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What Drives Inflows Into Disability? Evidence from Three OECD Countries: Australia, Switzerland, United Kingdom

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WHAT DRIVES INFLOWS INTO DISABILITY?
Evidence from Three OECD Countries

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SUMMARY

This paper investigates the dynamic effects of health shocks on labour market transitions to disability, employment and other non-employment pathways. It uses longitudinal data to estimate time discrete duration models for three countries: Australia, Switzerland and the United Kingdom. Both current and lagged health status are important predictors of exit to disability benefits and the effect of health problems varies by age group, education and income across countries. The results are robust to the inclusion of different socio-demographic variables and to instrumenting health status.

RÉSUMÉ

Ce papier analyse les effets dynamiques des chocs de santé sur les transitions du marché du travail vers des prestations d'invalidité, l'emploi et d'autres voies de non-emploi. Il utilise des données longitudinales pour estimer des modèles de durée à temps discret pour trois pays: l'Australie, la Suisse et le Royaume Uni. L'état de santé courante et celui de la période précédente ont un impact important sur la probabilité des sorties vers les régimes d'invalidité, et l'effet des problèmes de santé varie avec l'âge, l'éducation et le revenu à travers les pays. Les résultats sont robustes à l'inclusion des variables sociodémographiques et à l'instrumentation de l'état de santé.

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WHAT DRIVES INFLOWS INTO DISABILITY? EVIDENCE FROM THREE OECD COUNTRIES

1. Introduction

1. Too many workers leave the labour market permanently due to health problems and expenditures in disability programmes far exceed expenditures on other programmes (such as unemployment) in many OECD countries. The share of the working-age population relying on disability and sickness benefits as their main source of income has tended to increase since 1990 but trends vary greatly across OECD countries (see OECD Employment Outlook 2009, forthcoming). Disability recipient rates range from as high as 10% or 12% in Norway and Hungary to below 1% in Turkey and Mexico in 2007. In addition, once in disability benefits, very few recipients leave the benefits to return to the labour market, even if they have a significant remaining work-capacity. In most countries, very little is known about the pathway from illness or accidents to long-term disability benefits. To devise adequate policy responses to lower the inflow into disability benefits, it is important to know more about how people enter these benefits.

2. Explanations for the growing inflows into disability benefits have focused on how incentive structures within the welfare system may have created moral hazard issues. Benefit systems, through the combination of high generosity of benefits and lack of monitoring, may have eroded the willingness to work of individuals with health problems but with remaining work capacity (OECD, 2003; Marin *et al.*, 2004). In the past two decades, many OECD countries have enacted reforms addressing the incentive structure of the benefit system. However, besides financial incentives, the role of health should not be neglected as an explanatory factor and this paper throws more light on the relative importance of unforeseen health shocks on explaining inflows into disability.

3. There is only limited knowledge on the characteristics of individuals who apply for disability benefits compared with those that are more likely to stay in employment after a health shock. The existing literature looks at the links between disability and labour market and it mainly focuses on the impact of disability on labour force participation (Stern, 1989; Bound and Burkhauser, 1999; Haveman et al, 1991). The literature on retirement and early retirement decisions is more developed and this where this paper draws on. A large set of econometric models are used in this literature, to show that overall, health (either current or lagged) is found to be an important determinant of early retirement and labour market withdrawal more generally (see *i.e.* Roberts et al (2008) for Germany and the UK; Rice et al (2006) and Disney et al (2006) for Britain; Riphahn (1999) for Germany). This paper adds to the existing literature by examining the determinants of disability benefit recipiency and providing a comparative overview of them for three countries.

4. The aim of this paper is to investigate the effects of health on access to disability benefits and how both health and other socio-demographic characteristics affect the determinants of disability recipiency, comparing three countries with different institutional arrangements for disability benefits (Australia, Switzerland, and the UK). Section 2 briefly presents the data sources used in this paper and the main descriptive statistics of the persons receiving disability benefits relative to those who do not. The following section presents first the personal and work characteristics that are associated with a higher/lower probability of disability benefits. Secondly, it presents sensitivity test with the inclusion of

additional controls that may affect the probability of being on disability benefits. It also provides an analysis by age groups and gender to better understand how different characteristics may have different impacts depending on the group concerned. It finally provides an IV solution to potential problems of endogeneity of the health measure. Section 4 concludes.

2. The Data and Descriptive Statistics

2.1. Data sources

5. The analysis in this paper is performed for a reduced number of countries for which longitudinal surveys are available with sufficient information on health, demographics, work history and benefit status (see Annex A1 for further details). The following data surveys are used for the three countries: HILDA (2001-2007) for Australia, the SHP (2002-2006) for Switzerland and BHPS (1991-2006) for the United Kingdom. The sample includes individuals aged 15-64 who are not in full-time education and are present in at least three consecutive waves in the surveys.

6. The definition of disability benefits is based on self-reported information on income sources for working-age individuals. Country-specificities in the type of disability-related benefits are taken into account in the definition of recipient status (Box 1). The schemes differ across countries because some countries have universal coverage while others have means-tested benefits or a dual system with contribution-based benefits (earnings-related) together with non-contributory benefits. The countries chosen differ substantially in terms of labour market conditions and their disability benefit-systems, allowing a better understanding of how personal and work-related characteristics interact with macro-economic conditions and policies. While this will provide relevant information on whether the determinants of disability differ depending on the type of benefit systems, the restricted set of countries will have implications for the generalisation of the results.

7. Most regressions include additional controls (for a detailed list see Appendix A2) for individual characteristics such as gender, age, marital status, education, ethnicity (or foreign born dummy) and household features such as the number of children and household income. Work characteristics are also included in the regressions and range from prior labour market unemployment spell (and its duration), prior work experience, occupation, industry, employer size, contract type and sector, and hours of work in the last job. Health problems are defined as impediments in daily activities. This health variable has been preferred to the use of subjective measures of health, such as self-assessed health status.

2.2. Who are the disability benefit recipients?

8. In all three countries disability benefit recipients show very similar demographic characteristics (Figure 1). There are slightly more men among recipients and they are on average (6 years) older than non-recipients. [1] Among disability benefit recipients there is a higher share of separated/divorced individuals while widows are also overrepresented in all countries with the exception of the UK. In addition, the percentage of singles among beneficiaries is also more important than among non-beneficiaries in Australia and Switzerland. The fact that Australia has the lowest percentage of married disability beneficiaries is associated with the strong means-tested nature of the system.

9. In Australia, virtually all individuals receiving benefits have previous work experience although slightly less than those not receiving it. A greater percentage has previously been unemployed in Australia (44% versus 32%) and for a longer period (22 months versus nine months on average).

10. There are more low-skilled individuals and from manual occupations among beneficiaries compared with the non-beneficiaries group in all countries but previous industry or firm types differ across countries. The high prevalence of low-skilled individuals among disability recipients in Australia and the

UK may reflect the fact that benefits are means-tested. Part of these findings could also be linked to the well-established correlation between socio-economic status and health (Case, Fertig, and Paxson, 2005; Smith, 1999). However, examining the sector in which beneficiaries previously worked, no common pattern is found across countries.

11. Other work characteristics appear to be important. In all three countries, beneficiaries are overrepresented in non-standard types of jobs. A majority of recipients were previously working part-time or in mini-jobs (1-14 hours of work) in all countries, particularly in Australia and Switzerland. They were also more likely to have had temporary jobs. They are overrepresented in shift work in the UK and Australia. The explanation for this phenomenon could be two-fold. On the one hand, it is likely that individuals experiencing health problems have to reduce their working hours or are found in more precarious employment situations. On the other hand, it is possible that individuals working part-time or in temporary jobs might be less likely to remain in employment or that their health is affected by this type of employment (OECD, 2008) and thus they are more likely to enter a disability spell. Regression analysis in the next section will shed more light on this issue.

Box 1. **Types of disability-related benefits**

This box describes the types of disability-related benefits in Australia, Switzerland and the United Kingdom, and the conditions of access/ entitlement that apply (OECD, 2007).

Australia

Sickness allowance. There is a public, flat-rate and means-tested sickness allowance for residents over age 21 who have a sickness or injury preventing work, provided they have a job (or a study) to return to.

