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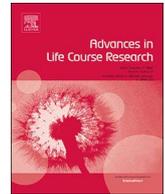
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# The effect of an early-career involuntary job loss on later life health in Europe



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## ABSTRACT

Recent years have witnessed an increase in interest towards the long-term health consequences of early-career job loss and youth unemployment. Relying on detailed retrospective data from the third wave (2008/09) of the Survey of Health, Ageing and Retirement in Europe (SHARE) this paper investigates whether an involuntary job loss in the first 10 years after labour market entry has lasting negative effects on health more than 30 years later. The results show that an early-career involuntary job loss due to a layoff or plant closure increases the probability of fair or poor self-rated health in late life by about 6 percentage points. Moreover, examining the mechanisms behind this relationship, the analysis reveals that the subsequent unemployment risks and employment instability only explain a small share of the total effect. In line with previous studies, these findings highlight the importance of early career experiences for workers' later life health.

## 1. Introduction

Research and policy debates over the long-term health consequences of job loss and unemployment, in particular for young people, have intensified over the last ten years. For example, in the aftermath of the financial crisis of 2007/08 and the subsequent economic recession some authors have argued that youth has “suffered disproportionately” in the recession (Bell & Blanchflower, 2011, p. 241) and others have raised concerns about a “lost generation” (Scarpetta, Manfredi, & Sonnet, 2010, p. 4). Although many studies show that job loss and unemployment have negative direct effects on health (e.g. Burgard, Brand, & House, 2007; Strully, 2009), surprisingly little is known about the potential long-term consequences, especially for workers who experience negative labour market events in their early-career.

While the long-term consequences for young people who lost their jobs over the course of the financial crisis of 2007/08 cannot yet be analysed, the data from older birth cohorts allows investigating the potential for lasting health effects of job loss and unemployment.<sup>1</sup> A few previous studies on the long-term health consequences mostly examine the general population (Daly & Delaney, 2013; Schröder, 2013). However, recent evidence from long-run cohort studies suggests that

young people may be particularly vulnerable to the negative effects of unemployment (Bell & Blanchflower, 2011; Strandh, Winefield, Nilsson, & Hammarström, 2014). There are a number of potential explanations for these findings. For example, Brydsten, Hammarström, Strandh, and Johansson (2015) highlight that the early-career represents a sensitive period in the life course as well as that young workers lack experience and resources to cope with and overcome unemployment.

Moreover, past research primarily focuses on the long-term effects of unemployment which may be either voluntary or involuntary. However, from a substantial as well as a methodological point of view, additional data on the reason for job loss provide rich information (Schröder 2013). Specifically, research on life events emphasises that their effects on health vary by ‘their desirability, by the degree of control people have over their occurrence, or by whether or not they are scheduled’ (Pearlin, Lieberman, Menaghan, & Mullan, 1981, p. 339), making it likely that only involuntary job losses will have lasting negative effects. In fact, voluntary job changes may even improve health as they either reflect an ‘escape from a ... stressful role situation’ (Wheaton, 1990, p. 2010) or upward socio-economic mobility (Schmelzer, 2012). In contrast, studies focusing on unemployment examine a state that mixes very heterogeneous experiences (Brand, 2015).

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<sup>1</sup> Previous studies mostly use data from two longitudinal cohort studies: The National Child Development Study (NCDS), following a sample of persons born in 1958 in Great Britain (e.g. Bell & Blanchflower, 2011; Daly & Delaney, 2013) or the Northern Swedish Cohort (NSC) following all pupils in their last year of compulsory school in a medium-sized industrial town in Sweden in 1981 (Brydsten et al., 2015; Strandh et al., 2014). Following Schröder (2013), we draw on the retrospective life history data from the SHARELIFE survey.

Analysing involuntary job losses also helps addressing the methodological challenges of health selection and confounding (Burgard et al., 2007). They may be considered more of an exogenous shock than unemployment. In particular, job losses due to plant closures can be thought to be ‘largely beyond the control of the individual worker’ (Brand, 2015, p. 360), making it unlikely that they are determined by workers’ health or other observed and unobserved characteristics (Baumann, Lipps, Oesch, & Vandenplas, 2016, p. 161). For these reasons, this article focuses on involuntary job losses in the first 10 years after the labour market entry and distinguishes layoffs from plant closures.<sup>2</sup>

Following recent interest in the mechanisms behind the negative long-term effects of job loss and unemployment on health (e.g. Strandh et al., 2014), we additionally examine how the subsequent unemployment risks and employment instability mediate this relationship. Although the previous empirical evidence is scarce (see Brydsten et al., 2015 for an exception), theoretically, a life course perspective is often employed arguing that initial disadvantages produce further relative disadvantages over time (e.g. DiPrete & Eirich, 2006). Specifically, the negative effects of an early-career job loss may work through channels of increased subsequent unemployment risks (e.g. Brandt & Hank, 2014), employment instability (e.g. Manzoni & Mooi-Reci, 2011) and lower job quality (e.g. Brand, 2006; Dieckhoff, 2011; Gangl, 2006).

