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The differential earnings and income effects of involuntary job loss on workers with disabilities

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by

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Abstract

People with disabilities, both in Sweden and elsewhere, are consistently found to face considerable difficulties on the labour market. In this study we have investigated the differential impact of involuntary job loss, on earnings and income, if being disabled. Our main findings are that earnings of those with and without disabilities began to diverge already several years prior to job loss because of a much larger incidence of longer periods of absence due to either sickness or rehabilitation. The seemingly permanent earnings differential following job loss seems to have been a consequence of much more of the job losers with disabilities not returning to employment but instead becoming disability retirees. Although the earnings differential experienced by the job seekers with disabilities was considerable during the post-job loss period, a majority of the difference was replaced by public social insurances.

Keywords: Disability, job loss, unemployment
JEL-codes: J14; J64; J68

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1   Introduction

In 2000, the Swedish Parliament adopted the Government Bill "From patient to citizen: a national action plan for disability policy" based on the United Nations Standard Rules for the Equalization of Opportunities of Persons with Disabilities. One of its stated goals is that disabled people should have the same opportunities to participate in working life as everyone else. Sweden has also a long tradition of labour market policies explicitly targeting job seekers with disabilities, ranging from in-work aids to subsidized employments, aiming at strengthening their position on the labour market.[1] Still, people with disabilities, in Sweden and elsewhere, are consistently found to face considerable difficulties in the labour market.[2] In Sweden, only half of those with an impairment that entails reduced work capacity participate in the labour force, and among them, the unemployment rate is more than twice the unemployment rate among others (Statistics Sweden, 2009).

In this study, we have investigated the differential effects of involuntary job loss on earnings and income if being disabled. Although there is a substantial body of empirical research, both in the United States and Europe, suggesting the existence of considerable private costs of job loss in terms of foregone earnings and income (e.g., Jacobson et al., 1993; Stevens, 1997; Eliason and Storrie, 2006; Couch and Placzek, 2010; Hijzen et al., 2010; Davis and von Wachter, 2011; Huttunen et al., 2011; Korkeamäki and Kyyrä, 2014), none of these studies examined whether there is a differential impact of job loss if being disabled. However, two studies have investigated the impact of the Great Recession on workers with disabilities in the US. Fogg et al. (2010) reported that during the recession persons with disabilities had a 43 percentage point lower labour force participation rate, a 41 percentage point lower employment rate, and a 6 percentage point higher unemployment rate, but provided no comparison to a time period preceding the recession. Kaye (2010) observed a proportional decline in employment among people with disabilities that was more than twice that of those without disabilities, and that the increase in the unemployment rate was almost 70 percent larger, and the job exit rate 80 percent higher

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[1]All these programs are regulated in Government Ordinance 2000:630 regarding special contributions for persons with impairments entailing a reduced work capacity.
[2]See Jones (2008) for a review of the empirical literature on the labour market consequences of disability.

among persons with disabilities compared to their counterparts without disabilities.

One probable reason there is a lack of studies on workers or job losers with disabilities is the difficulties in measuring and defining disability. Here, we have utilized the Public Employment Service's (PES') classification of occupational disability. Hence, we could identify the job losers that registered with the PES and who were classified as occupationally disabled and those who were not. We used exact covariate matching to construct a sample of job losers without disabilities that was identical to our sample of job losers with disabilities with respect to socio-demographic characteristics. To investigate the differential effects of job loss on earnings and income if being disabled we applied a fixed effect estimator to the matched sample. Our main finding is that there was a huge permanent gap in earnings, in favour of the job losers without disabilities, following job loss. Much of this earnings differential was replaced by various public transfers – mostly disability pension – leaving a much smaller income gap. However, and most importantly, the gap in earnings following job loss seem to have emerged already during the year preceding job loss due to extended periods of sickness absence, leaving us with the conclusion that the onset of disability, for considerable part of the job losers with disabilities, actually occurred during these years.

The rest of the paper is structured as follows. In the next section we start with brief descriptions of the concepts of disability, the economic environment in Sweden during the time period under study, and the Swedish social insurance system. The following section first presents how our sample is constructed (including our definitions of both disability and involuntary job loss). Then follows an investigation of how the job losers with and without disabilities differed in socio-demographic background characteristics, in their earnings trajectories before and after job loss, and in the extent they relied on social insurances during the same time period. The section closes with a description of our estimation strategy. In Section 4, we present our estimates of the differential impact of job loss, if being disabled, on earnings and income. That section also contains a heterogeneity analysis with respect to the type of disability and a discussion of the limitations of the study including an analysis of the sensitivity to altering our definition of disability. Finally, Section 5 discusses our findings and concludes.

2 Background

2.1 Defining disability

The conceptualization of disability has been an ongoing process during recent decades and there is still no universally accepted definition. In rough outlines the focus has shifted from medically-oriented to socially- or environmentally-oriented.[3] How to define disability is not only intrinsically difficult but from the researcher's point of view it is also constrained by data availability. Both survey data and administrative data have previously been used to identify populations of people with disabilities. In survey data, disability is often defined in terms of functional limitations or impairments as in the Swedish Living Conditions Survey, or as self-perceived disability as in the Swedish Labour Force Survey. In administrative data, disability is instead defined based on eligibility to certain welfare benefits such as disability insurance or assistance allowances. Each type of source and definition has its merits and pitfalls. Self-reported measures of disability, on the one hand, are not only subjective but also likely to depend on the very same economic conditions that we would like to examine. For example, someone currently unemployed may report that an impairment is work-limiting as a way of justifying being unemployed, i.e., "justification bias" (Bound, 1991). Likewise, someone currently employed may report that an impairment is not work-limiting just because s/he is working at the time when answering the question. Administrative definitions of disability, on the other hand, are based on examinations of peoples' eligibility for a certain support from the state. As different support systems have different eligibility criteria, such definitions will vary greatly. Moreover, most of them are likely to exclude a large fraction of those who would be deemed as having minor disabilities according to any other definition.

In the present study, we have utilized the PES' classification of occupational disability. Although this measure is not associated with the same biases as self-reported measures it cannot be viewed as an objective measure of disability. As all other administrative mea-

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[3]In 2001, Sweden and the other 190 WHO member states officially endorsed the International Classification of Functioning, Disability and Health (ICF) for use as the international standard to describe and measure health and disability. The framework of the ICF attempts to combine the medical and social focus into a "bio-psycho-social" model, where disability is understood as a dynamic interaction between impairments and personal and environmental factors.

sures of disability it defines eligibility and not disability. Therefore, there is an incentive structure that cannot be disregarded. The PES and the job seekers have different incentives to give and to accept a disability code, respectively (Johansson and Skedinger, 2009). On the one hand, from the PES' point of view, the goals set by the Government in the annual appropriation directions may affect the incentive structure. On the other hand, from the job seeker's point of view, the incentives may differ from person to person, since receiving a disability code implies that the job seeker may enjoy more "exclusive" measures, but may also be stigmatizing.

The terminology used by the PES has been "work handicap" (*arbetshandikapp*) or "occupational disability", which is defined as a reduced work capacity due to a physical, mental, cognitive, or socio-medical disability, which cause or is expected to cause difficulties to get or keep a regular employment (Government ordinance 1991:333). The use of the term "work handicap" was criticized, however, not only by the disability rights movement but also in state inquiries (e.g., SOU 2003:95). The main criticism was that the term led the thought to medicalization and diagnostization, focused on individual deficits instead of environmental conditions, and that emphasis was on the disability instead of the actual ability to work. The inquiry proposed that the term should be abolished and instead be replaced with two terms: "reduced work capacity" and "need of special support". This resulted in a government bill (2005/06:1) proposing that the term should be changed to "people with functional impairments that entail reduced work capacity", a change that took effect 1st January, 2006. Impairment should be understood as a reduction of physiological, psychological, or intellectual functioning as a result of a disease or disorder or a congenital or acquired injury. Such a condition can be either transitory or permanent. The concept "work capacity" is not legally regulated, but the PES' internal documents state that work capacity is determined by the interplay of a job seeker's individual characteristics, a specific work task, and the work environment.