Disability Support Pension. Residents between age 16 and the statutory pension age are eligible for a disability benefit. If the assessed disability began before residing in Australia, the person must have ten years of residence in the country. Individuals must be assessed as not being able to work or be retrained for work for at least 15 hours per week within two years because of their illness, injury or disability (or permanently blind). In Australia, these payments are household means and asset-tested (unless a person is blind). Veterans who are permanently blind or permanently unable to work and meeting the criteria of permanent incapacity to work are eligible for a *Service Pension*.

Switzerland

Disability Insurance. It covers all residents from age 18 onwards and those gainfully employed in the country, with a special benefit for those invalid from birth and before age 18 and those with less than one year of contributions. People not entitled to a second pillar disability benefit or only to a low one can be entitled to a means-tested, tax financed supplementary benefit.

United Kingdom

Incapacity benefits. They replaced Sickness Benefits and Invalidity Benefits from 13 April 1995. People need to be ordinary residents of the UK and be assessed as incapable of working because of their illness following the personal capability assessment. Individuals must have paid enough contributions in the last three years before the claim. There are three rates of Incapacity Benefit, two short-term rates (the lower rate is paid for the first 28 weeks of sickness and the higher rate for weeks 29 to 52) and a long-term rate for people who have been sick for more than a year. The higher short-term rate and the long-term rate are treated as taxable income.

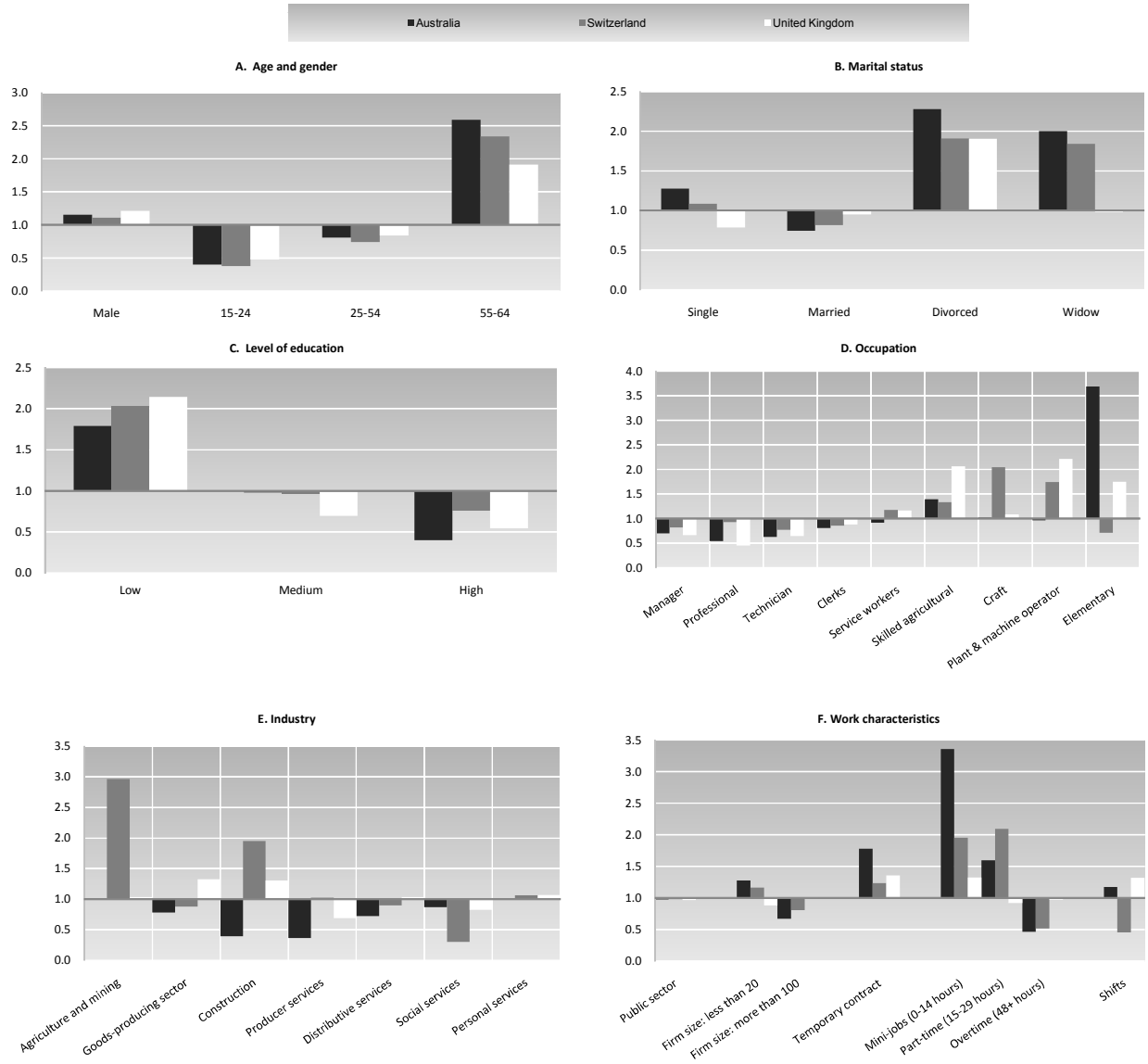
Severe Disablement Allowance. It was available to people under 65 and incapable of work, but whose National Insurance contributions were not enough to claim the long-term Incapacity Benefit. From April 2001, there have been no new claims to SDA. From this date, claimants under the age of 20 (or 25 if receiving training or education) may become entitled to Incapacity Benefit.

Income support. Individuals who do not qualify for incapacity benefit because they do not meet the means-testing or the contributions requirements may be eligible for income support and they may also receive a Disability Living Allowance if they have personal care and/or mobility needs as a result of severe disability and claim before age 65. Because the public disability benefit does not cover the entire population, like in Switzerland, many people with disability in the UK receive Income Support together with the Disability Living Allowance and it is therefore important to include such individuals as disability benefit recipients.

In the United Kingdom, contributory disability benefits are not means-tested, while non-contributory payments for those who do not fulfill the contribution requirements are. From October 2008, the Employment and Support Allowance (ESA) replaces Incapacity Benefit and Income Support for new applicants, paid because of an illness or disability.

Figure 1. **Demographic and work characteristics of disability benefit recipients**

Relative prevalence (1.0 is the population-average benchmark)



a) Numbers presented are ratios between disability benefit recipients and non-recipients.
b) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64.
c) The following years are considered for each country: 2001-2007 for Australia; 2002-2006 for Switzerland; and 1991-2006 for the United Kingdom.
d) Work characteristics are based on the respondent's last job. Samples are therefore different in Panels D-F, as they comprise only individuals who had a job in the past.
e) Three broad educational groupings were defined using ISCED. Occupational groupings were defined in terms of the nine one-digit occupations of the ISCO-88. Seven broad industry groupings were defined in terms of the 17 one-digit industries of the ISIC rev. 3: agriculture and mining corresponds to industries A, B and C (*i.e.* agriculture, hunting and forestry; fishing; and mining and quarrying); good-producing sector corresponds to industries D and E (*i.e.* manufacturing; and electricity, gas and water supply); construction corresponds to industry F (*i.e.* construction); producer services corresponds to industries J and K (*i.e.* financial intermediation; and real estate, renting and business activities); distributive services corresponds to industries G and I (*i.e.* wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods; and transport, storage and communications); social services corresponds to industries L, M, N and Q (*i.e.* public administration and defence; compulsory social security; education; health and social work; and extra-territorial organizations and bodies); and personal services corresponds to industries H, O and P (*i.e.* hotels and restaurants; other community, social and personal service activities; and private households with employed persons)
Source: OECD estimates based on the HILDA for Australia, the SHP for Switzerland and the BHPS for the United Kingdom.

3. Empirical Analysis

3.1. What affects entry into disability benefits?

12. Personal characteristics and prior work experience are likely to determine the probability that an individual enters into disability benefits or continues to work after the onset of a health problem. This section provides an analysis of annual transition probabilities into disability benefit.

13. Poor health is expected to raise the disutility of work and might even reduce the probability of returning to work while also generating an entitlement to disability benefits. At the same time, it is often assumed that, at the aggregate level, worsening health status alone cannot explain the increase in the number of recipients in the countries studied (McVicar, 2008; Bound and Burkhauser, 1999; Faggio and Nickell, 2003; Autor and Duggan, 2003). The regression analysis in this section throws more light on the role of health for different groups and the importance of previous activity status and work characteristics. We estimate hazard models of the effect of health and other socio-demographic variables on disability benefit recipiency (see Box 2 and Annex A2 for a description of regression methods).