This paper focuses on the following research questions. First, what are the long-term effects of an early-career involuntary job loss on self-rated health in late life? Second, do these effects differ for job losses due to layoff or plant closure? Third, to what extent do the subsequent unemployment risks and employment instability mediate the potential negative effects? To answer these questions, data from the third wave (2008/09) of the Survey of Health, Ageing and Retirement in Europe (SHARE) are used. The SHARELIFE survey collected retrospective life histories of elderly Europeans from 14 countries. It provides information on self-rated health at the time of the interview as well as details about respondents’ work histories, childhood health and childhood socio-economic status. As Daly and Delaney (2013) emphasise, data on these early-life circumstances are important to take into account selection into job loss and unemployment.

The remainder of the article is structured as follows: the next section provides theoretical considerations on why an involuntary early-career job loss can have negative effects on health in late life and how unemployment and employment instability following the job loss may mediate this effect. The next section presents the data, measures and methods followed by a discussion of the results. The last section summarizes the findings and offers some concluding remarks.

## 2. Theory and hypotheses

The life course perspective distinguishes two basic models explaining how early socio-economic conditions, in general, as well as job loss and unemployment, specifically, affect future health (e.g. Strandh et al., 2014).

The first model (I) assumes that the direct negative effect of an early-career job loss on health, once it occurred, for the most part persists over time. The direct effect itself may be explained by the deprivation of economic and psychosocial rewards that are associated with employment (see Nordenmark & Strandh, 1999 for a theoretical synthesis). Specifically, the loss of economic rewards requires individuals’ to adjust their living conditions as well as restricts the control over their lives and ability to plan ahead. Besides its financial consequences, an involuntary job loss may also deprive workers’ of

psychosocial rewards of employment (Jahoda, 1982) as well as entail the loss of a major social role and identity. This deprivation of the rewards of employment can both negatively affect mental health and over time accumulate and manifest into poorer physical health. For example, physical health may not only be affected through changes in living standards, but also increases in health-damaging and decreases in health-promoting behaviour (Nizalova & Norton, 2017). Lastly, previous studies highlight that negative psychological effects over time can translate into physical health problems (see Korpi, 2001 for a detailed discussion).

In contrast, the second model (II) supposes that an early-career involuntary job loss negatively affects later life health, because it elicits a ‘chronic stress process’ (Burgard et al., 2007, p. 370; Pearlin et al., 1981) or a ‘social chain of risks’ (Brydsten et al., 2015, p. 799). This perspective also echoes a key argument from life course sociology stating that trigger events, such as an early-career involuntary job loss, set young people on trajectories that negatively affect their health throughout their life. According to this cumulative (dis-) advantage framework (e.g. DiPrete & Eirich, 2006), initial disadvantages may produce further relative disadvantages resulting in greater inequalities over time. In this model, the negative effect of an early-career involuntary job loss on health is assumed to be mostly operating indirectly; for example, through channels such as increased unemployment risks, employment instability and lower job quality over the course of the subsequent career.

Moreover, the direct negative effect of an early-career involuntary job loss on health may partly explain why workers have difficulties in finding re-employment as well as jobs that match their pre-unemployment positions. Put differently, the long-term negative effects on health may be reinforced over the life course through an additive and sequential interplay of processes of health selection and social causation (West, 1991).

The specific mechanisms of increased unemployment risks, employment instability and lower job quality can be derived from economic and sociological labour market theories and have been attested in numerous empirical studies on the so-called scar effects of job loss and unemployment (e.g. Brand, 2006; Brandt & Hank, 2014; Dieckhoff, 2011; Gangl, 2006; Manzoni & Mooi-Reci, 2011). For instance, Becker’s (1993) human capital theory argues that job losses result in the loss of specific as well as the depreciation of general human capital, which, in turn, entails fewer and lower quality job offers by prospective employers. Another explanation is based on theories of unemployment stigma and signalling (e.g. Spence, 1973). Because employers have to overcome uncertainty about applicants’ productivity, they make use of observable characteristics such as their employment history. Job losses and periods of unemployment will likely signal job searchers’ ‘doubtful quality’ and ‘[create] scepticism about their merit’ (e.g. Young, 2012), weakening their bargaining position.

To explain why increased subsequent unemployment risks and employment instability negatively affect health across the life course, one can draw on the mechanisms for the direct negative effects as described above for the first model (I). In addition, work stress theories, such as the demand-control model or the effort-reward imbalance model, predict that reduced job quality over one’s career likely has negative effects on health, too (e.g. Wahrendorf, Blane, Bartley, Dragano, & Siegrist, 2013). Against this theoretical background, it is assumed that the potential negative long-term effects of an early-career involuntary job loss on later life health are partially mediated through these channels. Accordingly, the following hypotheses are derived:

**Hypothesis 1.** An early-career involuntary job loss has a negative effect on later life health.

<sup>2</sup> Although researchers emphasise that the school-to-work transition rather represents a process than a transition (Brzinsky-Fay, 2014), they have yet to agree on a common definition of the early-career. Because definitions of the school-to-work process often cover 5 years, we define the early-career to include the first 10 years of the career.

