Labour market impacts from disability onset

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ANU Working Papers in Economics and Econometrics
583

September 2012 JEL: J20, I10

ISBN: 0 86831 583 4

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September 2012

Abstract

In this paper we estimate the causal impacts of disability onset on labour market outcomes up to four years after onset using longitudinal data from the Household Income and Labour Dynamics Australia (HILDA) survey and difference-in-difference propensity score matching techniques. We find lasting negative impacts on full-time employment, which is linked more to people foregoing opportunities to move to full-time work rather than downshifting from full-time to part-time work. Impacts are greater for those without post-school qualifications because they face poor prospects once dislocated from work. These results point to the importance of prevention and vocational rehabilitation programs that are targeted at low-skilled workers.

JEL classifications: J20, I10
Keywords: disability, employment, transitions.

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1. Introduction

In OECD countries, employment rates for people with a disability are around 60% lower than rates for people without a disability (OECD 2010). Low employment rates places a significant financial burden on OECD countries, with expenditure on disability benefits at around 2% of GDP, which until the global financial crisis, was twice the expenditure on unemployment benefits (OECD 2010). Disadvantage is not just limited to employment rates, but working conditions as well. Compared to workers without a disability, workers with a disability are more likely to be in low paid and non-traditional jobs, such as part-time employment (DeLeire 2000; Kidd et al. 2000; Wilkins 2004).

To design policy measures to deal with the labour market disadvantage from disability, it is imperative to understand the causal impacts of disability onset during working-age. Analysis of the causal impacts of working-age onset is needed, separate from the causal impacts from early-life onset, because the vast majority of working-age people with disability first experience their condition during adulthood (Burchardt 2003a) and the nature of disadvantage and policy responses required are different (Baldwin and Johnson 2001, Wilkins 2004).[1] A key issue when estimating causal impacts of onset is dealing with selection that arises because those with an existing labour market disadvantage are more likely to suffer onset (Jenkins and Rigg 2004). Disentangling the impacts of onset from pre-existing disadvantage of people with disability is important to guide appropriate policy responses. If most of the disadvantage is not causally linked to onset, then it may be best to target pre-existing disadvantage; if it is, then to avoid possible scarring from time out of work (Arulampalam 2001; Gregg 2001; Knights et al. 2002), it may be more appropriate to design measures to prevent job loss and/or return people to work expeditiously. However, to be most cost-effective, these measures should be targeted at groups that are most likely to be dislocated from employment following onset and with poor re-employment prospects.

In this paper, we aim to improve the understanding of the causal impacts of disability onset by addressing the following questions: up to four years following disability onset, what are the causal impacts of onset on labour market outcomes, including full-time and part-time employment, receipt of income support and the chances of living in a low income household? To what extent is any impact on part-time employment driven by a switch from full-time to

[1] Because those who experience onset during adulthood have already made human capital investments, they may suffer a career disruption and benefit from rehabilitation programs. In contrast, those who have a disability from a young age face learning barriers, which requires extra support in school.

part-time work? How do the initial impacts and ability to adjust to onset over time vary by education status?

To date, much of the literature on the disadvantage faced by people with disability has employed cross-sectional analysis (see for example, DeLeire 2000; Kidd et al. 2000; Wilkins 2004; Jones 2007). Cross-sectional analysis, however, says nothing about how impacts of onset change over time and whether some individuals are better able to adapt to onset than others and contains a high proportion of long-term cases (known as the stock-sampling problem). Several studies have investigated the impacts of disability onset including Burkhauser and Daly (1998), Burchardt (2003a, 2003b), Jenkins and Rigg (2004), and Lechner and Vazquez-Alvarez (2012), but the insights from these studies have been limited. In all but one of these studies, the analysis has been limited to estimating short-run impacts on those in employment prior to onset by differencing before and after changes in outcomes.[2] While such an approach controls for time-invariant factors, it does not separate the impacts of onset from the impacts of contemporaneous changes. The exception is the recent study by Lechner and Vazquez-Alvarez (2012), which controls for contemporaneous changes by using propensity score matching (PSM), but the analysis is limited to the impacts of those full-time employed prior to onset.

This paper contributes to the literature in three ways. First, we build on the Lechner and Vazquez-Alvarez (2012) study by comprehensively dealing with non-random selection. In particular, by combining PSM techniques with difference-in-difference (DID), we are able to control for time-invariant unobservables and contemporaneous changes. Also we use extensive health information in the Household Income and Labour Dynamics Australia (HILDA) survey to control for non-random selection into disability due to poor health.

A second contribution is in addressing whether onset is causally linked to the high rate of part-time work among people with disability and whether this is a result of down-shifting from full-time to part-time work. A common finding in the literature is that people with disability are much more likely than those without disability to be employed part-time (Schur 2003; Hotchkiss 2004; Wilkins 2004; Jones 2007). Studies by Schur (2003); Jones et al. (2006); and Jones (2007) on the reasons for the high prevalence of part-time work among people with disability find that it is due to a preference for part-time work and not due to

[2] Burkhauser and Daly (1998) and Jenkins and Rigg (2004) used before and after onset changes in outcomes for those who experience onset. Analogously, Burchardt (2003a) estimated a fixed effects model on those who experience onset, but without controls for changes in macroeconomic or policy environment.

discrimination. While it may be preferred, the freedom in which people can shift from full-time to part-time work to manage their condition is untested. In this context, the use of Australian data is important. Australia has flexible labour laws, and as a result, it has the second highest rates of part-time employment in the OECD (Abhayaratna et al. 2008). Recent experiences suggest that the flexibility to switch from full-time to part-time work has been instrumental in helping Australia to maintain low unemployment rates during the global financial crisis (Australian Bureau of Statistics (ABS) 2010). If down-shifting in response to disability onset occurs, it should be observed to occur in Australia.

A third contribution of this paper is to estimate longer-term impacts of disability onset across people from different educational backgrounds. Cross-sectional studies have consistently shown that the labour market disadvantage of those with disability decreases with the level of education (see Kidd et al. 2000; Wilkins 2004; Jones et al. 2006). To date, only two studies that we are aware of have examined differential impacts by education in the first year after onset (Burchardt 2003b; Jenkins and Rigg 2004). We estimate impacts 3-4 years after onset, which is important to properly gauge differential impacts because those with higher qualification levels may be better equipped to adjust in the longer-term.

We find that disability onset has significant negative impacts on employment, especially full-time employment, and an elevated risk of belonging to a low-income household up to four years after disability onset. Results do not support the hypothesis that people retain employment by readily down-shifting from full-time to part-time work to manage their condition following disability onset. Rather, the greater impacts on full-time employment is related more to people foregoing opportunities to move from out of work or part-time to full-time. Importantly, impacts of disability onset are found to be around twice as great for those without qualifications than for those with higher education qualifications, due partly to the slower rates in which those without qualifications return to employment. These results point to differential social costs from disability onset across people from different education backgrounds and the need to target prevention and rehabilitation measures at the low-skilled.

This paper is structured in a traditional way, starting with a discussion of disability policy in Australia (section 2), followed by an overview of the data (section 3), a description of the modelling approach (section 4), a discussion of the results (section 5) and concluding comments (section 6).