14. Experiencing a health problem increases the probability of receiving a disability benefit in all countries (Table 1, Panel A). This is true for past or present health shocks. The effects of current health are more important in Australia while initial health (i.e. when the individual is first observed in the survey) matters more in Switzerland. At the same time, health measures used differ across countries because of data availability. To address comparability issues in the health measure as well as endogeneity problems with self-reported health measures, another type of estimation is presented in section 3.3.

15. The results also confirm the descriptive analysis of benefit recipiency in the previous section as the probability of receiving a disability benefit is lower for women and for the younger age groups, controlling for other observed characteristics and unobserved heterogeneity. The effects of age are lower in the UK, showing that there is less of a gap between younger and older individuals in their chances of disability recipiency. The number of children in the household matter in Australia and the UK as the total number of household members is taken into account for eligibility of means-tested benefits.

16. Other socio-economic characteristics are also important. Higher household income provides a protective effect since higher income is associated with a lower probability of disability benefit (except in the UK), particularly in the case of Australia where all higher quintiles, except the second, are significant. The effect of lower education is significant only in the UK.

17. The analysis of aggregate trends in disability recipiency rates has shown large increases over time for many countries, particularly among some groups. It is therefore particularly interesting to test whether particular groups suffer more from a health onset by including interaction terms in the regressions (Table 2). The interaction term reflects how much more (or less likely) are individuals belonging to a certain group to move into disability in the aftermath of a health shock. The results show that the coefficient is not significant for gender, indicating that having a health problem does not increase the likelihood of receiving a disability benefit for women. Only in Australia health shocks do have a worse impact for women, but only marginally.

18. There are however some differential effects according to age, income and education. Surprisingly, the effect of a health shock is worse for higher incomes in the UK; this is confirmed by the results for education, showing that low-educated individuals are less likely to enter disability benefits after a health shock. On the contrary, in Australia individuals in the highest income quintile experience a protective effect of income in case of a health problem. Younger individuals suffer more from the effect of health deterioration in Switzerland while in the UK it is both young and prime-age individuals. Since

younger individuals are more susceptible to enter a disability spell after a health shock, the results for Switzerland and for the UK point out that a worsening of their health status in recent years could explain the growth in the number of young beneficiaries.

Box 2. **Estimating the probability of labour market transitions**

A discrete-time event history model is used to analyze transitions to disability benefit

Transition into disability status is estimated using a complementary log-log model. This model is the discrete-time counterpart for an underlying continuous-time proportional hazard model and the hazard rate follows the expression:

$$h(t, X) = 1 - \exp[-\exp(X_{it}^{'}\beta + H_{it}^{'}\gamma + D(t) + u_i)]$$

Or

$$\log(-\log[1 - h(t, X)]) = X_{it}^{'}\beta + H_{it}^{'}\gamma + D(t) + u_i$$

Where the probability of a transition into receiving a disability benefit is a function of health (*H)* and socio-demographic characteristics (*X), duration dependence (D)* and unobserved heterogeneity modeled using Normal distribution.

19. Initial work characteristics (when the individual is first observed in the sample) do not appear to have a strong influence on the disability benefit risks. Exceptions include the effect of being in a low-skilled occupation in the UK -which increases the chances of entering the benefit- and working hours in Switzerland – where working less than full-time leads to a higher chance and the opposite is found for overtime work. The low effect of initial work characteristics might be explained by the fact that many disability recipients might have been out of work for a long-time and thus there is little impact of older socio-demographic characteristics.

20. Several studies have found that unemployment has a detrimental effect on health, particularly mental health (OECD, 2008) and that unemployment spells could raise the probability of receiving a disability benefit because of health-deteriorating effects. At the same time, there is a possibility that a worsening in health conditions may lead to job loss and further onto unemployment or inactivity. A regression analysis testing the effects of lagged unemployment and other inactivity on disability status shows that unemployment does increase the probability of benefit recipiency while lagged inactivity does matter in Australia (Figure 2).

Table 1. **Probability of receiving a disability benefit: health and demographics matter**

	Australia		Switzerland		United Kingdom	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Health problems	1.989***	(0.218)	0.830***	(0.211)	1.167***	(0.131)
Lagged health problems	1.196***	(0.199)	1.064***	(0.247)	1.174***	(0.140)
Initial health status	0.381***	(0.146)	0.693***	(0.221)	0.198**	(0.100)
Number of children in household (grouped)	-0.124*	(0.075)	-0.157	(0.125)	-0.090*	(0.049)
2nd income quintile	-0.045	(0.146)	0.509**	(0.247)	0.264***	(0.101)
3rd income quintile	-0.489**	(0.196)	0.175	(0.267)	0.172	(0.112)
4th income quintile	-1.536***	(0.317)	0.288	(0.277)	0.159	(0.126)
5th income quintile	-1.260***	(0.309)	-0.779**	(0.393)	-0.144	(0.165)
Sex=female	-0.326**	(0.129)	-0.876***	(0.184)	-0.937***	(0.076)
15-24	-0.891***	(0.293)	-1.958***	(0.598)	-0.638***	(0.204)
25-34	-0.716***	(0.231)	-1.383***	(0.379)	-0.485***	(0.152)
25-44	-0.663***	(0.191)	-0.828***	(0.267)	-0.230**	(0.115)
45-54	-0.365**	(0.153)	-0.549***	(0.197)	-0.151*	(0.089)
Foreign	-0.057	(0.142)	0.003	(0.234)	-0.743**	(0.351)
Single	0.503***	(0.164)	1.075***	(0.235)	0.426***	(0.090)
Separated/Divorced	0.385**	(0.151)	0.793***	(0.209)	0.501***	(0.196)
Widow	-0.728	(0.514)	0.387	(0.437)	0.097	(0.103)
Low education	0.048	(0.177)	0.099	(0.278)	0.340***	(0.101)
Medium education	0.146	(0.174)	0.078	(0.207)	0.070	(0.113)
Ever unemployed	0.166	(0.127)	…	…	0.073	(0.079)
Agr (initial)	0.389	(0.407)	1.161	(0.778)	-0.342	(0.414)
Construction (initial)	-0.251	(0.520)	0.006	(0.638)	0.091	(0.317)
Business (initial)	0.276	(0.382)	-0.097	(0.397)	0.013	(0.335)
Sales (initial)	-0.100	(0.342)	-0.100	(0.350)	0.230	(0.229)
Social (initial)	-0.264	(0.369)	0.301	(0.363)	0.257	(0.291)
Hotel (initial)	0.099	(0.372)	-0.562	(0.750)	0.185	(0.303)
Blue collar (initial)	0.052	(0.287)	0.520	(0.346)	0.714***	(0.179)
Elementary occupations (initial)	0.229	(0.266)	-0.332	(0.534)	0.619***	(0.217)
Temporary contract (initial)	-0.046	(0.234)	0.126	(0.504)	0.161	(0.227)
Mini-jobs (initial)	0.419	(0.300)	1.190***	(0.344)	-0.125	(0.313)
Part-time (initial)	0.317	(0.278)	1.017***	(0.304)	0.073	(0.228)
Overtime (initial)	-0.465	(0.364)	-1.033*	(0.545)	-0.098	(0.264)
Shift work (initial)	-0.324	(0.231)	0.059	(0.486)	0.137	(0.151)
Public sector (initial)	-0.255	(0.298)	-0.774**	(0.350)	0.192	(0.201)
Firm size < 20 (initial)	-0.163	(0.231)	0.169	(0.348)	-0.103	(0.193)
Firm size > 100 (initial)	0.247	(0.259)	0.156	(0.341)	0.073	(0.182)
Constant	-5.547***	(0.495)	-4.176***	(0.568)	-6.187***	(0.466)
Observations	36063		12502		84926	

a) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64

b) The following years are considered for each country: 2001-2007 for Australia; 2002-2006 for Switzerland; and 1991-2006 for the United Kingdom.

c) All regressions include regional dummy variables and the following "initial" work characteristics: industry, occupation, type of contract, working hours, shift work, public sector and firm size. "Initial" in brackets indicates the value of the variable in question at the time the individual enters the survey. Initial health status also refers to health status the first period the individual is observed in the survey.

d) Health problems are defined as follows: whether health is an impediment in daily activities.

e) See note e of Figure 1 for definitions.