**Hypothesis 2.** The total negative effect of an early-career involuntary job loss is partially mediated by increased unemployment risks and employment instability across workers' subsequent careers.<sup>3</sup>

### 3. Data, measures and methods

#### 3.1. Data

This article used data from SHARELIFE, the third wave (2008/09) of the Survey of Health, Ageing and Retirement in Europe (SHARE). The target population consists of all persons aged 50 years and over at the time of sampling who have their regular domicile in a respective SHARE country. Persons who are incarcerated, hospitalized, out of the country during the entire survey period, unable to speak the country's language or who have moved to unknown addresses are excluded. In all countries, the data were collected based on individual or household probability samples with the use of computer assisted personal interviews (CAPI). Current partners living in the same household were interviewed regardless of age. The average response rate in wave 1 was 62% and the average individual retention rates were 73% for wave 2 and 77% for wave 3 (Börsch-Supan et al., 2013).<sup>4</sup>

SHARELIFE collected retrospective life histories for all individuals who participated in wave 1 or 2 of SHARE (see Schröder, 2011 for methodological details). The following 14 countries were included: Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Czech Republic, Poland and Ireland. The data provided information on self-rated health at the time of the interview as well as details about respondents' work histories, childhood health and childhood socio-economic status, making it well-suited for the analysis of the long-term consequences of life course events (Brandt & Hank, 2014; Schröder, 2013).

To warrant high quality retrospective data, a life grid was used (Blane, 1996), taking respondents step by step through the questionnaire, starting with modules on children and partners. In the CAPI, dates of births and marriages were represented in a calendar, serving as anchor points for further questions (Schröder, 2013). The work history module collected data for every job lasting at least six months including the start and end, job characteristics and the reason for its end. If the gap between two jobs was six months or longer, respondents were asked for their activity status in between. Moreover, the activity statuses between leaving education and the first job as well as after the last job were reported.

For the analyses, the sample was restricted to persons 50 years and over reporting at least one job spell. Because the analyses focused on early-career involuntary job losses, only persons who started their first job between the ages 14–35 years were considered.<sup>5</sup> In addition, persons who were self-employed or retired in their early-career were excluded. Job losses of these persons are unlikely to be exogenous (Schröder, 2013). Moreover, information on whether any early-career job ended due to an illness or disability was exploited (see Burgard et al., 2007 for a similar approach). Excluding such health-induced job losses further addresses concerns about health selection issues.<sup>6</sup> Lastly, only workers with an interview at least 15 years after the early-career

were considered, to ensure the analyses' focus on the long-term effects of job loss on health. The resulting sample provided complete information on 16,826 persons, including 946 early-career involuntary job losses.

#### 3.2. Measures

Table S1 in the Supplementary materials provides details about the measurement. Tables 1 and 2 offer descriptive statistics. The *independent variable* early-career involuntary job loss was defined as any job loss due to layoff or plant closure within the first 10 years after the labour market entry (see footnote 2). The other reasons for separation either reflected voluntary job changes (i.e. resignation) or ambiguous situations (i.e. mutual agreement, temporary job completion, other). Because previous studies used different 'control groups', persons with involuntary job losses were compared with two different groups. First, they were compared with persons who did not experience any involuntary job loss in the first 10 years after starting their first job. Second, a comparison group of persons who did not experience involuntary job loss and, in addition, was continuously employed throughout their early-career was used.

The *dependent variable* self-rated health is an overall measure of health status with answers ranging from 1 'excellent' to 5 'poor' on a five-point scale. For the analyses, the responses were grouped into a binary variable in order to focus on the key contrast between bad ('fair', 'poor') and good health ('excellent', 'very good', 'good'). A sensitivity analysis using the five-point self-rated health scale is reported in Table S4 in the Supplementary materials. Respondents have been found to take into account a wide range of health factors, including both aspects of physical as well as mental health, in forming an assessment of their own health (see Garbarski, 2016 for a research synthesis). Moreover, it has been shown that self-rated health is a valid and reliable measure of overall health and is predictive of mortality even after adjusting for specific health measures and other covariates (e.g. Idler & Benyamini, 1997), making it well-suited for our analyses.

To further address the issues of health selection and confounding, several sets of *control variables* were selected assuming that they affect both the risk of involuntary job loss and the late life health. In the displacement literature, for example, poor health or work performance are discussed as factors that drive the selection into involuntary job loss and, in particular, layoffs (e.g. Baumann et al., 2016). Variables that are consequences of job loss were not considered as controls, but are discussed as mechanisms below. Besides country of residence, age at the interview, sex, and years of education, childhood health (age 0–15 years) and childhood socio-economic status (age 10 years) were considered relevant (e.g. Daly & Delaney, 2013). Specifically, respondents' reported whether they were in fair or poor health, stayed for one month or more in hospital, or had one or more illnesses according to two check lists of illnesses during childhood.<sup>7</sup> In addition, they indicated whether their parents smoked or drank heavily. Controlling for these factors should, in particular, reduce concerns about health selection. Furthermore, childhood socio-economic status was measured by whether the home was poorly equipped, the number of books that were available as well as the number of persons per room and the occupation of the main breadwinner. A home was poorly equipped if it had none of the following five amenities: a fixed bath, cold or hot running water, an inside toilet, central heating. The occupation of the main breadwinner was

<sup>3</sup> Theoretically, the job quality is also of interest. However, the data only allow for tests concerning unemployment as well as employment instability across workers' subsequent career. This issue is also revisited in the conclusion.

<sup>4</sup> In wave 2, three new countries entered SHARE and refreshment samples were drawn. The respective average response rates were 61% and 54%. As SHARE is a multinational survey the sampling procedures differ between countries (see Börsch-Supan et al., 2013 for details).