The PES' occupational disability coding system does not only consists of a code for whether a job seeker is occupationally disabled or not, but contains 11 different occupational disability codes depending on the specific impairment. These codes are: (11) cardio, vascular, and/or lung disease; (20) hearing impairment and deafness; (30) visual

impairment; (40) motor handicap; (51) other somatically related disabilities; (61) mental disability; (71) learning disability; (81) socio-medical disability; (91) asthma, allergy, and hypersensitivity; (92) dyslexia and specific learning difficulties; and (93) acquired brain injury.[4,5]

2.2 The Swedish labour market during 1992–2010

The period 1992–2010 began with the deepest economic crisis since the Great Depression and ended with the financial crisis of 2008–2010, also referred to as the Great Recession. The developments of the labour force participation, employment, and unemployment rates during this period are depicted in *Figure 1*.

Figure 1: The labour force, employment, and unemployment rates in Sweden during 1992–2010. Seasonally adjusted quarterly data for the age group of 16-64 years

Source: Statistic Sweden, Labour Force Survey
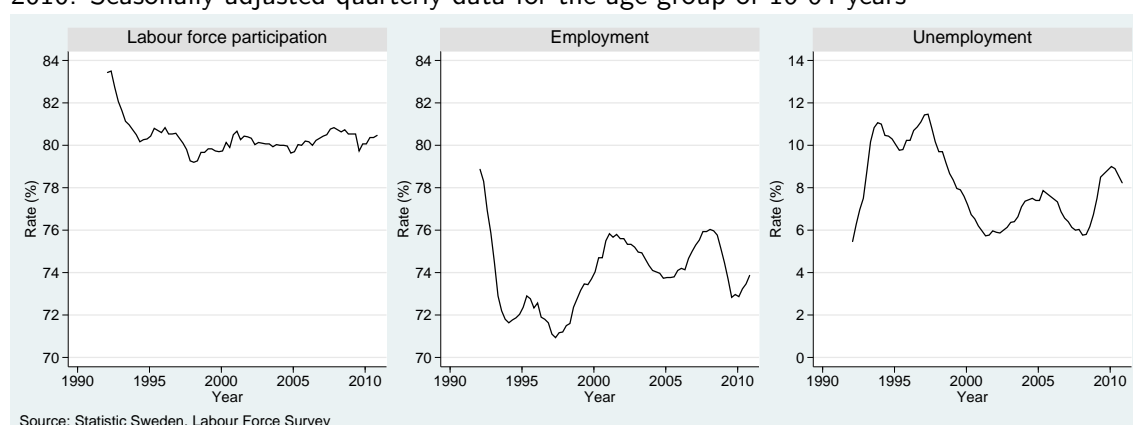
In the last quarter of 1993 the unemployment rate had increased to over 11 percent from a low of 1.9 percent in 1989. During the same period, the labour force participation fell

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[4] In July 2000, codes 20, 30, and 40 were replaced by two codes each (i.e., 21–22, 31–32, and 41–42) also categorizing the severity of the impairment. In all analysis the codes 21–22, 31–32, and 41–42 will be collapsed to correspond to the old codes 20, 30, and 40, respectively.

[5] As all, but one, of the disability codes above are self-explanatory no further descriptions will be provided here (a comprehensive description can be found in Angelov and Eliason, 2014). Socio-medical disability, however, is a code that lacks an international equivalent. The PES' internal documents state that the impairments contained in this code are caused by social difficulties that have led to long-lasting need of means-tested social benefits, or by complex relational problems, substance abuse, criminality, or difficult childhood and adolescence. To receive such a code, an investigation performed either by the PES' own social consultants or by another government agency (e.g., the Social services) that confirms the socio-medical impairment, and establishes how it affects the conditions for work, is necessary. For most other disability codes a medical report or a report from another specialist describing the extent of impairment and its effect on work capacity is required, while for those with congenital deafness (code 20) and learning disabilities (code 71), it is sufficient to receive documentation from a specialist school.

by four percentage points to 80.7 percent and the employment rate fell by 11 percentage points to 71.1 percent. While the labour force participation rate has been stable about 80–81 percent since then, employment and unemployment began to recover in 1997, and in 2002 the unemployment rate had almost halved and the employment rate had increased to 75 percent.

During the period 2000–2005, when the workers under study lost their jobs, the employment rate varied between 73.7 percent in the 4th quarter of 2004 to 75.8 percent in the 3rd quarter of 2001. The unemployment rate increased from 5.7 percent in the second quarter of 2001 to 7.9 percent in the 2nd quarter of 2005. A recovery period during 2006 and 2007 was then followed by the financial crisis in 2008. Then the unemployment rate once again started to increase and in the 1st quarter of 2010 it peaked at 9.0 percent while employment fell back to 72.8 percent. Hence, we can conclude that the labour market has seen some dramatic changes during the period that we have examined in this paper.

2.3 The Swedish social insurance system

In a modern welfare state such as the Swedish one, the social security system plays an important and often complex role after a job loss.[6,7] We, therefore, provide a short description of the parts of the Swedish social security system, most relevant for the study group. The social security system in Sweden aims at providing universal financial security and its structure is potentially of significant importance both for the real economic losses for workers experiencing job loss and for people with disabilities in general. The social security system offers four income sources of particular interest for those of working ages: unemployment insurance (UI),[8] sickness and rehabilitation insurance (SI), disability insurance (DI), and means-tested social assistance (SA).

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[6]In addition to the social security schemes discussed in this section, there are a number of supplementary schemes for unemployed workers (see Sjögren Lindquist and Wadensjö, 2006). For example, the trade union organizations provide both collective and individual unemployment insurance compensating for forgone income above the ceiling in the unemployment insurance scheme. A majority of all workers are covered by these collective agreements and similar insurance schemes also exist in the case of sickness and disability. None of the supplementary schemes will be explicitly included in the following analysis due to the difficulty to identify such payments in the data.

[7]See Bergmark and Palme (2003) for a more thorough description of the development and details of the Swedish social security system.

[8]Unemployment insurance is actually not a part of the social insurance system in Sweden but comes under labour market policy.

UI is, of course, the key public transfer for job losers. It will not only reduce income losses during periods of unemployment, but it may also reduce the longer term impact of job loss by allowing for extended job search resulting in better-quality matches. Payment of UI is conditional on registration with the PES and the recipient must be available for work and actively seek for a job. Entitlement is also associated with a "membership condition" and a "work condition".[9] [10] [11] During the time period covered here the UI system changed several times. Up to 2006, the benefit level varied between 80 and 90 percent of previous earnings up to a ceiling, but from 2007 the replacement rate was made dependent on the unemployment duration, starting at 80 percent and then stepwise decreasing to 65 percent.

Considering the massive literature showing an association between unemployment and ill-health,[12] SI and DI may also be important sources of income amongst the job losers and especially for those being disabled.[13] SI is payable in cases of temporary illness that reduces work capacity. However, the two first weeks of sick-leave is paid by the employer. Just like UI, it replaces a share of lost earnings up to a ceiling and for most of the period the replacement ratio was the same as for UI, whereas the ceiling consistently has been higher.

In case of a more permanently reduced work capacity, by at least 25 percent, a person could be eligible for DI.[14] DI is granted in quarters based on work capacity. The income ceiling for DI has been the same as for SI, but the replacement rate has been lower.

Finally, means-tested SA is the ultimate safety net for those otherwise unable to make a living. SA is means-tested on a household basis and is supposed to guarantee a "reasonable standard of living". To be entitled to SA, one should be unable to make a living on not only work, UI and other benefits, but also on assets. One might expect that job losers

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[9]The condition requires having been a member of an unemployment insurance fund for at least 12 months.

[10]According to the work condition a person needed to have worked at least 75 days distributed over a 4-month period – later this was changed to at least 6 months of at least 80 hours of work or, alternatively, 480 hours during a 6-month period and then no less than 50 hours each month – during the last 12 months prior to registration with the PES.

[11]Those who did not fulfil the membership condition could could be granted the flat (lower) rate unemployment assistance instead.