Source: OECD estimates based on the HILDA for Australia, the SHP for Switzerland and the BHPS for the United Kingdom.

Table 2. **Characteristics that protect against health shocks**

	Australia	Switzerland	United Kingdom
Gender= female	0.639 *	0.449	0.262
	(0.377)	(0.326)	(0.176)
Age			
15-24	1.060	2.318 **	0.684 *
	(0.832)	(1.043)	(0.360)
25-34	-0.086	0.614	1.258 ***
	(0.554)	(0.699)	(0.283)
35-44	-0.032	-0.415	0.612 ***
	(0.519)	(0.452)	(0.221)
45-54	0.006	0.327	0.651 ***
	(0.510)	(0.379)	(0.220)
Education level	..		
Low skilled	-0.045	-0.013	-1.253 ***
	(0.498)	(0.522)	(0.220)
Medium skilled	-0.142	0.107	-0.421
	(0.475)	(0.387)	(0.262)
Quintile			
2nd income quintile	0.307	0.158 *	-0.188
	(0.466)	(0.519)	(0.239)
3rd income quintile	0.301	-0.414	0.466 *
	(0.538)	(0.539)	(0.266)
4th income quintile	1.148	0.509	1.034 ***
	(1.087)	(0.541)	(0.292)
5th income quintile	-0.817	0.065	1.011 ***
	(0.620)	(0.766)	(0.326)
Observations	36063	12502	84926

a) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64

b) The following years are considered for each country: 2001-2007 for Australia; 2002-2006 for Switzerland; and 1991-2006 for the United Kingdom.

c) All regressions include regional dummy variables. In addition, the same controls as in Table 1 are included.

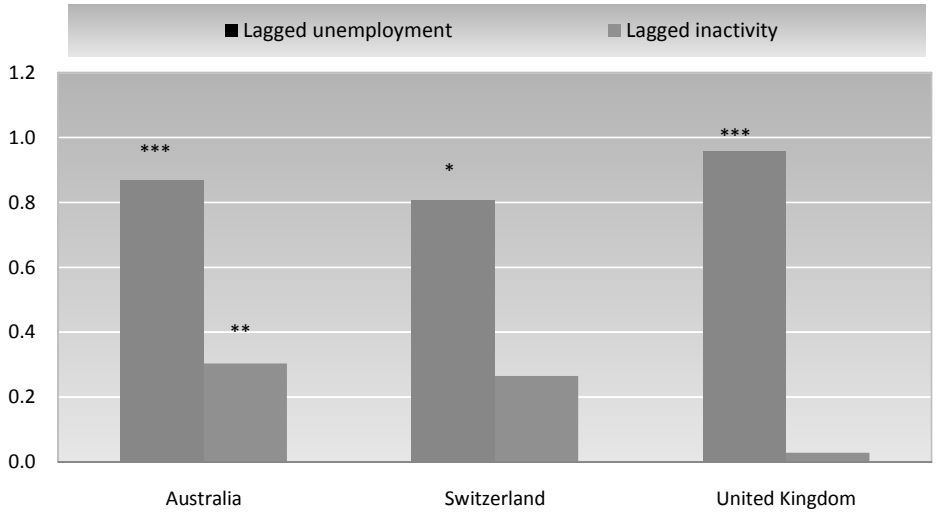
d) Health problems are defined as follows: whether health is an impediment in daily activities.

e) See note e of Figure 1 for definitions.

Source: OECD estimates based on the HILDA for Australia, the SHP for Switzerland and the BHPS for the United Kingdom.

Figure 2. **Lagged unemployment increases disability recipiency**

Coefficients from a disability probability model



*, **, ***: statistically significant at the 10%, 5%, 1% level, respectively.

a) Reported coefficients are estimated from a logit model. They capture the effect of lagged unemployment and lagged inactivity on the probability of receiving a disability benefit. A positive coefficient means a higher probability of receiving a disability benefit.

b) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64. Samples have been restricted to individuals who were not on disability benefit in the previous year. The same controls as in Table 1, except for initial characteristics, are included.

c) The years considered for each country are 2001-2007 for Australia; 2002-2006 for Switzerland; and 1991-2006 for the United Kingdom. The controls included in the regressions are the same as those in Table 1.

Source: OECD estimates based on the HILDA for Australia, the SHP for Switzerland and the BHPS for the United Kingdom.

3.2 Sensitivity analysis

21. The results from the previous section are robust to sensitivity tests including additional controls. Following the existing literature (Zucchelli et al, 2007; Roberts, Rice and Jones, 2008; Cappellari and Jenkins, 2008) four groups of variables were added to the basic regressions: *i)* house ownership, *ii)* spouse characteristics (age, education, labour force status), *iii)* parental characteristics when the respondent was a teenager and *iv)* life events when available.

22. Tables 3-5 present the results separately for every country and adding one set of controls at a time. Overall it can be seen that controlling for additional individual and background characteristics does not affect the main results in any significant way. Only the initial health status becomes insignificant in the UK, when partner characteristics are included in the regression. However this could be due to the reduction in the sample size. Similarly sample size drops significantly especially in the case of partner's characteristics in Australia and life events in Switzerland.

Table 3. **Probability of receiving a disability benefit: Australia**

	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Health problems	1.984***	(0.218)	1.896***	(0.325)	2.090***	(0.232)	1.866***	(0.235)
Lagged health problems	1.193***	(0.199)	1.051***	(0.301)	1.293***	(0.209)	1.220***	(0.220)
Initial health status	0.378***	(0.146)	0.531**	(0.249)	0.309**	(0.148)	0.440***	(0.163)
House owner=1	-0.266**	(0.129)						
Partner unemployed			1.145***	(0.398)				
Partner on disability benefits			0.649**	(0.310)				
Partner inactive			0.868***	(0.264)				
Partner retired			0.393	(0.367)				
Partner education=low			0.983***	(0.337)				
Partner education=medium			0.816**	(0.339)				
Partner age: 16-24			-0.609	(0.793)				
Partner age: 25-34			-1.164**	(0.562)				
Partner age: 35-44			-0.404	(0.399)				
Partner age: 45-54			-0.085	(0.280)				
Father employed					-0.064	(0.184)		
Mother employed					0.093	(0.124)		
Separated from spouse							0.025	(0.302)
Got back together with spouse							0.877*	(0.448)
Pregnancy							0.086	(0.531)
Birth/adoption of new child							-0.006	(0.652)
Serious personal injury/illness							0.325*	(0.169)
Serious injury/illness to family member							0.032	(0.175)
Death of spouse or child							-0.229	(0.797)
Death of close relative/family member							0.068	(0.204)
Death of close friend							0.138	(0.184)
Victim of physical violence							-0.293	(0.450)
Victim of property crime							0.356	(0.252)
Detained in jail							0.013	(1.171)
Close family member detained in jail							-0.281	(0.530)
Changed residence							-0.082	(0.196)
Constant	-5.315***,	(0.506)	-6.204***,	(0.815)	-5.587***,	(0.535)	-5.580***,	(0.539)
Observations	36063		21875		34254		32982	

a) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64.

b) The years considered are 2001-2007.

c) All regressions include regional dummy variables. "Initial" in brackets indicates the value of the variable in question at the time the individual enters the survey. Initial health status also refers to health status the first period the individual is observed in the survey.

d) See note e of Figure 1 for definitions.

Source: OECD estimates based on the HILDA.

23. Housing tenure, used as a proxy for wealth and social class (Roberts, Rice and Jones, 2008), shows that individuals that own their accommodation have a lower probability of receiving a disability benefit in Australia and the UK. In contrast, in Switzerland, there is a positive effect of housing tenure. Likewise, people receiving housing subsidies are also more likely to receive a disability benefit. Partner's labour market status seems to matter: both in Australia and the UK, having a partner who is not working is associated with a higher probability of receiving a disability benefit. This mirrors what has been found in the literature with respect to the impact of partner's labour market status on the probability of retirement (Roberts, Rice and Jones, 2008). Individuals with lower educated partners are also more likely to be on

disability benefits in Australia. This is in line with the finding of Cappellari and Jenkins (2008) for the UK, where individuals with better educated spouses are less likely to receive social assistance. This sensitivity analysis confirms that individuals at risk of receiving disability benefits come from households which accumulate multiple disadvantages i.e. workless households or that the means-tested nature of the disability benefit system makes it more likely to be granted a disability benefit if the partner is not receiving income from work.