<sup>5</sup> Moreover, only persons who left education between the ages 11–35 years were considered, because some control variables only pertained to persons who were in school at age 10 years.

<sup>6</sup> Of the reported early-career involuntary job losses less than 1% were also due to illness or disability.

<sup>7</sup> The illnesses on list 1 included: infectious disease (e.g. measles, rubella, chickenpox, mumps, tuberculosis, diphtheria, scarlet fever), polio, asthma, respiratory problems other than asthma, allergies (other than asthma), severe diarrhoea, meningitis/encephalitis, chronic ear problems, speech impairment, difficulty seeing even with eyeglasses. The illnesses on list 2 included: severe headaches or migraines, epilepsy, fits or seizures, emotional, nervous, or psychiatric problem, broken bones, fractures, appendicitis, childhood diabetes or high blood sugar, heart trouble, leukaemia or lymphoma, cancer or malignant tumour (excluding minor skin cancers), other serious health condition.

based on the four skill levels associated with the ISCO-88 major groups (ILO, 1990). Furthermore, respondents reported their relative position in math and language at age 10 compared to their classmates. Next to the socio-demographic variables, childhood socio-economic status and school performance are important factors for individuals' career choices and, thus, their risk of involuntary job loss. They are also likely factors that determine later life health. The last set of control variables concerned characteristics at the first job. Because these characteristics precede any involuntary job loss, they allow further reducing heterogeneity between those workers who experience a job loss and those who do not. The importance of these confounding variables is highlighted by studies suggesting that layoffs, but also plant closures occur more often in industries "that are more vulnerable to economic and structural problems" (Baumann et al., 2016, p. 161). In our data, the type of employment, the occupation, the sector and working time were reported allowing us to control for some associated factors. In addition, measures of whether the person lived with a partner or had children at the first job were constructed. Lastly, the age at the first job and the labour market entry cohort were controlled for.

To assess workers' subsequent careers, the following *mediating variables*, concerning the years 11–25 of the careers, were used. Subsequent unemployment risks were measured by the cumulated unemployment duration in years and employment instability was indicated by the number of job ends and the number of involuntary job losses. Because previous research suggests that career complexity is best measured by analyses of holistic trajectories as compared to single states (Manzoni & Mooi-Reci, 2011), in addition, a complexity index based on a sequence analysis of workers' activity statuses in years 11–25 of their careers was constructed. The complexity index proposed by Gabadinho, Gilbert, Müller, and Studer (2011) ranges from zero (no complexity) to one (maximum complexity) and is a composite measure of the number of transitions and the longitudinal entropy. The latter measures the diversity of states within a sequence meaning that, overall, careers with more transitions and greater variety in activity statuses were considered more complex.<sup>8</sup>

### 3.3. Methods

To estimate the effect of an early-career involuntary job loss on later life health, logistic multiple regression models with cluster-robust standard errors by country were used.<sup>9</sup> Because the coefficients of logistic regression models cannot be easily interpreted and can also not be compared across nested models (Mood, 2010), average marginal effects (AME) are reported. Three different models were fitted. Model 1 was a bivariate regression of fair or poor health on early-career involuntary job loss. Model 2 added the control variables and Model 3, in addition, included the mediating variables to examine to what extent the total effect (Model 2) was operating through channels of increased subsequent unemployment risks and employment instability. The analyses were first performed for all involuntary job losses combined. In addition, they were repeated using an indicator variable to distinguish layoffs and plant closure.

<sup>8</sup> The following activity statuses were used: unemployed, retired, training and education, domestic work, other and working. Overlaps were solved using the listed order. For less than 1% of persons, gaps have been filled using the preceding activity status (Kröger, 2015). The complexity index was constructed using the TraMiner library in R (Gabadinho et al., 2011). The data preparation and all analyses were performed in Stata 14.

<sup>9</sup> As the SHARELIFE data include variables about self-rated health in both childhood and adulthood, it may be asked why the advantages of panel data regression models were not utilised (i.e. differencing out time-constant unobserved heterogeneity using, for example, change score models). Although the measures of self-rated health concerning early and later life are similar, they differ in their reference period as well as the allowed responses meaning that we do not measure the same dependent variable over time.

**Table 1**

Descriptive statistics on early-career involuntary job losses. Sources: SHARELIFE, authors' calculations.

	Median/Percent	N	Minimum	Maximum
Reason for job loss				
Layoff	69.5%	657		
Plant closure	30.5%	289		
Type of employment				
Employee	95.8%	906		
Civil servant	4.2%	40		
Job	1		1	6
Year in the early career	5		1	10
Age	22		14	40
Year	1969		1931	1992
Time to interview (in years)	39		16	77

## 4. Results

### 4.1. Descriptive findings

Table 1 provides details about the early-career involuntary job losses. Of the 946 involuntary job losses about 70% (N = 657) were due to layoffs while the remaining 30% (N = 289) followed plant closures. A minority of job losses were experienced by civil servants. The median job loss concerned the first job, the fifth year of the career and happened at the age of 22 years in 1969, showing that the analysed job losses pertain to workers' early careers. The median time to the interview was 39 years emphasising the analyses' focus on the long-term effects of job loss on health.

Table 2 offers descriptive statistics on the dependent, control and mediating variables separating workers who experienced a job loss and those who did not. Persons who involuntarily lost a job in their early career more often reported to be in fair or poor health at the time of the interview, illustrating the potential for negative long-term effects.