2. Disability policy in Australia

Central to interpreting results presented in this study is an appreciation of the Australian policy context that may affect labour market participation and hours of work following disability onset. Flexible labour market conditions, including deregulated shopping hours and liberal workplace relations arrangements that allow employers to hire staff on a casual and part-time basis, means that the rate of part-time employment in Australia is second among OECD countries behind the Netherlands (Abhayaratna et al. 2008). The flexibility to move from full-time to part-time work in Australia is seen as important in maintaining participation in the workforce. In each of the economic downturns in the last three decades in Australia, there has been a marked fall in full-time employment and a corresponding rise in part-time work (ABS 2010). For people with disability, the move from full-time to part-time employment is also supported by allowing part-time workers to access income support (under the Disability Support Pension (DSP)).

Like in the United States and the United Kingdom, employment of people with disability in Australia is supported by antidiscrimination legislation — the Disability Discrimination Act (DDA) 1992. The DDA imposes obligations on employers to make 'reasonable adjustments' to the workplace for employees with disability. Adjustments may come in many forms, including time off from work to recuperate, shifts from full-time to part-time work and workplace modifications/additions to plant and equipment. When deciding whether an adjustment is reasonable, employers are entitled to weigh-up the costs against potential benefits, which may depend upon the skills, experience and the duration of tenure of the employee concerned. Therefore, the readiness of employers to make adjustments in practice may vary with the education of employees.

3. Data and key definitions

Our analysis uses data from the first nine annual waves of HILDA, covering the period from 2001-2009. The first wave of the HILDA was a nationally representative sample of Australia living in private households in 2001. In the context of this study, an attractive feature of HILDA is its detailed personal socio-demographic, health and labour market outcomes.[3] Because the analysis is focussed on labour market impacts of onset, we limit the sample to those of working-age: 15-64 years for men and 15-59 years for women.

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[3] For documentation on HILDA and related publications, visit the HILDA website http://www.melbourneinstitute.com/hilda/default.html).

3.1. Disability onset

The definition of disability status used in this study is the reported presence of a specific health condition that restricts everyday functioning. In HILDA, this information is derived by showing the respondent a card containing a list of long-term health conditions, such as sight problems that cannot be corrected by glasses/lenses.[4] Respondents are then asked to report whether they *'have a long-term health condition, impairment or disability (such as these) that restricts you in everyday activities and has lasted or is likely to last, for 6 months or more?'* Such a measure is less susceptible to justification bias than those based on the self-reported presence of a 'work-limiting condition' (Bound 1991; Cai 2010). Measures of specific conditions are commonly used as exogenous instruments when estimating the impacts of health on employment (see for example Stern 1989; Bound, Schoenbaum and Waidmann 1996; Cai 2010).

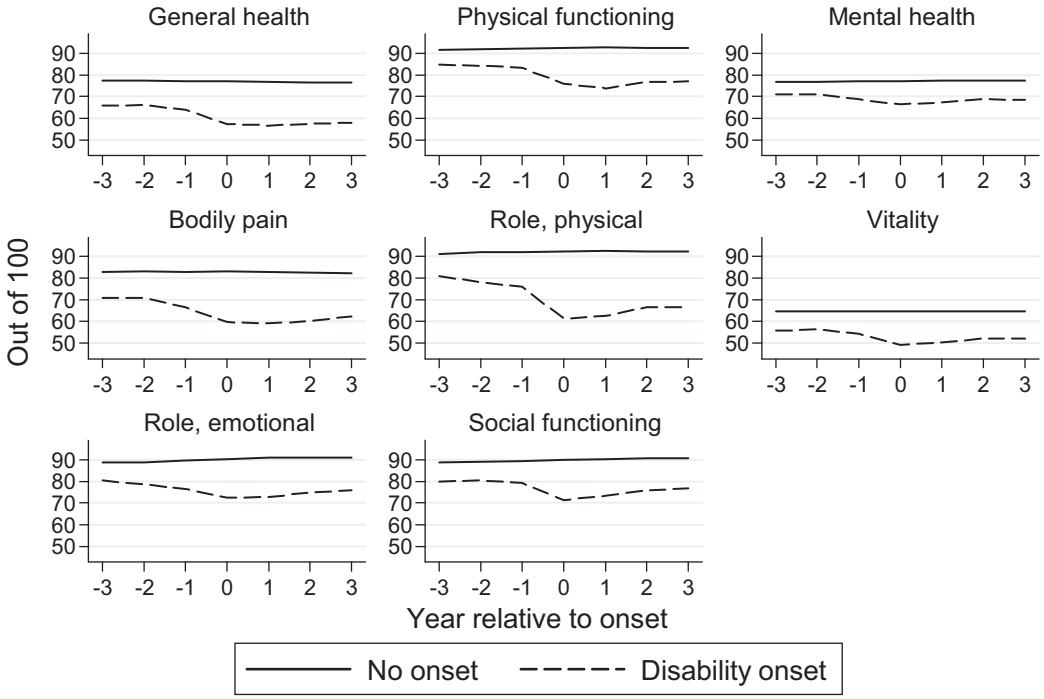
Consistent with Burkhauser and Daly (1998), Burchardt (2003a) and Jenkins and Rigg (2004), we define disability onset as the commencement of a disability that lasts for at least two periods in HILDA and was preceded by at least two consecutive periods without disability (identified by the four wave string of disability status 00**1**1). This definition is chosen because it discounts the impacts of transitory disability that may not have longer-term employment impacts (Jenkins and Rigg 2004). To avoid the problem of multiple spells of disability onset for the same individual, we limit our analysis to the first onset observed in the survey.

Impacts are estimated for three periods after the year of onset, or 3-4 years after onset occurs, by comparing the outcomes of those who experience onset (onset group) to outcomes, over the same period, of a 'matched' or 'like' control group who do not experience onset. Based on the divergence in health and employment outcomes in HILDA observed in the period prior to onset (-1 on the x-axes in Figures 1 and 2), we assume that impacts commence from this time and choose a *reference period* of two periods prior to onset (-2 on the x-axes) from which to

[4] The full list is: sight problems that cannot be corrected by glasses/lenses; hearing problems; speech problems, blackouts, fits or loss of consciousness; slow at learning and understanding things; difficulty gripping things, limited use of feet or legs; nervous or emotional condition that requires treatment; conditions that restricts physical activity or physical work (e.g. back problems, migraines); disfigurement or deformity; mental illness which requires help or supervision; shortness of breath or difficulty breathing; chronic or recurring pain; long-term effects as a result of a head injury, stroke or other brain damage; long-term condition or ailment which is still restrictive even though it is being treated and any other long-term condition such as arthritis, asthma, heart disease, Alzheimers, dementia.

measure impacts.[5] This assumption is consistent with the notion that disability onset is often a slow deterioration rather than a sharp change in health (Jenkins and Rigg 2004). The control group is defined in each period in HILDA from 2003 to 2006 as those who after two periods without disability, remain disability free in the current and following three periods (in binary code (00**0**000). In total, there are around 16000 observations in the control group.