24. Parental information seems to matter only in the case of the UK and this only for the case of the mother. Individuals with working mother at the age 16 and those whose mother had died at that age are more likely to be on disability benefits. Finally life events do not seem to play a major role in the probability of being on receiving disability benefits. Only exceptions are a serious personal injury or illness and getting back together with partner in Australia, with both increasing the chances of disability benefit.

Table 4. **Probability of receiving a disability benefit: Switzerland**

	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Health problems	0.830***	(0.211)	0.813***	(0.215)	0.706***	(0.271)	1.662***	(0.441)
Lagged health problems	1.064***	(0.247)	1.045***	(0.243)	1.129***	(0.319)	0.921*	(0.506)
Initial health status	0.693***	(0.221)	0.773***	(0.213)	0.575**	(0.289)	1.365***	(0.460)
House owner=1			0.372**	(0.174)				
Housing subsidy			0.718**	(0.298)				
Death					-0.133	(0.239)		
Separation					0.242	(0.331)		
Conflict					0.182	(0.307)		
Problem with child					0.393	(0.242)		
Soc. Support index (practical)							0.008	(0.017)
Soc. Support index (emotional)							-0.000	(0.019)
Constant	-4.176***	(0.568)	-4.252***	(0.585)	-4.911***	(0.823)	-7.565***	(1.749)
Observations	12502		10989		7740		5464	

a) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64.

b) The years considered are 2002-2006.

c) All regressions include regional dummy variables. "Initial" in brackets indicates the value of the variable in question at the time the individual enters the survey. Initial health status also refers to health status the first period the individual is observed in the survey.

d) See note e of Figure 1 for definitions.

Source: OECD estimates based on the SHP.

Table 5. **Probability of receiving a disability benefit: United Kingdom**

	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Health problems	1.157***	(0.131)	1.447***	(0.189)	1.161***	(0.131)
Lagged health problems	1.160***	(0.140)	1.070***	(0.194)	1.169***	(0.141)
Initial health status	0.201**	(0.100)	0.139	(0.135)	0.207**	(0.100)
House owner=1	-0.338***	(0.080)				
Partner unemployed			0.349	(0.320)		
Partner on disability benefits			0.303**	(0.144)		
Partner inactive			0.488***	(0.157)		
Partner retired			0.436**	(0.170)		
Partner education=low			-0.133	(0.137)		
Partner education=medium			0.023	(0.148)		
Partner age: 16-24			0.072	(0.432)		
Partner age: 25-34			-0.293	(0.306)		
Partner age: 35-44			0.105	(0.218)		
Partner age: 45-54			-0.239	(0.162)		
Father employed					0.159	(0.185)
Father dead					0.240	(0.174)
Mother employed					0.140*	(0.078)
Mother dead					0.379*	(0.203)
Constant	-5.886***		-7.455***		-6.312***	
	(0.477)		(0.994)		(0.470)	
Observations	84926		55431		84926	

a) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64.

b) The years considered are 1991-2006.

c) All regressions include regional dummy variables. "Initial" in brackets indicates the value of the variable in question at the time the individual enters the survey. Initial health status also refers to health status the first period the individual is observed in the survey.

d) See note e of Figure 1 for definitions.

Source: OECD estimates based on the BHPS.

25. The results of separate regressions for men and women are presented in Table 6 for all three countries. They do show, in addition, that other variables have a different impact in the transition to a disability benefit by gender. This is the case for instance of marital status which matters more for women: across all countries women have much higher chances of ending in a disability benefit if they are single or separated (compared with men). A lower disability benefit risk with a higher number of children is observed for women (except in Switzerland) and not for men. The effects of income are also somewhat different by gender. For instance, in the UK, the highest quintile is associated for men with a lower chance of transition to disability but this is not the case for women. Instead, the second to fourth quintiles carry for women a higher disability risk than the first quintile. This could be related to women having shorter work experience or more frequent part-time work, which are in turn linked to higher chance of receiving means-tested non-contributory benefits. The effects of the health shocks differ significantly by gender in Australia only.

26. Table 7 presents the results of the probability of disability recipiency for three broad age groups. The analysis shows that low education matters more for the young age group. The effect of gender differs by age: being female is associated with a higher likelihood of entering disability benefit in Australia for the young age group. On the contrary, there is an opposite gradient by age in the UK with a lower probability for females for the older age group.

Table 6. **Probability of receiving a disability benefit by gender**

	Men			Women		
	Australia	Switzerland	United Kingdom	Australia	Switzerland	United Kingdom
Health problems	1.612 ***	0.489	1.090 ***	2.416 ***	0.940 ***	1.242 ***
	(0.291)	(0.353)	(0.170)	(0.336)	(0.270)	(0.207)
Lagged health problems	1.190 ***	0.696 *	0.950 ***	1.218 ***	1.319 ***	1.465 ***
	(0.287)	(0.423)	(0.183)	(0.277)	(0.316)	(0.224)
Initial health status	0.419 *	0.866 **	0.095	0.249	0.583 **	0.352 **
	(0.218)	(0.390)	(0.136)	(0.204)	(0.296)	(0.154)
Number of children in household (grouped)	-0.039	-0.227	-0.040	-0.352 ***	-0.126	-0.245 ***
	(0.094)	(0.183)	(0.065)	(0.126)	(0.185)	(0.077)
2nd income quintile	0.049	0.314	0.165	-0.127	0.610 *	0.448 ***
	(0.204)	(0.375)	(0.128)	(0.212)	(0.340)	(0.169)
3rd income quintile	-0.413 *	0.087	0.108	-0.494 *	0.429	0.381 **
	(0.275)	(0.392)	(0.142)	(0.286)	(0.374)	(0.187)
4th income quintile	-1.234 ***	-0.307	0.024	-1.819 ***	0.738 *	0.501 **
	(0.404)	(0.428)	(0.162)	(0.534)	(0.377)	(0.206)
5th income quintile	-0.973 **	-1.897 **	-0.385 *	-1.507 ***	-0.122	0.290
	(0.403)	(0.793)	(0.222)	(0.496)	(0.473)	(0.250)
15-24	-1.373 ***	-1.820 **	-1.179 ***	-0.343	-2.508 **	0.414
	(0.441)	(0.823)	(0.273)	(0.412)	(1.091)	(0.322)
25-34	-1.314 ***	-1.615 **	-1.107 ***	0.027	-1.128 **	0.698 ***
	(0.344)	(0.673)	(0.207)	(0.329)	(0.469)	(0.244)
25-44	-1.096 ***	-0.564	-0.657 ***	-0.013	-1.072 **	0.625 ***
	(0.268)	(0.374)	(0.154)	(0.281)	(0.416)	(0.186)
45-54	-0.512 **	-0.631 *	-0.422 ***	-0.244	-0.471 *	0.397 **
	(0.216)	(0.333)	(0.113)	(0.229)	(0.261)	(0.155)
Foreign	-0.067	-0.273	-0.787 *	-0.037	0.153	-0.890
	(0.198)	(0.382)	(0.460)	(0.212)	(0.318)	(0.551)
Single	0.474 **	-0.026	0.306 **	0.624 ***	1.844 ***	0.716 ***
	(0.236)	(0.401)	(0.130)	(0.237)	(0.315)	(0.175)
Separated/Divorced	0.409 *	0.259	0.205	0.434 **	1.048 ***	0.946 *
	(0.222)	(0.371)	(0.126)	(0.214)	(0.278)	(0.141)
Widow	-22.502	0.649	0.144	-0.472	0.548	0.337
	(146,652.093)	(1.136)	(0.271)	(0.525)	(0.492)	(0.289)
Low education	-0.038	0.897 **	0.401 ***	0.305	-0.327	0.316 *
	(0.256)	(0.427)	(0.129)	(0.260)	(0.422)	(0.165)
Medium education	0.062	-0.035	0.124	0.316	0.147	0.001
	(0.235)	(0.296)	(0.145)	(0.271)	(0.334)	(0.184)
Ever unemployed	0.249	...	-0.086	0.123	...	0.233 *
	(0.182)	...	(0.102)	(0.182)	...	(0.132)
Agr (initial)	0.358	1.306	-0.234	1.488 *	-31.958	-25.948
	(0.499)	(0.852)	(0.423)	(0.833)	(26697366.873)	(451,438.529)
Construction (initial)	0.018	-0.120	0.238	-0.426	-31.639	-25.129
	(0.598)	(0.674)	(0.336)	(1.127)	(16966745.714)	(609,610.179)
Business (initial)	0.904 *	-1.926 *	0.094	-0.943	0.629	0.082
	(0.461)	(1.049)	(0.396)	(0.736)	(0.563)	(0.693)
Sales (initial)	0.210	-0.368	0.312	-0.754	0.272	0.454
	(0.437)	(0.508)	(0.258)	(0.557)	(0.557)	(0.571)
Social (initial)	-0.112	0.185	0.505	-0.677	0.506	0.264
	(0.510)	(0.590)	(0.376)	(0.549)	(0.549)	(0.571)
Hotel (initial)	0.252	-0.738	0.431	-0.284	-0.300	0.108
	(0.533)	(1.067)	(0.376)	(0.558)	(1.092)	(0.611)
Blue collar (initial)	0.321	-0.043	0.686 ***	0.314	0.810	1.156 **
	(0.354)	(0.420)	(0.207)	(0.651)	(0.791)	(0.473)
Elementary occupations (initial)	0.675 *	0.240	0.519 *	-0.452	-0.409	0.968 ***
	(0.369)	(0.809)	(0.294)	(0.504)	(0.760)	(0.351)
Temporary contract (initial)	-0.325	0.232	0.455 *	-0.004	0.152	-0.227
	(0.358)	(0.727)	(0.272)	(0.342)	(0.776)	(0.444)
Mini-jobs (initial)	0.428	1.156	-0.373	0.410	1.475 ***	-0.154
	(0.510)	(0.737)	(0.742)	(0.422)	(0.450)	(0.389)
Part-time (initial)	0.620	1.992 ***	-0.020	0.185	0.854 **	-0.011
	(0.451)	(0.453)	(0.425)	(0.399)	(0.435)	(0.296)
Overtime (initial)	-0.252	-1.118 *	-0.125	-24.544	-0.223	0.355
	(0.386)	(0.650)	(0.285)	(145,444.125)	(1.054)	(0.764)
Shift work (initial)	-0.719 *	0.126	0.079	-0.030	0.108	0.244
	(0.367)	(0.658)	(0.184)	(0.323)	(0.758)	(0.268)
Public sector (initial)	-0.356	-1.607 **	-0.137	-0.110	-0.494	0.623 **
	(0.412)	(0.654)	(0.271)	(0.429)	(0.468)	(0.316)
Firm size < 20 (initial)	-0.445	0.065	-0.188	0.331	0.489	0.132
	(0.311)	(0.508)	(0.248)	(0.400)	(0.516)	(0.313)
Firm size > 100 (initial)	-0.006	-0.551	0.202	0.551	0.723	-0.124
	(0.356)	(0.479)	(0.225)	(0.431)	(0.525)	(0.325)
Observations	15802	5263	39281	20261	7239	45645

a) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64.

b) The following years are considered for each country: 2001-2007 for Australia; 2002-2006 for Switzerland; and 1991-2006 for the United Kingdom.

c) All regressions include regional dummy variables. "Initial" in brackets indicates the value of the variable in question at the time the individual enters the survey. Initial health status also refers to health status the first period the individual is observed in the survey.

d) See note e of Figure 1 for definitions.

Source: OECD estimates based on the HILDA for Australia, the SHP for Switzerland and the BHPS for the United Kingdom.

Table 7. **Probability of receiving a disability benefit by age**

	Under 34			35-49			50-64		
	Australia	Switzerland	United Kingdom	Australia	Switzerland	United Kingdom	Australia	Switzerland	United Kingdom
Health problems	1.792 ***	...	1.713 ***	2.089 ***	0.720 *	0.801 ***	1.987 ***	0.820 ***	1.089 ***
	(0.451)	...	(0.273)	(0.361)	(0.378)	(0.240)	(0.339)	(0.266)	(0.183)
Lagged health problems	2.071 ***	...	1.558 ***	0.630 **	1.229 ***	1.461 ***	1.329 ***	0.673 **	0.860 ***
	(0.502)	...	(0.286)	(0.319)	(0.434)	(0.265)	(0.296)	(0.314)	(0.195)
Initial health status	0.222	...	-0.276	0.445	0.758 *	0.445 **	0.290	0.814 ***	0.281 **
	(0.386)	...	(0.251)	(0.274)	(0.425)	(0.189)	(0.203)	(0.279)	(0.142)
Number of children in household (grouped)	-0.391 **	...	-0.067	-0.260 **	-0.541 ***	-0.136 **	-0.027	-0.046	-0.174
	(0.194)	...	(0.104)	(0.117)	(0.183)	(0.065)	(0.108)	(0.218)	(0.142)
2nd income quintile	0.553	...	0.072	-0.312	0.027	0.343 *	-0.112	0.686 **	0.287 **
	(0.369)	...	(0.273)	(0.278)	(0.531)	(0.181)	(0.201)	(0.298)	(0.141)
3rd income quintile	0.169		0.283	-0.803 **	-0.188	0.424 **	-0.584 **	0.185	0.135
	(0.457)	...	(0.301)	(0.376)	(0.526)	(0.206)	(0.274)	(0.334)	(0.153)
4th income quintile	-1.099	...	0.176	-1.994 ***	-0.114	0.389 *	-1.602 ***	0.364	0.131
	(0.774)	...	(0.342)	(0.632)	(0.536)	(0.236)	(0.423)	(0.349)	(0.169)
5th income quintile	0.504	...	0.162	-0.897 *	-1.093	0.160	-2.866 ***	-0.790	-0.368
	(0.586)	...	(0.410)	(0.479)	(0.693)	(0.291)	(0.741)	(0.533)	(0.236)
Sex=female	0.596 *	...	-0.040	-0.301	-0.581 *	-0.847 ***	-0.598 ***	-0.938 ***	-1.230 ***
	(0.340)	...	(0.211)	(0.247)	(0.344)	(0.140)	(0.180)	(0.238)	(0.108)
Foreign	-0.935	...	-0.441	0.038	-0.493	-0.110	-0.036	0.078	-1.080 **
	(0.744)	...	(0.999)	(0.262)	(0.479)	(0.829)	(0.181)	(0.305)	(0.433)
Single	0.409	...	0.475 *	0.239	0.459	0.352 ***	0.400	1.551 ***	0.440 ***
	(0.354)	...	(0.268)	(0.287)	(0.425)	(0.173)	(0.271)	(0.289)	(0.151)
Separated/Divorced	1.067	...	0.606	-0.183	0.161	0.526 ***	0.511** ***	0.957 ***	0.466 ***
	(0.668)	...	(0.375)	(0.301)	(0.448)	(0.160)	(0.190)	(0.252)	(0.116)
Widow	-24.727	...	-25.923	-0.059	1.275	0.534	-0.858	0.372	0.175
	(1766664.158)	...	(675,852.478)	(1.054)	(1.072)	(0.520)	(0.600)	(0.484)	(0.214)
Low education	1.079 *	...	0.537 **	-0.173	0.256	0.493 ***	0.069	0.026	0.261 *
	(0.635)	...	(0.266)	(0.306)	(0.544)	(0.186)	(0.244)	(0.360)	(0.135)
Medium education	1.103 *	...	-0.267	0.032	-0.096	0.451 **	0.027	0.057	-0.100
	(0.600)	...	(0.275)	(0.290)	(0.340)	(0.191)	(0.252)	(0.291)	(0.170)
Ever unemployed	-0.039	...	0.641 ***	0.343	1.900	-0.186	-0.026	1.895	0.079
	(0.343)	...	(0.220)	(0.246)	(0.800)	(0.152)	(0.172)	(0.494)	(0.108)
Agr (initial)	1.039	...	0.881	1.019	-20.962	-0.502	-0.219	1.570 *	-0.612
	(1.084)	...	(1.142)	(0.654)	(109,757.325)	(1.076)	(0.654)	(0.837)	(0.492)
Construction (initial)	-0.130	...	0.431	-0.270	-0.116	0.453	-0.485	0.368	-0.099
	(1.311)	...	(0.824)	(1.109)	(1.112)	(0.678)	(0.695)	(0.843)	(0.419)
Business (initial)	-0.811	...	-0.534	0.521	-0.591	0.478	0.179	0.188	-0.147
	(1.312)	...	(1.151)	(0.667)	(0.842)	(0.612)	(0.521)	(0.502)	(0.457)
Sales (initial)	-1.041	...	1.019	-0.066	0.164	0.409	-0.027	-0.294	-0.149
	(1.024)	...	(0.637)	(0.640)	(0.602)	(0.526)	(0.459)	(0.496)	(0.300)
Social (initial)	-0.265	...	0.825	0.353	0.907	0.914 *	-0.653	-0.374	-0.230
	(1.081)	...	(0.801)	(0.655)	(0.565)	(0.554)	(0.520)	(0.533)	(0.400)
Hotel (initial)	-0.835	...	0.624	0.563	-0.459	0.581	-0.261	-0.151	-0.168
	(1.076)	...	(0.787)	(0.657)	(1.111)	(0.624)	(0.531)	(1.067)	(0.416)
Blue collar (initial)	0.060	...	0.941 ***	0.569	0.596	0.528	-0.271	0.846 *	0.769 ***
	(0.901)	...	(0.452)	(0.512)	(0.619)	(0.353)	(0.426)	(0.478)	(0.241)
Elementary occupations (initial)	0.526	...	0.845	0.679	-0.560	-0.324	-0.009	0.123	0.856 ***
	(0.688)	...	(0.520)	(0.483)	(1.075)	(0.556)	(0.387)	(0.637)	(0.280)
Temporary contract (initial)	0.180	...	-0.107	-0.590	-0.264	0.647 *	0.244	1.041	0.076
	(0.592)	...	(0.488)	(0.437)	(1.071)	(0.384)	(0.350)	(0.657)	(0.375)
Mini-jobs (initial)	0.436	...	0.197	0.842	0.866	0.410	0.027	1.620 ***	-0.671
	(0.732)	...	(0.593)	(0.564)	(0.663)	(0.528)	(0.461)	(0.481)	(0.539)
Part-time (initial)	0.478	...	-0.267	0.921 *	0.175	0.398	-0.017	1.740 ***	-0.061
	(0.684)	...	(0.573)	(0.471)	(0.553)	(0.397)	(0.441)	(0.421)	(0.323)
Overtime (initial)	-0.894	...	-0.789	-0.210	-1.167	0.556	-0.748	-1.202	-0.442
	(1.095)	...	(1.037)	(0.576)	(1.052)	(0.446)	(0.541)	(0.785)	(0.364)
Shift work (initial)	0.633	...	0.041	-0.569	0.501	0.020	-0.413	-0.415	0.152
	(0.582)	...	(0.370)	(0.447)	(0.671)	(0.280)	(0.344)	(0.796)	(0.207)
Public sector (initial)	0.696	...	0.059	-0.428	-1.377 **	-0.047	-0.547	-0.094	0.323
	(0.694)	...	(0.518)	(0.552)	(0.580)	(0.365)	(0.447)	(0.493)	(0.283)
Firm size < 20 (initial)	-0.612	...	-0.428	-0.425	-0.079	-0.148	-0.016	0.315	0.007
	(0.539)	...	(0.406)	(0.400)	(0.554)	(0.392)	(0.387)	(0.572)	(0.275)
Firm size > 100 (initial)	-1.014	...	-0.617	-0.017	0.105	0.407	0.624	0.691	0.116
	(0.720)	...	(0.447)	(0.464)	(0.500)	(0.343)	(0.400)	(0.541)	(0.261)
Observations	11788	...	26595	14646	5717	32705	9629	4262	25626

a) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64.

b) The following years are considered for each country: 2001-2007 for Australia; 2002-2006 for Switzerland; and 1991-2006 for the United Kingdom.

c) All regressions include regional dummy variables. "Initial" in brackets indicates the value of the variable in question at the time the individual enters the survey. Initial health status also refers to health status the first period the individual is observed in the survey.

d) The regression for the age group 15-34 has not been performed for Switzerland because of the small sample size.

e) See note e of Figure 1 for definitions.

Source: OECD estimates based on the HILDA for Australia, the SHP for Switzerland and the BHPS for the United Kingdom.

3.3. Controlling for the possible endogeneity of health

27. In order to correct for the possible endogeneity of health and to use a more comparable health measure across countries, we follow the method of Bound et al. (1999) where a latent variable model is defined. This methodology consists of constructing a latent health stock or index of health for each individual as a function of more objective measures of ill health. This constructed variable can be used to instrument self-assessed health.

28. To deal with possible health endogeneity the individual's health stock variable is constructed assuming that health is defined by objective health measures:

$$\eta_{it} = Z'_{it}\alpha + v_{it}$$

29. Such health stock is not observed in the data but a self-reported health status measure is (as a categorical variable with five states). The latent health stock, using self-assessed health will be a function of true health stock and an error term. The latent health stock can then be estimated as a function of objective measures of health[2] using an ordered probit:

$$H^*_{it} = Z'_{it}\alpha + [v_{it} + \varepsilon_{it}]$$
$$H^*_{it} = Z'_{it}\alpha + \omega_{it}$$

30. The findings confirm the importance of own health as a determinant of the receiving a disability benefit. Using a latent health stock has a substantial impact on the effect of health on disability recipiency: the effect of health shocks is dramatically reduced, particularly in the case of Australia and the UK. A one unit worsening in health is estimated to increase the probability of labour market exit into disability benefits to a much greater extent in Australia, followed by Switzerland and the UK. The larger effect of health in Australia compared with the UK might reflect the fact that some benefits in the UK, particularly non-contributory ones, might be granted for reasons other than health-related ones. It might also be related to differences in the medical criteria used for disability assessments.

31. At the same time, the results obtained after instrumenting the health variable are very similar in the case of socio-demographic characteristics. Some differences are observed: in the case of age, the coefficients become lower in the case of Switzerland and insignificant for the older age groups for Australia and the UK. The effects of health become now less important than certain characteristics such as income in Australia (given the strict means-tested system), gender in Switzerland and the UK and age in Switzerland. Important age effects in Switzerland (lower for age groups below 54) might reflect the more important use of disability benefits as an early retirement route in the country compared with the two others.

Table 8. **Probability of receiving a disability benefit (instrumented health measures)**

