Quantitative Analysis of the Links between Psychological Well-being & Employment Outcomes: International Evidence

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Note on Published Work

Chapter 3 has been accepted for publication during the period of the PhD registration. Copyright of this papers resides with the publishers, but under the terms of the copyright it has been reproduced as a chapter in this thesis. The published paper is:

Chapter 3: Mousteri, V., Daly, M. and Delaney, L. (accepted for publication). The scarring effect of unemployment on psychological well-being across Europe. *Social Science Research.*

Abstract

This thesis seeks principally to examine the nature of the long-term associations between human well-being and unfavourable employment outcomes. Given the surge in insecure employment and unemployment following the Great Recession, it identifies unemployment and hours-underemployment, being a prevalent type of precarious employment, as major labour market hardships. Specifically, it proposes that (i) unemployment has long-run welfare consequences that can be observed internationally and that (ii) hours-underemployment is an important determinant of psychological well-being both contemporarily and in the long run. Further, it is important to recognise that employment outcomes and psychological well-being may be mutually defined. The third aim of the thesis is therefore to explore whether pre-labour market psychological health predicts employment difficulties, namely unemployment, across life. Three individual chapters explore these distinct research objectives.

Chapter 3 studies the long-term psychological effects of past unemployment across 14 European countries, using a cross-national, longitudinal survey. Past unemployment is shown to predict reduced satisfaction with life and quality of life after the age of 50, after controlling for the influence of country-specific passive labour market policies and macro-economic conditions. Overall, evidence is uncovered that unemployment psychological scarring is a broad, cross-country phenomenon. Chapter 4 sheds new light on the hitherto largely neglected well-being effects of hours-underemployment. Using samples drawn from nationally representative British surveys, it shows that working part-time while preferring to work more hours is substantially associated with elevated psychologicall distress contemporarily, after adjusting for socio-economic confounding characteristics. Moreover, transitions from full-time employment to hours-underemployment appear to predict increased distress over long time intervals, after controlling for unobserved individual heterogeneity. Finally, chapter 5 explores the impact of adolescent mental health on adult unemployment. Using a sample of Swedish males, objective diagnoses of specific subtypes of mental health conditions appear to predict prolonged time spent in unemployment over lifelong labour market trajectories, after adjusting for common family characteristics shared among siblings. Additionally, the long-term unemployment impact of adolescent mental ill-health appears to be magnified during the period following the 1990s Swedish crisis, suggesting that workers with poor mental health may bear disportionately high economic burdens during recessions.

Taken together, these studies highlight the importance of two types of interventions: (i) short-term activation programmes designed to compensate for well-being losses among unemployed and underemployed workers and (ii) long-term preventative interventions aiming to enhance psychological well-being even prior to labour market entry.

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Chapter 1. Psychological well-being and employment outcomes

1.1 Introduction

The present thesis is primarily concerned with the complex relationships between psychological well-being and employment outcomes. Recently, there has been a shift in economics towards acknowledging the importance of individual well-being as a determinant and consequence of economic performance. As Western economies have become progressively wealthier, their priorities have extended beyond covering basic human needs (Diener and Seligman 2004). They have begun to move beyond economic indicators traditionally used to measure the performance of national economies to consider noneconomic factors related to individuals' mental health, emotions, perceptions, and evaluations of life domains, which have emerged as important indicators of national prosperity and welfare. Following these developments, a new framework has emerged which exceeds classic economic indices in order to understand and analyse economic behaviour. The concept of well-being is a basic pillar of this new approach, as it incorporates cognitive, affective and contextual factors which are potentially associated with major economic outcomes, such as labour market success (Diener and Seligman 2004; McGregor and Pouw 2016; Seligman and Csikszentmihalyi 2000).

Psychological well-being has been shown to predict outcomes such as job performance, labour market attachment, absenteeism and benefits take up (Layard 2013). For example, individuals who suffer from early-onset psychological symptoms are more likely to face labour market challenges and adversities, such as low earnings and a reduced likelihood of employment, compared to workers without mental health problems (e.g. Lundborg et al. 2014; Smith and Smith 2010). Moreover, labour market trajectories appear to influence workers' psychological well-being. There is robust evidence in the literature that unfavourable labour market experiences, such as unemployment, are harmful for individual well-being across a diverse range of countries and time periods (e.g. Paul and Moser 2009). Further, high unemployment rates appear to negatively affect human welfare even among the employed populations (Frey and Stutzer 2002). In the present thesis, we take an interdisciplinary approach, combining economics and psychology, to map the links between psychological well-being and labour market adversities. A long-term perspective is adopted to trace out the enduring psychological effects of employment adversities such as unemployment and hours-underemployment and how pre-labour market mental health problems may lead to persistent labour market insecurity across life. Understanding these links is essential for informing public policy, which seeks both to prevent the negative psychological consequences of labour market difficulties and to offer employment opportunities and support to people experiencing psychological problems.

Recent increases in the share of unemployed and underemployed populations across Western countries have brought the implications of such labour market hardships for workers to the centre of attention (e.g. OECD 2013; 2014). While there is a broad consensus that unemployment imposes vast costs on individuals and economies, the study of underemployment consequences is a currently developing field. The formal definition of underemployment provided by the International Labour Organisation (ILO) implies that it may be a damaging experience for workers. Namely, according to ILO, *"the underemployed population is identified by comparing their current employment situation with an "alternative" employment situation that they are willing and available to carry out: simply put, persons in underemployment are all those who worked or had a job during the reference week but were willing and available to work "more adequately"*.[1] This discrepancy between workers' preferences and their actual employment status could be the source of discouragement, reduced self-confidence, uncertainty about the future and decreased satisfaction with work which may extend to other life domains. Based on this evidence, we identify unemployment and underemployment as major difficulties, which workers may face in the labour market. Therefore, we mainly focus on the associations between psychological well-being and outcomes related to unemployment and underemployment.

In this chapter, we review the literature on: i) the influence of adverse labour market experiences on psychological well-being, and on ii) psychological well-being components as predictors of labour market outcomes. Specifically, we summarise the main theories and empirical findings regarding the well-being consequences of past and present spells of unemployment and underemployment. Additionally, we outline existing evidence of the influence of psychological well-being on employment outcomes.

1.2 Employment outcomes as determinants of psychological well-being

1.2.1 Theoretical background

Apart from providing financial stability and security, employment is considered to at least partially fulfil social and psychological needs. Consequently, it is linked to individual mental health and psychological well-being (see, for example, Argyle 1989 and Muller et al. 2005). Psychological theories were used to explain how the daily experience of employment and its absence affect individuals in various ways related to mental processes, attitudes and emotions (e.g. Wanberg 2012). The psychological and cognitive reactions of workers to

[1] The full definition of underemployment can be found here: http://www.ilo.org/global/statistics-and-databases/statistics-overview-and-topics/underemployment/lang--en/index.htm [Accessed: 06 February 2018]

adverse labour market experiences were analysed using conceptual frameworks based on principles and concepts borrowed from the field of psychology. Cognitive, identity and functional theories have been applied to map the psychological benefits of employment and understand the potential harm caused by the lack of it. Experiencing absence of adequate employment, for example, when spending prolonged time in unemployment or engaging in non-typical employment agreements, potentially has psychologically deleterious consequences (e.g. Paul and Moser 2009; McKee-Ryan and Harvey 2011). Understanding the mechanisms of the effects of such employment outcomes on psychological well-being is important for explaining and predicting individuals' performance and behaviour in the labour market. In this section, we review the most influential theoretical models, which explain the links between unemployment and underemployment and psychological well-being.

One of the most prominent theories is the latent deprivation theory proposed by Jahoda (1981; 1982). Apart from the obvious financial rewards it provides, employment is thought of as serving five latent psychological and social functions: time structure; social interactions outside the immediate family; serving common goals; earning a position in the social hierarchy; and, engaging in purposeful activities on a regular basis. People who are excluded from employment even though they are willing and able to work, i.e. the unemployed, are deprived of these psychological benefits. Thus, the unemployed are likely to suffer from reduced psychological well-being compared to the employed. Despite the insightful analysis of how social institutions, such as employment, influence individual well-being, Jahoda's model has been criticised for disregarding the fact that not all types of employment cover the five socio-psychological needs to the same extent. For instance, part-time employment contracts often do not offer the same time structure as full-time employment and jobs in which workers underutilise their skills do not satisfy fully the need for carrying out meaningful duties.

Warr (1987) builds on Jahoda's work, by considering the influence of the social environment of employment on the psychological well-being of workers. He identifies nine environmental features of employment which are important for mental health: autonomy; utilisation of skills; externally generated goals; variety of tasks; environmental clarity; financial remuneration; physical security; social contact; social status. These factors are considered using the analogy of vitamins; intake of the right amount of vitamins is necessary for good (mental) health while vitamin deprivation can cause (mental) ill-health. The vitamin model does not strictly define the psychological consequences of employment-related hardship as the absence of the universally beneficial factors of working. Instead, it allows for a more integrative approach of the psychological impact of both unemployment and various types of employment.

Both the latent deprivation model and the vitamin model do not take into consideration the variability in workers' perceptions and personality traits and thus, the individual heterogeneity in psychological responses to labour market experiences. Fryer and Payne (1984) and Fryer (1986) argue that the psychological impact of any employment situation also depends on individuals' unique perspectives and intrinsic motivation. Fryer (1986) considers individuals as agents who act and make decisions independently and thus, are able to determine their trajectories in the labour market. Assuming that the unemployed are potentially capable of engaging in proactive behaviour, he argues that the severity of the well-being effects of unemployment primarily depends on personal attitudes towards employment experiences. As opposed to the deprivation and vitamin models, which emphasise the universal role of employment in shaping psychological well-being, agency theory suggests that the primary determinant of the psychological impact of adverse employment outcomes, particularly unemployment, is individual disposition towards labour market experiences.

Ezzy (1993) contributed to this strand of the literature by proposing a new framework for studying the relationship between employment hardship and human welfare. Based on the theory of social identity, he suggests that psychological well-being is the byproduct of the interactions between individual perceptions and self-concept and social institutions rather than a simple reaction to environmental stimuli. According to Ezzy's (1993) status passage theory, adverse employment events can be seen as disruptive to individual life-plans, which are developed to validate social identities through engaging in social interactions, serving meaningful purposes and playing self-fulfilling roles. The psychological harm caused by such hardships depends on whether the individual will manage to adapt his or her social identity to the new circumstances or not. Within this framework, employment is not considered a priori a positive experience, facilitating the analysis of the psychological effects of a whole spectrum of employment situations rather than a simple dichotomy of employment versus unemployment.

Nordenmark and Strandh (1999) extend this theory by hypothesising that employment provides resources necessary to meet social needs and pursue socially defined goals. According to their theory, employment problems can generate adverse psychological effects by preventing individuals from accomplishing their socially defined goals. Given that individuals do not develop similar social identities, adverse employment outcomes are predicted to be more psychologically harmful for workers who attach great importance to employment and as such find it hard to adapt to its absence. For example, in the case of a worker who highly values the economic and social merits of employment, the unemployment situation will create reduced resources and opportunities to fulfil social needs, leading to reduced well-being. In other words, the primary assumption of this theory is that the well-being impact of employment hardship depends on how central employment is to individuals'

social identities. Evidently, there is a shift in the theoretical literature regarding the associations between employment outcomes and well-being towards a broader conceptual framework which incorporates the importance of the interactions between individual perceptions, feelings and attitudes and social settings. The product of such theoretical developments is the adoption of inclusive approaches to the study of the links from employment outcomes to mental health and psychological well-being. Such approaches do not only consider inter-personal variability in psychological responses to employment events. They also highlight the importance of differences between various types of work arrangements impacting uniquely on psychological well-being.

Taken together, these theories (Ezzy 1993; Fryer 1986; Fryer and Payne 1984; Nordenmark and Strandh 1999) provide the analytic tools which are necessary to interpret the following aspects of the well-being impact of employment hardship: the unique influence of social and economic factors on the psychological consequences of negative labour market experiences; the individual heterogeneity in psychological responses to employment hardship; and, the differential impact of various employment adversities on well-being. In the present thesis, we adopt this broad perspective, aiming to examine empirically how employment adversities shape workers' psychological well-being and how the psychological effects of such unfavourable outcomes vary across different socio-economic settings. Particularly, we identify a key element of employment adversity: underemployment; and aim to examine its relation with psychological distress to shed new light on the associations between modern types of employment adversity and psychological well-being. Additionally, we examine the long-term well-being effects of past unemployment across Western countries, considering the influence of country-specific socio-economic circumstances on workers' emotional responses to labour market hardship.

1.2.2 Empirical evidence

A large body of economic and psychological literature examines the role of labour market experiences, among which unemployment and underemployment, as predictors of mental well-being. The psychological effects of unemployment have been extensively researched since the 1930s, when unemployment rose dramatically as a response to the Great Depression and the first evidence of its psychological consequences was documented (as described for example in Bakke 1934). On the other hand, the rise in non-standard employment contracts falling into the category of underemployment, which began to take place in the early 1990s and was expanded during the Great Recession, was followed by increasing interest in their associations with psychological well-being (e.g. McKee-Ryan and Harvey 2011). In this section, we chiefly discuss meta-analyses, which summarise the main

findings of numerous studies on the psychological repercussions of adverse employment outcomes, i.e. unemployment and underemployment.

Unemployment

Thus far, a negative link between unemployment and psychological well-being has been established in the literature. Evidence from various reports, which summarise the findings on the associations between unemployment and human welfare, suggests that unemployment predicts elevated psychological distress and reduced life satisfaction across Western economies (Catalano 1991; Dooley and Catalano1988; Hammarstrom 1994; Hanisch 1999; Kasl et al. 1998). We mainly focus on meta-analytic research of longitudinal studies, which analyse the impact of unemployment on individual well-being, after adjusting for demographic covariates and self-selection effects.

Murphy and Athanasou (1999) summarised the results from sixteen longitudinal studies conducted between 1986 and 1996, which examined the psychological impact of moving from employment to joblessness and vice versa. The samples used in these studies were drawn from the UK, USA, Canada, Australia, Norway, Finland, Denmark, Germany and the Netherlands. Some of the surveyed studies considered potential selection effects produced by people with poor psychological well-being being more prone to job loss. Such studies adjusted for vulnerability to labour market hardships due to particular personality traits and psychological well-being prior to the unemployment spell. This work revealed a robust link between unemployment and an increased risk of poor mental health and reduced psychological well-being across gender and occupations. Drawing on nine longitudinal studies, which examined the psychological impact of job loss, it was shown that moving into unemployment predicts a marked increase in psychological distress. Finally, measures of age, gender and country of origin were tested as potential moderators but no such links were evident.