[12]For a review, see Catalano et al. (2011).

[13]See Rege et al. (2009) and Bratsberg et al. (2013) on the effects of job loss on disability retirement.

[14]Until 1997 persons aged at least 60 years could also be granted disability insurance for a combination of health and labour market reasons. Thereafter, only medical reasons for the reduced working capacity should be considered.

with disabilities also to a larger extent rely on means-tested SA, as it can be viewed as an indicator of officially recognized economic hardship (Stenberg, 1998) and a growing literature has established that disability and poverty are closely linked (Palmer, 2011). Not only can poverty cause disability, but for several reasons people with disabilities are more likely to become poor (Elwan, 1999). Glendinning and Baldwin (1988) explain the latter mainly by lower earnings capacity, expenses attributable to the disability, and that their need for assistance and caring may reduce the labour supply of other household members.

3 Data and method

3.1 The data sources

Three different data sources were merged to create the data set. First, to identify those who suffered a job loss, each worker's main employer in the month of November each year was identified from the register-based labour market statistics (RAMS). Second, the PES' administrative register on job seekers (i.e., Händel) was used mainly to obtain a measure of disability. Finally, the various outcome measures and background characteristics were drawn from Statistics Sweden's longitudinal databases (i.e., LOUISE and LISA).

3.2 The measure of disability

The disability measure that we used is the PES' classification of occupational disability. As described in Section 2.1, this measure serves as a eligibility criteria for additional support to those who have a reduced work capacity due to a physical, mental, cognitive, or socio-medical disability, and therefore have or are expected to get difficulties to get or keep a regular employment. The initiative for coding a job seeker as occupationally disabled is taken by the responsible caseworker. In some cases the disability is obvious (e.g., if the job seeker uses a wheelchair), in other cases the impairment might be much more subtle and perhaps not even recognized by the job seeker him-/herself (e.g., some specific learning disabilities and mental disabilities). In such cases it might take some time before the caseworker suspects that the job seeker has a disability and that an investigation by the PES' own social consultants is necessary to confirm the impairment and establish

how it affects the conditions for work.[15] In the latter case it is, obviously, necessary that the job seeker remains unemployed sufficiently long for the disability to be coded.

Figure 2: The cumulative distribution function of time from registration with the PES until receiving a disability code conditional on being classified as occupationally disabled at any time during the registration period
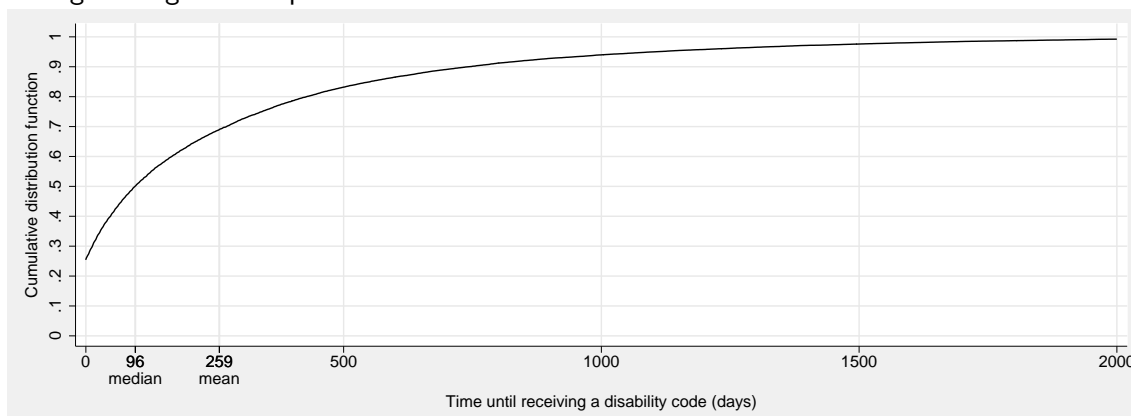
In *Figure 2*, the cumulative distribution function of time until receiving a disability code (conditional on being classified as occupationally disabled at any time during the registration period) is plotted. A quarter of those being classified as occupationally disabled at any time during their registration spell actually received the disability code at the time of registration. Another quarter had received the code within 96 days. For a considerable fraction, however, it took rather long before they eventually were classified as occupationally disabled and the mean elapsed time was as long as 259 days.

In the main analysis we defined disability as being classified as occupationally disabled at any time during the registration period following job loss. However, in Section 4.4 we discuss the implications of this choice and also present the results from a sensitivity analysis.

3.3 The measure of involuntary job loss

Our measure of involuntary job loss was constructed in two steps. First, we identified all job separations. A job separation was defined to have occurred if an employee in Novem-

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[15]In most cases a medical report or a report from another specialist (e.g., a psychologist or speech therapist) describing the extent of impairment and its effect on work capacity is required and the job seeker also has to approve the coding. Although the job seeker has the right to refuse being coded as occupationally disabled, this seems to rarely happen (Garsten and Jacobsson, 2014).

ber year $t-1$ either had no employer at all or a new main employer in November year t.[16] This definition, obviously, includes also voluntary transitions where the employee left the old job for a new one. Then, to rule out these voluntary transitions we also required that the job loser had registered as a job seeker with the PES during the same period. This restriction was also necessary to obtain a measure of disability.

3.4   The sample

Our sample initially comprised all who lost a job (according to the definition in Section 3.3) during November 1999 to October 2005.[17] Two sample restrictions were imposed: (1) to ensure that all were of working ages during the whole observation period (i.e., from seven years prior to five years following job loss) the sample was restricted to those of ages 25–59 years in the year of job loss; and (2) to ensure that the lost job was a regular un-subsidized job it was also required that the job loser had not been registered with the PES during the previous year (i.e., November–October).[18]

Table 1: The number of job losers with and without disabilities (and by type of disability) by year of job loss

Disability coding	Year of job loss											
	2000		2001		2002		2003		2004		2005	
	N	%	N	%	N	%	N	%	N	%	N	%
Non-disabled	59,221	94.9	62,007	94.7	80,112	95.0	81,604	94.6	81,528	93.7	74,369	93.0
Disabled	3,172	5.1	3,452	5.3	4,214	5.0	4,696	5.4	5,523	6.3	5,606	7.0
Code 11	105	3.3	137	4.0	144	3.4	155	3.3	160	2.9	177	3.2
Code 20	127	4.0	161	4.7	200	4.7	170	3.6	219	4.0	177	3.2
Code 30	45	1.4	73	2.1	65	1.5	75	1.6	66	1.2	82	1.5
Code 40	1,677	52.9	1,736	50.3	2,133	50.6	2,360	50.3	2,927	53.0	2,878	51.3
Code 51	545	17.2	487	14.1	589	14.0	636	13.5	651	11.8	626	11.2
Code 61	270	8.5	330	9.6	451	10.7	690	14.7	797	14.4	977	17.4
Code 71	87	2.7	88	2.5	123	2.9	80	1.7	96	1.7	113	2.0
Code 81	187	5.9	201	5.8	216	5.1	208	4.4	250	4.5	240	4.3
Code 91	70	2.2	136	3.9	156	3.7	159	3.4	153	2.8	157	2.8
Code 92	50	1.6	90	2.6	122	2.9	131	2.8	167	3.0	138	2.5
Code 93	9	0.3	13	0.4	15	0.4	32	0.7	37	0.7	41	0.7

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[16]Main employer is defined as the employer of November from which the worker received the largest annual earnings.

[17]Those who lost a job in November or December in one year were assigned the following year as the year of job loss.

[18]Having a subsidized employment implies also being registered with the PES.

From *Table 1* we can see that each year 62–87 thousand workers, meeting the sample restrictions, involuntary lost their jobs. About 5–7 percent of them were classified as occupationally disabled. Hence, the total sample contained 27 thousand job losers with disabilities and 439 thousand job losers without disabilities. The outstandingly most common reason for receiving a disability code was that the job seeker had a motor handicap (code 40). About 51 percent of those that were classified as disabled had such a code. Other somatically related disabilities (code 51) and mental disability (code 61) were the second and third most common disability codes and accounted for 13.3 and 13.2 percent, respectively.