For the majority of the control variables, the mean standardized difference between the two groups was small to moderate. However, for some variables, relevant differences were revealed. Specifically, persons with involuntary job losses were younger and less educated. Although they also consistently reported worse childhood health, these differences were small to moderate. Moreover, the parents of persons with involuntary job losses were more likely to smoke and drink heavily during the respondents' childhood. Regarding the childhood socio-economic status, persons with a job loss more often lived in households with none or very few books. The respective main breadwinners were less likely to hold a medium-skilled (skill level 2) and more likely to hold a lower-skilled (skill level 1) occupation. Persons with an involuntary job loss also reported to be worse or much worse compared to their classmates in math and languages. Moreover, they were less likely to be civil servants as well as less likely to be in higher-skilled (skill level 4) and more likely to be in lower-skilled (skill level 1) occupations at their first job. Their first job was also more likely in the manufacturing and energy sectors and less likely in the public, health or education sectors. Finally, they were younger at the time of labour market entry and were (under-) overrepresented in (older) younger labour market entry cohorts. Overall, the descriptive findings suggest that persons who experienced a job loss and those who did not differ on a number of characteristics that have to be controlled for to ensure that the estimated associations between job losses and health are not spurious.

Furthermore, Table 2 shows the differences in the mediating variables concerning years 11–25 of workers' careers. As expected, early-career involuntary job losses were associated with longer subsequent unemployment durations, more job ends, more involuntary job losses, and a higher career complexity. However, Table 2 also reveals that the careers in the sample analysed were overall quite stable and that the differences by involuntary job loss were moderate.

**Table 2**  
Descriptive statistics on the dependent, control, and mediating variables.  
Sources: SHARELIFE, authors' calculations.

	Early-career involuntary job loss?			
	No (N = 15,880)		Yes (N = 946)	
	Mean/ Percent	SD	Mean/ Percent	SD
<b>Dependent variable</b>				
Fair or poor self-rated health (at the interview)	34.9%		42.1%	
<b>Control variables</b>				
<i>Demographics and education</i>				
Age at interview (in years)	64.89	9.09	63.56	9.62
Female	53.0%		52.7%	
Education (in years)	13.68	3.64	13.00	3.31
<i>Childhood health (age 0–15)</i>				
Fair or poor self-rated health	7.9%		8.7%	
1+ month in hospital	6.5%		8.1%	
1+ illness(es) from list 1	84.6%		86.7%	
1+ illness(es) from list 2	25.1%		26.2%	
<i>Parents health behaviour</i>				
Parents smoked	63.0%		71.9%	
Parents drank heavily	7.5%		12.5%	
<i>Childhood socio-economic status (age 10)</i>				
Poorly equipped home	21.6%		22.0%	
<i>Number of books</i>				
None or very few	33.5%		40.8%	
Enough to fill one shelf	25.3%		22.2%	
Enough to fill one bookcase	25.7%		22.9%	
Enough to fill two or more book cases	15.5%		14.1%	
<i>Persons per room</i>				
≤ 1 person	29.7%		29.9%	
> 1 and ≤ 2 persons	48.5%		48.3%	
> 2 persons	21.8%		21.8%	
<i>Occupation breadwinner</i>				
Major group 1 (no skill level)	5.3%		4.3%	
Major group 2 (skill level 4)	4.7%		3.7%	
Major group 3 (skill level 3)	5.6%		6.1%	
Major group 4–8 (skill level 2)	65.7%		59.8%	
Major group 9 (skill level 1)	15.4%		22.5%	
Major group 0 (no skill level)	1.9%		1.6%	
No breadwinner	1.5%		1.9%	
<i>Relative position in math</i>				
Much better	12.0%		11.0%	
Better	26.6%		23.0%	
About the same	50.0%		50.6%	
Worse or much worse	11.4%		15.3%	
<i>Relative position in language</i>				
Much better	12.0%		11.0%	
Better	28.9%		25.3%	
About the same	48.5%		48.5%	
Worse or much worse	10.6%		15.2%	
<i>Characteristics (at) first job</i>				
Civil servant	10.6%		3.7%	
<i>Occupation</i>				
Major group 1 (no skill level)	2.0%		0.5%	
Major group 2 (skill level 4)	10.0%		5.6%	
Major group 3 (skill level 3)	9.5%		7.1%	
Major group 4–8 (skill level 2)	58.8%		55.1%	
Major group 9 (skill level 1)	18.3%		30.5%	
Major group 0 (no skill level)	1.5%		1.2%	
<i>Sector</i>				
Primary sector	8.1%		7.2%	
Manufacturing and energy	24.0%		32.3%	
Construction	7.6%		8.7%	
Services	35.5%		38.9%	
Public sector, health, and education	24.8%		12.9%	
Full-time	96.7%		97.3%	
Living with a partner	12.7%		12.2%	
Children	5.7%		6.8%	
<i>Labour market entry</i>				
< 1950	11.5%		13.3%	
1950–59	23.2%		17.5%	

Table 2 (continued)

	Early-career involuntary job loss?			
	No (N = 15,880)		Yes (N = 946)	
	Mean/ Percent	SD	Mean/ Percent	SD
1960–69	38.4%		36.2%	
≥ 1970	26.9%		33.0%	
Age at first job	18.69	3.75	18.05	3.58
<b>Mediating variables</b>				
Unemployment duration (in years)	0.18	1.15	0.74	2.39
Employment instability (year 11–25)				
Number of job ends	0.65	0.97	0.93	1.15
Number of involuntary job losses	0.08	0.30	0.23	0.54
Complexity index (0–1)	0.04	0.08	0.06	0.10

Notes: See Table S1 in the Supplementary material for further details on the measurement.