In a more extensive meta-analysis conducted by McKee-Ryan and colleagues (2005), the findings of 104 empirical studies from the period between the 1970s and 2002 on the contemporary psychological impact of unemployment were aggregated. Altogether, the surveyed studies pointed to the psychologically detrimental consequences of unemployment. Among them, eight longitudinal studies explored the psychological burden of individual transitions from employment to involuntary joblessness. Replicating the findings of the meta-analytic study by Murphy and Athanasou (1999), the average effect of job loss on well-being was found to be robust and similar in magnitude. Moreover, it was found that workers' age and duration of unemployment spell influenced substantially the psychological harm of involuntary joblessness. Young labour market entrants and workers who spent prolonged time in unemployment appeared to be more vulnerable to its adverse effects. Finally, it was shown

that social, personal and financial resources to cope with joblessness, values attached to employment and cognitive assessments of the unemployment experience were more important than human capital and demographic factors in shaping emotional reactions to unemployment.

Finally, Paul and Moser (2009) conducted the most recent meta-analytic study to explore the causal links leading from unemployment to reduced psychological well-being. Additionally, they examined the potential moderators of such links which have been documented in the literature so far. More than 300 longitudinal and cross-sectional studies from 26 Western countries, published between 1963 and 2004, were aggregated. The meta-analysis of the 89 longitudinal studies retrieved in the sample revealed that becoming jobless predicted a robust increase in distress levels. Finding a job after a spell of unemployment was found to have an opposite but similar in size effect on distress. They also analysed studies which explored the psychological impact of redundancy because of factory-closure, where workers' baseline psychological well-being is not likely to have influenced the lay-off, to further strengthen the argument that unemployment is causally linked to reduced well-being. Finally, they showed that gender, duration of unemployment spells and occupational status are potential moderators of the psychological consequences of unemployment, with men, workers who spend prolonged time without a job and blue-collar workers being more likely to suffer from impaired well-being during a spell of unemployment.

Besides the contemporary well-being effects of unemployment, there is evidence in the literature suggesting that such effects potentially persist through time. Going through spells of joblessness in the past is shown to have detrimental impacts on the accumulation of economic and social capital, physical health (Wadsworth et al. 1999), cognitive evaluations of well-being (Clark et al. 2001; Knabe and Rätzel 2011; Lucas et al. 2004) and mental health (Daly and Delaney 2013; Strandh et al. 2014), long after the spell has ended and even after re-employment. Further, it has been shown that the well-being scarring effect of unemployment could potentially be triggered by a single but relatively long-lasting unemployment spell occurring at the time of entry in the labour market (Strandh et al. 2014). Young entrants, who are in the process of developing their social identity and labour market behaviour, are sensitive to negative experiences, which discourage human capital investment, and this may have permanent adverse economic and welfare effects (Gregg 2001; Gregg and Tominey 2005; Mroz and Savage 2006). Youth unemployment has been found to diminish individuals' sense of worth, thus leading to worsened future prospects (Goldsmith et al. 1997). Moreover, it has been shown to predict elevated distress levels (Mossakowski 2009), alcohol consumption and mental ill-health (Hammarström and Janlert 2001) after age 30. Strandh et al. (2014; 2015) found that youth unemployment is related to poorer mental health even at age

40 and suggested that psychological scarring could be possibly driven through a combination of diminished long-term coping mechanisms, feelings of despair and learned helplessness.

While meta-analytic studies have uncovered evidence that the effects of unemployment on psychological well-being might vary across countries by comparing longitudinal studies with different countries of origin (e.g. Paul and Moser 2009), the long-term effects of past unemployment on well-being have not been explicitly analysed in a cross-country context. The studies which explore the psychological scarring effects of unemployment mainly use nationally representative samples drawn from a few Western countries; particularly, UK, Germany and Sweden (e.g. Clark et al. 2001; Daly and Delaney 2013; Strandh et al. 2014). In the present thesis, we aim to address this gap, by conducting comparative analysis of the long-term psychological repercussions of past unemployment across a set of Western countries.

Cross-country evidence of unemployment effects

According to recent psychological theories on the links between employment hardship and human welfare, the centrality of employment for workers' social identities shapes the individual well-being impact of adverse employment outcomes (e.g. Ezzy 1993). Undoubtedly, social identities heavily depend on the country-specific socio-economic and cultural settings where they were formed. Therefore, despite the fact that employment is a quite fundamental concept for Western societies, the magnitude of the psychological impact of employment adversities is expected to vary across countries. Cultural, social and economic factors, which are specific to each country, may influence the well-being repercussions of unfavourable experiences in the labour market. It is important to analyse the well-being impacts of employment hardship in their full, international extent and explore potential cross-country variations. Uncovering potential moderators of the psychological harm caused by unemployment at the country level could produce insightful suggestions for policy makers to protect workers from the deleterious effects of negative work experiences.

The distress associated with unemployment has been observed in the majority of European countries and the US, suggesting that the psychological effects of unemployment are a broad, cross-country phenomenon (e.g. Gallie and Pagaum 2000; Gallie and Russell 1998; Whelan and McGinnity 2000). Unemployed individuals appear to be less satisfied with life compared to the employed in all countries examined in the literature, after adjusting for the influence of several individual and country-specific confounding factors. However, the magnitude of the well-being impact of unemployment, which is chiefly measured using self-reported satisfaction with life in this set of studies, appears to vary across the different countries. The question then arises as to what are the country-specific characteristics that potentially influence the psychological reactions of workers to being jobless while they are available and willing to work. Existing literature has hypothesised that welfare state

interventions in the labour market moderate the psychological impact of employment hardship and, particularly, unemployment (see for example, Gallie and Pagaum 2000 and Wulfgramm 2014). Moreover, labour market policies, including passive measures such as unemployment insurance and activation programmes, have been shown to have a direct effect on human welfare (Ochsen and Welsch 2012; Di Tella et al. 2003). Specifically, employment protection and unemployment benefits appear to have a positive average effect on life satisfaction across gender, occupational status and age (Ochsen and Welsch 2012). Further, Di Tella et al. (2003) indicated that the generosity of welfare provision towards the unemployed is substantially associated with increased national well-being across twelve European countries and the US.

Therefore, it is reasonable to assume that welfare state generosity may determine how workers experience unemployment and how they perceive such an experience. Labour market policies designed to protect the unemployed possibly reflect social perceptions of failure in the labour market and attitudes towards jobless workers. For instance, high levels of unemployment benefits could reflect prevailing notions that unemployment is not a personal failure but rather an unfortunate event, which could happen to anyone. Hence, generosity of the welfare state may mitigate the psychological consequences of unemployment through non-pecuniary mechanisms. On the contrary, low unemployment benefits available for a limited period of time or low coverage of unemployment insurance could reflect stigmatisation of the unemployed, thus, magnifying the harmful impact of unemployment (Gallie and Paugam 2000).

Evidently, labour market policies potentially explain cross-country variation in the psychological consequences of unemployment. A set of cross-country studies uncovers evidence that unemployment is a psychologically harmful experience across countries (e.g. Whelan and McGinnity 2000) and that between-country differences in labour market policies influence the magnitude of the well-being effects of involuntary joblessness. For example, Gallie and Paugam (2000) showed that passive and active labour market policies are important moderators of the effects of unemployment across Europe. Unemployment benefits provide material support to the unemployed and activation programmes potentially serve some of the psycho-social functions of employment at a certain extent, thus mitigating the damage caused by joblessness. The authors also pointed out the importance of country-specific cultural and economic factors in shaping psychological reactions to unemployment; for example, the role of the family in supporting the unemployed and the influence of economic change on values attached to employment.

Moreover, Gallie and Russel (1998) tested whether level of unemployment, demographic composition of the unemployed group, social meanings attached to employment

and generosity of welfare provision explain cross-country differences in the contemporaneous well-being effects of unemployment. They concluded that the country-specific factor, which mostly affects the psychological impact of unemployment, is level and duration of benefits in ten European countries. In agreement with this finding, Ochsen and Welsch (2012) uncovered evidence that employment protection and benefit generosity reduce the negative effect of being unemployed on life satisfaction across ten countries in central, southern and northern Europe. They also discussed that unemployment benefits are potentially more beneficial to and thus, may be chiefly favoured by groups of labour market outsiders such as unemployed, women and older workers. Finally, Wulfgramm (2014) identified benefit generosity and duration as moderators of the negative impact of unemployment on life satisfaction in 21 Western countries. Active labour market programmes did not appear to play a major role in shaping the contemporary impact of unemployment on subjective well-being. Additionally, it was shown that the effects of labour market policies were driven by both pecuniary and non-pecuniary mechanisms, with the latter being related to social status and stigmatisation of the unemployed. We extend this literature, which mainly focuses on the cross-country contemporary effects of unemployment on well-being, by examining the psychological scarring effect of unemployment across 14 European countries, after considering the influence of country-specific prevailing economic conditions and passive labour market policies.

Underemployment

In contrast to unemployment, being clearly defined as not having a job while looking for one, the concept of underemployment is less definite, with various definitions and measurements being used in the literature (Feldman 1996; McKee-Ryan and Harvey 2011). According to the main definition provided by the ILO, underemployment is conceptualised as having a job, which is inadequate, compared to the one the worker is willing and able to do (Hussmanns 2007). For example, underemployed workers are viewed as those who would like to change their employment situation because they prefer to work more or less hours, or because their current job limits their skills and capacities and negatively influences their well-being at the workplace. Employment can be insufficient relative to standards related to various dimensions, such as wages, working hours and utilisation of skills and competencies. For instance, Friedland and Price (2003) identify four types of underemployed workers: the *"hours-underemployed"*, the *"skills-underemployed"*, the *"income-underemployed"* and finally, the *"status-underemployed"* workers who have jobs with occupational status, which does not match their background.

Prior work, which examines the psychological consequences of underemployment, has resulted in contradictory findings primarily because of failing to adopt a consistent definition

of underemployment. This stream of research could be divided in two groups: (i) studies which use objective indicators to identify underemployment, such as working below a specific threshold of hours per week or engaging in a temporary employment agreement and (ii) those which take under consideration workers preferences and satisfaction with their work situation. For example, the studies which analyse the psychological influence of part-time employment, measured using objective indicators of weekly working hours, do not find any substantial effects of part-time employment on well-being (Bardasi and Francesconi 2004; Booth and Van Ours 2008; Rodriguez 2002). On the other hand, the studies, which use an objective threshold of numbers of hours worked per week combined with the workers' preferences to identify time-related underemployment, uncover evidence that involuntary part-time employment potentially triggers symptoms of depression, low self-esteem and negative self-image (Dooley et al. 2000; Friedland and Price 2003; Page et al. 2013; Prause and Dooley 1997; Wooden et al. 2009).

In this section, we summarise prior work that identifies underemployment as a mismatch between the current work situation and the job workers would prefer and are able to do. In a review of the literature on the nature, determinants and influences of underemployment, Feldman (1996) reports the findings on the psychological consequences of being underemployed from studies conducted chiefly in the 1980s and early 1990s. The reviewed studies suggested that underemployment may predict depression and lower self-esteem. Additionally, the negative psychological consequences of underemployment were shown to be comparable to those of unemployment. Interestingly, this finding contradicts the theoretical predictions of various conceptual frameworks, such as the theories developed by Jahoda (1981; 1982), which describe employment as a psychologically beneficial experience without distinguishing between different employment types and considering workers' preferences.

Based on this evidence, the newly revealed detrimental impact that underemployment may have on human welfare begun to gain greater attention. In a recent interdisciplinary review, McKee-Ryan and Harvey (2011) documented the latest developments in underemployment research, building on the work by Feldman (1996). Discussing studies chiefly conducted in the late1990s and early 2000s, they delineated the detrimental effects of various types of underemployment, such as involuntary part-time employment, skills mismatch and poverty wage jobs, on psychological well-being. They found evidence in the literature that underemployment may trigger symptoms of depression, anxiety and self-doubt. Particularly, perceived over-qualification was found to be associated with higher levels of depression and psychosomatic symptoms between adult workers and reduced self-esteem and optimism among younger workers. Moreover, underemployment appeared to have

disproportionately detrimental psychological consequences for immigrants and displaced workers.

Anderson and Winefield (2011) conducted an integrative review of the literature focusing on the well-being impact of underemployment. They examined the literature from the same period as in McKee-Ryan and Harvey (2011). They argued that even though underemployment is observed to have detrimental psychological effects, the majority of the studies were cross-sectional, failing to uncover links leading from underemployment to individual well-being. Most of the reviewed studies mainly observed differences in well-being between groups of adequately and inadequately employed individuals, without being able to ascertain whether these differences can be attributed to employment situation or other socio-economic characteristics. To address this shortcoming, the authors analysed the limited set of longitudinal studies that looked into the psychological consequences of underemployment. These studies, which mainly followed samples of workers from the time of entry in the labour market, suggested that discrepancies between workers' preferences and their current job may have harmful well-being consequences. For example, it was shown that underemployment predicts elevated probabilities of adopting risky health habits, such as alcohol and drug abuse. Additionally, they found that different types of underemployment have unique effects on psychological well-being; for instance, *"income-underemployment"* was found to be associated with symptoms of depression and low self-esteem whereas *"status-underemployment"* predicted worse physical health and lower self-concept but did not substantially impact on mental health. Time-related underemployment appeared to affect negatively various indicators of well-being, including life satisfaction.

In summary, the literature on the psychological effects of underemployment is limited in that the majority of the studies depend on cross-sectional data or imperfect study designs, failing to adjust for individual heterogeneity and self-selection biases. We address this gap by explicitly examining the contemporary psychological repercussions of a prevalent type of underemployment, namely, hours-underemployment, using up-to-date statistical techniques. Moreover, we add to this stream of research by exploring whether transitions between hours-underemployment and regular, full-time employment predict changes in psychological well-being over long labour market trajectories.

1.3 Psychological well-being as a predictor of employment outcomes

1.3.1 Theoretical background

As outlined above, the link from unfavourable employment outcomes to psychological well-being has been extensively researched and well-documented in the theoretical and

empirical literature (see, for example, Ezzy 1993; McKee-Ryan and Harvey 2011; Paul and Moser 2009). However, the connections between well-being and career outcomes are not limited to the psychological repercussions of individuals' experiences in the labour market. It is likely that well-being and labour market trajectories are determined simultaneously. Employment hardships, such as unemployment, may traumatise workers psychologically and such psychological damage can lead to poor performance and worse employment outcomes in the future. Theories such as the social psychological theory of hysteresis (Darity and Goldsmith 1993) and the reverse causation theory (Kasl 1982) theoretically substantiate this argument. It is hypothesised that there may exist a vicious cycle of impaired well-being due to unemployment leading to discouragement, pessimism and damaged coping mechanisms and thus, fruitless job search, which in turn, potentially results in prolonged unemployment in the future.

