weakness of our instruments yields implausibly large estimates for the effect of workplace accommodation on SSDI application. Results from both the first and second stages of our 2SLS model are discussed in Appendix 1 and the tables are included in Appendix 2.

V. Conclusions

While several studies have estimated the effect of workplace accommodation on subsequent application for SSDI benefits, they have done so for only a select demographic group, using retrospective reports of disability and accommodation prior to 1992. This study updates these estimates using a broader set of the population and includes both current and retrospective reports of disability onset and accommodation linked to administrative records on SSDI application. Our estimates confirm that accommodation effectively reduces the probability of application for SSDI following the onset of a work limitation. Moreover, our estimates are largely consistent with the magnitude of the effect estimated in previous studies. We find that providing an employee with an accommodation following the onset of a work limitation would reduce applications to the SSDI program by 27 percent within one year of onset and 30 percent within five years of onset. Where our estimates differ from those of previous studies is in the magnitude of the long-run effect of accommodation on SSDI application. We estimate that accommodation reduces SSDI application by 21 percent within 10 years of onset, whereas previous estimates were on the order of a 30 percent reduction.

To our knowledge this is the first study to attempt to estimate the effect of accommodation on SSDI application using an IV strategy to control for the endogeneity of accommodation receipt and thus produce unbiased estimates. However our attempt to do so by exploiting exogenous variation in the implementation of state and federal anti-discrimination laws yielded implausibly large estimates of the effect of accommodation on reducing SSDI applications. One explanation for these implausible findings

is that our identification strategy, which was dependent on having sufficient observations during the implementation of state level anti-discrimination laws prior to the ADA failed to yield sufficient variation to generate plausible second stage coefficient estimates.

In addition to our IV coefficients being implausibly large, the direction of the change in the effect between the non-IV and IV estimates ran counter to our hypothesis. We had anticipated that the use of the IV would result in the magnitude of the coefficient decreasing as employers were expected to be more likely to accommodate higher quality workers who would be less likely to apply for SSDI benefits regardless of accommodation. Instead we observed the magnitude of the effect increasing substantially with the use of the IV, suggesting that workplace accommodation may in fact be a very effective mechanism for reducing SSDI application following the onset of a work limitation. Re-estimation of this analysis on a larger sample would likely yield a more accurate estimate of the true magnitude of the effect of workplace accommodation in reducing SSDI application.

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Table 1. Summary Statistics by Receipt of Workplace Accommodation and Presence of Accommodation Law

	Full Sample	Accommodated	Not Accommodated
Received Workplace Accommodation	0.283 (0.451)	1.000 0.000	0.000 0.000
No State Accommodation Law	0.131 (0.338)	0.113 (0.317)	0.139 (0.346)
State Accommodation Law	0.313 (0.338)	0.291 (0.317)	0.320 (0.346)
ADA	0.556 (0.497)	0.596 (0.491)	0.541 (0.498)
Disability Caused by Work Accident	0.218 (0.413)	0.262 (0.440)	0.201 (0.401)
Age at Onset	49.266 (9.281)	49.220 (9.185)	49.284 (9.320)
White	0.820 (0.384)	0.840 (0.367)	0.812 (0.391)
Non-White	0.180 (0.384)	0.160 (0.367)	0.188 (0.391)
Less than High School	0.270 (0.444)	0.240 (0.427)	0.282 (0.450)
High School Diploma	0.340 (0.474)	0.322 (0.468)	0.347 (0.476)
Some College	0.237 (0.425)	0.252 (0.435)	0.231 (0.422)
College Degree	0.152 (0.360)	0.186 (0.389)	0.139 (0.346)
Presence of Comorbidities	0.317 (0.465)	0.296 (0.457)	0.325 (0.468)
Has Musculoskeletal Condition	0.584 (0.493)	0.597 (0.491)	0.579 (0.494)
Has Cardiovascular Condition	0.127 (0.333)	0.120 (0.326)	0.129 (0.335)
State Unemployment Rate at Onset	5.939 (1.796)	5.774 (1.716)	6.004 (1.823)
Year of Onset	1991 (10.182)	1992 (10.134)	1991 (10.199)

Table 1. Continued

Time to SSDI Application in Years			
1	0.171 (0.377)	0.139 (0.347)	0.184 (0.388)
2	0.207 (0.405)	0.164 (0.371)	0.224 (0.417)
3	0.229 (0.420)	0.176 (0.381)	0.250 (0.433)
4	0.244 (0.429)	0.182 (0.386)	0.268 (0.443)
5	0.254 (0.436)	0.192 (0.394)	0.279 (0.449)
10	0.290 (0.454)	0.229 (0.421)	0.314 (0.464)
Observations	3877	1037	2840