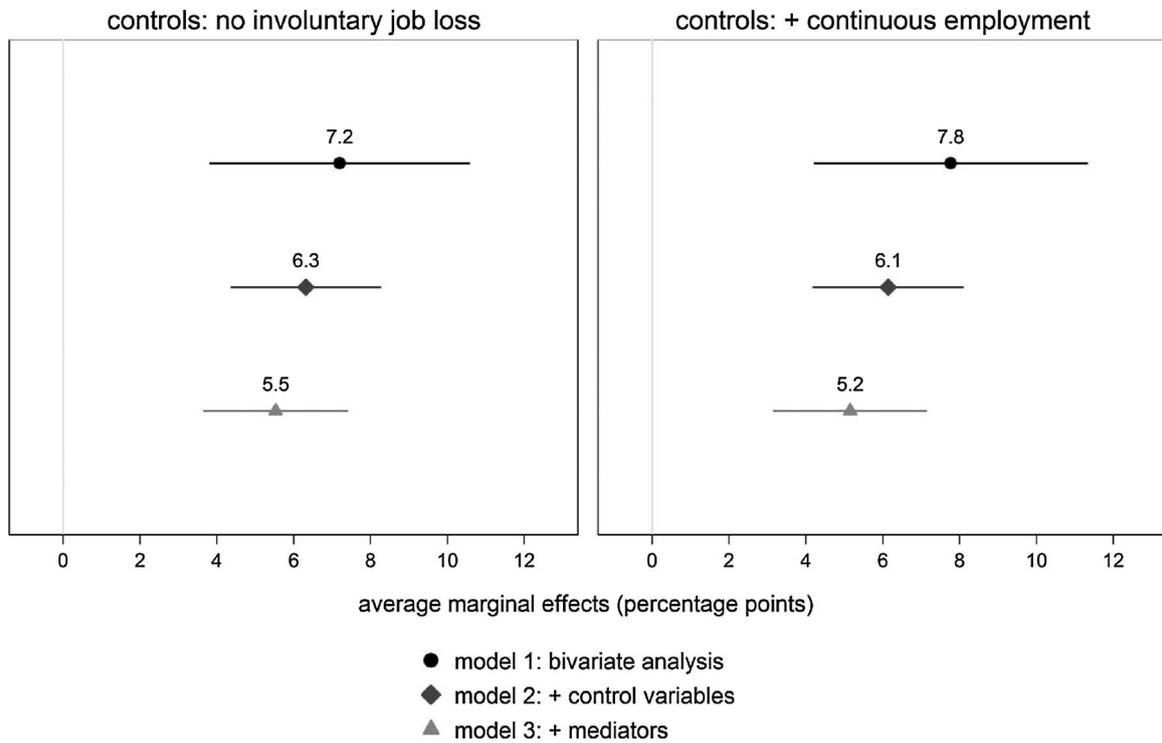
#### 4.2. Multivariate findings

The results of the bivariate and multiple logistic regression analyses are illustrated graphically and average marginal effects (AME) with 90% confidence intervals are presented (Jann, 2014). The full regression tables are provided in the Supplementary materials. Model 1 in Fig. 1 (left side, Table S2.1) shows that an involuntary job loss compared to no job loss in the early-career was associated with a 7.2 percentage point higher probability to report fair to poor self-rated health. After adjusting for country of residence, demographics and education, childhood health, parents' health behaviour, childhood socio-economic status and characteristics at the first job, the estimated total effect was reduced to 6.3 percentage points (Model 2). This suggests that despite extensive controls for health selection and confounding, an early-career involuntary job loss is negatively associated with later life health. Similar results were found using the five-point self-rated health scale and applying models for ordinal or continuous dependent variables. Table S4 in the Supplementary materials compares the results for Model 2 using a binary logistic regression (see Fig. 1) to the findings from an ordinal logistic and a linear regression model. In Model 3, the mediating variables indicating subsequent unemployment risks and employment instability were added, to test to what extent the negative effect of job loss was explained by these factors. Although the total effect further diminished to 5.5 percentage points (direct effect), the proportion mediated ( $PM = (6.3 - 5.5) / 6.3 = 0.127$ ) only amounted to about 13%.<sup>10</sup>