Moreover, according the Erikson's (1959) life-span development theory, the formation of individual identity consists of intertwined stages, in which individuals' interactions with their external environment shape their perceptions, attitudes and outlook on life. In this framework, self-esteem and self-efficacy, which are linked to psychological well-being (Ryff 2014), play a central role in shaping economic performance and behaviour. Psychologically healthy individuals, who have managed to develop autonomous and industrious identities, are expected to perform better in the labour market compared to self-doubting workers. Additionally, workers' adaptation to job loss, which is considered to be a major life-changing event, is expected to determine their identities. These predictions further support the argument that psychological well-being and labour market experiences could be mutually determined.

Consequently, a comprehensive analysis of the relationships between psychological well-being and individual careers requires the exploration of the links from affective and cognitive well-being to work-related outcomes. There is conceptual and empirical support in the literature that psychological well-being is an important predictor of attachment to the labour market and employment outcomes (e.g. Darity and Goldsmith 1996; Lagerveld et al. 2010; Staw et al. 1993). Prior theoretical literature on this subject has emphasised the importance of self-esteem and positive affectivity, as in experiencing and displaying positive feelings and moods, in influencing employment events (e.g. Brockner 1988; Darity and Goldsmith 1996; De Neve et al. 2013). Further, the importance of psychological capital, comprising elements such as optimism, resilience and self-efficacy, for employment-related achievement is highlighted in this literature (e.g. Goldsmith et al. 1997).

Korman (1970) uses the self-consistency theory to formulate the hypothesis that individuals will choose to perform in a way that is consistent to their self-image. For instance, confident workers who perceive themselves as worthy of being entrusted with challenging

tasks are expected to demonstrate diligence and accountability at the workplace. Therefore, positive self-concepts, reflected in self-perceived competency and self-confidence, are associated with high performance. Moreover, self-esteem has been identified as a determinant of occupational choice. Tharenou (1979) reviewed the literature on self-esteem and employee behaviour at the work place and suggested that self-consistency theory explains the relationships between self-esteem and occupational choice. She also highlighted self-esteem as an important predictor of on-the-job performance. In agreement with this argument, Brockner (1988) indicated that many concepts related to self-esteem, such as self-confidence and self-assurance, are associated with work performance, job search and the probability of a layoff. Individuals with high levels of self-esteem are more likely to handle stressful situations and be less vulnerable to external negative influences compared to workers who doubt their skills and competencies. The control they are able to assert over their careers potentially helps them to overcome hardships, such as unemployment or underemployment, by actively seeking for work. However, we cannot exclude the possibility of reverse causality in the relationship between self-esteem and job performance, as there is evidence that the associations between them are highly variable (Baumeister et al. 2003; Ferris et al. 2010). For example, it has been shown that career success might boost self-esteem while employment adversities may deflate it (Baumeister et al. 2003). The concept of contingent self-esteem, which mainly represents the extent to which workers perceive their personal worth as an outcome of perceived failure or success in the workplace, was introduced to explain the links from self-esteem to job productivity (Ferris et al. 2010).

Darity and Goldsmith (1996) went one step further by developing a behavioural macro-economic model of labour market demand and supply, which takes into consideration the relationships between employment outcomes and psychological well-being. According to this model, psychological well-being is a major determinant of labour market supply and productivity. They suggest that psychological well-being components, such as self-esteem, determine the level of *effective* human capital, which is the share of skills and competencies actually utilised by workers. In other words, workers' effective human capital depends on their psychological health; particularly, their optimism, positive self-concept and emotional stability. Such attitudes and behavioural traits, which reflect workers' psychological well-being, predict labour market performance by influencing workers' behaviour and skills utilisation at the workplace.

Further, Staw et al. (1993) hypothesised that positive emotions are substantially associated with favourable work-related outcomes, such as higher productivity. Positive emotions encourage more productive cognitive functioning; for example, optimism was shown to lead to effective decision-making and creative problem solving. Moreover, positive feelings and moods predict greater persistence and more intensive task activity. With respect

to interpersonal relationships at the workplace, people with positive emotions appear to be more interpersonally attractive, influential and able to inspire altruism and cooperation. In summary, expressing positive emotions is expected to have desirable effects on work-related outcomes, through the following mechanisms: enhancing individual skills and cognitive processes; triggering favourable responses from co-workers and managers to the employee; and, motivating the employee to behave attentively and amiably towards others at the workplace. For example, being positive and optimistic influences work achievement by predicting better performance evaluations from superiors at work and higher financial rewards. Positive affectivity, reflected in adopting positive attitudes at work, potentially encourages the establishment of a supportive social context, which can be beneficial for both the employee and other people at the workplace. In agreement with these theoretical predictions, De Neve et al. (2013) highlighted the importance of happiness for job performance. They argued that workers with positive emotions tend to be more productive at work because they are healthier; have better social relations; are able to integrate information and come up with new ideas more easily; and are more persistent in pursuing their goals, thus, being more productive at work compared to unhappy workers who experience negative moods and emotions.

As such, to date the theoretical literature has focused on psychological well-being as a determinant of employment outcomes and workers' achievements within the workplace. The implications of this theoretical work have not been extensively applied to examine the risk of unfavourable employment outcomes among people who suffer from low well-being. For example, workers with poor psychological well-being might engage in employment agreements which they consider inadequate, such as hours-underemployment, because of lack of confidence that they will manage to find a better job (e.g. Tharenou 1979). Moreover, given the proposed linkages between low well-being and reduced job performance, it is likely that such 'underperforming' workers may be at risk of employment adversities particularly during adverse economic conditions where layoffs and redundancies are required (e.g. Egan et al. 2016; Evans-Lacko et al. 2013). For example, the associations between low self-esteem and increased probability of job loss (Brockner 1988) might be magnified during economic downturns when employers might seek to minimise employee costs, resulting in increased risk of exposure to unemployment. Moreover, low self-esteem might discourage job search activities (Brockner 1988), especially in times of labour market slack.

Based on the implications of these theories linking poor psychological well-being to reduced work performance, we empirically examine whether poor mental health is a predictor of failures in the labour market. Particularly, we investigate whether mental health disorders, such as depression, neurotic conditions, personality disorders and abuse of alcohol and other substances, linked to damaged components of psychological well-being (e.g. Ryff and Singer

1996), predict prolonged unemployment spells over long time intervals. Moreover, we take into consideration the impact of economic downturns on the unemployment outcomes of poor psychological health.

1.3.2 Empirical evidence

As discussed above, various psychological theories explain the links between elements such as self-esteem, positive attitudes and resilience to performance in the labour market. It has been shown that there is conceptual overlap with such elements and psychological well-being. For example, Ryff (1989) has shown that self-acceptance, which is similar to the self-esteem construct (Rosenberg 1965) is strongly correlated with traditional psychological well-being measures; particularly, life satisfaction, moods and emotions. Moreover, self-esteem is closely related with psychological health (e.g. Mann et al. 2004) while positive attitudes and emotions were found to be associated with dimensions of psychological well-being such as happiness (e.g. Fredickson 2001; Kahneman 1999). Therefore, the theoretical relationships between those specific features and individual careers are indicative of potential links from various well-being components and psychological health to employment success.

While the links from the whole spectrum of well-being dimensions to employment outcomes are not fully explored, the basic guidelines for explaining the impact of psychological well-being on employment outcomes can be found in the theoretical models discussed above. Moreover, there is empirical evidence suggesting that various other components of psychological well-being determine workers' labour market trajectories. Particularly, empirical studies focus on the impact of self-esteem, mental health conditions and psychological distress in predicting contemporary and future labour market experiences. The majority of such studies focus on productivity, earnings and employment as functions of psychological well-being. For example, Goldsmith et al. (1997) explored the impact of psychological capital on job earnings among American young workers and showed that self-esteem has substantial positive effects on wages. Interestingly, the financial impact of self-esteem was found to be larger compared to financial returns to human capital, as reflected in schooling, accumulation of basic skills and work experience. Further, Judge and Bono (2001) conducted a meta-analysis of the links between several features of psychological capital and job performance. They analysed all relevant studies conducted between 1967 and 1997 to show that self-esteem and self-efficacy are substantially correlated to increased job performance.

Besides self-esteem, which has strong affective components (Rosenberg et al. 1995) and strongly correlates with psychological well-being (e.g. Ryff 1989), other measures of psychological well-being have been shown to predict work outcomes. For example, links have been established between adult happiness and productivity, with low levels of happiness

being systematically related to low performance at work (Oswald et al. 2015). Additionally, adult common mental health conditions, such as depression, anxiety-related disorders and alcohol and drug dependence, are linked to worsened labour market outcomes in empirical literature. Lagerveld et al. (2010) conducted a systematic review of the literature exploring the links between depression and work participation and functioning. They summarised all studies conducted between 1995 and 2008, which examined whether depression-related factors predict outcomes associated either with employment or productivity. They found that long duration of depression symptoms is associated with increased probability of being absent due to disability. Additionally, they showed that the severity of workers' depression symptoms predicted lower productivity and limitations in fulfilling interpersonal, time management and output-related tasks. While the majority of the studies reviewed by Lagerveld et al. (2010) were cross-sectional, longitudinal evidence also suggested that the onset of specific mental health disorders is associated with unsatisfactory labour market outcomes. For instance, adults who were diagnosed with neuroses or psychoses were shown to have decreased earnings and reduced working hours even 20 years after the diagnoses (Bartel and Taubman 1979). Additionally, suffering from any type of mental disorder appeared to reduce the probability of being employed and increase the likelihood of dropping out of the labour market among American (Banerjee et al. 2015; Chatterji et al. 2011; Ettner et al. 1997) and Latino workers who lived in the US (Chatterji et al. 2007).

Psychological problems during childhood and adolescence have been also shown to predict difficulties in the labour market, such as reduced earnings and lower probabilities of employment in adulthood (e.g. Goodman et al. 2011; Smith and Smith 2010). Suffering from low self-esteem (Trzesniewski 2006), elevated psychological distress (Egan et al. 2015; 2016) and self-reported depression symptoms (Fletcher 2013) at young age have been shown to be substantially associated with increased risk of unemployed, longer duration of unemployment spells and increased probability of dropping out of the labour market. Assessing psychological health prior to labour market entry further establishes links from poor psychological well-being to adverse work outcomes, by reducing the possibility of bias due to reverse causation. Notably, the long-term economic damage inflicted by poor psychological health during childhood has been shown to exceed the negative influence of physical health problems, suggesting that maintaining good psychological well-being is crucial for economic success (e.g. Goodman et al. 2011; Lundborg et al. 2014). Interestingly, Lundborg et al. (2014) showed that adolescent mental health disorders, such as alcohol and drug abuse, personality disorders and neuroses, have the harshest effects on adult earnings compared to any other physical health problem.

Finally, there is another aspect in the links from psychological well-being to labour market outcomes, which should be explored in order to fully comprehend the effects under

analysis. This aspect is the influence of the country-specific settings, where people live and work, on their experiences in the labour market, their emotional reactions to such experiences and the development of their psychological well-being. Macro-economic conditions, which affect the performance of the labour market, may have a substantial impact on the effect of psychological well-being on employment prospects. Specifically, it is shown that economic crises magnify the effect of impaired well-being on unemployment across countries, making it harder for people who suffer from psychological problems to remain attached to the labour market (Egan et al. 2016; Evans-Lacko et al. 2013). Taking into consideration the socio-economic background, where labour market trajectories are shaped and individual psychological well-being is developed, is crucial for grasping the whole picture of the interactions between well-being and work-related outcomes.

Empirical literature on adult mental health and individual careers mainly addresses outcomes such as earnings, performance and employment while the impact of mental ill-health on unemployment has not been extensively examined yet. Moreover, the studies that explore the long-term labour market impacts of poor psychological health at young age chiefly rely on general assessments of psychological health, such as psychological distress and emotional maladjustment. We extend these streams of literature by identifying whether adolescent mental health predicts subsequent unemployment over lifelong labour market trajectories. Moreover, we examine whether the unemployment effects of adolescent poor mental health varies by subtypes of mental disorders, such as depressive, neurotic, personality and alcohol and drugs abuse and dependence conditions, which were diagnosed by mental health professionals in adolescence. Finally, we contribute to the small literature on the influence of macro-economic conditions on the links from psychological well-being to employment outcomes, by explicitly analysing the impact of a macro-economic shock on the unemployment effects of adolescent mental health disorders diagnosed prior to the crisis.

Chapter 2. Overview of the thesis

Chapter 1 outlined the main theories explaining the connections between psychological well-being and employment outcomes and documented the empirical findings which validate the predictions of these theories. The present chapter discusses the rationale of the thesis, the research questions we address and their relevance to prior literature. Additionally, the datasets used for the empirical research and the methodologies adopted to uncover the relationships of interest are outlined. This chapter is essentially an entry into chapters 3, 4 and 5, which present in detail the empirical analyses conducted in the context of the present thesis.

2.1 Research synopsis

The main purpose of the current thesis is to break new ground in understanding the connections between well-being and unfavourable employment outcomes. Two issues that have been highlighted in the aftermath of the Great Recession are the long-term welfare consequences of unemployment and the well-being consequences of underemployment. Moreover, since psychological well-being and employment outcomes are likely to be determined jointly, the investigation of the opposite direction of the relationships between psychological health and employment adversities is necessary to complement the analysis. On these grounds, the present thesis sets three distinct research objectives: (i) to explore the long-term psychological well-being effects of unemployment on a cross-country setting, (ii) to examine the well-being repercussions of hours-underemployment contemporaneously and in the long-run and, (iii) to study the impact of poor psychological health on subsequent unemployment over long trajectories in the labour market. In line with the theories that emphasise the long-term associations between psychological health and employment outcomes, the focus of this thesis is to unravel the links from psychological health to employment adversity and vice versa over time. To address the three objectives set out above, individual employment experiences are observed over either lifelong employment trajectories or over long time intervals (e.g. 20 years).