Standard deviations in parentheses

Table 2. Application for SSDI Benefits following Disability Onset, by Years Post Onset

	Number of Years Post Onset			
	1	3	5	10
Received Workplace Accommodation	-0.0448*** (0.0083)	-0.0619*** (0.0098)	-0.0725*** (0.0111)	-0.0567*** (0.0117)
Disability Caused by Work Accident	0.0154 (0.0113)	0.0426** (0.0150)	0.0484** (0.0160)	0.0384* (0.0165)
Age at Disability Onset	0.0163*** (0.0043)	0.0310*** (0.0050)	0.0398*** (0.0057)	0.0478*** (0.0064)
Age at Disability Onset Squared	-0.0002*** 0.0000	-0.0004*** (0.0001)	-0.0005*** (0.0001)	-0.0006*** (0.0001)
Non-White	0.0501** (0.0148)	0.0606** (0.0186)	0.0702*** (0.0196)	0.0774*** (0.0182)
High School	-0.0602*** (0.0117)	-0.0724*** (0.0126)	-0.0739*** (0.0155)	-0.0679*** (0.0158)
Some College	-0.0687*** (0.0140)	-0.0804*** (0.0163)	-0.0945*** (0.0177)	-0.0832*** (0.0193)
College	-0.0872*** (0.0186)	-0.1215*** (0.0223)	-0.1291*** (0.0254)	-0.1272*** (0.0316)
Presence of Comorbidities	0.0687*** (0.0120)	0.0993*** (0.0124)	0.1107*** (0.0130)	0.1241*** (0.0131)
Has Arthritis	-0.1150*** (0.0172)	-0.1236*** (0.0183)	-0.1273*** (0.0166)	-0.1268*** (0.0169)
Has Back Pain	-0.0878*** (0.0166)	-0.1147*** (0.0193)	-0.1194*** (0.0201)	-0.1253*** (0.0201)
Has Musculoskeletal Condition	-0.1125*** (0.0177)	-0.1239*** (0.0197)	-0.1260*** (0.0205)	-0.1379*** (0.0218)
Has Cardiovascular Condition	0.0356 (0.0227)	0.0472 (0.0244)	0.0443* (0.0218)	0.0548* (0.0240)
State Unemployment Rate at Onset	0.0072 (0.0045)	0.0087 (0.0050)	0.011 (0.0059)	0.0161* (0.0062)
Year of Onset	0.0035*** (0.0009)	0.0038*** (0.0011)	0.0037** (0.0012)	0.0028* (0.0012)
State Fixed Effects				
Observations	3,877	3,877	3,877	3,877

* p<0.05, ** p<0.01, *** p<0.001

Table 3. Application for SSDI Benefits following Disability Onset, by Years Post Onset

	Number of Years Post Onset			
	1	3	5	10
Received Workplace Accommodation	-0.0455*** (0.0085)	-0.0636*** (0.0098)	-0.0745*** (0.0111)	-0.0597*** (0.0115)
Disability Caused by Work Accident	0.0164 (0.0117)	0.0432** (0.0151)	0.0486** (0.0158)	0.0388* (0.0166)
Age at Disability Onset	0.0169*** (0.0046)	0.0318*** (0.0051)	0.0403*** (0.0056)	0.0481*** (0.0065)
Age at Disability Onset Squared	-0.0002*** 0.0000	-0.0004*** (0.0001)	-0.0005*** (0.0001)	-0.0006*** (0.0001)
Non-White	0.0438** (0.0158)	0.0555** (0.0192)	0.0644** (0.0200)	0.0719*** (0.0187)
High School	-0.0583*** (0.0116)	-0.0704*** (0.0129)	-0.0700*** (0.0157)	-0.0651*** (0.0158)
Some College	-0.0621*** (0.0144)	-0.0746*** (0.0168)	-0.0870*** (0.0180)	-0.0772*** (0.0197)
College	-0.0821*** (0.0190)	-0.1177*** (0.0231)	-0.1228*** (0.0266)	-0.1228*** (0.0334)
Presence of Comorbidities	0.0671*** (0.0124)	0.0966*** (0.0130)	0.1078*** (0.0134)	0.1217*** (0.0136)
Has Arthritis	-0.1161*** (0.0177)	-0.1246*** (0.0191)	-0.1268*** (0.0172)	-0.1258*** (0.0173)
Has Back Pain	-0.0860*** (0.0173)	-0.1136*** (0.0201)	-0.1174*** (0.0211)	-0.1240*** (0.0207)
Has Musculoskeletal Condition	-0.1114*** (0.0185)	-0.1221*** (0.0206)	-0.1222*** (0.0212)	-0.1340*** (0.0221)
Has Cardiovascular Condition	0.0352 (0.0229)	0.0464 (0.0245)	0.0427 (0.0216)	0.0518* (0.0237)
State Unemployment Rate at Onset	0.0063 (0.0047)	0.0085 (0.0057)	0.0109 (0.0065)	0.0168* (0.0069)
Year of Onset	0.0035** (0.0010)	0.0039** (0.0012)	0.0037** (0.0013)	0.0029* (0.0013)
State Fixed Effects	X	X	X	X
Observations	3,877	3,877	3,877	3,877