Figure 1: SF-36 health measures



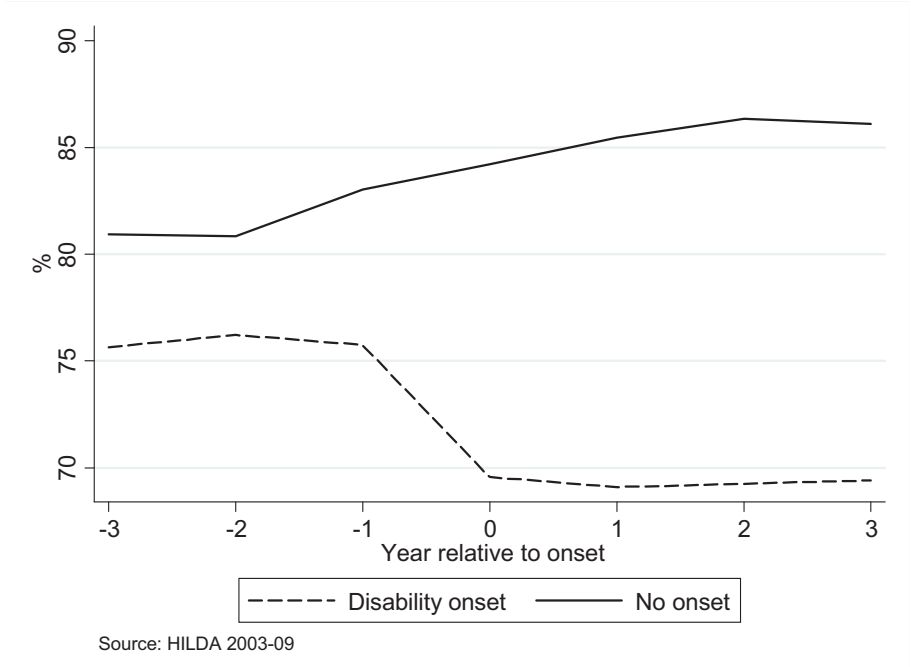
Source: HILDA 2003-09

Given that identifying onset requires four consecutive periods of data, the first year in which disability onset can be observed in HILDA is 2003. At the time of analysis, the last year of data was 2009, which means the last year of onset in which we can observe a full three periods of outcomes following the onset year was 2006. In all, we observe 600 individuals of working age who experience disability onset during the period 2003-06 in HILDA.[6] Descriptive statistics on the type, severity, duration and post-onset health among people who experience onset are reported in Table A.1 in Appendix A.

[5] The increasing rates of employment among those who do not experience onset in Figure 2 is due to strong economic growth in Australia between 2003 and 2009, which underlines the importance of taking time-trends into account when estimating impacts from onset.

[6] 185 experience onset in 2003, 156 in 2004, 149 in 2005 and 140 in 2006.

Figure 2: Employment rates



Source: HILDA 2003-09

4. Econometric methodology

The aim of this paper is to estimate causal impacts from disability onset. To achieve this end we use a difference-in-differences matching estimator that utilises the longitudinal aspect and richness of the HILDA data to identify causal effects.

Inference about the causal effects from disability onset is based on evaluating the outcomes of those who experience onset relative to the outcomes if onset had not occurred over the same period (counterfactual outcomes). Formally, let $D_{it} \in \{0,1\}$ be an indicator of whether individual i experiences disability onset at time period t, and y^1_{it+s} be the post-onset outcome at time $t+s, s \geq 0$. The counterfactual outcome y^0_{it+s} is the outcome at time $t+s$ if individual i had not experienced disability onset. Thus, the casual effect of disability onset for individual i at time period $t+s$ can be written as:

$$\tau_{is} = y^1_{it+s} - y^0_{it+s} \quad (1)$$

The fundamental evaluation problem arises because the counterfactual outcome y^0_{it+s} is not observed for each treated individual i; which means estimating the individual effect τ_{is} is not possible and one has to estimate average casual effects instead.

In this paper, we are interested in the average causal effects of disability onset among those who actually experience onset. Following the standard micro-economic evaluation literature

(for example, see Rosenbaum and Rubin 1985), the casual average effect of disability onset can be written as:

$$E\{\tau_{is}|D_{it}=1\}=E\{y_{it+s}^{1}|D_{it}=1\}-E\{y_{it+s}^{0}|\mathrm{D_{it}}=1\} \quad (2)$$

where causal inference relies on the estimation of the counterfactual for the last term in equation (2). This term is approximated using outcomes from those who did not experience disability onset (control group), which is constructed using matching techniques. The basic idea of matching is to generate a counterfactual outcome for each individual *i* by averaging outcomes over a selected group of control group members who are similar in all relevant characteristics at the time of onset.

In practice, finding exact matches across multiple dimensions is almost impossible, which is why most studies deploy a propensity score matching (PSM) approach, as suggested by Rosenbaum and Rubin (1985). PSM simplifies the task by selecting counterfactual outcomes on the basis of a function of all relevant covariates. In this study, our propensity score function is predicted probability of disability onset estimated using a binary probit model. Let p_i denote the predicted probability for individual i from the onset group (denoted as O) at time t and let p_j denote the predicted probability for individual j in the control group (denoted as C). A matching estimator of the causal effect of disability onset can be written as:

$$\hat{t}_s=\frac{1}{O}\sum_{i\in O}\left(y_{it+s}-\sum_{j\in C}g(p_i,p_j)y_{jt+s}\right) \quad (3)$$

where $g(.)$ is a function that assigns weights to the counterfactual outcome for control group member j in the construction of the counterfactual for onset group member i.

Different matching algorithms can be used to generate the weights for the matched control groups (see Smith and Todd 2005 for a review of different matching methods). The most straight forward matching algorithm is Nearest Neighbour Matching (NNM), which for each *i* assigns a weight of 1 for the counterfactual with the identical or most similar propensity score and 0 otherwise. Commonly used alternative methods, Kernel Matching (KM) and Local Linear Matching (LLM) are nonparametric estimators that use a weighted average of many control group members for each *i* onset group member. Specifically, KM weights are given by:

$$g(p_i, p_j) = \frac{\mathrm{G}((p_i, -p_j)/a_n)}{\sum_{\mathrm{j}\in\mathrm{C}} \mathrm{G}((p_i, -p_j)/a_n)} \tag{4}$$

where $G(.)$ is a kernel function and a_n is a bandwidth parameter that are to be specified by the researcher (see Heckman et al., 1997). Local linear matching proposed by Heckman et al (1997) is a generalised version of KM, with the weighting function being given by:

$$g(p_i, p_j) = \frac{G_{ij} \sum_{k\in C} G_{ik}(p_k - p_i)^2 - \left[G_{ij}(p_j - p_i)\right]\left[\sum_{k\in C} G_{ik}(p_k - p_i)\right]}{\sum_{j\in C} G_{ij} \sum_{k\in C} G_{ik}(p_k - p_i)^2 - (\sum_{k\in C} G_{ik}(p_k - p_i))^2} \tag{5}$$

where $G_{ij} = \mathrm{G}((p_i - p_j)/a_n)$. LLM differs from KM in that it includes a linear term in the propensity score of the treated individual. Inclusion of the linear term is advantageous whenever control groups are distributed asymmetrically around the treated observations. In other words, LLM is superior to KM in generating counterfactual outcomes for treated observations at boundary points of the propensity score.[7]

The estimation methods discussed above assume that after conditioning on a set of observable characteristics, outcomes are mean independent of treatment status. This conditional independence assumption (CIA) is plausible when all covariates that affect both selection and outcomes are observed. Thus, the richness of the data is crucial to the performance of the matching methods. As described below (section 4.1), the richness of the HILDA allows us to control for many important variables that may affect both disability onset and the labour market outcome.