As discussed in chapter 1, extensive work has been devoted to explaining and substantiating the associations between individual performance in the labour market and workers' self-concepts, emotional health and cognitive evaluations of life domains. This review uncovered three key research gaps which merit further research. First, whilst the psychological impact of past unemployment has been documented, this phenomenon has not been investigated using large-scale cross-country data thus far. Prior cross-country comparisons have focused on the contemporaneous well-being impact of unemployment experiences and neglected the potential long-term residual effects of these experiences (Gallie

and Paugam 2000; Whelan and McGinnity 2000). To address this gap, we explore the long-term psychological repercussions of unemployment in a cross-country European setting. Additionally, we test whether between-country differences in welfare state policies towards the unemployed can predict differences in the well-being effects of past unemployment across countries in southern, northern and central Europe. For example, it has been shown that country-specific characteristics, such as national and regional unemployment rates, dominant attitudes and welfare state generosity towards the unemployed, potentially influence the experience of unemployment per se and thus, its psychological repercussions (e.g. Gallie and Paugam 2000; Wulfgramm 2014).

We focus on unemployment because it is considered a major hardship, which can pose threats to individual prosperity and welfare. According to the latest employment outlook issued by the OECD (2017), even though the average European unemployment rate has gone back to its pre-recession levels, European labour markets are still struggling with the adverse consequences of its dramatic rise following the 2008 crisis. Apparently, the prevention of a persistent rise in structural unemployment came at the price of decreased job quality, reduced wages and poor productivity among the more resilient European labour markets. On the other hand, more rigid markets are still striving to overcome high unemployment rates. This situation is further exacerbated by the striking rise in youth and long-term unemployment across member countries of the European Union persisting up to 2016.[2] The rise in unemployment in Western economies is quite alarming given the negative consequences of involuntary joblessness. Besides its economic repercussions, there is robust evidence in the literature showing that spells of unemployment are associated with various adversities at the individual and social level, such as suicide (Milner et al. 2013), alcoholism (Mossakowski 2008) and increased risk of mortality particularly at early and medium career stages (Roelfs et al. 2011). Comprehending the links between unemployment and well-being at the European level is crucial for both mitigating the far-reaching impact of unemployment for human welfare and designing interventions to help people who are more likely to experience job loss to avoid unemployment.

Second, the links between particular types of underemployment and psychological well-being have not been examined extensively. Existing literature has been restricted by inadequate definitions of underemployment (e.g. Booth and Van Ours 2008) and imperfect study designs, which fail to isolate the links from underemployment to psychological well-being (e.g. Friedland and Price 2003). Moreover, there are only a few longitudinal studies, which look into the psychological effects of underemployment, dating back to 1990s and

[2] Detailed statistics on unemployment rates across OECD countries can be found in the following link: https://data.oecd.org/unemp/unemployment-rate.htm [Accessed: 06 February 2018]

early 2000s (for example, Dooley et al. 2000). We contribute to this literature by examining the effect of a specific type of underemployment, namely hours-underemployment, on various dimensions of the psychological well-being of British workers who work part-time because there were no other available options. Moreover, the effects of transitions between part-time and full-time employment on changes in psychological well-being through time are investigated.

We examine the psychological impact of hours-underemployment because it emerges as a major type of underemployment, which is considered to augment inequality and decelerate economic growth (OECD 2014). According to the OECD, the surge in the share of workers who unwillingly engage in part-time contracts following the 2008 crisis contributed to social disparities, with part-time workers facing lower earnings and higher insecurity compared to full time employees.[3] Moreover, hours-underemployment is shown to be associated with a set of harmful consequences for human welfare. Specifically, involuntary part-time employment is linked to discouragement potentially leading to higher probability to drop out of the labour market (Bell and Blanchflower 2011), elevated levels of depression (Bell and Blanchflower 2010), mental ill-health (Dooley 2003), alcohol abuse among young adults (Dooley and Prause 1998), marital strain, damaged interpersonal relationships, increased crime rates and reduced social resources (Pedulla and Newman 2011). Taken together, this evidence highlights the need for a better understanding of the well-being impact of involuntary part-time employment, facilitating the design for effective policy interventions to foster underemployed workers.

Finally, it is important to explore the opposite direction of the relationship between psychological well-being and employment outcomes. Apart from the causation mechanism connecting employment hardship to reduced levels of well-being, there might also be a selection mechanism, indicating that unhappy people are more likely to find themselves in adverse situations in the labour market. In the studies which look into the psychological harm caused by unemployment, there is evidence which suggests that workers who have affective disorders or demonstrate low levels of subjective well-being may self-select into adverse labour market states including unemployment (Paul and Moser 2009; Winefield 1995). For example, it is suggested that workers who suffer from psychological distress are more susceptible to the risk of a layoff, because of poor performance or extended absence due to sickness. Additionally, people with psychological problems are probably less likely to get re-employed, because they might invest fewer resources to job search or be more likely to get rejected by employers (Mastekaasa 1996). Moreover, direct links from poor mental health during adolescence and childhood to adverse economic outcomes have been documented in

[3] The full report can be found in the following link: http://oe.cd/cope-divide-europe-2017 [Accessed: 06 February 2018]

the literature (see for example Currie 2009; Egan et al. 2015; 2016) further supporting the argument that psychological health is an important predictor of employment prospects. Given that mental ill-health has been shown to account for 40% of the health problems of working age population in advanced economies (Layard 2013), assisting people with poor mental health to remain employed and increase their performance at work emerges as a major policy concern (OECD 2015). Delineating the associations between mental health conditions and employment prospects could provide important insights for policy aiming to tackle the economic burden of mental illness.

Related to the above, the third key research gap that we identified in prior literature is that the links from impaired psychological health to unemployment have not been unravelled in full. Most of prior work focuses on the impact of psychological well-being on work-related outcomes, such as earnings and job performance. Additionally, the studies, which do examine unemployment per se as an outcome of psychological well-being (e.g. Egan et al. 2015; 2016), mainly focus on self-assessed psychological distress while the links between other well-being dimensions and the likelihood of spending time in unemployment remain unclear. In the present thesis, we identify specific mental health conditions, including affective, personality and alcohol and other substance dependence disorders, as predictors of unemployment spells across lifelong labour market trajectories of young Swedish workers. Additionally, we explore the influence of the 1990s Swedish macro-economic crisis on employment prospects of workers with early-onset mental health conditions.

2.2 Datasets and methodology

2.2.1 Data

The research questions discussed in the previous section are addressed quantitatively using samples drawn from national and cross-country surveys. We examine the relationships between psychological well-being and employment outcomes both at a single point in time and over extended intervals. For this purpose we chiefly use longitudinal datasets, which allow us to observe the development of individual psychological well-being and labour market trajectories through time. We use panel, cohort and retrospective surveys, which follow individuals over prolonged periods of time and document various aspects of their past and present lives. Additionally, these datasets contain information about childhood and adolescent factors known to predict employment prospects and well-being, including variables relating to health, cognitive abilities and parental socio-economic background. Therefore, we are able to both identify patterns and changes in individual characteristics that may vary temporally and observe traits and background factors prior to labour market entry,

which may affect psychological well-being and career prospects and explain their interrelation. One basic advantage of this detailed documentation of individual lifelong experiences and living conditions is that it allows adjusting for the influence of both time-varying and constant confounding factors on the effects of interest.

In the studies which aim to investigate whether employment outcomes predict impaired psychological well-being, we chiefly compare what we define as employment hardship, specifically being unemployed or employed under undesirable conditions, to being employed. Particularly, we compare being jobless while being able to work and looking for a job to being in any type of employment. Additionally, we compare being in involuntary part-time employment to working full-time. For this purpose, we use samples of people who actively participate in the labour market, excluding those who are economically inactive either because of retirement, home production, education or sickness and disability. In chapter 3, we draw a sample of employed and unemployed workers from the cross-country Survey of Health, Ageing and Retirement in Europe (SHARE) to examine the psychological repercussions of past unemployment on future psychological well-being on the individual and the cross-country level. In chapter 4, we use a sample of full-time and part-time workers from the National Child Development Study (NCDS) to study the contemporaneous impact of hours-underemployment on psychological well-being. Finally, we use an alternative sample consisting of full-time and part-time workers, who were followed on an annual basis in the British Household Panel Survey (BHPS), to examine whether transitions between full-time employment and hours-underemployment can predict changes in psychological well-being over time.

SHARE is a longitudinal, cross-national survey, which follows elder people who live across 27 countries in Europe. It consists of probability samples drawn from each surveyed country, which are representative of the population of people aged 50 or over (Alcser et al. 2005). Information about respondents' various life domains, including self-assessments of psychological well-being, is chiefly gathered in prospective waves. Moreover, the third wave of SHARE is retrospective, collecting information about respondents' childhood, work and health histories with the use of the Event History Calendar (Freedman et al. 1988). Taking under consideration the disparities in the structure of the various SHARE waves, we use that combination of prospective and retrospective waves which results in the broadest sample, including 14 countries and a large group of respondents.

The retrospective wave of SHARE, which is essential for the creation of the basic explanatory variable regarding respondents' past unemployment spells, has one prominent limitation. People are susceptible to recall errors when it comes to past unemployment experiences, especially for longer recall times (e.g. Manzoni et al. 2010; Mathiowetz and

Ouncan 1988; Paull 2002). Such recall errors result in underreported unemployment spells and simplified employment careers, with fewer episodes and transitions in general. It is argued that this happens because people can recollect more easily bundles of positively defined social activities and roles attached to a specific labour market status rather than the absence of them. Therefore, people tend to confuse past unemployment spells with other statuses. For example, women are shown to frequently redefine past unemployment as time spent in home production (Manzoni et al. 2010), while older people tend to redefine past unemployment as being out of the labour force (Paull 2002). However, Dex and McCulloh (2001) showed that there are ways to minimize bias, for instance by adopting approaches which use noteworthy and salient events as reference points for assisting respondents to remember what had happened around them. Additionally, Freedman et al. (1988) showed that the longer the duration of the unemployment spell the more likely that people will precisely recall it. Data collection in the retrospective wave of SHARE was conducted with a method similar to those described by Dex and McCulloh (2001), the Life History Calendar (Freedman et al. 1988), which is shown to facilitate accurate recollection of past events (Belli 1998). Moreover, the respondents were asked if they had experienced a spell of long-term unemployment, lasting 6 months or longer, in each year following their entry in the labour market. Therefore, both the design of the retrospective survey and the measure of past unemployment experiences aims to minimise memory bias. In our study we suggest these steps may reduce serious underestimation of the true well-being consequences of past unemployment.

Samples of British part-time and full-time workers drawn from the BHPS and the NCDS are used to uncover evidence of the repercussions of involuntary part-time employment on workers' psychological well-being in Chapter 4. The NCDS is a cohort study following over 17,000 individuals who live in England, Scotland and Wales and were born in a single week in 1958. It contains detailed information on study subjects' employment outcomes, psychological well-being and socio-economic background starting from early childhood. The main constraint imposed by the dataset is that we cannot rule out the possibility that the observed well-being impact of hours-underemployment is spurious and driven by cohort effects. For example, people who were born during a particular week in the UK may share common experiences related to historic events, economic and social prevailing conditions which might influence the development of their psychological well-being and their probability to end up in involuntary part-time employment. Additionally, we create an alternative sample of part-time and full-time workers drawn from the BHPS, which is a household-based panel survey, annually following household members who live in the UK. Using this sample, we are able to observe the links between switching from full-time to involuntary part-time employment and variations in psychological well-being across long

intervals in respondents' careers. Based on such a complementary analysis, we further support the argument that the observed well-being harm caused by hours-underemployment is not the outcome of confounding cohort-specific factors.

Finally, in Chapter 5, we examine the links from psychological well-being to future employment hardship, using a unique dataset, comprising conscription and other registry information on Swedish males' mental health, labour market trajectories and socio-economic background. This dataset covers the whole population of Swedish men, who underwent compulsory enlistment between 1969 and 1994, and provides objective diagnoses of early-onset mental health conditions and unemployment events. The analysis conducted using this sample is not subject to self-response bias, as all information regarding study subjects' psychological well-being and unemployment experiences are documented by Swedish public authorities. However, the dataset has one key limitation. Specifically, the administrative data detailing unemployment experiences for each year spent in the labour market does not indicate the amount of time participants were employed or out of the labour force during the same period. As such it is not possible to identify the effect of adolescent mental health on the probability of being unemployed compared directly to being employed. This may lead to underestimation of the true impact of mental health disorders on future exposure to unemployment. Nonetheless, the information about total number of days spent in unemployment up to 2012 is available, allowing for the examination of the aggregated effect of adolescent mental ill-health on unemployment over long labour market trajectories to be estimated.

2.2.2 Measures of employment outcomes, psychological well-being and confounding characteristics

In the quantitative analysis discussed in chapters 3-5, we use various indicators and measures of employment hardship and psychological well-being. Moreover, we adjust for various socio-economic characteristics, which may influence both individual well-being and predict employment outcomes. Controlling for the influence of such confounding factors facilitates the isolation of the links from psychological well-being to employment outcomes and vice versa.

Employment outcomes

In chapter 3, we examine whether past unemployment can predict contemporary psychological well-being. We use self-reported information about respondents' employment status drawn from SHARE, where unemployment is defined as being jobless while seeking work. We use a binary indicator for contemporary unemployment, measured between 2006 and 2007. Additionally we use a count measure of the number of unemployment spells the

respondents had gone through from the time of entry in the labour market and up to 2005, a year before their psychological well-being was measured.

In chapter 4, we investigate the links from hours-underemployment to psychological well-being both contemporarily and over time. To measure contemporary hours-underemployment, we use an indicator combining two questions available at the 6th wave of the NCDS, conducted between 1999 and 2000. We identify respondents as underemployed if they reported that they were working fewer than 30 hours per week while they would prefer to work additional hours. Moreover, we form binary variables to identify annual transitions between full-time and involuntary part-time employment. We use lagged employment status to observe whether the BHPS respondents were part-time employed and unsatisfied with their number of weekly working hours or in full-time employment in the previous wave and whether they had changed their employment status in the current wave.

In chapter 5, we examine whether psychological well-being during adolescence can predict unemployment throughout individual trajectories in the labour market. We use objective indicators of unemployment, as recorded in Statistics Sweden's longitudinal integration database for health insurance and labour market studies (LISA). Study subjects are identified as being unemployed if they had been registered as such in the Swedish Public Employment Services. We use two measures of unemployment: a binary variable indicating whether the study subjects were registered as unemployed in any year between 1990 and 2012 and a measure of the number of days spent in unemployment in the period between 1992 and 2012. Using objective measures of unemployment, we eliminate the risk of underestimating the effect of psychological well-being on future unemployment due to recall bias. However, as noted above, the main limitation of the coding of the unemployment indicator is that we cannot distinguish between those being employed and those being economically inactive in the reference group.