* p<0.05, ** p<0.01, *** p<0.001

Appendix 1 – Discussion of 2SLS Estimates

As we have previously argued, the provision of a workplace accommodation to an employee by a firm is likely dependent in part on various characteristics of the employee that are unobservable in our data, such as productivity, work effort, intelligence, severity of the disability and the nature/cost of the accommodation needed to maintain the employee, which may be correlated with subsequent application for SSDI application. We would hypothesize that, all else equal, employers are more likely to accommodate higher quality employees who would be less likely to apply for SSDI regardless of receipt of accommodation. Thus we would expect the exclusion of these unobserved characteristics to bias our coefficients upward in magnitude, towards finding a greater reduction in subsequent SSDI application as a result of a workplace accommodation than is accurate. We therefore re-estimate the models presented in Tables 2 and 3 using a two-stage least squares procedure, where receipt of accommodation is instrumented for using state and federal antidiscrimination and workplace accommodation laws.

Table A1 presents results from the first stage of our model. The coefficients on both the ADA and the presence of state employment protection laws are in the expected direction, indicating that they increase the probability of receiving an accommodation by 7.2 percentage points and 1.8 percentage points, respectively. However, only the ADA coefficient is statistically significant. Thus the F-statistic for the joint significance of our IVs falls well below the generally accepted threshold of 10. As the ADA coefficient is simply an indicator for post-1992, this is not a credible IV for accommodation by itself.

Table A2 presents the results of our 2SLS estimates excluding state fixed-effects. Unfortunately, we obtain implausibly large estimates for the effect of workplace accommodation on SSDI application, ranging from a 94 to 126 percentage point reduction in the probability of SSDI application within one to ten years following disability onset. Moreover, only the three and ten year estimates are significant at the 5 percent level. In Table 5, which adds state fixed-effects, the coefficient magnitudes are even more

implausible, ranging from a 94 to 160 percentage point decrease in the probability of subsequent SSDI application with a workplace accommodation.

Given the improbably large effects found using the 2SLS estimation strategy we next turn to the estimation of a two-stage logistic model. For brevity, we estimate only the logit specification that includes state fixed effects. Table A3 presents the marginal effects for the coefficient estimates from the logit model. As in the LPM model we find that receipt of a workplace accommodation decreases the likelihood of subsequent application for SSDI. Here we now find that the effect increases in magnitude from one through ten years post-onset. While all logit estimates are significant at the five percent level, the magnitude of the effect implied by the coefficients is again too large to be plausible.

Appendix 2 – Tables of 2SLS Estimates

Table A1. First Stage LPM Estimates of Receipt of an Accommodation, by Years Post Onset

	Receipt of Accommodation
ADA	0.0720** (0.0256)
State Anti-Discrimination Law	0.0183 (0.0330)
Disability Caused by Work Accident	0.0558* (0.0219)
Age at Disability Onset	0.0119* (0.0051)
Age at Disability Onset Squared	-0.0001* (0.0001)
Non-White	-0.0226 (0.0147)
High School	0.0228 (0.0176)
Some College	0.0469* (0.0179)
College	0.0720** (0.0243)
Presence of Comorbidities	-0.0148 (0.0235)
Has Arthritis	-0.0068 (0.0207)
Has Back Pain	0.0418 (0.0227)
Has Musculoskeletal Condition	0.0365 (0.0191)
Has Heart Condition	0.0570* (0.0260)
State Unemployment Rate at Onset	0.0032 (0.0054)
Year of Onset	-0.001 (0.0017)
State Fixed Effects	X
Observations	3,877

* p<0.05, ** p<0.01, *** p<0.001

Table A2. IV Estimates of Application for SSDI Benefits following Disability Onset, by Years Post Onset