Besides the CIA, a further requirement is the common support or overlap condition. In essence, this condition requires that for each onset group member, there are control group members with similar propensity scores. While the violation of the common support is less of a concern due to the large number of control group members relative to onset group members, we still impose the common support condition in all estimations. In particular, we follow the minima and maxima approach (Dehejja and Wahba 1999), deleting all onset group observations whose propensity score is smaller/larger than the minimum/maximum in the control group.

Asymptotically under the CIA and common support conditions these different estimators should yield similar results; however, in small samples there is generally a trade-off between

[7] For more discussion on the advantages of the local linear regression over the kernel regression, see Fan (1992a; 1992b).

bias and efficiency (Smith and Todd, 2005). Notably, NNM estimators are less biased while nonparametric estimators are more efficient. In this paper, we use LLM as our main estimators and use a Gaussian kernel with a standard bandwidth of 0.06.[8] We choose LLM over KM because it is less sensitive to different propensity score distributions. For sensitivity analysis, we also estimate results using NNM.

To fully exploit the longitudinal nature of our data, we combine the LLM and NNM matching estimators with the difference-in-differences (DID) approach, by estimating impacts on before and after onset changes in labour market outcomes. Formally, the differences-in-differences matching estimator can be written as:

$$\hat{t}_s = \frac{1}{T}\sum_{i \in T}\left(\Delta y_{is} - \sum_{j \in C} g(p_i, p_j)\Delta y_{js}\right) \tag{6}$$

where Δy_s denotes the change in labour market outcomes from the reference period (two periods prior to the year of onset or *t*-2) to post-onset period t+*s*. The use of this DID matching estimator, which was first proposed by Heckman et. al. (1997), is motivated by the fact that DID matching has the additional advantage of eliminating unobserved time-invariant differences in the outcomes between the onset and matched control group. In their analysis of different matching estimators, Smith and Todd (2004) conclude that difference-in-differences matching estimators perform much better than cross-sectional methods.

4.1. Specification of the propensity score function

The difference-in-differences matching method rests on the assumption that the time effects from the onset and matched control group are the same. To ensure that individuals from the matched control group and those from the onset group experience the same time trends after onset, we require that the matched control group members are chosen from the same period in which onset occurs. To reduce the chance that common time trends may affect the matched control group and onset group in different ways, we utilise the rich, health, education, labour market and personal information in HILDA to ensure that the characteristics of those in the

[8] Results are robust to the use of alternative bandwidth assumptions and these results are available upon request from the corresponding author.

matched control group closely resemble those in the onset group prior to onset.[9] Descriptive statistics of all variables used in the matching along with the estimated coefficients from the probit model of onset used in the matching are presented in Table B.1 of Appendix B

When estimating impacts by prior education and employment status, we also restrict the match to control group members with the same reference period education and employment status respectively. The prior education categories are no post-school qualifications, vocational education and training (VET) qualifications (International Standard Classification of Education (ISCED) 1997 levels 2C, 3C, 4B or 5B) and higher education qualifications (ISCED 1997 levels 5A and 6). The prior employment categories are employed full-time (at least 35 hours on average per week), employed part-time (less than 35 hours on average a week) and not employed.

This is the first study to control for the lower prior health status of those who experience onset, which according to SF-36 measures, is around 10% lower in the reference period (Figure 1). In controlling for prior health, we use the 8 derived SF-36 indices (positively scaled from 0-100) available in HILDA, which have been proven to be reliable measures of mental and physical health (Ware et al. 1993; Ware et al. 1994; Ware 2000).[10] Controlling for differences in health in the reference period means that we are estimating impacts of onset itself and not the impacts of pre-existing differences in health between those who do and do not experience onset.

As well as having poorer health, people who experience disability onset have poorer labour market outcomes prior to onset (Jenkins and Rigg 2004). To deal with selection by prior labour market disadvantage, we match on a range of labour market variables including industry of employment, labour market status, real labour earnings ($'000s, 2009 prices) and percentage of time in employment since left full-time education for the first time. In the same way that we control for prior health, we match on labour market information in the reference

[9] A range of interactions were also trialled, including interactions between occupation and age, occupation and years in occupation and between age and gender. However, these interactions were omitted either because they were not significant or failed the balancing test. Also omitted for the same reason were variables such as employer size and home ownership.

[10] SF-36 is a short-form health survey within HILDA that asks specific questions about physical and mental functioning, such as, "whether or not individuals have difficulty climbing stairs and whether individuals felt so down in the dumps that noting could cheer you up". There are numerous studies that have used SF-36 scales to measure physical and mental health. See Glassman et al. (2006); Syddall et al. (2009); Carreon et al. (2010) for examples using SF-36 to measure physical health and Strand et al. (2003); Prochaska (2008); Chang et al. (2007) for examples measuring mental health.

period. To control for the effect of labour market conditions, we also include regional unemployment rates from the year of onset.

Personal information used in the matching includes gender, marital status, the presence of dependent children, immigrant status, age, state and region of residence (urban, rural, remote), equivalised household income excluding own earnings ($'000s, 2009 prices) and highest education level. To control for time effects, we include wave dummies. All personal information used in the matching is from the period prior to onset.

A reliable estimate of disability onset on labour market outcomes requires that the outcomes are independent of the incidence of disability onset, conditional on the propensity score. Under the assumption of independence conditional on the observables, the pre-onset variables should be balanced between the onset and matched control groups. As proposed by Rosenbaum and Rubin (1985), post-match balancing tests are carried out to ensure this condition is met. The balancing tests check for differences (using t-tests) in the variable means of the treatment and matched control groups.[11] Significant differences suggest that the conditional independence assumption is violated. When a post-match balancing test fails, the specification is modified accordingly.[12]

5. The estimated effects of disability onset

In this section we present the estimated impacts of disability onset on labour market outcomes using the LLM with difference-in-difference (LLM-DID) estimator. The estimated impacts are measured as average treatment effects on the treated (ATET). Accompanying standard errors are estimated using a 500 draw bootstrap procedure. Results for NNM with difference-in-difference (NNM-DID) are presented in Tables B.2, B.3 and B.4 in Appendix B. NNM-DID estimates are generally consistent with those from the LLM-DID estimator, suggesting that results are robust to the choice of matching algorithms.

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[11] Balancing test results are available upon request from the corresponding author.

[12] For flexibility, continuous variables such as hours of work, age and experience in current job were entered as a series of dummy variables. Various specifications were trialled with different numbers of dummies and different break points and the final specification was chosen according to the significance of the categories and the outcome of the balancing tests.

5.1. Overall impacts

Overall, the onset of disability is estimated to reduce labour market participation by around 10 percentage points in the year of disability onset (Table 1). It is important to note however; of the 10 percentage point reduction in employment in the year of onset, 1.6 percentage points is due to people stopping work, but retaining their job (Not in the Labour Force (NLF) and has a job).[13] This result suggests that most people who stop working because of onset do not have a job kept open to return to when they recover which is likely to extend the time out of work following recovery and underlines the need for employment services to help people return to work.