Psychological well-being

As suggested in the literature, we consider well-being to be a multilayer construct, incorporating both cognitive evaluations of life domains and affective elements, such as moods and emotions, rather than a single theoretical concept (Diener et al., 1999). We examine various components of emotional well-being, including life satisfaction, non-clinical distress and psychiatric disorders, both as determinants of labour market trajectories and as outcomes of past and current employment experiences.

In chapter 3, we examine the effect of past unemployment on affective and cognitive well-being across European countries. All data on psychological well-being components were self-reported. As done broadly in the literature thus far (e.g. Clark et al. 2001; Knabe and

Ratzel 2011), cognitive well-being was assessed using measures of overall life satisfaction. The life satisfaction variable was created using responses of study subjects to a question regarding the level to which they feel satisfied with their lives contemporarily, ranging from 0 (*"completely dissatisfied"*) to 10 (*"completely satisfied"*). Positive functioning was measured using the 12 items of the Control, Autonomy, Self-Realisation and Pleasure (CASP) scale, assessing participants' judgements related to fulfilment of hopes and ambitions through own efforts, happiness, enjoyment of life and freedom to act on own will. Finally, affective well-being was measured using the EURO-D scale, designed to assess individual experiences of depression symptoms such as irritability, fatigue, sadness, anger, sleeping disorders etc.

In chapter 4, we explore the impact of hours-underemployment and transitions between hours-underemployment and full-time employment on affective well-being of British workers. Specifically, we used a measure of psychological distress, based on individual responses to the General Health Questionnaire (GHQ). GHQ is a simple screening device used to assess non-psychotic and minor psychiatric conditions. We used 12 items of the GHQ, which gauge social dysfunction and symptoms of depressive and anxiety-related disorders, to create a composite index of psychological distress.

One major concern regarding well-being variables is that they are potentially prone to measurement and self-report bias. Survey participants' own assessments of psychological distress, life satisfaction and quality of life are potentially not accurate. For example, it has been shown that individuals tend to underreport experiences of depression symptoms for example, because they think that being psychologically distressed is socially unacceptable (e.g. Eaton et al. 2000; Vredenburg et al. 1986). Further, survey-based measures of psychological well-being are substantially influenced by methodological flaws of survey designs. Factors such as the wording of the survey questions, the potential ambiguity of the concepts expressed in the questions and even language differences in the context of cross-country surveys appear to lead to misinterpretation and response bias (OECD 2013).

The scales used in the present thesis to measure components of psychological well-being have been shown to be reliable and valid. All measures of affective components of well-being, namely, CASP, EURO-D and GHQ-12, use multiple items to capture broad constructs; a method shown to improve reliability of measurement (Michalos and Kahlke 2010). Additionally, they are shown to be internally consistent, which means that the items of each scale actually capture the same conceptual construct (Banks et al. 1980; Hyde et al. 2013; Prince et al. 1999) Further, CASP has been shown to capture the same concepts of control, autonomy, pleasure, and self-realization across different national settings (Hyde et al. 2015). Additionally, it appeared to demonstrate high levels of convergent validity, when compared to an index designed to measure overall acceptance and contentment with life in the

UK population (Hyde et al. 2003). Finally, life satisfaction, extensively used to measure cognitive components of well-being, is shown to reliably reflect subjective well-being (Krueger and Schkade 2008). Additionally, it has been shown to have high test-retest reliability (Lucas and Donnellan 2012).

In chapter 5, we investigate whether suffering from mental health conditions predicts future unemployment among Swedish men. Psychologists assessed study subjects' mental health at the time of conscription. In the cases where psychiatric illness was detected, the conscripts were examined by psychiatrists, who would make the final diagnosis of their conditions. Diagnoses were grouped according to International Classification of Diseases (ICD) categories (e.g. Gale et al. 2014). We used binary variables indicating whether the study subjects were suffering from the following conditions: schizophrenia; other non-affective psychotic disorders; bipolar disorders; depressive disorders; neurotic/adjustment disorders; personality disorders; alcohol-related disorders; and other substance use disorders. A major strength of this measure is that it reduces self-report bias and potential underreporting of psychological conditions, allowing us to observe true prevalence of mental health conditions in the population of Swedish adolescent men.

Confounding factors

Individual characteristics which are likely to simultaneously predict labour market events and influence psychological well-being are adjusted for in order to reduce omitted variable bias. Failing to consider the influence of such demographic characteristics could result in overestimation or underestimation of the true relationships under study. For example, suffering from poor psychological well-being during childhood and adolescence is shown to be likely to predict both elevated distress level and increased probability of ending up in unemployment during adulthood (Egan et al. 2015; 2016). Therefore, if prior psychological well-being is not controlled for, the possibility that the observed effect of unemployment on psychological well-being is driven by individuals who suffer from emotional problems self-selecting into prolonged unemployment cannot be ruled out.

We use similar sets of control variables in chapters 3, 4 and 5. Namely, we adjust for the influence of the following adult background characteristics: age, gender, marital status, number of children, highest educational achievement, household income, physical health and occupational status. Additionally, we take into consideration the influence of childhood socio-economic factors. Particularly, we include controls for maternal and paternal socio-economic background, global health and cognitive ability during childhood. Further, we use time controls when applicable to adjust for changing macro-economic conditions, which might affect both labour market trajectories and psychological well-being.

Finally, in chapter 3, where the links from past unemployment to contemporary psychological well-being are examined on the cross-country level, we adjust for country-specific characteristics in addition to individual confounding factors. We consider the impact of exogenous economic conditions and passive labour market policies towards the unemployed, which are shown to influence emotional responses to unemployment (Wulfgramm 2014). Specifically, we included controls for national unemployment rates and unemployment benefit duration and generosity.

2.2.3 Methodology

As discussed in this chapter, the present thesis uses national and cross-national surveys and registry data to observe individual employment outcomes and psychological well-being. Given that individuals are followed through their actual trajectories in the labour market, their experiences are not the outcome of randomised allocation to employment states but rather the aftermath of complex interactions between individual traits, demographic background, socio-economic conditions and institutional factors. Therefore, the relationships between labour market outcomes and psychological well-being are potentially confounded by various observed and unobserved factors related to individual socio-economic background. The objective of the present thesis is to empirically examine the links from employment outcomes to psychological well-being and vice versa, after adjusting for the influence of factors which potentially drive the observed effects. For this purpose, a methodology aiming to diminish confounding and individual heterogeneity is adopted through chapters 3 to 5.

Namely, in chapter 3 we use a rich set of controls to reduce the possibility that links from past unemployment to contemporary well-being are driven by individual observed demographic characteristics. Unfortunately, data limitations do not allow us to use multiple observations of individual psychological well-being over time. Therefore, we rely on recorded information regarding study subjects' background during childhood and adulthood. In chapter 4, we adopt the propensity score technique to match hours-underemployed workers to full-time employed workers with respect to their demographic characteristics. Therefore, we observe the links from hours-underemployment to psychological well-being among workers who have similar probabilities to work part-time involuntarily given their socio-economic background. Additionally, we estimate fixed effects models linking variations in psychological well-being to transitions between full-time employment and hours-underemployment over time to control for time-invariant unobserved heterogeneity. Finally, we use sibling fixed-effects to gauge the impact of adolescent mental health on future unemployment prospects in chapter 5. Comparing pairs of siblings allows us to adjust for the influence of unobserved family and neighbourhood factors which could influence individuals'

psychological well-being and the likelihood of unemployment. These strategies are discussed in detail in the following chapters.

Chapter 3. The scarring effect of unemployment on psychological well-Being across Europe

3.1 Abstract

Past unemployment may have a pervasive psychological impact that occurs across nations. We investigate the association between unemployment events across working life and subsequent psychological well-being across 14 European countries. Additionally, we consider the influence of between-country differences in labour market institutions and conditions on the cross-country well-being effects of unemployment. Data detailing life-long employment trajectories and contemporary life conditions are drawn from the Survey of Health, Ageing and Retirement in Europe. The well-being impact of unemployment is modelled using linear, multi-level specifications. Each six-month spell of past unemployment is found to predict reduced quality of life and life satisfaction after the age of 50, having adjusted for a broad range of individual and country-specific covariates. In contrast, the impact of past unemployment on depression is explained by individual demographic factors. We identify the first comparative long-term evidence that unemployment welfare scarring may be a broad, international phenomenon.

3.2 Introduction

In the aftermath of the Great Recession, the majority of the European countries experienced a series of economic adversities including a sharp rise in unemployment with potentially profound welfare consequences. Although the recession affected European countries in unique ways, most of them have experienced a persistent increase in unemployment (e.g. Blanchflower 2015; Scarpetta et al. 2010). Evidently, the average unemployment rate of the member-states of the European Union reached the level of 10.2% in 2014, approximately 3% higher than its 2008 level.[4] Even though unemployment has recently started to move towards its pre-crisis levels, with the European average rate falling to 8.5% in 2016, it is important to understand how the accumulation of unemployment experiences may affect human welfare over prolonged periods.

Unemployment has been shown to adversely affect psychological well-being, predicting poor mental health and reduced life-satisfaction (e.g. Paul and Moser 2009). Further, the harmful impacts of involuntary joblessness on well-being have been found to persist through time, remaining evident long after the spell has ended, a phenomenon known as *psychological scarring* (Clark et al. 2001). Reduced well-being is likely to have consequential downstream repercussions for later economic outcomes such as earnings and employment (Binder and Coad 2010; De Neve and Oswald 2012; Egan et al. 2016) as well as negative social consequences including social deprivation. Hence, understanding the general long-term effect of unemployment on future well-being is an important step forward in informing public debates and recommending policy measures to protect individuals from the long-run adverse welfare consequences of unemployment.

Thus far, existing research examining psychological scarring following unemployment, has chiefly relied on single-country panel and cohort studies limited to a small subset of European countries; mainly, Germany, Sweden and the UK (Daly and Delaney 2013; Clark et al. 2001; Knabe and Rätzel 2011; Strandh et al. 2014). It is, therefore, not currently known whether unemployment has long-run well-being influences that could occur across a broad range of social settings, or whether scarring is a unique context and potentially country-specific phenomenon. We contribute to prior work on the long-term psychological impact of unemployment by tackling this question directly. Using a sample of workers drawn from contemporaneous and retrospective waves of the Survey of Health, Ageing and Retirement in

[1] While average unemployment rates are informative of the macro-economic trends prevailing in Europe, the increase in unemployment was not uniform across all countries. For instance, in the Euro area, the unemployment rate in 2014 was 4% higher compared to 2008. In some countries, such as Spain, Greece and Italy, the rise was more dramatic (i.e 18.7% in Greece, 13% in Spain, 6% in Italy). The relevant figures are retrieved from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=une_rt_a&lang=en [Accessed: 15 February 2018]

Europe (SHARE), we test whether past unemployment has long-term repercussions for psychological well-being in fourteen European countries; Germany, France, Belgium, Austria, Switzerland, Netherlands, Spain, Italy, Greece, Ireland, Sweden, Denmark, Poland and Czech Republic. Taking into consideration the structure of our sample, which consists of individual observations of labour market trajectories and life conditions nested within countries, we estimate linear multi-level models with mixed-effects techniques.

Further, we identify the influence of contextual variation in policies towards unemployment and prevailing labour market conditions on unemployment scarring across countries. Adjusting for differences in passive labour market policies and unemployment rates across the 14 sampled countries will reveal whether scarring is a phenomenon which occurs across countries, regardless of the specific institutional and socio-economic background where the unemployment events occur. Moreover, we test whether country-specific labour market policies and conditions can predict differences in the magnitude of the scarring effect across countries. Finally, we extend the literature on the psychological impact of unemployment by shedding further light on the importance of unemployment as a determinant of various components of well-being. Particularly, we explore the effects of prolonged unemployment on cognitive evaluations of life, mental health and positive functioning, a concept, which incorporates feelings, moods and sense of life meaning and purpose (Vanhouette 2014).

3.3 Theoretical background and expectations

Empirical evidence detailing the association between unemployment and well-being is unequivocal. Meta-analyses, summarizing the findings of numerous studies on the subject, indicate that being unemployed predicts substantial decrements in psychological well-being as long as the spell lasts (McKee-Ryan et al. 2005; Murphy and Athanasou 1999; Paul and Moser 2009). Moreover, numerous theories have been developed to explain the mechanisms driving the adverse psychological consequences of unemployment.

According to the latent deprivation theory (Jahoda 1981;1982), employment serves universal psycho-social needs. Therefore, involuntary joblessness, defined as the absence of employment, is expected to have negative effects on well-being irrespective of the individual and country-specific settings where the unemployment events take place. On the contrary, alternative theoretical frameworks take into consideration the unique influence of individual perceptions and social factors on the well-being impact of unemployment. According to these theories, unemployment can be seen as a disruption to life-plans developed to validate individuals' social identities (Ezzy 1993). Further, unemployment can be considered as

depriving workers from resources, which are necessary to cover social needs and pursue socially defined goals (Nordenmark and Strandh 1999). The primary assumption of both theories is that the psychological impact of unemployment depends on how central employment is to workers' social identities.

Taken together, these theories suggest that the psychological consequences of unemployment depend on the extent to which joblessness interferes with the fulfilment of purposes pertaining to specific social identities. The formation of such identities is determined by cultural and social factors (Abrahams and Hogg 1990), which are likely to vary across countries. Therefore, the psychological impact of unemployment is potentially influenced by the country-specific settings, where individuals' employment trajectories are shaped. Particularly, labour market conditions and welfare policies could affect the well-being impact of unemployment. For example, generous unemployment benefits reduce the financial impact of unemployment and prevent workers from having to take up insecure, unstable or low-quality jobs. Thus, unemployment insurance potentially mitigates the psychological harm caused by job loss, by protecting unemployed workers from financial strain and motivating them to think positive about the future. However, such passive labour market policies are not expected to fully offset the psychologically deleterious effects of unemployment, as they cannot substitute employment itself (e.g. Wulfgramm 2014).

In summary, whilst unemployment is understood to be a detrimental experience, the magnitude of its effects on well-being potentially depends on the interaction between socio-economic stimuli and individual perceptions and self-concepts. Important international institutes point to the importance of unemployment as a determinant of psychological well-being across various Western economies. For instance, in OECD's reports and working papers, unemployment is identified as a major well-being component across member countries (see for example Fleche et al. 2012; OECD 2015). Therefore, we anticipate that despite the potential cross-country nuances in the psychological impact of unemployment, this impact will be negative both in the short- and the long-run in all examined countries.