3.5 Background characteristics

From the registers we have drawn background information on a number of socio-demographic variables: age (seven 5-year categories), sex, marital status (i.e., never-married, married, divorced, widow/-er), children of ages 0–6 and 7–17 years, attained education (unknown education, compulsory schooling, upper secondary schooling, and tertiary education), and type of residential municipality (10 categories).[19] Descriptive statistics by disability classification are presented in *Table 2*.

It is evident that the job losers with disabilities on average were older. Only 7 percent of those with disabilities were in ages 24–29 years, compared to 23 percent among those without disabilities. Instead, more than twice as large share of those with disabilities were in ages 50–59 years (i.e., 35.1 percent compared to 17.0 percent). The differences in age were also reflected in marital status: half of the job losers without disabilities were never married, compared to 38 percent of those with disabilities, and the share of job losers with disabilities who were divorced was 7 percentage points larger than among those without disabilities (i.e., 19 and 12 percent, respectively. Regarding the level of attained education it is notable that the share with a tertiary education among the job losers with disabilities was less than half of that among those without disabilities (i.e., 13 percent compared to 33 percent), while the share with no more than compulsory schooling was twice as large (i.e., 28 percent compared to 14 percent). The most notable difference with

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[19]The types of municipalities were based on The Swedish Association of Local Authorities and Regions' (SALAR) classification of Swedish municipalities.

respect to the type of residential municipality was that while 21 percent of the job losers without disabilities resided in metropolitan municipalities only 13 percent of those with disabilities did so.

Table 2: Descriptive statistics for job losers with and without disabilities

Background characteristics	Non-disabled	Disabled
Sex		
Male	52.8%	52.3%
Female	47.2%	47.7%
Age		
25–29 years	22.6%	7.2%
30–34 years	19.7%	11.1%
35–39 years	17.1%	14.6%
40–44 years	13.2%	15.9%
45–49 years	10.4%	16.0%
50–54 years	8.9%	17.4%
55–59 years	8.1%	17.7%
Nativity		
Native born	85.2%	82.5%
Foreign born	14.8%	17.5%
Marital status		
Never-married	49.7%	38.4%
Married	37.7%	41.3%
Divorced	12.1%	19.1%
Widow/-er	0.6%	1.2%
Children		
Children aged 0–6 years	23.6%	13.3%
Children aged 7–17 years	28.3%	30.9%
Education		
Unknown education	0.2%	0.1%
Compulsory schooling	14.1%	27.9%
Upper secondary schooling	52.9%	59.3%
Tertiary education	32.8%	12.7%
Type of residential municipality		
Metropolitan municipalities	21.3%	13.3%
Suburban municipalities	16.3%	12.8%
Large cities	26.6%	25.6%
Commuter municipalities	6.1%	7.5%
Sparsely populated municipalities	3.2%	5.5%
Manufacturing municipalities	5.3%	7.5%
Other municipalities, >25,000 inhabitants	12.4%	15.4%
Other municipalities, 12,500–25,000 inhabitants	6.3%	8.7%
Other municipalities, <12,500 inhabitants	2.6%	3.7%

3.6 The income measures – descriptive results

The income measure includes both earnings and public transfers, i.e., unemployment insurance (UI), sickness insurance (SI), disability insurance (DI), and means-tested social

assistance (SA); all deflated to 2010 values by the consumer price index. The unadjusted trajectories of these components of the income measure, and the annual shares receiving a positive amount of each respective component, from seven years before to five years after job loss, are depicted in *Figure 3* for both job losers with and without disabilities.

Earnings – In the first year of our observation period, i.e., seven years prior to job loss, there were only minor differences between those with and without disabilities with respect to both the share having non non-zero earnings and the actual amount of earnings. While the gap in the shares having non-zero earnings was closing even more up to the year preceding job loss, mean annual earnings exhibited a different pattern. The gap in earnings increased in each pre-job loss year. At first because of a lower earnings growth among those with disabilities, but two years prior to job loss their earnings actually began to decline. Hence, already in the year preceding job loss, an earnings gap of more than SEK 80,000 (EUR 9,000) had emerged.

In the year of job loss there was a small drop in the shares having non-zero earnings corresponding to 8.2 and 2.7 percentage points among those with and without disabilities, respectively, while there was a larger drop, in the following year, of 24.5 and 11.2 percentage points. During the same two years mean earnings dropped by SEK 78,800 (EUR 8,600) and SEK 71,600 (EUR 7,800) among the two groups of job losers and widened the gap to SEK 90,600 (EUR 9,900).

In the rest of the observation period, there was only a weak recovery of the shares with non-zero earnings, leaving a gap of 15.8 percentage points in favour of the job losers without disabilities. The amount of earnings recovered among both those with and without disabilities, but the gap between the two groups remained substantial and even increased slightly to SEK 99,300 (EUR 10,800).

Unemployment insurance – Both the shares of UI receivers and the received amounts were diminishing almost to zero during the pre-job loss period, and there were only minor differences between those with and without disabilities. As expected, there was a sharp increase in the year of job loss. The shares of job losers with and without disabilities receiving any UI reached 66.4 and 61.7 percent, respectively, and the corresponding amounts were SEK 41,200 (EUR 4,500) and SEK 35,800 (EUR 3,900).

Figure 3: The fractions receiving positive amounts of earnings, UI, SI, DI, and means-tested SA (left column), respectively, and the average received amount of earnings, UI, SI, DI and means-tested SA, respectively, in thousand SEK (right column), for the job losers with and without disabilities from 7 years before to 5 years after job loss
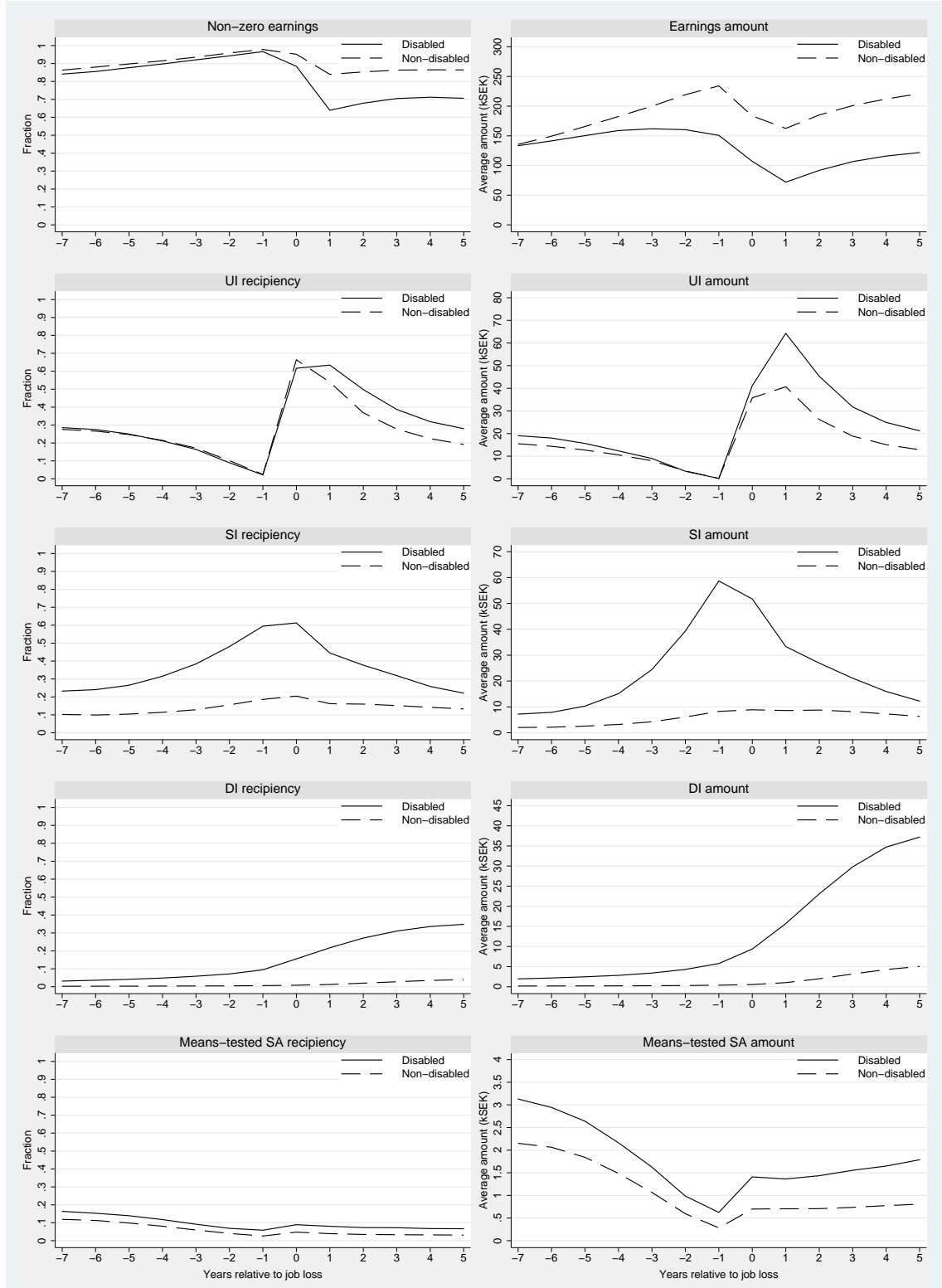
In the following year, the gaps between the two groups increased to 9.5 percentage points and SEK 23,600 (EUR 2,600).