Table 1: Estimated effects of disability onset, LLM-DID

	Year of onset (less than one year since time of onset)		1st year after (1-2 years since time of onset)		2nd year after (2-3 years since time of onset)		3rd year after (3-4 years since time of onset)	
	ATET	s.e.	ATET	s.e.	ATET	s.e.	ATET	s.e.
Employed	-0.103***	0.016	-0.118***	0.017	-0.125***	0.017	-0.115***	0.017
Full-time employed	-0.062***	0.016	-0.082***	0.017	-0.085***	0.017	-0.129***	0.018
Part-time employed	-0.041***	0.015	-0.036**	0.017	-0.040**	0.016	0.015	0.017
Unemployed	-0.002	0.009	0.012	0.011	0.017	0.011	0.014	0.011
Labour market participation	-0.104***	0.015	-0.106***	0.016	-0.108***	0.017	-0.101***	0.016
NLF has a job	0.024*	0.014	0.030**	0.013	0.027**	0.013	0.031**	0.014
NLF doesn't have a job	0.080***	0.015	0.075***	0.015	0.082***	0.017	0.070***	0.017
Low income household	0.033*	0.017	0.053***	0.019	0.075***	0.019	0.086***	0.019
Income support	0.048***	0.014	0.081***	0.016	0.070***	0.017	0.079***	0.017

*** is significant at 1%, ** is significant at 5%, * is significant at 10%. Note: results are generated by exact match on year of onset and employment status in reference period.

Significant employment impacts are estimated to persist for at least 3 periods after the onset year, or at least 3-4 years after the time onset. Longer-term employment impacts translate into significant increases in the chances of receiving income support, especially from one year after onset. Those who are displaced from work at disability onset may initially be less reliant on income support because many may receive lump-sum workers compensation payments for loss of income from an injury sustained at work.[14] Compensation for loss of earnings is considered as income under DSP arrangements, which means that compensation holders may

[13] Employment in HILDA is defined by whether or not an individual responds working in a job, a business or farm at any time at all in the last 7 days. NLF is not employed and not looking for work, whether or not NLF individuals have a job is based on whether respondents report not looking for work because they already have a job.

[14] Workers compensation in Australia is a 'no fault' scheme, covers around 90% of all workers and is funded by employers through a compulsory levy to cover the costs of work related injuries (Safe Work Australia 2011).

initially be ineligible. Compensation may also explain why disability onset is estimated to have a delayed effect on the chances of becoming a low-income household, defined as having household disposable income in the bottom quintile of all working-age households.[15]

Importantly, we find that the high prevalence of part-time work that is commonly associated with people with disability (Schur 2003; Hotchkiss 2004; Wilkins 2004; Jones 2007) can be explained by greater impacts on full-time employment relative to part-time employment following onset. A key question posed in this study is whether any reduction in rate of full-time employment relative to part-time employment represents workers down-shifting from full-time to part-time?

5.2. Impacts by employment status prior to onset

Estimated impacts on employment status, conditional on employment status in the reference period, are presented in Table 2. Results suggest that the impacts on full-time employment are driven more by large reductions in the rate of transition into full-time work among those who were previously part-time employed or were out of work than down-shifting from full-time to part-time. For those in part-time work and out of work in the reference period, disability onset is estimated to lead to a 14 percentage point and a 13 percentage point reduction respectively in the rate of transition to full-time work by 3-4 years after onset. There is some evidence that those previously full-time employed move to part-time work after onset, but this only occurs 3-4 years after onset.[16] We find no evidence that part-time work helps buffer against the impacts of disability onset, with those who were previously employed part-time at least as likely to exit employment as those who were employed full-time.

[15] The bottom quintile of real household income is calculated each year. Real household income is equivalised to adjust for differences in the number of household members using the OECD square root scale (OECD 2008), which is derived by dividing real household income by the square root of the number of people living in the household. The impact of disability onset on the likelihood of being in a low income household may be underestimated because we do not account for the extra living costs that may be associated with living with a disability.

[16] This is supported by an estimated 5 percentage point increases in the transition probability from full-time to part-time work between the second and third period after the onset year on average for those in the onset group.

Table 2: Estimated employment effects of disability onset, conditional on employment status in the reference period, LLM-DID

Status in reference period	Year of onset (less than one year since time of onset)		1st year after (1-2 years since time of onset)		2nd year after (2-3 years since time of onset)		3rd year after (3-4 years since time of onset)	
	ATET	s.e.	ATET	s.e.	ATET	s.e.	ATET	s.e.
				Employment				
Full-time	-0.065***	0.017	-0.092***	0.019	-0.078***	0.018	-0.073***	0.019
Part-time	-0.086**	0.037	-0.117***	0.040	-0.107**	0.041	-0.112**	0.044
Out of work	-0.167***	0.035	-0.153***	0.041	-0.180***	0.042	-0.180***	0.040
				Full-time employment				
Full-time	-0.049**	0.022	-0.079***	0.024	-0.079**	0.024	-0.119***	0.026
Part-time	-0.066*	0.038	-0.074*	0.040	-0.095*	0.042	-0.139***	0.038
Out of work	-0.088***	0.021	-0.084***	0.025	-0.103***	0.029	-0.132***	0.028
				Part-time employment				
Full-time	-0.016	0.015	-0.013	0.017	0.001	0.018	0.045**	0.022
Part-time	-0.020	0.044	-0.042	0.045	-0.012	0.048	0.028	0.047
Out of work	-0.079**	0.033	-0.069*	0.037	-0.077*	0.036	-0.048	0.038

*** is significant at 1%, ** is significant at 5%, * is significant at 10%. Results are generated by exact match on year of onset and employment status in the reference period.

These findings are found to be robust to the omission of pre-sample information on disability.[17] It is possible that those who were out of work or in part-time employment in the reference period may be in these states because they have experienced disability sometime in the past. As a result, regardless disability onset, they may be less inclined to move to full-time employment compared to those in the matched control group for fear of aggravating their condition. To test this, we repeated the matching on a sub-sample of 148 onset group members who first experience their condition in the year of onset. Except for higher standard errors associated with the smaller sample size, estimated impacts for first time onset are consistent with estimated impacts for all those who experience onset presented in Table 2.[18]

There may be several reasons for the limited scope for people to switch from full-time to part-time work following the onset of a longer-term disability, despite the fact that such movements have been observed in response to the global financial crisis in Australia. First, unlike in response to the global financial crisis, employers may have to shoulder additional costs to retain employees with disability on a part-time basis if they have to make significant modifications to the workplace. Second, the benefits associated with any adjustment are

[17] Information on disability history is only observed for those who report having a disability in HILDA.

[18] Results are available upon request from the corresponding author.

uncertain because employers have limited information on how they may affect the productivity of their employees long-term. Given that people with disability work in less skilled jobs on average than people without disability; employers may see such investments as imposing unreasonable costs. Third, the nature of many jobs means that it may be difficult to move from a full-time to a part-time schedule, for example, in jobs that involve highly specialised skills for operating expensive capital equipment. Fourth, the nature of a longer-term disability may severely restrict the capacity of an individual to continue in an existing job even in a part-time capacity. Finally, moving to part-time work may signal a capacity to work full-time, which may jeopardise their access to disability-related income support (DSP).