3.4 Prior empirical research on the well-being scarring effect of unemployment

3.4.1 Evidence of long-term effects of unemployment on individual well-being

A growing set of studies indicates that the psychological effects of unemployment may persist for years after the initial spell occurred. The key studies examining this topic are longitudinal and draw on panel samples of individuals living in a specific country and/or belonging to a specific birth cohort (Clark et al. 2001; Daly and Delaney 2013; Knabe and Rätzel 2011; Lucas et al. 2004; Strandh et al. 2014; Wadsworth et al. 1999). For example,

Clark and colleagues (2001) use eleven consecutive waves from the German Socio-Economic Panel (GSOEP) to show that the longer the duration of past unemployment the lower the life satisfaction level respondents reported, even if they were currently employed. Utilising the same panel study, Knabe and Rätzel (2011) further explore the above relationship by showing that the scarring effect is driven by expectations of future unemployment among German workers. Particularly, they show that past unemployment triggers feelings of insecurity, which, in turn, may generate persistent psychological damage. Strandh et al. (2014) follow the 1965 birth cohort who lives in northern Sweden and show that multiple exposures to unemployment predict poor mental health in the long-term. Finally, Daly and Delaney (2013) strengthen this argument by finding the positive relationship between past unemployment and current psychological distress to persist even after controlling for childhood mental health, intelligence, and social background in the 1958 National Child Development Study cohort in the UK.

The studies discussed above attempt to address reverse causality and endogeneity issues; a common problem involved in well-being studies. Specifically, they aim to account for the possibility that the relationship between past unemployment and well-being later in life could be driven by poor mental health prior to labour market entry causing self-selection into prolonged unemployment. The longitudinal nature of the panel samples used in these studies allows for the implementation of various econometric techniques, which control for unobserved heterogeneity at the individual level, thus, enabling the observation of the path from past unemployment to future psychological well-being. Taken together, these studies provide support for the idea that experiencing unemployment throughout working life could detrimentally affect subsequent well-being years or even decades later.

However, past unemployment has only been shown to affect future subjective well-being in a limited number of countries; mainly, Germany, UK and Sweden. It is the goal of this paper to elucidate whether there is evidence for the presence of such long-run welfare scars resulting from prior unemployment across a range of European nations.

3.4.2 Cross-country evidence of unemployment scarring

To date, the literature on the cross-country scarring effects of unemployment has focused on the economic consequences of involuntary joblessness. Unemployment has been linked to various economic hardships in the long run, including reduced earnings and poorer occupational prospects and mobility, evident on a multinational scale (Brandt and Hank 2014; Ekert-Jaffé and Terraz 2011; Gangl 2004; 2006). For example, Brandt and Hank (2014) find that past unemployment spells lasting at least six months are associated to increased risk of becoming unemployed after the age of 50, across eleven European countries participating in

SHARE. Further, the authors find that these permanent scars inflicted by unemployment are quite stable across the countries they examine.

Further, it has been shown that the generosity of the welfare state towards the unemployed, the wage-setting institutions, and employment protection can reduce the scars in a number of economic outcomes, such as occupational status and mobility, probability of future unemployment and engaging in unstable employment contracts and earnings (Ekert-Jaffé and Terraz 2011; Gangl 2004; 2006). Ekert-Jaffé and Terraz (2011) find that the financial consequences of unemployment are harsher in more flexible economies. Similarly, Gangl (2004; 2006) shows that the impact of unemployment on future earnings is moderated by generous benefit systems and strict employment protection legislation in a set of countries including USA and countries in northern, centre and southern Europe. Exploring various economic repercussions of unemployment, Gangl (2004) suggests that generous welfare-state transfers to the unemployed alleviate the adverse impact of unemployment on future labour market outcomes.

However, there has not been cross-national research on unemployment's potential well-being scarring effect as yet. The few studies that look into the psychological impact of unemployment across countries have examined the relationships between unemployment and individual well-being contemporarily using cross-sectional data (Gallie 2000; Whelan and McGinnity 2000; Wulfgramm 2014). Wulfgramm (2014) identifies unemployment as a predictor of reduced life satisfaction in 21 Western countries. Further, the findings of the study indicate that low levels and short duration of unemployment benefits magnify the psychological harm caused by unemployment. Given that the moderating effect of unemployment benefits generosity remains active after adjusting for individual income, it is suggested that non-pecuniary mechanisms, such as stigmatisation, potentially drive the observed influence of passive labour market policies on the psychological repercussions of being unemployed.

Building on evidence that the contemporary welfare effects of current unemployment are a broad, cross-country phenomenon (Wulfgramm 2014), the objective of the present study is to explore the long-term effect of past unemployment on future well-being across a range of socio-economic settings. We draw on unique historical and contemporary data from SHARE to observe workers' unemployment experiences throughout working life and link these experiences to their contemporary well-being. Despite memory bias being a potential limitation, there is evidence to suggest that survey participants can reliably recall their childhood circumstances (Havari and Mazzona 2011; Smith 2009), unemployment histories (Dex and McCulloch 1998) and past socio-economic conditions (Berney and Blane 1997) and that this data can be used to explain later life events (Smith 2009).

Further, we adjust for level and duration of benefit replacement rates, which reflect between-country differences in welfare provision for the unemployed. The inclusion of such covariates allows to test whether unemployment has a scarring effect across all countries irrespective of differences in labour market institutions. Additionally, we distinguish between different aspects of well-being (Steptoe et al., 2015; Vanhoutte 2014) and examine cognitive evaluations of life, psychological distress, and quality of life measures. Finally, in order to isolate the link from past unemployment to contemporary well-being, we consider the influence of child characteristics and socio-economic factors, which could influence both labour market experiences and psychological well-being. Specifically, we adjust for indicators of childhood health, cognitive ability, and socio-economic background, which are unlikely to have been influenced by labour market experiences and have been shown to lead to low well-being and self-selection into unemployment (e.g. Currie 2009; Haas 2007).

3.5 Data and methods

3.5.1 Study sample

We use contemporaneous and retrospective data from the second and third wave of SHARE to examine the relationship between past unemployment and contemporary well-being. SHARE is a longitudinal, cross-country survey, following individuals close to retirement who lived in sampled households drawn from 20 European countries. All household members aged 50 and over, as well as their possibly younger partners, were interviewed using Computer Assisted Personal Interviews. Respondents were asked to document various aspects of their contemporary lives in consecutive waves, including evaluations of life quality and emotional health. Such data were collected between 2006 and 2007 in the context of the second SHARE wave (Börsch-Supan 2017). The third wave of SHARE (Börsch-Supan 2017), entitled SHARELIFE and conducted between 2008 and 2009, was retrospective and reported detailed information about the life histories of around 27,000 individuals who lived across 14 countries in Europe (Börsch-Supan et al. 2011; Börsch-Supan et al. 2013; Schröder 2011). Respondents were interviewed, using the Life History Calendar approach, which facilitates accurate memory recollection. This extensive retrospective panel, which covers the lifelong employment trajectories of a large sample of participants, contains a very low share (1-2%) of missing observations (Brugiavini et al. 2013).

Despite SHARE being a longitudinal survey, the present study uses a sample drawn from the cross-section of a single survey wave and the retrospective SHARE wave which

allows the observation of the largest shares of respondents and countries.[5] Variables regarding past unemployment experiences were constructed using SHARELIFE's retrospective micro-data on respondents' full employment trajectories spanning from the 1950s to the time of the survey. SHARELIFE was also used to create measures on socio-economic background and health during childhood. Indicators for contemporary unemployment experiences, psychological well-being measures and other demographic confounding factors were drawn from the second SHARE wave.

From the 25,341 participants of the original sample, 15,610 had either retired, reported that they had never been in paid employment or were permanently sick. As retirement has been identified as a life-changing event, which may remove concerns about future employment and/or compensate for the loss in subjective well-being of workers who have experienced unemployment in the past (Hetschko et al. 2014), we chose to focus on active populations and thus, exclude the retirees from the study sample. Further, respondents older than 75 years old were eliminated from the sample, as they were very close to retirement. One particular concern regarding the sample of non-retirees is that it may be selective. Prolonged unemployment might result in early retirement among older workers, depending on the specific regulations across countries and gender (Tatsiramos 2010). Therefore, we may underestimate the scarring effect of past unemployment, as those who potentially suffered the most from unemployment scarring are likely to self-select into early retirement and thus, be excluded from the study sample. One possible way to observe whether past unemployment led to early retirement is to examine the association between age and accumulation of past unemployment spells in the pooled sample. A negative and substantial correlation between past unemployment and age would indicate that older workers with experiences of past unemployment might have chosen to retire and thus, are not represented in the study sample. The association between past unemployment and age in the pooled, cross-country sample was not found to be significant ($\rho = -0.011$, $p > 0.05$). Therefore, we can assume that the potentially selective nature of the group of non-retirees is not substantially related to their past unemployment experiences.

The final sample consisted of 9,464 participants, aged less than 75, who were active in the market at the time of the survey and who lived in 14 European countries; Germany (7.77%), France (8.35%), Belgium (10.08%), Austria (2.11%), Switzerland (6.53%),

[5] Since the first wave was launched, various changes have occurred in the structure of the SHARE waves, ranging from the selection of countries participating in the survey to the formulation of questionnaires and variables. Therefore, conducting a longitudinal analysis would require sacrificing valuable information regarding respondents' past trajectories in the labour market and their contemporary experiences and limiting the number of countries included in the sample. Instead, we combined SHARELIFE with the second survey wave as this combination produced the sample with the largest number of both individual observations and number of countries.

Netherlands (9.68%), Spain (7.15%), Italy (7.13%), Greece (10.21%), Ireland (3.48%), Sweden (7.12%), Denmark (9.97%), Czech Republic (5.62%) and Poland (4.80%).[6]

3.5.2 Variables description

Subjective well-being

The outcomes of interest capture a range of aspects of psychological well-being; namely, the affective component, positive functioning and cognitive evaluations of life (Vanhoutte, 2014). The affective well-being component is assessed using the EURO-D measure, a depression scale developed for international comparisons (mean= 1.969, SD=2.011). The respondents were asked to report whether they had experienced 12 depression symptoms, including irritability, fatigue, poor appetite, sleeping disorders, sadness, anger etc. during the last month. The binary indicators for each symptom were then aggregated to form a scale, ranging from 0 (*"not depressed"*) to 12 (*"very depressed"*). The EURO-D scale has been shown to be internally consistent and also, highly correlated to other, more common measures of depression (Prince et al. 1999).

Positive functioning was assessed using the Control, Autonomy, Self-Realisation and Pleasure (CASP) scale, which measures subjective quality of life at later age (mean= 38.497, SD=5.412), specifically assessing pleasure, self-realisation, autonomy, meaning and purpose of life (Hyde et al., 2003). The CASP scale comprises 12 items reporting participants' judgements on the four dimensions that form its acronym (control, autonomy, self-realisation and pleasure). Participants were asked to evaluate how often they had experienced moods, thoughts and feelings related to self-fulfilment, happiness, enjoyment of life, and self-determination during the past four weeks (1=*"often", 2="sometimes", 3="rarely",4= "never"*). The CASP scale, which ranges from 12 to 48, has been found to be a reliable and valid measure of quality of life enabling cross-country comparisons (Hyde et al. 2015; Kim et al. 2015).

Finally, the cognitive dimension of individual well-being was examined using life satisfaction, broadly used as a valid measure of subjective well-being (Dolan et al. 2011; Kahneman and Krueger 2006). Additionally, it has been shown that life satisfaction is comparable across countries (Bolle and Kemp 2009). In the second SHARE wave, life

[6] Respondents from Czech Republic and Poland are expected to have experienced different labour market trajectories from the 1950s onwards compared to the rest of the study sample. Despite being post-communist, the two countries are kept in the sample to examine whether unemployment experiences have different psychological impacts in formerly socialist countries compared to the rest of Europe.

satisfaction was measured using a single item ranging from 0 to 10, with 0 standing for *"completely dissatisfied"* and 10 for *"completely satisfied"* (mean= 7.820, SD=1.563). [7]

Past unemployment

The variable we used to assess past unemployment was constructed using the job episodes panel, a dataset generated from the first two regular SHARE waves and SHARELIFE (Antonova et al. 2017). The job episodes panel is a longitudinal dataset, including information regarding respondents' employment situation for every single year from the time they entered the market onwards. We used this information to create a count measure of the number of times the study subjects reported that they had been unemployed for six months or longer**.** It has been shown that the share of missing observations in the job episode panel is quite low, with missing data on employment and unemployment events being retrieved from other information provided at SHARELIFE (Brugiavini et al. 2013). However, some inconsistencies, potentially emerging from memory bias, were identified: overlap was found between working and unemployment status in 0.007% of person-year observations. Further, 0.16% of observations overlapped between retirement and unemployment status. These events were not included in this analysis for consistency purposes.

In SHARELIFE's job episode panel, unemployment spells were recorded annually. A binary variable was used indicating whether the respondent had gone through unemployment for at least six months in each year, starting from the time they entered the labour market. Annual unemployment indicators were then aggregated to produce a count measure of past unemployment spells, which lasted at least six months, covering the period from the beginning of 1950s onwards. Since the outcome data used in this study were collected between 2006 and 2007, we only included past unemployment experiences up to 2005. Binary variables indicating the decade when the unemployment spells occurred for each respondent were included in the models to adjust for the influence of older versus more recent events.

The variable measuring past unemployment is skewed towards zero, with 88% of the participants reporting that they had never spent six months or more in unemployment. An alternative, categorical measure of past unemployment spells (0= 0 spells, 1= 1-3 spells, 2= 4-6 spells, 3= more than 6 spells) was constructed and used as the basic explanatory variable instead of the count measure, to test the robustness of the scarring effect.

[7] It has been show that despite appearing to be ordinal, subjective well-being measures could be treated as being cardinal without causing substantial biases. Thus, all the outcomes of interest are assumed to be cardinal in the present study (Ferrer-i-Carbonell and Frijters 2004). Descriptive statistics for the outcomes of interest and all other variables by country are displayed in table 3A.1 in section A of the appendix.

Individual confounding factors

Controls for individual demographic characteristics during adulthood and childhood were constructed to account for observed differences in socio-economic background, which could potentially influence the accumulation of past unemployment spells and/or contemporary well-being. Binary indicators were used for gender (1= *"female"*, 0= *"male"*), marital status (1= *"married*" and *"in registered partnership"*, 0= *"never married", "divorced"* and *"widowed*") and currently being unemployed (1= *"unemployed"*, 0= *"employed"* or *"homemaker"*). Moreover, age, number of children and highest educational level, measured using the International Standard Classification of Education (ISCED-1997 levels 0-6) scale, were adjusted for. Household monthly income, derived by the aggregation of all income components at the household level, measured in euro and adjusted for power purchase parity, was also used.