	Number of Years Post Onset			
	1	3	5	10
Received Workplace Accommodation	-0.9443 (0.5026)	-1.1436* (0.5314)	-1.2619* (0.5633)	-1.2526* (0.6111)
Disability Caused by Work Accident	0.0633* (0.0312)	0.1001*** (0.0295)	0.1117*** (0.0327)	0.1020** (0.0341)
Age at Disability Onset	0.0250** (0.0078)	0.0415*** (0.0094)	0.0514*** (0.0104)	0.0594*** (0.0116)
Age at Disability Onset Squared	-0.0003*** (0.0001)	-0.0005*** (0.0001)	-0.0006*** (0.0001)	-0.0007*** (0.0001)
Non-White	0.0312 (0.0244)	0.0379 (0.0297)	0.0452 (0.0308)	0.0523 (0.0303)
High School	-0.0347 (0.0234)	-0.0418 (0.0271)	-0.0403 (0.0301)	-0.034 (0.0326)
Some College	-0.0209 (0.0398)	-0.0229 (0.0425)	-0.0313 (0.0470)	-0.0197 (0.0495)
College	-0.0108 (0.0464)	-0.0296 (0.0530)	-0.028 (0.0603)	-0.0256 (0.0686)
Presence of Comorbidities	0.0546* (0.0233)	0.0823** (0.0283)	0.0920** (0.0335)	0.1053** (0.0341)
Has Arthritis	-0.1196*** (0.0215)	-0.1292*** (0.0265)	-0.1334*** (0.0270)	-0.1330*** (0.0269)
Has Back Pain	-0.0484 (0.0351)	-0.0673 (0.0415)	-0.0672 (0.0433)	-0.0729 (0.0440)
Has Musculoskeletal Condition	-0.0773* (0.0339)	-0.0815 (0.0425)	-0.0794 (0.0437)	-0.0910* (0.0457)
Has Cardiovascular Condition	0.0902 (0.0475)	0.1128* (0.0534)	0.1165* (0.0519)	0.1274* (0.0554)
State Unemployment Rate at Onset	0.0014 (0.0054)	0.0018 (0.0064)	0.0033 (0.0070)	0.0084 (0.0075)
Year of Onset	0.0047*** (0.0011)	0.0053*** (0.0013)	0.0053*** (0.0014)	0.0044** (0.0014)
State Fixed Effects				
Observations	3,877	3,877	3,877	3,877

* p<0.05, ** p<0.01, *** p<0.001

Table A3. IV Estimates of Application for SSDI Benefits following Disability Onset, by Years Post Onset

	Number of Years Post Onset			
	1	3	5	10
Received Workplace Accommodation	-0.9433 (0.5134)	-1.4490* (0.6403)	-1.5879* (0.6582)	-1.6044* (0.7337)
Disability Caused by Work Accident	0.0647* (0.0327)	0.1177** (0.0376)	0.1300** (0.0409)	0.1219** (0.0448)
Age at Disability Onset	0.0235** (0.0073)	0.0419*** (0.0100)	0.0514*** (0.0111)	0.0594*** (0.0121)
Age at Disability Onset Squared	-0.0003*** (0.0001)	-0.0005*** (0.0001)	-0.0006*** (0.0001)	-0.0007*** (0.0001)
Non-White	0.0238 (0.0247)	0.0245 (0.0318)	0.0306 (0.0326)	0.0374 (0.0332)
High School	-0.0379 (0.0235)	-0.0389 (0.0333)	-0.0355 (0.0362)	-0.03 (0.0392)
Some College	-0.0203 (0.0401)	-0.0101 (0.0511)	-0.0165 (0.0555)	-0.0052 (0.0596)
College	-0.0158 (0.0478)	-0.0153 (0.0645)	-0.011 (0.0712)	-0.0086 (0.0815)
Presence of Comorbidities	0.0526* (0.0248)	0.0743* (0.0368)	0.0834* (0.0424)	0.0968* (0.0438)
Has Arthritis	-0.1202*** (0.0224)	-0.1309*** (0.0325)	-0.1336*** (0.0335)	-0.1328*** (0.0336)
Has Back Pain	-0.0474 (0.0344)	-0.054 (0.0489)	-0.0523 (0.0505)	-0.0575 (0.0516)
Has Musculoskeletal Condition	-0.0766* (0.0338)	-0.0684 (0.0491)	-0.0635 (0.0491)	-0.0741 (0.0519)
Has Cardiovascular Condition	0.0867 (0.0466)	0.1259* (0.0618)	0.1295* (0.0597)	0.1404* (0.0639)
State Unemployment Rate at Onset	0.0074 (0.0055)	0.0102 (0.0074)	0.0127 (0.0079)	0.0187* (0.0088)
Year of Onset	0.0053*** (0.0014)	0.0067*** (0.0019)	0.0068*** (0.0020)	0.0060** (0.0021)
State Fixed Effects	X	X	X	X
Observations	3,877	3,877	3,877	3,877

* p<0.05, ** p<0.01, *** p<0.001

Figure 1

Pre-ADA State Disability Discrimination Laws