A new and important finding is that the labour market disadvantage of those out of work is compounded by the onset of disability. For those out of work, disability onset is estimated to reduce the chances of returning to employment by 18 percentage points after 3-4 years. This compares to a 7 percentage point and a 10 percentage point reduction in employment rates for those previously employed full-time and part-time respectively. Those out of work prior to onset are likely to face a number of factors that pre-dispose them to labour market disadvantage, such as poor employment history and low qualifications, relative to those in employment, which makes it more difficult for them to adjust to onset. Impacts from difficulty adjusting to onset are likely to be greater for those out of work during periods of strong economic growth, which prevailed during the period of analysis in Australia. Under weak economic conditions, the opportunity cost of disability onset for those out of work is likely to be lower because, with or without onset, their employment prospects are limited.

5.3. Impacts by education qualification prior to onset

Contrary to the findings of Jenkins and Rigg (2004), we find marked differences in initial employment impacts by education status. In the year of onset, we estimate a 6 percentage point, 8 percentage point and a 12 percentage point reduction in the rates of employment for those with higher education qualifications, VET qualifications and no qualifications respectively (Table 3).[19] In contrast, Jenkins and Rigg (2004) find no significant difference in the chance of losing employment by education in the year of onset. A possible explanation is that Jenkins and Rigg (2004) limit their analysis to those employed prior to onset. As

[19] Although 90% confidence intervals for all three intersect, which suggests that none of the estimated ATET are significantly different from each other, which is mainly because of the small sample sizes involved.

Table 3: Estimated employment effects from disability onset, conditional on education status in the reference period, LLM-DID

Status in reference period	Year of onset (less than one year since time of onset)		1st year after (1-2 years since time of onset)		2nd year after (2-3 years since time of onset)		3rd year after (3-4 years since time of onset)	
	ATET	s.e.	ATET	s.e.	ATET	s.e.	ATET	s.e.
				Employment				
Higher education	-0.055**	0.028	-0.094***	0.033	-0.060*	0.030	-0.045	0.031
VET	-0.078***	0.029	-0.098***	0.031	-0.089***	0.031	-0.080**	0.032
No qualifications	-0.124***	0.023	-0.121***	0.026	-0.137***	0.027	-0.145***	0.028
				Full-time employment				
Higher education	-0.063**	0.026	-0.055	0.034	-0.048	0.033	-0.048	0.033
VET	-0.094***	0.031	-0.089***	0.034	-0.107**	0.036	-0.166***	0.037
No qualifications	-0.052**	0.021	-0.092***	0.025	-0.100**	0.024	-0.142***	0.024
				Part-time employment				
Higher education	0.008	0.027	-0.040	0.030	-0.012	0.033	0.003	0.033
VET	-0.005	0.028	-0.017	0.029	0.004	0.030	0.069**	0.034
No qualifications	-0.070***	0.024	-0.032	0.027	-0.038	0.025	-0.004	0.028
				Labour force participation				
Higher education	-0.053**	0.027	-0.072**	0.029	-0.051*	0.029	-0.045	0.029
VET	-0.100***	0.030	-0.110***	0.033	-0.095***	0.035	-0.077**	0.033
No qualifications	-0.132***	0.023	-0.113***	0.025	-0.131***	0.026	-0.134***	0.026
				Not in labour force, does not have a job				
Higher education	0.028	0.023	0.045	0.028	0.024	0.028	0.020	0.028
VET	0.064**	0.027	0.084***	0.029	0.066**	0.030	0.054*	0.029
No qualifications	0.119***	0.025	0.092***	0.025	0.112***	0.026	0.103***	0.027
				Income support				
Higher education	0.010	0.021	0.047**	0.023	0.025	0.018	0.017	0.017
VET	0.071**	0.032	0.076**	0.032	0.067**	0.032	0.045	0.034
No qualifications	0.054**	0.025	0.104***	0.027	0.094**	0.031	0.128***	0.033
				Low income household				
Higher education	0.023	0.023	0.018	0.027	0.032	0.030	0.046	0.032
VET	0.034	0.031	0.085**	0.036	0.071*	0.038	0.082**	0.034
No qualifications	0.041	0.030	0.069**	0.029	0.079**	0.030	0.111***	0.030

*** is significant at 1%, ** is significant at 5%, * is significant at 10%. Results are generated by exact match on year of onset and education status in reference year.

discussed in the previous section, we find that impacts of onset are much larger for those out of work prior to onset. Because a high proportion of people out of work prior to onset have no post-school qualifications, limiting analysis to those previously employed underestimates the impacts of onset on those without secondary school qualifications. This explanation is

supported by much smaller relative impacts by education estimated in the year of onset when the analysis is limited to the sub-sample who were employed prior to onset.[20]

When we distinguish between those who stop work while retaining their job and those who stop work *without* retaining their job, the relative impacts are even more stark. Of the 6 percentage point reduction in employment among those with higher education qualifications, around half stop work and retain their job and half do not. As well as being able to take time out while retaining their job, those with higher education qualifications appear to be less impacted because they are able to remain in employment by shifting from full-time to part-time work in the year of onset. For those without qualifications, we find no evidence that they are either able to take time out from employment and retain their job or move to part-time work. These initial results point to the greater willingness of employers to make adjustments for higher skilled workers who may be more difficult to replace than low-skilled workers.

As the disability persists into the second period (1-2 years after onset) however, many of the accommodations made to people with higher education to buffer against the initial impacts of onset appear to end and the employment impacts become more equal across education groups. However, there are differences in how members of these groups react to being dislocated from employment. Those without qualifications appear to refrain from looking for work and move to income support — a 12 percentage point reduction in employment 1-2 years after onset coincides with a 11 percentage point reduction in labour market participation and a 11 percentage point increase in the rate of income support receipt. In contrast, those with higher education qualifications appear more likely to persist in the labour market and look for work — a 9 percentage point reduction in employment 1-2 years after onset coincides with a 7 percentage point reduction in labour market participation and a 5 percentage point increase in income support. A greater apparent persistence in the labour market 1-2 years after onset among those with higher education qualifications may be because they have better labour market prospects, but also because their greater accumulated wealth may limit their access to income support.

From 2-3 years after onset, there is clear divergence in the estimated employment impacts by education.[21] For those without qualifications, impacts continue to grow 2-3 years after and

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[20] Results available upon request from the authors.

[21] Constructing 90% confidence intervals around the ATETs, the divergence in impacts in year four between those with higher education qualifications and those without any qualifications is significant.

stabilise 3-4 years after. In contrast, employment impacts for those with post-school qualifications are smaller by 3-4 years after onset compared to impacts 1-2 years after as some displaced workers return to employment. While we cannot rule out the possibility that the divergence in employment impacts from 2-3 years is due to differences in rates of recovery in health, this is not supported by differences in the rates of improvement in SF-36 health measures across the education groups following onset (Table A.1 in Appendix A). A more likely explanation may be that the divergence in employment impacts is a result of differences in the willingness of individuals to return to ongoing employment once their health sufficiently recovers.

Access to income support does not prevent an increase in the likelihood that those with VET and no post-school qualifications will become low-income. While initially protected from financial disadvantage in the year of onset, in subsequent years the rates of disadvantage are estimated to rise steeply for these groups. Those with VET qualifications are more vulnerable than those without qualifications to financial disadvantage following a job loss because they are more likely to be the main income earner in the household.