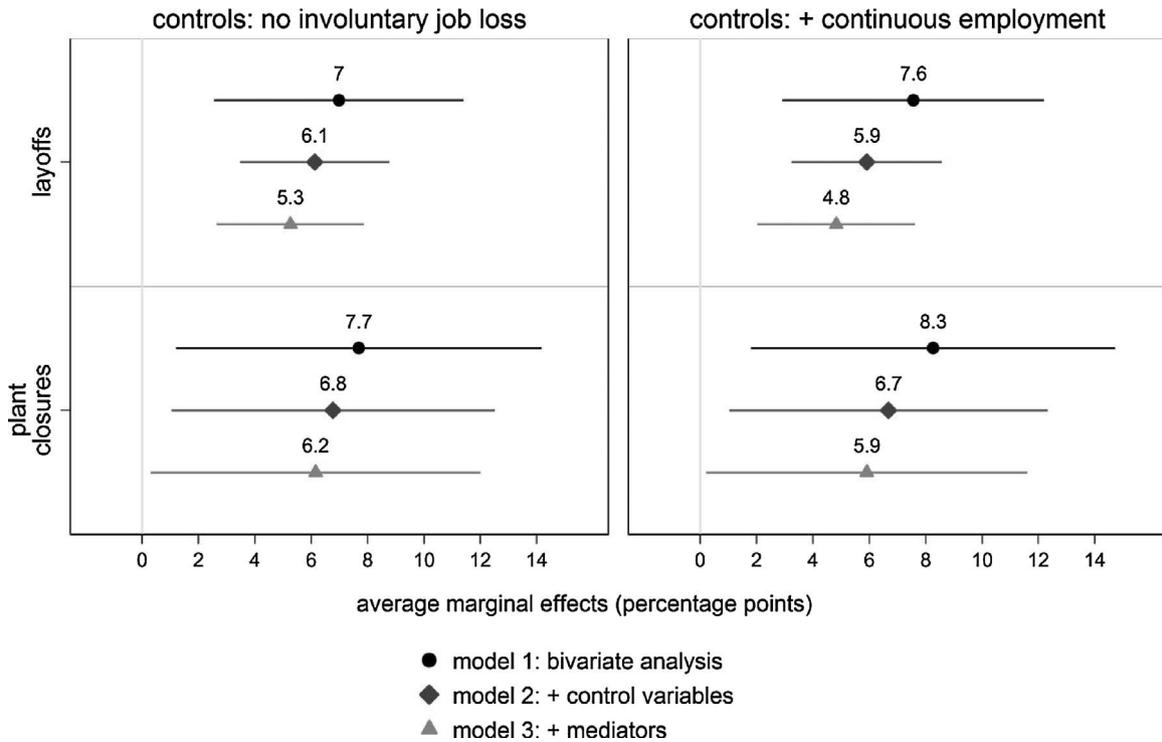
On the right side of Fig. 1 (Table S2.2), the results are shown for the analyses using an alternative control group of persons who did not experience job loss and were, in addition, continuously employed throughout their early career. Overall the estimated average marginal effects were very similar, showing that the findings are not sensitive to the definition of the control group. The estimated total and direct effects of 6.1 and 5.2 percentage points were slightly smaller and the proportion mediated was about 15%. Even if compared to continuously employed persons, the subsequent unemployment risks and employment instability only explained a small share of the total effect of job loss on later life health. In summary, these results support hypothesis 1. Hypothesis 2 can only partially be confirmed, as the subsequent unemployment risks and employment instability seem to play a limited role in the mediation of the total effect.

On the left side of Fig. 2 (Table S3.1), results are shown for the control group of persons who did not experience involuntary job loss in their early career. Overall, the effects were very similar to those for the

<sup>10</sup> The variables measuring employment instability may be more meaningful if the employment duration in years 11–25 is controlled. The results were very similar if in addition to the mediating variables the employment duration is included in Model 3.



**Fig. 1.** Effects of an early-career involuntary job loss on fair or poor self-rated health in late life (average marginal effects, 90% confidence intervals). Notes: See Table S2.1 (left side) and Table S2.2 (right side) in the Supplementary material for the full logistic regression models. Sources: SHARELIFE (N = 16,826), authors' calculations.



**Fig. 2.** Effects of an early-career involuntary job loss on fair or poor self-rated health in late life by reason for job loss (average marginal effects, 90% confidence intervals). Notes: See Table S3.1 (left side) and Table S3.2 (right side) in the Supplementary material for the full logistic regression models. Sources: SHARELIFE (N = 12,135), authors' calculations.

combined analyses and the differences between layoffs and plant closures were relatively small, with somewhat higher point estimates for the latter. Wald tests comparing the effects of job losses due to layoff and plant closure revealed that the differences were not statistically significant (model 1:  $p = 0.89$ , model 2:  $p = 0.88$ , model 3:  $p = 0.84$ ).

Moreover, given the fewer job losses due to plant closure, the respective effects were estimated with greater uncertainty, as indicated by the wide 90% confidence intervals. The proportion mediated was estimated to be 13% for layoffs and 9% for plant closures, confirming the previous findings that the subsequent unemployment risks and employment

instability only mediate a small share of the total effect.

The right side of Fig. 2 (Table S3.2) shows the results for the analyses using the alternative control group. As for the combined analyses, the results were very similar for the different control groups, with somewhat smaller estimates for the total and direct effects of job loss and slightly larger estimates for the proportion mediated (i.e. 19% for layoffs, 12% for plant closures). Again, Wald tests of whether the effects of layoffs and plant closures differ were not statistically significant (model 1:  $p = 0.89$ , model 2:  $p = 0.86$ , model 3:  $p = 0.81$ ). Overall, the results suggest that an early-career job loss had a moderate negative effect on the probability to be in fair or poor health in late life. This finding was robust to the control group used as well as the reasons for involuntary job loss considered. The latter result is particularly relevant, as the use of plant closures should further reduce concerns about health selection and confounding.