Moreover, the influence of socio-economic background and health during childhood was considered, in order to reduce the possibility that the scarring effect is driven by self-selection into prolonged unemployment. As participation in the labour force is highly unlikely before age 15, parental socio-economic status, self-reported cognitive ability and health up to age 15 are most probably not influenced by labour market experiences. Thus, we adjusted for self-reported psychiatric, emotional and nervous problems (1= *"Having experienced such illness or health condition"*, 0 = *"No such illness or health condition"*) and being hospitalised for at least one month (1= *"Yes"*, 0= *"No"*) up to age 15, parental socio-economic status at age 10 and self-rated cognitive ability at the same age. As done before in the literature using the SHARE survey (Brandt and Hank, 2014), parental socio-economic status was measured using two variables: number of books in the household (0= *"none or very few (0-10 books)",* 1= > 10 books) and number of rooms per person at age 10. Further, cognitive ability was assessed using self-reported relative performance in mathematics and language compared to other classmates (1= *"much better"*, 2= *"better"*, 3= *"about the same"*, 4= *"worse"*, 5= *"much worse"*). These two variables were reversed and used for the construction of a composite measure of cognitive ability, ranging in a scale from 1 to 5.

Country-specific confounding characteristics

Country-specific characteristics were included in the models in order to: (1) evaluate whether the potential scarring effects of past unemployment persist when substantial between-country differences in labour market institutions and prevailing macro-economic conditions are accounted for and, (2) to test whether the strength of scarring effects remains constant or varies systematically as a function of between-country differences in labor market institutions and economic conditions. We used unemployment benefit replacement rates both at the initial phase of unemployment, not lasting longer than a year, and after five years of unemployment

to account for both level and duration of unemployment benefits. As suggested in the literature, the level and duration of net benefit replacement rates are indicative of the generosity of welfare state towards the unemployed (Di Tella et al. 2003; Ochsen and Welsch 2012; Wulfgramm 2014). Measures of annual average benefit replacement rates, averaged over 2006 and 2007, aggregated over six family types ("*single person"*, *"one-earner married couple"*, *"two-earners married couple"* having no children and two children) and two previous income levels (67% and 100%) were used (OECD 2007). Additionally, levels of harmonised unemployment rates, averaged over years 2006 and 2007, were retrieved from the OECD online database and included in the specifications to adjust for exogenous labour market conditions in the sampled countries.

Finally, we conducted supplementary analyses to adjust for the influence of differences in benefit generosity in the past, covering the majority of the period when past unemployment was observed. We used historical data on net benefit replacement rates drawn from the BGHS dataset (Baker et al. 2004).[8] The latter includes detailed information about benefit generosity and unemployment rates for 20 major OECD countries, covering the period between 1960 and 2000. Average benefit replacement rates during initial period of unemployment and after five years of unemployment were calculated and weighted using annual unemployment rates for each country. Unfortunately, no historical data were available for three of the countries included in our sample: Poland, the Czech Republic and Greece. Thus, we had to exclude them from the additional analysis, which considers the effects of between-country variation in the development of passive labour market policies.

3.6 Model specification and methodology

The structure of the dataset, consisting of 14 national subsamples, allows for adopting the multilevel approach to model the relationship between past unemployment and subjective well-being in a cross-country context (Snijders and Bosker 1999). As shown in figure 3.1, we assume that there is a link from past unemployment to contemporary well-being at the individual level, which is influenced by observed and unobserved factors operating at the national level, such as labour market conditions and institutions. We examine the extent to which permanent characteristics of countries can explain the scarring phenomenon, by exploring cross-level interactions, reflecting potential cross-country variability in the scarring effect. Further, we consider individual employment trajectories and subjective well-being as possibly being dependent on country-specific factors. We adjust for the confounding effects

[8] The dataset was retrieved from: http://ceprdata.org/other-data/bghs/ [Accessed: 15 February 2018]

of country-level factors, by incorporating country-level macro-economic variables in the empirical specifications.

We estimate the following empirical specification which reflects the relationship described above:

$$WB_{ic}=(b_0+\beta_{0c})+(b_1+\beta_{1c})PU_{ic}+u_{ic}WB_{ic}=(b_0+\beta_{0c})+(b_1+\beta_{1c})\times$$

$$PU_{ic}+u_{ic}WB_{ic}=(b_0+\beta_{0c})+(b_1+\beta_{1c})\times PU_{ic}+u_{ic} \quad (1)$$

where *i* and *c* are indices representing individuals and countries respectively. WB_{ic} stands for subjective well-being indicators (EURO-D, CASP and life satisfaction scales). PU_{ic} is the number of unemployment spells lasting at least six months participants had gone through since they entered the labour market. In order to account for cross-country variability in the scarring effect, we allow the well-being impact of past unemployment to have two components; a fixed one, which is the same for all individuals in the sample (b_1) and a random one (β_{1c}), which varies by country. The coefficient b_1 reflects the scarring effect within each country, which is assumed to be the same across countries. The between-group coefficient β_{1c} demonstrates the long-term psychological repercussions of past unemployment in each country. In other words, the relationship between past unemployment and subjective well-being is allowed to differ between countries, with the slope of past unemployment in model 1 randomly varying across countries. Further, psychological well-being, is assumed to have a fixed, average value in the pooled sample (b_0) as well as country-specific mean levels (β_{0c}), modelled as random intercepts. Finally, u_{ic} stands for the individual error term.

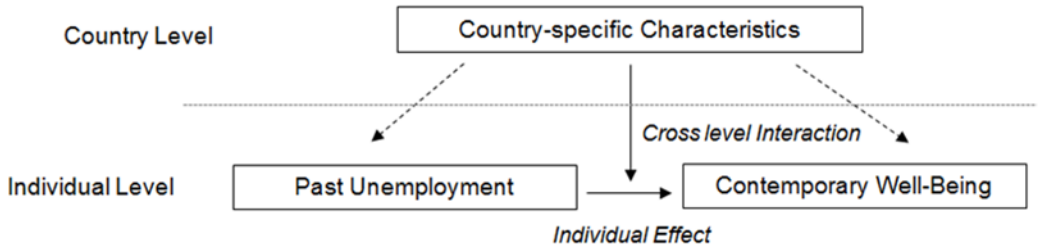

Figure 3.1 Multilevel construct of the psychological scarring hypothesis

A set of individual confounding factors is then included in specification 1 to test whether individual adult and childhood background can explain the psychological effect of past unemployment within the countries. First, an indicator for being currently in unemployment is added to examine whether contemporary unemployment (U_{ic}) could be an indirect pathway linking past unemployment to contemporary subjective well-being. Further,

various socio-economic characteristics (XI_{ic}), such as gender, age, marital status, number of children, household income and educational background are included in the model at a later stage, to account for heterogeneity at the individual level. At the final stage, childhood health and socio-economic background (CH_{ic}) are adjusted for to control for potential self-selection into unemployment due to ill-health and low socio-economic background prior to labour market entry. The full specification is the following:

$$WB_{ic}=(b_0+\beta_{0c})+(b_1+\beta_{1c})PU_{ic}+b_2U_{ic}+b_3\sum XI_{ic}+b_4\sum CH_{ic}+u_{ic} \quad (2)$$

Moreover, we conduct supplemental analysis to examine whether the effects of past unemployment on contemporary psychological well-being vary across gender and employment state, adding interaction terms between past unemployment and current unemployment and past unemployment and gender to specification 2. Existing literature uncovers evidence of habituation to unemployment (Clark et al. 2001; Knabe and Rätzel 2011), suggesting that unemployment scarring is larger among workers who are currently employed compared to the unemployed, who are likely to have experienced more unemployment in the past (Knabe and Rätzel 2011). Additionally, it is suggested that the experience of unemployment is not homogeneous across gender (Artazcoz et al. 2004; Knabe and Rätzel 2011). Women are shown to be less vulnerable to the detrimental consequences of both past and contemporary unemployment compared to men, potentially because of differences in family responsibilities and social roles across gender (Artazcoz et al. 2004; Strandh et al. 2013).

Then, we add country-specific factors (CI_c) to test whether between-country labour market differences moderate the scarring effect of past unemployment on subjective well-being. In specification 3, interaction terms between past unemployment and labour market policies of each country stand for cross-level interactions. National unemployment rates and net benefit replacement rates during initial period of unemployment and after five years spent in unemployment are adjusted for in specification (3). These factors serve as proxies for the differences in macro-economic conditions and passive labour market policies across the countries. By interacting measures of welfare state's generosity towards the unemployed with past unemployment, we examine whether labour market policies can explain the cross-country variability in the impact of past unemployment on psychological well-being.

$$WB_{ic}=(b_0+\beta_{0c})+(b_1+\beta_{1c})PU_{ic}+$$

$$+b_2U_{ic}+b_3\sum XI_{ic}+b_4\sum CH_{ic}+a_1\,PU_{ic}*\sum_h^k CI_c+a_2\sum CI_c+u_{ic} \quad (3)$$

Finally, we test the influence of the cross-country evolution of labour market policies on the scarring effect by substituting the contemporary labour market characteristics with

variables on unemployment benefit generosity during the period from 1960 to 2000 in specification 3. Given that the available measures are aggregated during the period of interest, cross-level interactions based on historical data are mainly indicative of the between-country differences in labour market policies through time rather than reflecting nationally distinct trajectories of institutional developments. However, the available information certainly reflects historic trends and could indicate the potentially moderating impact of past labour market policies on unemployment's psychological scarring.

3.7 Results

3.7.1 Descriptive statistics

Detailed descriptive statistics for all variables examined in the sample are shown in table 3.1. An initial examination of descriptive trends in the pooled, cross-country sample showed that past unemployment is associated with low psychological well-being. Those that had experienced at least one unemployment event during their working life reported substantially lower levels of life quality, measured using the CASP-12 scale, (Diff= -1.739, SD= 0.175, CI= [-2.076, -1.402]) and elevated levels of distress (Diff= 0.451, SD= 0.064, CI= [0.325, 0.576]). Additionally, they were less satisfied with their lives on average, with the mean difference between the two groups being statistically significant (Diff= -0.487, SD= 0.050, CI= [-0.585, -0.390]).

Evidently, the two groups were different in their socio-economic characteristics as well. Participants who had reported any unemployment experience in the past were evidently more likely to find themselves again in unemployment. They also reported lower average household income and educational achievements. Moreover, the share of married people was lower in this group. They had fewer books in their households and have lived in smaller houses during childhood, indicating lower socio-economic background, compared to those who spent their working life without having to deal with unemployment. Finally, the share of those having suffered from psychiatric, emotional and nervous problems during childhood was also slightly larger in the group with past unemployment experiences. However, the difference in the prevalence of childhood mental health conditions between those who had experienced at least one past spell of unemployment and those with no such experience was not significant.

Table 3.1 Descriptive statistics

	No spells			At least one spell			Group Difference [a]	
	Mean	SD	Min/Max	Mean	SD	Min/Max	t	p
Subjective well-being								
EURO-D	1.916	1.976	0-11	2.366	2.214	0-11	7.035	<0. 001
CASP-12	38.701	5.318	12-48	36.962	5.855	12-48	-10.115	<0. 001
Life satisfaction	7.877	1.529	0-10	7.390	1.735	0-10	-9.813	<0. 001
Contemporary SES								
Currently unemployed	0.033	0.178	0-1	0.253	0.435	0-1	30.813	<0. 001
Female	0.579	0.494	0-1	0.619	0.486	0-1	2.539	<0.01
Age	56.710	5.517	32-75	55.57	4.990	33-74	-6.529	<0. 001
Married	0.825	0.380	0-1	0.755	0.430	0-1	-5.692	<0. 001
No of children	2.187	1.256	0-12	2.022	1.333	0-9	-4.098	<0. 001
Hhd income	36,398	52,303	0-1,218,168	26,619	36,764	0-522,099	-6.037	<0. 001
Education	3.069	1.460	0-6	2.872	1.378	0-6	-4.257	<0. 001
Childhood SES								
No of books	0.684	0.465	1-5	0.583	0.493	1-5	-6.740	<0. 001
Rooms/person	0.783	0.409	0-6.25	0.734	0.389	0.06-4.33	-3.796	<0. 001
Cognitive skills	3.346	0.744	1-5	3.292	0.737	1-5	-2.312	<0.05
Hospitalisation	0.060	0.238	0-1	0.058	0.233	0-1	-0.314	>0.05
Mental health conditions	0.010	0.097	0-1	0.015	0.123	0-1	1.780	>0.05
Obs		8,353			1,111			

[a] t-statistics and p-values from t-tests on the equality of mean levels of subjective well-being and all socio-economic characteristics of those who had gone through at least 6 months of unemployment in the past and those who had never experienced long term unemployment are displayed.

3.7.2 Regression models

Tables 3.2, 3.3 and 3.4 display the results from the estimation of mixed-effects models linking past unemployment to three different measures of psychological well-being; quality of life, life satisfaction and depression. Evidently, accumulation of past unemployment spells has long-lasting effects on self-perceived life quality and satisfaction with life, within the sampled countries. Specifically, having gone through one more unemployment spell lasting six months or longer is associated to a 0.017 SD reduction in quality of life and a 0.014 SD decrease in life satisfaction in the full models, accounting both for individual and country-specific confounding factors. On the contrary, the impact of prolonged past unemployment on

self-reported depression symptoms appears to be fully explained by individual socio-economic factors in the examined countries.

Being currently unemployed predicts lower psychological well-being across all specifications and outcomes of interest, pointing to the traumatising consequences following unemployment in all European countries included in the study sample. Contemporary unemployment accounts for approximately 26% (column 2 of Tables 3.2, 3.3 and 3.4) of the effects of past unemployment on depression, life quality and satisfaction with life, respectively. Frequently entering unemployment, as a consequence of having gone through multiple spells of involuntary joblessness in the past (Arulampalam et al. 2001; Gregg 2001; Heckman and Borjas 1980; Nordström 2011), could trigger feelings of resignation and low self-confidence, harming individual well-being. Hence, contemporary unemployment is possibly an indirect pathway linking past unemployment to current life satisfaction. Further, supplementary analysis conducted to examine whether past unemployment scarring varies with contemporary employment state revealed that going through prolonged unemployment spells is psychologically damaging for workers irrespective of whether they are currently employed or unemployed. As shown in tables 3B.1, 3B.2 and 3B.3 in section B of the appendix, the interaction effects between past and contemporary unemployment are not statistically significant, suggesting that there are no major differences in unemployment scarring between employed and unemployed respondents.