6. Conclusion

Using propensity score matching difference-in-difference and longitudinal data, we show that the onset of a longer-term disability has lasting negative causal impact on employment, especially full-time employment, and increases the risk of belonging to a low income household. An important finding is that people who cease employment in the year of onset overwhelmingly do so without retaining their job. Therefore, returning to work following the onset of a longer-term condition is likely to involve a period of job search. From these findings, we can conclude that rehabilitation programs to return people to work should include access to employment services.

Despite flexible labour arrangements in Australia, we find little evidence that workers shift from full-time to part-time to retain their jobs. Instead, the reduction in full-time employment following disability onset is found to be driven more by people out of work or in part-time employment foregoing, or having reduced opportunities, to move to full-time work. Possible reasons for the lack of down-shifting include unreasonable adjustment costs to employers to retain employees, the nature of work and health conditions and incentives to leave employment to receive income support. Identifying barriers to down-shifting is an important topic for future research.

The impacts of disability onset are found to vary according to levels of education prior to onset. We find that 3-4 years after onset, the impacts on employment and the risk of living in a low income household are around twice as great for those without qualifications than for those with higher education qualifications. However, the relative impacts are shown to vary over time, which highlights the importance of taking a longer-term view of differential impacts. In the year of onset, those with qualifications are less affected than those without, which may in part be explained by differences in employer adjustments. By the second period of disability however, these differences appear to dissipate, after which there is a divergence in impacts by education, reflecting differences in employment prospects for those displaced. Those with higher education qualifications are more likely to commence looking for work or return to employment, whereas those without qualifications are more likely to remain outside of work and rely on income support.

These results point to differential social costs from disability onset across people from different education backgrounds.[22] This has important implications for the design of policies that aim to reduce the social costs of disability onset. Moreover, prevention and vocational rehabilitation measures aimed at reducing the social cost of disability will be more cost-effective if they are targeted at those with low levels of qualifications. For example, incentive schemes such as payroll tax incentives and return-to-work subsidies to encourage employers to retain or return workers to employment (as outlined in Stapleton et al. 2008) will be more cost-effective if they're designed to give greater incentives to retain or return workers with lower levels of education. By offering greater incentives to retain or return employees with low levels of education, the scheme will be more cost effective because it better aligns the private cost to the employer of retaining/returning their employees with the avoided social cost of onset. Failure to do so would mean that in many cases, incentive payment to employers of highly educated workers would amount to nothing but a windfall.

[22] In terms of reduced well-being from losing employment and the associated financial hardship and the fiscal burden of income support.

Acknowledgements

This paper was partially funded by the National Centre for Vocational Education Research (NCVER). The paper uses the confidentialised unit record file from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Commonwealth Department of Family, Housing, Community Service sand Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper are those of the authors and should not be attributed to NCVER, FaHCSIA or the MIAESR.

The authors would like to thank Duncan McVicar, Richard Burkhauser, John Haisken-DeNew and Yi-Ping Tseng for their helpful comments on an earlier draft of this paper.

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Appendix A: Descriptive statistics

Table A.1: Characteristics of those who experience disability onset by education status

	Higher education	VET	No qualifications
Disability type in year of onset (%)[a]			
Sensory	9	9	10
Physical	30	27	23
Mental	9	6	9
Health conditions	33	31	34
Multiple	19	28	25
Duration of disability (%)			
Has a disability in the 3rd year after onset	55	62	65
Has a disability in the 4th year after onset	45	54	56
Change in SF-36 health measures between year of onset and reference period (% diff.)			
General health	-13	-11	-15
Physical functioning	-9	-9	-9
Bodily pain	-17	-17	-13
Role, physical	-26	-24	-17
Vitality	-11	-13	-12
Social functioning	-10	-12	-10
Role, emotional	-9	-8	-8
Mental health	-6	-6	-6
Change in SF-36 health measures between year of onset and third year after onset (% diff)			
General health	2	-1	2
Physical functioning	3	-1	-1
Bodily pain	4	1	4
Role, physical	2	8	1
Vitality	3	18	0
Social functioning	5	5	3
Role, emotional	3	8	4
Mental health	0	0	0
Disability limits amount of work you can do in the year of onset (%)			
No work limitation (0 out of 10)	48	45	41
Mild limitation (1-3 out of 10)	28	18	17
Moderate limitation (3-6 out of 10)	10	16	22
Severe limitation (7-9 out of 10)	13	17	17
Can't work (10 out of 10)	1	4	3
Average age in year of onset	44	46	41

[a] Sensory: sight, hearing and speech problems. Physical: limited use of legs, feet, arms or legs; difficulty gripping; disfigurement or deformity; other conditions that affect physical work (e.g. back pain). Mental: Learning disorder; intellectual disability; mental illness; emotional or nervous disorder and acquired brain damage. Health conditions: shortness

Appendix B: Full results

Table B.1: Sample statistics and estimated coefficients for the binary probit model of disability onset model (coded 1 for onset group member; 0 for control group member)

	Model estimates		Sample statistics	
	coeff.	s.e.	mean	std. dev.
Male	-0.025	0.047	0.458	0.498
Married/defacto	-0.084*	0.050	0.669	0.470
Has dependent children less than 25	-0.106**	0.049	0.468	0.499
Immigrant	-0.136***	0.050	0.208	0.406
Highest education qualification in reference period (ref. case: Higher education)				
VET	-0.056	0.058	0.279	0.448
No qualification	-0.032	0.056	0.469	0.499
Age (ref. case: 15-24)				
25-29	0.199**	0.098	0.098	0.297
30-34	0.339***	0.091	0.131	0.337
35-39	0.318***	0.094	0.141	0.348
40-44	0.593***	0.088	0.147	0.354
45-49	0.561***	0.089	0.125	0.331
50-54	0.622***	0.090	0.090	0.287
55-64	0.763***	0.086	0.098	0.297
Year (ref. case: 2003)				
2004	-0.085	0.054	0.247	0.431
2005	-0.082	0.058	0.248	0.432
2006	-0.135**	0.059	0.252	0.434
State of residence (ref. case: NSW)				
Victoria	-0.121**	0.053	0.256	0.436
Queensland	-0.119**	0.056	0.211	0.408
South Australia	0.024	0.072	0.085	0.279
Western Australia	-0.151**	0.073	0.102	0.303
ACT/NT	0.048	0.085	0.058	0.234
Live outside of a major city	-0.071	0.047	0.366	0.482
Own real earnings ($'000s, 2009 prices)	-0.048	0.039	0.673	0.708
Equivalised real household disposable income, excluding own in reference period ($'000s, 2009 prices)	-0.001	0.001	21.396	20.456
SF-36 health scores in reference period (0-100)				
Physical functioning	-0.006***	0.001	85.966	27.970
Role, physical	-0.003***	0.001	85.595	31.876
Bodily pain	-0.007***	0.001	77.140	28.048
Mental health	0.001	0.002	71.102	24.651
Emotional health	-0.002**	0.001	82.863	33.755
General health	-0.012***	0.001	71.919	25.396
Social functioning	0.001	0.001	82.263	28.868
Vitality	-0.001	0.002	59.834	23.756
Completed a self-completion questionnaire	2.188***	0.154	0.925	0.264
Current regional unemployment rate (%)	-0.002	0.024	5.299	1.013