During the rest of the observation period the take-up of UI diminished in each year, but the gaps remained: Five years following job loss 8.8 percentage points more of the job losers with disabilities relied on UI and received on average SEK 8,400 (EUR 900) more. As the incidence of UI recipiency during these years differed less this suggest that more among those with, than among those without, disabilities also had longer spells of unemployment.

Sickness and rehabilitation insurance – As described in Section 2.3, the employer pays for the two first weeks of sick-leave, and these payments cannot be distinguished from earnings in the administrative registers. Hence, what is measured here is incidence of longer periods of sickness or rehabilitation. Regarding take-up of SI the two groups of job losers differed markedly during the whole study period. Seven years prior to job loss, the share of job losers without disabilities who received SI was 10.2 percent and the average amount was SEK 7,200, while the share was more than twice as large among those with disabilities and the received amount more than three times as large. Although the share increased among the job losers without disabilities to a high of 20.5 percent in the year of job loss, the corresponding share among those with disabilities was three times as large. The differences in received amounts were even larger: in the year preceding job loss those with disabilities received on average SEK 58,700 (EUR 6,400) compared to SEK 8,300 (EUR 900) among those without disabilities. During the post-job loss period, however, the shares had almost returned to their initial levels: Five years after job loss the shares receiving SI were 22.1 and 13.3 percent among job losers with and without disabilities, respectively. The received amounts were about twice as large as the initial amounts.

Hence, it seems that much of the diverging earnings between job losers with and without disabilities during the period preceding job loss can be explained by the former group to a larger extent being off work because of sickness or rehabilitation. However, it does not seem to explain the remaining gap in earnings during the period following job loss.

Disability insurance – As with SI one would expect a larger share of job seekers with disabilities receiving DI. As described in Section 2.3, DI can be granted in quarters. Hence, the shares of job seekers receiving any DI depicted in *Figure 3* cannot necessarily be interpreted as the share who have left the labour market altogether due to permanently reduced work capacity.

For the job losers without disabilities the shares (and the average received amounts) were practically zero during the whole pre-job loss period. However, with the event of job loss the share began to slowly increase and in the end of the observation period the share of job losers without disabilities receiving any DI was 4.0 percent and the average received amount SEK 5,100 (EUR 550). Among the job losers with disabilities 3.2 percent received DI seven years prior to job loss, and the corresponding amount was SEK 2,000 (EUR 210). In the year preceding job loss the share had increased to 9.5 percent and the average received amount to SEK 5,800 (EUR 630). During the post-job loss period there was a dramatic increase in both the share receiving any DI and the received amount. Five years following job loss the share of DI receivers had increased by 25.3 percentage points to 34.8 percent and there had been a sixfold increase in the received amount.

Hence, while more job losers with disabilities being on long-term sickness absence or in rehabilitation seems to have been the explanation for the emerging pre-job loss gap in earnings between the job losers with and without disabilities, the remaining gap following job loss instead seems to be explained by a much larger share of job losers with disabilities being viewed as having permanently reduced work capacity and therefore granted DI.

Means-tested social assistance – Seven years prior to job loss 16.4 and 11.9 percent of the job losers with and without disabilities, respectively, received SA (the average received amounts were SEK 3,100 (EUR 340) and SEK 2,200 (EUR 240)). As more and more of them became employed, fewer had to rely on such assistance and in the year preceding the job loss the shares were down at 5.9 and 2.6 percent and the average received amounts at SEK 630 (EUR 68) and SEK 280 (EUR 31). The job losses temporarily put halt to this downward trend and the share increased by 2-3 percentage points and the received amount doubled for both groups. During the years following job loss the shares once again diminished, while the average received amounts increased slightly. Hence, the

initial difference between the two groups of job seekers remained, more or less, constant throughout the full observation period.

3.7 Estimation strategy

The aim of this paper is to measure the differential economic impact of job loss if being disabled, compared to if not being disabled. A common strategy, both in the literature on the effects of job displacement (e.g., Jacobson et al., 1993; Stevens, 1997; Couch and Placzek, 2010) and of the onset of disability (e.g., Charles, 2003; Mok et al., 2008), is to estimate a fixed effects model including both lagged and leaded indicators of incidence of displacement or disability onset. This method allows the effect of displacement/disability both to set in prior to the actual event and to be long lasting. However, we have to assume that the average outcomes for the study and control group would have followed parallel paths in absence of displacement/disability. This assumption of parallel trends may not be plausible if there are background characteristics associated with the dynamics of the outcomes that differ between those who do and do not experience the event of interest. However, as suggested in von Wachter (2009), in the case of displacement, conditioning on a richer set of characteristics within, for example, a matching framework may increases the plausibility of the assumption of parallel dynamics in the outcome(s) in the absence of displacement.

Here, we have applied the fixed effect estimator to a matched sample. We performed one-to-one exact covariate matching with replacement. The matching covariates were year of job loss and all the background variables presented in Section 3.5.[20] The job losers were followed during the years $s - 7$ to $s + 5$, where s is the year of job loss, and using the matched sample a fixed effect model was estimated: $y_{i,t} = \alpha_i + x_{it}\beta + \sum_{k=-6}^{5} \gamma_t I(t = s + k) + \sum_{k=-5}^{5} \delta^{s+k} D_i S_{i,t}^{s+k} + \varepsilon_{i,t}$, where $y_{i,t}$ is the particular outcome of interest for job loser i in year t and $X_{i,t}$ is a vector of observed time-variant characteristics (i.e., a quartic in age). D_i is a time-invariant indicator of disability and the $S_{i,t}^{s+k}$'s are a set of indicators for the number of years relative to job loss in year s, allowing us to estimate, for each year

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[20]In applied work propensity score matching is often preferred over exact covariate matching because of the high dimensionality problem causing too few matches to be found. However, since all our variables are discrete (age is obviously a continuous variable, but is here divided into five-year categories) this does not cause a major problem and we found matches to 97.1 percent of the job losers with disabilities.

k following job loss, the differential effect δ^{s+k} of job loss if being disabled. $I(\cdot)$ is an indicator function of time relative to job loss, the parameter α_i is an individual-specific fixed effect, and $\varepsilon_{i,t}$ is the error term.[21]

4 Results

In Section 3.6, we saw that seven years prior to job loss there were no (unadjusted) differences in earnings between the job losers with and those without disabilities. The earnings then began to diverge, not coinciding with job loss, however, but already several years earlier. The job loss instead put halt to the diverging earnings between those with and those without disabilities and the gap then remained approximately constant during the post-job loss period. Moreover, the diverging earnings during the pre-job loss period seem to have been a consequence of more and more job losers with disabilities being off work because of sickness or rehabilitation, while the transfer of many of them to DI during the post-job loss period seem to explain the remaining gap in earnings during that period.