	Australia		Switzwerland		United Kingdom	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Health problems	0.858***	(0.141)	0.743***	(0.145)	0.554***	(0.060)
Lagged health problems	0.893***	(0.148)	0.312*	(0.174)	0.485***	(0.066)
Initial health status	-0.025	(0.114)	0.716***	(0.162)	0.003	(0.054)
Number of children in household (grouped)	-0.199**	(0.096)	-0.114	(0.129)	-0.096*	(0.050)
2nd income quintile	-0.043	(0.167)	0.383	(0.265)	0.271***	(0.102)
3rd income quintile	-0.426*	(0.219)	0.191	(0.279)	0.172	(0.114)
4th income quintile	-1.464***	(0.349)	0.230	(0.293)	0.104	(0.129)
5th income quintile	-1.283***	(0.359)	-0.758*	(0.416)	-0.193	(0.168)
Sex=female	-0.697***	(0.146)	-0.859***	(0.192)	-1.119***	(0.079)
15-24	-0.754**	(0.380)	-1.393**	(0.605)	-0.601***	(0.213)
25-34	-0.650**	(0.293)	-0.949**	(0.385)	-0.337**	(0.157)
25-44	-0.300	(0.216)	-0.854***	(0.279)	-0.158	(0.119)
45-54	-0.349**	(0.175)	-0.524**	(0.211)	-0.137	(0.092)
Foreign	-0.032	(0.153)	-0.116	(0.257)	0.708	(1.013)
Single	0.691***	(0.199)	0.768***	(0.246)	0.486***	(0.106)
Separated/Divorced	0.572***	(0.166)	0.609***	(0.230)	0.467***	(0.092)
Widow	-0.333	(0.517)	0.420	(0.483)	0.112	(0.196)
Low education	-0.222	(0.194)	0.261	(0.296)	0.443***	(0.103)
Medium education	0.017	(0.187)	0.088	(0.215)	0.109	(0.116)
Ever unemployed	0.156	(0.144)			0.054	(0.081)
Agr (initial)	0.635	(0.458)	1.386*	(0.799)	-0.484	(0.442)
Construction (initial)	-0.767	(0.775)	0.149	(0.647)	0.049	(0.325)
Business (initial)	0.068	(0.461)	0.092	(0.401)	-0.110	(0.357)
Sales (initial)	-0.153	(0.393)	-0.082	(0.363)	0.278	(0.232)
Social (initial)	-0.120	(0.408)	0.257	(0.369)	0.311	(0.302)
Hotel (initial)	0.050	(0.429)	-0.454	(0.754)	0.091	(0.324)
Blue collar (initial)	0.148	(0.324)	0.392	(0.364)	0.821***	(0.184)
Elementary occupations (initial)	0.217	(0.309)	-0.397	(0.540)	0.666***	(0.224)
Temporary contract (initial)	-0.167	(0.271)	-0.495	(0.630)	0.128	(0.238)
Mini-jobs (initial)	0.571	(0.350)	1.057***	(0.355)	-0.060	(0.328)
Part-time (initial)	0.588*	(0.311)	0.896***	(0.314)	0.167	(0.236)
Overtime (initial)	-0.661	(0.442)	-1.049*	(0.558)	-0.054	(0.271)
Shift work (initial)	-0.228	(0.258)	0.008	(0.491)	0.086	(0.156)
Public sector (initial)	-0.010	(0.323)	-0.752**	(0.355)	0.174	(0.212)
Firm size < 20 (initial)	0.042	(0.270)	0.208	(0.366)	-0.046	(0.202)
Firm size > 100 (initial)	0.297	(0.303)	0.170	(0.361)	0.135	(0.190)
Constant	-5.439***	(0.551)	-4.669***	(0.598)	-7.766***	(1.063)
Observations	30286		11902		82618	

a) Samples include persons present in at least three consecutive waves, not in full-time education, and aged 15-64.

b) The years considered for each country are given in Table 1 and the controls included in the regressions are the same as those in Table 1.

c) Health problems are constructed by instrumenting.

d) All regressions include regional dummy variables. "Initial" in brackets indicates the value of the variable in question at the time the individual enters the survey. Initial health status also refers to health status the first period the individual is observed in the survey.

e) See note e of Figure 1 for definitions.

Source: OECD estimates based on the HILDA for Australia, the SHP for Switzerland and the BHPS for the UK.

4. Conclusions

32. Rising trends in the numbers of persons relying on disability benefits have led to reforms addressing the incentive structure of the benefit system in many OECD countries. The success of these

policies depends greatly on whether they effectively address those factors that lead individuals out of the labour market or construct obstacles for them to return to employment after a health shock. For their success, a better understanding of the personal and work characteristics of the individuals on disability benefits is needed, as well as the pathways that lead them in and out of the labour market.

33. This paper looks at precisely this issue and attempts to fill a gap in the literature that has mostly addressed the factors leading to early retirement but not those pushing people into disability benefits. This analysis identifies the most vulnerable groups to health conditions that public policies may fail to reach out to. Using individual level panel data for three Australia, Switzerland and the UK, we estimate a series of different models, controlling for personal and work characteristics and unobserved heterogeneity. Our results confirm that own health is a very important determinant of transitions to disability benefits. Income and marital status play an important role in the probability of moving into a disability benefit while initial work characteristics seem less important.

34. The importance of health holds for both men and women and the effects remain important after instrumenting health shocks. At the same time, the impact of health on transition to disability declines once health is instrumented and other socio-demographic characteristics become more important determinants. This highlights the importance of an adequate health assessment for determining access to disability benefits.

35. Health has a different impact for different socio-demographic groups. In particular, young individuals are more likely to enter a disability benefit after experiencing an adverse health shock in Switzerland and the UK. Although men are more likely to receive disability benefits, health shocks (in Australia) and household characteristics increase the risk of disability benefits more for women than for men. Women and young individuals suffer from a stronger than average impact of health shocks in some countries only, providing only a partial explanation for the recent rise of beneficiaries among these groups.

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ANNEX A1. DATA SOURCES

The following longitudinal household surveys are used for the analysis in section 2. All longitudinal datasets cover a wide range of subjects including personality traits, occupational and family biographies, employment, participation and professional, mobility, earnings and health. We construct complete labour market histories of the individuals. The labor market histories contain yearly information based on employment status (employed or non-employed) and the type of benefit individuals are receiving.

Household, Income, Labour Dynamics in Australia (HILDA)

Household, Income, Labour Dynamics in Australia (HILDA) is an ongoing household-based panel survey funded by the Department of Families, Community Services and Indigenous Affairs. The survey started in 2001 and contains at the moment seven waves. The wave 1 of the panel consisted of 7682 households and 19,914 individuals.

Swiss Household Panel (SHP)

The Swiss Household Panel is an ongoing household panel designed to investigate trends in social dynamics among the Swiss population. The survey started in 1999 and is financed by the Swiss national science foundation, the Swiss federal statistical office and the University of Neuchatel. It was designed from the start to be compatible with various national and international surveys. A national representative sample of households was selected containing around 5,000 households in 1999. Data are collected annually at both the household and the individual level.

British Household Panel Survey (BHPS) -UK

The British Household Panel Survey[3] (BHPS) is a nationally representative household-based yearly survey which began in 1991, interviewing every adult member of sampled households. The wave 1 of the panel consists of some 5,500 households and 10,300 individuals. Additional samples of 1,500 households in both Scotland and Wales were added to the main sample in 1999, and in 2001 a sample of 2,000 households was added in Northern Ireland. These same individuals are re-interviewed each successive year and, if they split-off from original households to form new households, they are followed and all adult members of these households are also interviewed.

ANNEX A2. ESTIMATION METHODS

A discrete-time event history model is used to analyze possible transitions to disability benefits. Logit specifications are used to parameterize the probabilities of transitions across the different labour market states.

The probability of entering a disability recipient state is estimated using the complementary log-log model where the hazard rate is:

$$h(t, X) = 1 - \exp[-\exp(X_{it}^{'}\beta + H_{it}^{'}\gamma + D(t) + u_i)]$$

Or

$$\log(-\log[1 - h(t, X)]) = X_{it}^{'}\beta + H_{it}^{'}\gamma + D(t) + u_i$$

X refers to certain socio-demographic characteristics including:

- Standard individual characteristics: age, gender, marital status, education, Foreign nationality, or born abroad
- Household characteristics: number of children, net household income
- Work characteristics: controls for occupation (ISOC), controls for industry (ISIC), company size, Private/ public, contract duration, working hours (*i.e.* time of the day, shifts).

Health variables (*H*) defined as health limitation.

Individual heterogeneity *u* is controlled for and it is modelled according to a Normal distribution. Sensitivity analysis is performed by estimating the model using a Gamma distribution.

Sensitivity analysis is performed to test the robustness of the results to the inclusion of additional variables. Such variables include additional controls for: house ownership, spouse characteristics (age, education and labour force status), parental characteristics when the respondent was aged 16 and life events if available. In addition, separate regressions were estimated by gender and age.

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1 In Australia and Switzerland, there are no substantial age differences between men and women and across education groups, whereas in the UK low-skilled individuals and men are on average older.

2 For Australia, we perform an ordered probit regression of self-assessed health on whether the individual has the following limitations: in performing vigorous activities, moderate activities, lifting or carrying groceries, climbing stairs (1) one or 2) several), in bending, kneeling or stooping, in walking, in walking (1)100 meters, 2) half a km, 3) more than 1 km), in bathing or dressing. For Switzerland we perform an ordered probit regression of self-assessed health on whether the individual has had an illness or an accident or whether the individual suffers from health limitations. For the UK we perform an ordered probit regression of self-assessed health on whether the individual has the following health problems: arms, legs or hands, sight, hearing, skin conditions or allergies, chest/breathing, heart/blood pressure, stomach or digestion, diabetes, anxiety or depression, alcohol or drugs, epilepsy, migraine or other.

3 The BHPS was obtained through the UK data archive (www.data-archive.uk)

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