Proportion of time in employment since first left full-time education (ref. case: less than a third)				
One to two-thirds	-0.247***	0.086	0.136	0.343
More than two-thirds	-0.288***	0.079	0.810	0.392
Employment status in reference period (ref. case: out of work)				
Full-time	-0.112	0.085	0.554	0.497
Part-time	-0.180**	0.081	0.253	0.435
Industry of employment in reference period (ref. case: Business)				
Agriculture	-0.127	0.084	0.033	0.177
Manufacturing	-0.189**	0.080	0.086	0.280
Construction	-0.043	0.134	0.069	0.254
Retail trade	0.164**	0.082	0.132	0.338
Hospitality	0.106	0.094	0.039	0.194
Education	0.190**	0.076	0.087	0.281
Health	0.248**	0.107	0.096	0.295
Other	-0.069	0.091	0.095	0.293
Constant	-1.424***	0.188		
Sample (N)	16,732		16,732	

*** is significant at 1%, ** is significant at 5%, * is significant at 10%. Note: employment and health variables, that may be affected by onset are defined in the reference period (2 years prior to onset), except for the unemployment rate. All other variables are defined in the year prior to onset or in the year prior to onset.

Table B.2: Estimated effects from disability onset, NNM-DID

Status in reference period	Year of onset (less than one year since time of onset)		1st year after (1-2 years since time of onset)		2nd year after (2-3 years since time of onset)		3rd year after (3-4 years since time of onset)	
	ATET	s.e.	ATET	s.e.	ATET	s.e.	ATET	s.e.
Employed	-0.081***	0.026	-0.097***	0.028	-0.121***	0.030	-0.105***	0.031
Full-time employed	-0.013	0.028	-0.035	0.030	-0.067**	0.031	-0.102***	0.032
Part-time employed	-0.068**	0.028	-0.062**	0.031	-0.054*	0.031	-0.003	0.032
Unemployed	-0.010	0.017	0.006	0.018	0.014	0.017	0.000	0.018
Labour market participation	-0.090***	0.024	-0.090***	0.026	-0.106***	0.027	-0.105***	0.028
NLF has a job	0.021	0.022	0.032	0.021	0.027	0.021	0.030	0.022
NLF doesn't have a job	0.070***	0.023	0.059**	0.025	0.079***	0.025	0.075***	0.027
Enrolled in a course	0.041	0.027	0.076***	0.029	0.094***	0.030	0.111***	0.031
Low income household	0.041*	0.022	0.065***	0.023	0.070***	0.024	0.068***	0.025
Income support	-0.081***	0.026	-0.097***	0.028	-0.121***	0.030	-0.105***	0.031

*** is significant at 1%, ** is significant at 5%, * is significant at 10%.

Table B.3: Estimated employment effects of disability onset, conditional on employment status in the reference period, NNM-DID

Status in reference period	Year of onset (less than one year since time of onset)		1st year after (1-2 years since time of onset)		2nd year after (2-3 years since time of onset)		3rd year after (3-4 years since time of onset)	
	ATET	s.e.	ATET	s.e.	ATET	s.e.	ATET	s.e.
				Employment				
Full-time	-0.068***	0.024	-0.095***	0.025	-0.077***	0.027	-0.071**	0.029
Part-time	-0.130**	0.053	-0.153***	0.056	-0.122**	0.06	-0.076	0.063
Out of work	-0.135**	0.067	-0.071	0.070	-0.110	0.075	-0.121*	0.073
				Full-time employment				
Full-time	-0.056*	0.033	-0.092***	0.034	-0.081*	0.038	-0.116***	0.04
Part-time	-0.023	0.066	0.008	0.070	-0.040	0.074	-0.084	0.071
Out of work	-0.057	0.045	-0.007	0.052	-0.043	0.054	-0.071	0.06
				Part-time employment				
Full-time	-0.012	0.024	-0.003	0.026	0.004	0.03	0.045	0.034
Part-time	-0.107	0.074	-0.160**	0.074	-0.082	0.077	0.008	0.076
Out of work	-0.078	0.059	-0.064	0.063	-0.067	0.066	-0.050	0.068

*** is significant at 1%, ** is significant at 5%, * is significant at 10%. Note: results are generated by exact match on year of onset and employment status in the reference period, which is two years prior to the onset period.

Table B.4: Estimated employment effects from disability onset, conditional on education status in the reference period, NNM-DID

Status in reference period	Year of onset (less than one year since time of onset)		1st year after (1-2 years since time of onset)		2nd year after (2-3 years since time of onset)		3rd year after (3-4 years since time of onset)	
	ATET	s.e.	ATET	s.e.	ATET	s.e.	ATET	s.e.
				Employment				
Higher education	-0.056	0.046	-0.084	0.052	-0.059	0.055	-0.049	0.054
VET	-0.096**	0.045	-0.107**	0.049	-0.104**	0.052	-0.112**	0.053
No qualifications	-0.086**	0.042	-0.129***	0.045	-0.130***	0.048	-0.139***	0.048
				Full-time employment				
Higher education	-0.112**	0.052	-0.084	0.057	-0.063	0.064	-0.056	0.065
VET	-0.073	0.051	-0.056	0.055	-0.084	0.059	-0.157**	0.061
No qualifications	0.007	0.040	-0.050	0.044	-0.064	0.046	-0.125***	0.048
				Part-time employment				
Higher education	0.056	0.050	0.000	0.055	0.003	0.061	0.007	0.063
VET	-0.022	0.048	-0.051	0.050	-0.020	0.051	0.045	0.054
No qualifications	-0.092**	0.045	-0.079	0.049	-0.067	0.049	-0.013	0.050
				Labour force participation				
Higher education	-0.056	0.043	-0.056	0.048	-0.058	0.051	-0.056	0.053
VET	-0.084*	0.043	-0.096**	0.047	-0.087*	0.051	-0.079	0.050
No qualifications	-0.079*	0.041	-0.099**	0.045	-0.101**	0.046	-0.109**	0.047
				Not in labour force, does not have a job				
Higher education	0.049	0.038	0.028	0.045	0.037	0.045	0.042	0.047
VET	0.124***	0.039	0.146***	0.043	0.121***	0.043	0.101**	0.045
No qualifications	0.109***	0.038	0.073*	0.042	0.098**	0.042	0.092**	0.044
				Income support				
Higher education	0.007	0.032	0.042	0.032	0.016	0.030	0.000	0.031
VET	0.051	0.040	0.090**	0.041	0.063	0.041	0.034	0.043
No qualifications	0.059	0.038	0.132***	0.039	0.116**	0.043	0.172***	0.044
				Low income household				
Higher education	-0.021	0.039	-0.028	0.045	-0.030	0.047	-0.035	0.050
VET	0.056	0.049	0.090*	0.050	0.090	0.055	0.107**	0.052
No qualifications	0.013	0.046	0.066	0.048	0.078	0.049	0.109**	0.048

*** is significant at 1%, ** is significant at 5%, * is significant at 10%. Note: results are generated by exact match on year of onset and education status in reference year.