In this section, we first present the results from a more formal examination of how the earnings differential, but also the income differential (i.e., earnings and each of the insurances discussed in Section 3.6), evolved around the time of job loss. This is followed by an analysis of how these differential effects varied by type of disability. The next section provides an analysis of the sensitivity to our definition of disability. A discussion of the limitations of the empirical analysis concludes.

4.1 The differential impact of job loss on earnings and income

This section present the estimates of the temporal differential effect of job loss on earnings and income if being disabled from applying the fixed effects model to the matched sample. The only variable included in $X_{i,t}$ was a quartic in age. The estimates of the δ^{s+k}'s, with 95 percent confidence intervals, for k from -5 to 5 in the earnings (income) equation are plotted in the left (right) part of *Figure 4* (in years -7 and -6 the differentials are by assumption equal to zero and therefore plotted without confidence intervals).

Figure 4 ascertains what was previously found in Section 3.6. Job loss was asso-

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[21]Including also an individual-specific time trend did not substantially alter any estimates.

ciated with declining earnings among the job losers with disabilities, relative to those without, already four years prior to the actual job loss. In the year preceding job loss the earnings gap had increased to SEK 56,400 (EUR 6,100). There was a slight recovery of SEK 11,500 (EUR 1,250) in the year of job loss. During the rest of the observation period the earnings differential only varied between SEK 46,000 (EUR 4,980) and SEK 49,300 (EUR 5,340).

Figure 4: The estimated mean differential earnings and income effects of job loss if being disabled from 7 years before to 5 years after job loss. The effects in year −6 and −7 are zero by assumption and the dashed lines represent 95 percent confidence intervals
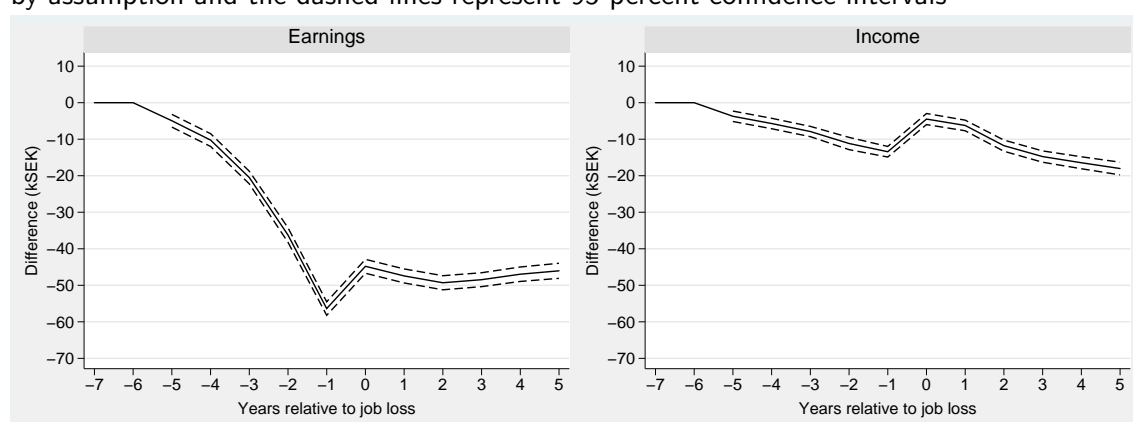
Given the much higher take-up of SI among job losers with disabilities during the pre-job loss period and of DI during the post-job loss period we would expect a considerably smaller income, than earnings, differential. This is also evident from *Figure 4*. Although the income differential increased linearly over time during the pre-job loss period, the gap in the year preceding job loss was less than one fourth of the earnings differential (i.e., SEK 13,400 (EUR 1,450)). In the year of job loss the gap was closing even more: SEK 4,500 (EUR 490) compared to a gap of SEK 44,800 (EUR 4,850) in earnings. The job losses seem to have permanently shifted the income differential upward by about SEK 13,000 (EUR 1,410), since thereafter the income differential again increased linearly by about the same annual amount. Five years after job loss the income differential had increased to SEK 18,000 (EUR 1,950) in favour of those without disabilities.

Hence, if we compare the income and earnings differentials, social insurances seem to have replaced between 61 and 90 percent of the differences in earnings, between those with and those without disabilities, that arose in association with the job loss.

4.2 Heterogeneity by type of disability

Hitherto, we have treated occupational disability as dichotomous and homogeneous. However, disability – even the PES' definition of occupational disability – contains diverse impairments and a continuous scale of functional limitation. Although we do not have data on severity of impairment or the degree of reduced work capacity, we do have information on the type of disability. Each category obviously contains a broad spectrum of severity of impairment and associated work capacity. However, the categories, per se, actually contain some limited information of the chronicity and onset of disability. For example, learning disability and (congenital) deafness are both congenital and chronic, while mental disabilities have a probable onset later in life and are not necessarily chronic.

In this section, we present the results from repeating the earnings and income estimations, but separately for each type of disability. The estimated δ_{s+k}'s from the earnings and income estimations are presented in *Table 3* and *Table 4*, respectively. The estimates in *Table 3* reveal that the earnings differential around the time of job loss varied substantially with type of disability. During the pre-job loss period all disabilities, except for dyslexia or specific learning difficulties (code 92), exhibited an increasing earnings differential over time. In the year preceding job loss there was a difference of SEK 97,100 (EUR 10,510) between the two extremes: the estimated earnings differential in this year was SEK 106,400 (EUR 11,520) for those with an acquired brain injury (code 93) and only SEK 9,300 (EUR 1,010) for those with dyslexia or specific learning difficulties (code 92). Two other disability groups also exhibited particularly large and increasing earnings differentials: For those with mental disability (code 61) and motor handicap (code 40) the estimated earnings differentials in the year preceding job loss were SEK 74,000 (EUR 8,010) and SEK 65,500 (EUR 7,090) respectively. What is common for these disabilities exhibiting particularly large earnings differentials in the pre-job loss period is that none of them are (necessarily) congenital but rather likely to have an onset later in life. Hence, the estimates can probably not be interpreted as the impact of job loss if being disabled compared to not being disabled, but instead as a combined effect of the differential effect of job loss and the effect of disability onset.

Table 3: The estimated differential effect (with standard errors within parentheses) of job loss on earnings, by type of disability