## 5. Conclusions

This article contributes to the growing literature on the long-term effects of job loss and unemployment on health (Daly & Delaney, 2013; Schröder, 2013) and, in particular, complements previous studies on the lasting negative health consequences of youth unemployment (Bell & Blanchflower, 2011; Brydsten et al., 2015; Strandh et al., 2014). Specifically, it examines the effects of involuntary job loss in the first ten years after labour market entry on self-rated health measured for more than 30 years later. In addition, it takes up the increased interest in the mechanisms behind this relationship (e.g. Strandh et al., 2014) by analysing to what extent the negative effects are mediated through channels such as increased subsequent unemployment risks and employment instability.

Using detailed retrospective data from the third wave (2008/09) of the Survey of Health, Ageing and Retirement in Europe (SHARE) the analysis shows that workers' who involuntarily lost a job in their early career have on average a 6 percentage point higher probability to report fair or poor health at the time of the interview. Comparing the size of this effect to other effects in the same model, it is about as large as the effect of having five years less of education.<sup>11</sup> These results are based on analyses that carefully control for health selection and confounding. Specifically, health-induced job losses due to illness or disability were excluded beforehand and the regression models adjusted for demographics and education, childhood health, childhood socio-economic status as well as characteristics at the first job. Moreover, it was revealed that the effects are very similar for involuntary job losses due to layoffs and plant closures. As in plant closures almost all workers are let go, it is less likely that the corresponding job loss is due to health or other observed and unobserved characteristics (Strully, 2009). This should further reduce concerns that the revealed associations are spurious. The finding of moderate negative long-term consequences is also in line with the recent evidence from British and Swedish cohort studies showing negative effects of youth unemployment on functional somatic symptoms, life satisfaction, mental health, and self-rated health (Bell & Blanchflower, 2011; Brydsten et al., 2015; Strandh et al., 2014).

Moreover, this article also contributes to our understanding of the mechanisms behind these long-run relationships. Additional analyses controlling for indicators of unemployment risks and employment instability concerning workers' subsequent careers showed that the total effect of an early-career involuntary job loss was only reduced by about 10–15%. This is consistent with findings by Brydsten et al. (2015), showing that the association between youth unemployment and later health remained similar after adjusting for later unemployment.

There remain, however, some important caveats to the current

<sup>11</sup> Although such a comparison may help in judging the size of effects, we note, that it must be interpreted with caution as for involuntary job loss a total effect is estimated, while for years of education a direct effect is estimated as the model already controls for variables that mediate the effect of education on health.

analyses. First, this article used retrospective data, implying, that measures of childhood health and childhood socio-economic status are not as specific as, for example, in prospective cohort studies. In addition, although the SHARELIFE survey was carefully planned and techniques to improve data quality, such as the life grid, were used (Schröder, 2011), the results may be affected by recall errors. However, a recent study by Havari and Mazzonna (2015) assesses the internal and external consistency of the SHARE data, offering empirical evidence about the importance of this issue. They conclude that respondents remember childhood health and living conditions fairly well.

Second, because panel data with a comparable time window are not available, the analyses addressed issues of health selection and confounding by adjusting for a large number of observed variables. Moreover, the use of involuntary job losses and analyses taking into account the reason for job loss provide some evidence that the found associations are not spurious. However, even for involuntary job losses due to plant closures, selection may still be a problem as closures are anticipated to some extent and specific workers' may (be) select(ed) out of plants before they close (Baumann et al., 2016). For example, Schwerdt (2011, p. 93) describes two scenarios: one in which positively selected workers leave early and one in which negatively selected workers are dismissed by the management. Using Austrian administrative data he finds support for the former scenario by examining pre- and post-separation labour market outcomes. As we cannot observe such strategic behaviour in our data, the current analyses rest on the assumption, that these issues are sufficiently addressed by controlling for observed variables. If, however, 'more qualified and adaptive employees' leave early (Brand, 2015, p. 362) and these workers are also more healthy, our results may overestimate the long-term negative health effects of job loss.<sup>12</sup>

Lastly, our results, in particular, the finding that the subsequent unemployment risks and employment instability only mediated a small share of the total effect of job loss on health, may not necessarily generalise beyond the cohorts represented in the data.<sup>13</sup> Most of the respondents in the SHARELIFE survey entered the labour market under good economic conditions implying that it was easier to avoid long interruptions after a job loss, as a sufficient number of adequate jobs for reemployment were available (Schröder, 2013). However, the results at least suggest that concerns about the potential long-term consequences should be taken seriously and more empirical evidence needs to be accumulated.

Overall, this article points to the importance of workers' early career experiences for later life health, highlighting the potential long-term costs of involuntary job loss. The finding that the unemployment risks and employment instability across workers' subsequent careers played only a limited role in explaining the negative health effects, merits attention in future research. Specifically, an investigation on whether this result generalises to other cohorts as well as whether other mechanisms, such as the subsequent job quality, are important, seems worth examining.

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<sup>12</sup> The selection out of plants before they close may, however, be less of a problem in survey data as workers who leave early are likely to report that their job ended due to an (upcoming) plant closure.

<sup>13</sup> As highlighted in the introduction current studies on the long-term consequences necessarily have to use data about older birth cohorts.

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## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.alcr.2018.01.001>.

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