					Disability code[a]						
Year	11	20	30	40	51	61	71	81	91	92	93
-5	-8.6 (5.1)	-7.5 (4.5)	-7.9 (7.5)	-5.7 (1.2)	-5.6 (2.4)	-3.0 (2.6)	-5.7 (5.3)	0.1 (4.2)	1.6 (5.0)	-1.7 (5.4)	-5.8 (13.0)
-4	-16.6 (4.9)	-9.2 (5.0)	-8.8 (7.9)	-11.2 (1.2)	-8.9 (2.5)	-9.6 (2.6)	-15.0 (5.7)	-6.5 (4.2)	-1.5 (4.9)	-2.0 (5.4)	-32.3 (12.8)
-3	-23.4 (5.0)	-19.2 (5.0)	-9.0 (8.2)	-23.1 (1.2)	-16.9 (2.4)	-25.3 (2.6)	-16.5 (5.1)	-8.8 (4.2)	-5.6 (4.8)	-3.3 (5.4)	-36.4 (13.6)
-2	-33.1 (5.1)	-24.5 (4.5)	-25.3 (8.3)	-41.8 (1.5)	-31.8 (2.4)	-46.6 (2.6)	-19.3 (5.1)	-9.8 (4.1)	-10.8 (4.8)	-6.5 (5.1)	-78.2 (15.3)
-1	-44.1 (5.5)	-31.4 (4.8)	-44.5 (9.6)	-65.5 (1.3)	-48.3 (2.5)	-74.0 (2.7)	-20.2 (5.1)	-20.1 (4.2)	-26.5 (5.1)	-9.3 (5.4)	-106.4 (15.2)
0	-37.2 (5.6)	-23.7 (5.1)	-12.2 (9.2)	-51.4 (1.3)	-41.2 (2.6)	-59.3 (2.8)	13.3 (6.1)	-25.8 (4.6)	-32.1 (5.2)	-12.4 (5.7)	-63.8 (15.4)
1	-39.1 (5.6)	-36.1 (5.3)	-35.4 (9.7)	-48.8 (1.3)	-46.4 (2.6)	-65.9 (2.8)	-12.8 (6.2)	-22.9 (4.8)	-39.8 (5.5)	-44.2 (5.9)	-64.5 (14.6)
2	-44.3 (5.5)	-41.6 (5.1)	-34.5 (9.1)	-50.3 (1.4)	-46.9 (2.6)	-68.3 (2.8)	-21.5 (6.1)	-24.7 (4.7)	-38.0 (5.3)	-47.2 (6.0)	-75.2 (14.1)
3	-41.1 (5.6)	-39.4 (5.1)	-33.3 (9.0)	-48.7 (1.3)	-50.0 (2.6)	-68.4 (2.8)	-21.3 (6.1)	-25.4 (4.7)	-33.4 (5.4)	-42.3 (5.9)	-74.6 (14.7)
4	-37.7 (5.7)	-43.1 (5.2)	-26.5 (9.6)	-47.1 (1.4)	-50.7 (2.7)	-66.2 (2.9)	-27.3 (6.1)	-22.4 (4.9)	-29.5 (6.1)	-30.1 (6.2)	-82.5 (14.7)
5	-37.2 (6.0)	-40.0 (5.4)	-36.6 (9.9)	-45.1 (1.4)	-51.2 (2.8)	-64.7 (3.0)	-29.1 (6.5)	-25.1 (5.2)	-29.7 (5.9)	-33.0 (6.6)	-73.7 (14.4)

Table 4: The estimated differential effect (with standard errors within parentheses) of job loss on income, by type of disability

					Disability code[a]						
Year	11	20	30	40	51	61	71	81	91	92	93
-5	-3.5 (4.0)	-5.0 (3.7)	-7.4 (6.3)	-4.3 (1.0)	-5.3 (2.0)	-1.0 (2.1)	-3.2 (4.2)	-1.4 (3.6)	0.0 (4.2)	-0.5 (4.5)	-2.6 (10.7)
-4	-8.7 (3.9)	-6.1 (4.3)	-7.3 (6.7)	-6.1 (1.0)	-6.2 (2.0)	-0.8 (2.1)	-9.3 (4.8)	-7.6 (3.7)	-3.0 (4.1)	-5.9 (4.5)	-20.0 (10.1)
-3	-13.6 (4.0)	-11.4 (4.3)	-8.4 (7.1)	-7.6 (1.0)	-6.7 (1.9)	-5.2 (2.1)	-10.9 (4.1)	-8.5 (3.6)	-7.9 (4.0)	-8.7 (4.5)	-20.8 (11.3)
-2	-16.0 (4.1)	-13.0 (3.8)	-14.8 (7.1)	-11.1 (1.3)	-9.5 (1.9)	-9.7 (2.1)	-13.8 (4.1)	-10.1 (3.5)	-7.9 (3.9)	-10.0 (4.3)	-37.1 (13.1)
-1	-12.3 (4.5)	-16.4 (4.1)	-17.7 (8.4)	-13.0 (1.0)	-11.6 (2.0)	-13.0 (2.1)	-17.8 (4.2)	-17.1 (3.6)	-10.8 (4.2)	-10.1 (4.6)	-40.0 (11.7)
0	-0.5 (4.3)	-2.9 (4.1)	10.7 (7.8)	-5.0 (1.0)	-3.6 (2.1)	-1.7 (2.3)	8.3 (4.8)	-25.0 (3.9)	-2.6 (4.0)	1.1 (4.5)	-12.5 (12.8)
1	5.2 (4.1)	-2.7 (4.1)	-4.2 (7.9)	-6.2 (1.0)	-6.9 (1.9)	-8.8 (2.1)	0.5 (4.3)	-10.5 (3.8)	-6.1 (4.1)	-4.2 (4.4)	-11.6 (11.3)
2	-0.1 (4.1)	-8.9 (4.1)	-1.8 (7.7)	-11.5 (1.1)	-10.7 (2.0)	-17.2 (2.2)	-1.7 (4.7)	-13.1 (3.9)	-16.5 (4.2)	-13.7 (4.7)	-24.4 (11.3)
3	2.5 (4.4)	-10.9 (4.2)	-4.5 (7.8)	-13.7 (1.1)	-16.1 (2.1)	-23.8 (2.3)	-0.9 (4.9)	-15.8 (4.1)	-13.2 (4.5)	-21.5 (4.8)	-26.4 (12.2)
4	4.5 (4.5)	-14.3 (4.4)	-5.4 (8.3)	-15.3 (1.1)	-18.9 (2.2)	-27.0 (2.4)	-3.0 (5.0)	-17.6 (4.3)	-12.8 (5.3)	-14.3 (5.2)	-30.1 (11.9)
5	3.5 (4.9)	-14.0 (4.7)	-13.6 (8.6)	-15.6 (1.2)	-22.0 (2.3)	-29.4 (2.6)	-5.9 (5.3)	-22.3 (4.6)	-15.5 (5.1)	-25.3 (5.7)	-18.2 (11.8)

[a] See Section 2.1 for a description of the disability codes

The job loss not only seems to have put a halt on the widening earnings gap, but also temporarily closing the gap. For most disability groups the gap in the year following job loss seems to be permanent. The largest post-job loss earnings differentials are found for those with acquired brain injury (code 93) and with mental disabilities (code 61); five years after job loss there were large remaining earnings differentials corresponding to SEK 73,700 (EUR 7,980) and SEK 64,700 (EUR 7,010), respectively.

If we instead turn to the income estimates, most disability groups roughly exhibited the same pre-job loss patterns as shown in *Figure 3* for the composite disability group. During the pre-job loss period only those with an acquired brain injury (code 93) diverged and showed a markedly worsen income pattern.

In the year of job loss, the income differential diminished considerably for all categories but socio-medical disability (code 81). For those with such disabilities the income differential instead dropped even further to on average SEK 25,000 (EUR 2,710), while for most other disability groups it was not significantly different from zero.

During the post-job loss period the income differential increased again for most disability groups relative to the non-disabled. However, those with cardio, vascular, and/or lung diseases (code 11) or learning disability (code 71) showed a distinctly different pattern from the other disability groups as the income gap was not significantly different from zero. Those with acquired brain injury (code 93)or mental disabilities (code 61), on the other hand, not only exhibited the largest post-job loss earnings differentials, but also the largest income differentials

4.3   Sensitivity to the definition of disability

As could be seen in Section 3.2 there was a considerable variation in the elapsed time from registration with the PES to actually being classified as occupationally disabled. In cases when disability is not coded at the time of registration but later on it is, of course, necessary that the job seeker remains unemployed at least equally long. At the time of registration with the PES the job losers could be divided into four categories: (1) those without disabilities at the time of registration with the PES who never would have been coded as occupationally disabled regardless of how long they had remained unemployed;

(2) those without disabilities at the time of registration with the PES who would have been coded as occupationally disabled had they remained unemployed sufficiently long; (3) those with disabilities at the time of registration with the PES who would always have been coded as occupationally disabled; and (4) those with disabilities at the time of registration with the PES who would have been coded as occupationally disabled had they remained unemployed sufficiently long.

We would have liked to compare those in categories 3 and 4 to those in categories 1 and 2. However, the only category that can be identified with certainty is category 3. In the main analysis we compared those who received a disability code at any time during their registration period to those who did not. In terms of the four categories this means that we compared category 3 and the sub-samples of category 2 and 4 who were unemployed long enough to be classified as disabled to category 1 and the sub-samples of category 2 and 4 who were not unemployed long enough to be classified as disabled.

In this sensitivity analysis, we have redefined the groups of job losers with and without disabilities by imposing various time limits on the duration from registration to disability classification. The unconstrained case in the main analysis constitutes one extreme. The other extreme would be that disability had to be coded at the time of registration. In this latter case, category 3 is compared to categories 1, 2, and 4.

The results from the sensitivity analysis are depicted in *Figure 5*. We have re-estimated the differential effects on earnings and total income using seven time-windows classifying the job losers with and without disabilities (i.e., receiving a disability code at registration; within 1, 3, or 6 months; within 1 or 2 years; or at any time during the registration period). Once again we have plotted the estimated δ_{s+k}'s, but to avoid making the figures too cluttered, the confidence intervals are suppressed; instead the shaded area represents the area between the maximum 95% upper bounds and the minimum 95% lower bounds.

It is evident that the pre-job loss estimates are rather similar regardless of time-window, although all time-windows produced larger earnings differentials than the window used in the main estimation (i.e., classification at any time during the registration period) and they also diverged more and more the closer to the job loss. During the post-job loss period, however, the estimates diverged dramatically and the larger the time-window

the larger earnings differential. This we should expect, of course, as a longer time until receiving a disability code implies an equally long time without a job. Hence, we also observe the largest differences in estimates during the first one or two years following job loss, i.e., the years when the various time-windows mechanically changed also the time in unemployment for the most job losers.

Figure 5: The estimated mean differential earnings and income effects of job loss if being occupationally disabled, by various time spans for the duration until being classified as occupationally disabled, from 7 years before to 5 years after job loss. The effects in year −6 and −7 are zero by assumption
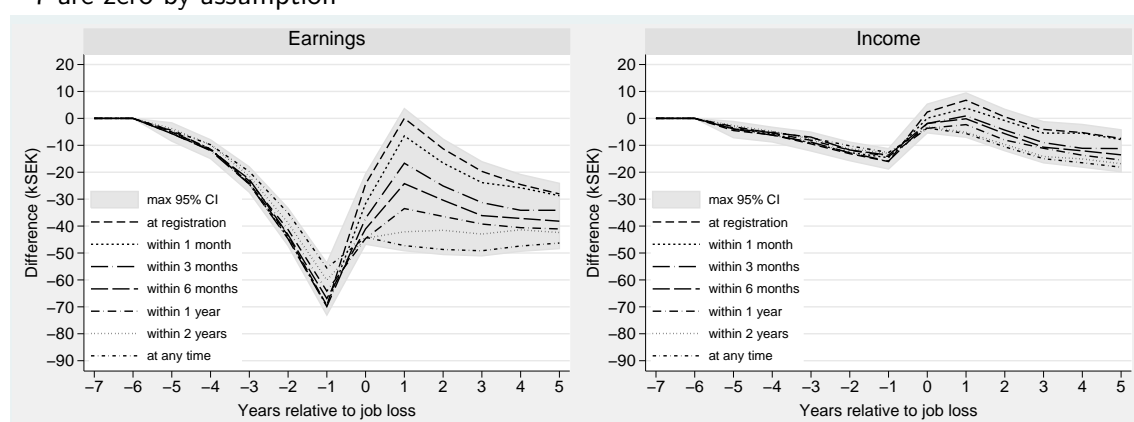
Turning to the estimates on total income, we observe a similar pattern. The estimates from using different time-windows exhibited no, or only small, pre-job loss differences. The post-job loss differentials were also more compressed than the earnings differentials. As much of the differences in the earnings estimates can be related to the mechanical increase in unemployment duration this is expected since such earnings losses, to a large extent, should have been replaced by UI.

This sensitivity analysis has shown that: 1) the post-job loss estimates, especially the earnings estimates, vary considerably depending on how the group of job losers with disabilities was defined, and 2) as most of the variation is apparent during the first couple of years following job loss it seems to be more of a consequence of the mechanically longer unemployment durations rather than anything else.

4.4 Limitations

The empirical analysis presented above is marred by several limitations. Most of them are related to our definition of disability. The only useful measure of disability available to us was the PES' classification of occupational disability upon registration as a job seeker. In Section 4.3 we found that how disability is defined with respect to the elapsed time from registration with the PES to actually being classified as occupationally disabled greatly affected the estimates. However, there are also some additional concerns:

We do not know the timing of disability onset. The two extremes would be that disability was either congenital or acquired with onset while registered with the PES. The model we estimated implicitly assumes the former extreme. This is certainly an unrealistic assumption. Diminishing earnings and increasing take-up of SI with start several years prior to job loss also suggest that for a non-ignorable fraction the onset of disability seems to have occurred during our observation period. Hence, our estimated differential effects of job loss are a combination of the differential effects of job loss and the effects of disability onset. Of course, our estimates still depict the differences in how earnings and income evolved surrounding the job loss depending on whether being classified as disabled or not by the PES.

The PES' measure is not an objective, but rather an administrative, measure of disability, and might contain measurement errors due to various incentive mechanisms. Although the classification of the various disabilities is dichotomous, i.e., either a job seeker gets a certain code or s/he does not, both "occupational disability" and "impairment that entail reduced work capacity" are floating concepts. Hence, the coding leaves some discretion to the particular caseworker. As discussed in Section 2.1, the PES also has various incentives to code job seekers as disabled depending on certain volume targets and goals, and the job seekers may have incentives both to accept and to refuse a disability classification.

The difficulties associated with defining and measuring disability are inherent to all labour research focusing on the particular group of persons with disabilities, nevertheless, these concerns have to be kept in mind when interpreting the findings. However,

regardless of its problems the PES' measure of disability together with our longitudinal data will provide a good picture of the differences in how earnings and income evolved surrounding the job loss depending on whether being classified as disabled or not by the PES.

5 Discussion and conclusions

People with disabilities, both in Sweden and elsewhere, are consistently found to face considerable difficulties on the labour market. In this study we have investigated the differential impact of involuntary job loss, on earnings and income, if being disabled. Our main findings are that the earnings of job losers with and without disabilities began to diverge already several years prior to job loss. The diverging earnings were not driven by the job losers with disabilities being employed to lesser extent or unemployed to a larger extent than those without disabilities but by a much larger incidence of longer periods of absence due to sickness or rehabilitation. This might suggest that the estimates not only pick up the differential impact of job loss but also the impact of disability onset. Moreover, the job loss put a halt on the diverging earnings between those with and without disabilities. The seemingly permanent earnings differential following job loss seems to have been a consequence of much more of the job losers with disabilities not returning to employment but instead becoming disability retirees. Although the earnings differential experienced by the job losers with disabilities was considerable during the post-job loss period, a majority of the difference was replaced by public social insurances.

As job losers with disabilities are not a homogeneous group, we also repeated the earnings and income analysis distinguishing between different types of disabilities. This analysis revealed that the earnings differential around the time of job loss varied remarkably with type of disability. The categories likely to contain disabilities that, in most cases, are not congenital but rather have an onset later in life exhibited the largest pre-job loss (and post-job loss) earnings differentials. This supports the previous conclusion that much of the pre-job loss earnings differential can be explained by the negative earnings effect of disability onset. The disability groups suffering the largest earnings losses

did not necessarily suffer the largest income losses. Those exhibiting the largest income differentials could instead be categorized as those with mental or cognitive disabilities.

For various reasons there is a considerable variation in the elapsed time from registration with the PES to actually being classified as occupationally disabled. Whether constraining the sample of job losers with disabilities to those being classified as occupationally disabled at the time of registration or also include those being classified at some later point during the registration period dramatically affected the short- to medium-term estimates. This sheds some light on the difficulties associated with using administrative measures of disability in labour research and to the importance of being able to date the onset of disability.

To conclude, the findings suggest that for some groups of job losers with disabilities the onset of disability might have been the very reason for eventually losing the job. Moreover, although the objective of the coding of disability by the PES is to ascertain that the labour market policies explicitly targeting job seekers with disabilities, aiming at strengthening their position at the labour market and equalizing the opportunities between disabled and non-disabled job seekers, these efforts do not seem to have resulted in equal labour market outcomes for the job losers with and without disabilities. Large earnings differentials remained throughout the observation period, and a considerable fraction of the job losers with disabilities actually became disability retirees during the first few years following job loss.

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