Socio-economic background appears to influence the scarring effect of unemployment on life satisfaction and quality but not fully explain it. Models including indicators for adult background were estimated separately for each characteristic and revealed that controls for educational achievement were responsible for the largest share of the 22% and 32% reductions of the scarring effects on quality of life and life satisfaction, respectively, which are presented in column 3 of tables 3.2, 3.3 and 3.4. This result suggests that scarring could be partly driven by those with low educational qualifications self-selecting into prolonged unemployment and facing various economic adversities, which, in turn, may lead to reduced well-being. For instance, going through long-term unemployment spells could be the outcome of unsuccessful school-to-work transitions, potentially influenced by low educational achievement. Further, parental socio-economic background, cognitive ability and mental health during childhood do not appear to substantially affect unemployment scarring. Finally, results from the supplemental analysis presented in tables 3B.4, 3B.5 and 3B.6 in section B of the appendix revealed that differences in the magnitude of unemployment's psychological scarring effects between men and women are not substantial.

Table 3.2 Past unemployment & CASP (random intercepts & random slopes model)

Variables	*(1)* [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
			CASP			
Past unemployment	-0.031***	-0.023***	-0.018**	-0.017**	-0.016**	-0.017***
	(0.007)	(0.006)	(0.005)	(0.005)	(0.005)	(0.004)
Being currently unemployed [c]		-0.491***	-0.459***	-0.452***	-0.454***	-0.457***
		(0.043)	(0.042)	(0.042)	(0.042)	(0.042)
Unemployment rate					-0.078	-0.089
					(0.067)	(0.063)
Benefit replacement rate (1st yr)					0.097	0.149
					(0.072)	(0.083)
Benefit replacement rate (5 yrs)					0.084	0.037
					(0.057)	(0.067)
Interactions with past unemployment						
x Benefit replacement rate (1st year)						-0.006
						(0.004)
x Benefit replacement rate (5 years)						0.006
						(0.004)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.018***	0.015***	0.012***	0.012***	0.011***	0.008***
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.003)
Random intercept (SD) [i]	0.360***	0.357***	0.329***	0.322***	0.265***	0.256***
	(0.069)	(0.068)	(0.063)	(0.062)	(0.056)	(0.050)
Individual level (SD)	0.922***	0.916***	0.903***	0.899***	0.899***	0.899***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001[b] Standardised coefficients are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects. [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] the term "random intercept" represents country-dependent deviations of the pooled-sample mean CASP level (intercept).

Table 3.3 Past unemployment & life satisfaction (random intercepts & random slopes model)

	(1) [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
Variables			*Life Satisfaction*			
Past unemployment	-0.030***	-0.022***	-0.015**	-0.014*	-0.014*	-0.014*
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Being currently unemployed [c]		-0.553***	-0.510***	-0.505***	-0.504***	-0.505***
		(0.044)	(0.043)	(0.043)	(0.043)	(0.043)
Unemployment rate					-0. 154***	-0.148**
					(0.041)	(0.042)
Benefit replacement rate (1st yr)					0.111*	0.109*
					(0.046)	(0.047)
Benefit replacement rate (5 yrs)					0.017	0.022
					(0.036)	(0.037)
Interactions with past unemployment						
x Benefit replacement rate (1st year)						-0.003
						(0.005)
x Benefit replacement rate (5 years)						0.004
						(0.005)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.020***	0.016***	0.014***	0.014***	0.015***	0.012***
	(0.007)	(0.006)	(0.006)	(0.005)	(0.007)	(0.007)
Random intercept (SD) [i]	0.301***	0.294***	0.271***	0.261***	0.136***	0.135***
	(0.058)	(0.056)	(0.052)	(0.051)	(0.028)	(0.028)
Individual level (SD)	0.948***	0.940***	0.922***	0.919***	0.919***	0.919***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001[b] Standardised coefficients are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] The term "random intercept" represents country-dependent deviations of the pooled-sample mean life satisfaction level (intercept).

Table 3.4 Past unemployment & EUROD (random intercepts & random slopes model)

Variables	*(1)* [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
			EURO-D			
Past unemployment	0.023**	0.017*	0.008	0.007	0.006	0.007
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)
Being currently unemployed [c]		0.305***	0.325***	0.318***	0.318***	0.319***
		(0.045)	(0.044)	(0.044)	(0.044)	(0.044)
Unemployment rate					0.150***	0.148***
					(0.041)	(0.041)
Benefit replacement rate (1st yr)					0.059	0.075
					(0.044)	(0.048)
Benefit replacement rate (5 yrs)					0.022	0.009
					(0.035)	(0.039)
Interactions with past unemployment						
x Benefit replacement rate (1st yr)						0.005
						(0.005)
x Benefit replacement rate (5 yrs)						-0.004
						(0.005)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.020***	0.018***	0.014***	0.014***	0.014***	0.012***
	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)
Random intercept (SD) [i]	0.224***	0.220***	0.206***	0.193***	0.144***	0.143***
	(0.044)	(0.043)	(0.041)	(0.038)	(0.030)	(0.029)
Individual level (SD)	0.972***	0.969***	0.937***	0.932***	0.932***	0.932***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001[b] Standardised coefficients are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15[f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] The term "random intercept" represents country-dependent deviations of the pooled-sample mean EUROD level (intercept).

Columns 5 and 6 in tables 3.2, 3.3 and 3.4 present the results of estimating the full model, including controls for country-specific labour market characteristics and interactions of unemployment benefit generosity with past unemployment, for each outcome of interest. Benefit replacement rates during first year of unemployment and after five years spent in unemployment do not appear to affect the within-country effects of past unemployment on the various aspects of psychological well-being. Further, the estimated cross-level interactions, which indicate whether scarring varies systematically across countries as a function of benefits generosity, are not statistically significant. However, introducing these factors in the model appears to reduce the variance of the random slopes, which reflect the between-country differences in the impact of past unemployment on contemporary well-being. Namely, comparing the results from estimating the full specification including both country-specific controls and cross-level interactions (column 6) with the results from estimating the model without any country-specific controls (column 4) reveals that adjusting for benefit duration and generosity explains 33% of the country-dependent deviations from the average effect of past unemployment on life quality in the pooled sample and 14% from the average effect on life satisfaction respectively. Despite being quite small in magnitude, particularly in the case of life satisfaction, reductions in the variances of the country-specific effects potentially indicate that differences in labour market policies might predict differences in the magnitude of the scarring effect of unemployment across countries.

Further, table 3.5 displays the effects of past unemployment on the three measures of subjective well-being by country. The country-specific random effects were calculated using best linear unbiased predictors, which are essentially estimates of the country-specific random slopes. Evidently, the relationship between past unemployment and quality of life and life satisfaction is negative across all sampled countries. Italy is an exception, with past unemployment appearing to have a positive effect on evaluations of life quality in the fully adjusted model. However, the estimated effect is very weak indicating that individual and country-specific confounding characteristics may explain the effect of past unemployment on future life quality in the case of Italy. Despite the differences in the magnitude of the effects across countries, potentially reflecting the importance of country-specific socio-economic characteristics in shaping employment trajectories and psychological well-being, table 3.5 uncovers evidence that the long-term psychological repercussions of unemployment are not a country-specific phenomenon.

Table 3.5 Predicted scarring effects by country [a b]

Countries [c]	CASP		Life Satisfaction		EURO-D	
	Unadjusted (model 1)	Fully adjusted (model 6)	Unadjusted (model 1)	Fully adjusted (model 6)	Unadjusted (model 1)	Fully adjusted (model 6)
Denmark	-0.056	-0.024	-0.059	-0.021	0.042	0.016
Switzerland	-0.051	-0.021	-0.042	-0.015	0.029	0.009
Germany	-0.048	-0.022	-0.032	-0.009	0.009	-0.012
Poland	-0.042	-0.027	-0.039	-0.023	0.040	0.027
Austria	-0.037	-0.014	-0.048	-0.024	0.025	0.009
France	-0.036	-0.015	-0.035	-0.018	0.046	0.020
Sweden	-0.035	-0.022	-0.029	-0.005	0.033	0.001
Netherlands	-0.033	-0.026	-0.023	-0.012	0.016	0.006
Czech Republic	-0.026	-0.002	-0.046	-0.024	0.041	0.004
Belgium	-0.023	-0.015	-0.020	-0.007	0.014	0.005
Ireland	-0.022	-0.019	-0.021	-0.010	0.013	0.011
Spain	-0.012	-0.013	-0.003	-0.001	0.006	0.000
Italy	-0.011	0.002	-0.028	-0.019	0.014	0.010
Greece	-0.006	-0.020	-0.001	-0.005	-0.007	-0.006

[a] The random effects are calculated using best linear unbiased predictors, estimated using the full model which controls for both individual and country specific characteristics. [b] All slopes are standardised [c] Countries are listed in the order of the magnitude of the unadjusted effect of past unemployment on CASP (from largest to smallest)

3.7.3 Robustness tests

Further, controls for benefit generosity and duration during the period between 1960 and 2000 were added in the models to test whether historical trends in labour market institutions explain the between-country variability of the scarring effect. Additional analysis excludes Greece, Czech Republic and Poland, as data on historical replacement rates were not available for these countries. As shown in tables 3C.1, 3C.2 and 3C.3 presented in section C of the appendix, between-country differences in the development of labour market policies in the past do reduce the variance in the random slopes but do not explain the within-country scarring effect. Scarring is robust to the inclusion of cross-level interactions between the accumulation of past unemployment spells and between-country differences in historical benefit generosity and duration.

Additionally, we estimated alternative specifications where past unemployment was measured by a categorical variable instead of using a count measure of past spells. Thus far, the estimated effect of the accumulation of past unemployment spells on future well-being was modelled as being linear. Hence, the well-being effect of having spent at least six months in unemployment compared to having no such experiences was considered to be the same as going through one more unemployment spell; for example, moving from one past

unemployment event to two of them. We used a categorical measure of past unemployment to distinguish between different levels of past unemployment. As shown in Table 3D.1 in section D of the appendix, the scarring effect of unemployment varies across different levels of past spells accumulation (1-3 spells; 4-6 spells; more than 6 spells), with the greatest harm inflicted by having gone through four to six unemployment spells. Evidently, the psychological scarring effect is robust to different measures of past unemployment.

In summary, despite the importance of each country's specificities reflected in the between-country variation, unemployment is found to be psychologically harmful across countries, with the effect being time-persistent. Therefore, it is suggested that unemployment is a psychologically detrimental event potentially of global nature, with its well-being consequences being negative across all countries analysed here, apart from Italy where the effect of past unemployment on life quality is found to be positive but not substantial. Notwithstanding the small and disparate in size national subsamples, these results uncover evidence that unemployment has long-term repercussions for individual well-being across Europe. On the grounds of this finding, the mechanisms driving the differences in unemployment's influence on well-being in each country emerge as an area for further investigation.

3.8 Conclusions and discussion

The present study uncovers evidence that the effect of past unemployment on contemporary life satisfaction and self-reported quality of life is present across nations. Experiencing unemployment predicts reduced well-being after age 50 in 14 European countries. This finding replicates country-specific analyses of unemployment scarring and moves beyond existing research to demonstrate that these associations are evident at a broader, cross-country level. In line with prior work (e.g. Clark et al. 2001; Daly and Delaney 2013), the negative influence of unemployment is present both contemporarily and over the long-run. Furthermore, the persistent link between past unemployment spells and subjective and psychological well-being could not be accounted for by other observed factors operating at the individual or country level. Thus, this study suggests that unemployment is likely to have long-term, psychologically damaging effects both within and across countries.

Across working life, spanning from the beginning of the survey participants' careers to their mid-50s, each six-month spell of past unemployment is found to predict a 0.017 SD reduction in self-reported quality of life and a 0.014 SD reduction in satisfaction with life after age 50, after adjusting for various confounding factors at the individual and country level. On the contrary, the within-country effect of past unemployment on self-reported

depression symptoms appears to be explained by individual demographic factors, such as gender, marital status and highest academic achievement. Taken together, the main results of the present study indicate that past unemployment appears to detrimentally affect positive functioning and individual evaluations of life. Specifically, we found that prolonged time spent in unemployment may impact negatively on perceptions of satisfaction with life and self-development, self-actualisation and autonomy, which are captured in the CASP scale (Vanhouette 2014). The CASP also captures the ability to take pleasure in one's life pointing towards a potential affective impact of the accumulation of past unemployment. Yet, we found little evidence that past unemployment generated a robust increase in depressive symptoms. This could be attributed to the fact that the distress measure we use in this study is clustered around zero, possibly making it less sensitive to picking up changes in subjective well-being compared to the highly granular, normally distributed measure of life quality.

The long-term, within-country psychological consequences of past unemployment, which persist after the age of 50, could be indicative of the long-term scarring effect of unemployment on labour market outcomes, such as earnings and occupational status. It has been shown that the psychological impact of past unemployment experiences, occurring at any point of individual employment trajectories, could trigger feelings of resignation, low self-esteem and pessimism (Goldsmith et al. 1996). Consequently, damaged coping mechanisms may predict poor performance, increased absenteeism, inadequate job-seeking skills and low on-the-job productivity, thus leading to poor career prospects (Waters and Moore, 2002). Further research is necessary to identify possible pathways linking the mental impact of unemployment to future economic adversities.

The current findings suggest that unemployment may detrimentally affect long-run well-being *across countries*, after adjusting for different sources of inter-personal and between-country heterogeneity, using a detailed set of individual and country-specific controls. Our findings are limited in that we rely on retrospective accounts of employment history and childhood background and health. Additionally, we were not able to eliminate completely the probability that the observed results are driven by self-selection into prolonged unemployment. Data limitations did not allow us to observe study subjects prospectively over long time periods and thus, control for time-invariant unobserved confounding characteristics, as done previously in the key studies examining the psychological scarring effect of unemployment (e.g. Clark et al. 2001; Knabe and Rätzel 2011). While adjusting for psychological health prior to respondents' entry in the labour market reduces the probability of self-selection bias, it does not ensure that there are not unobserved factors which may predict both increased unemployment and damaged psychological well-being.

Measurement error in the assessment of unemployment may have attenuated the magnitude of the potential welfare scarring we observe. Conversely, correcting for measurement error in the assessment of childhood characteristics and adjusting for the presence of unobserved confounders may reduce the strength of the association we identified between past unemployment and contemporary well-being. However, previous studies incorporating prospectively assessed measures of childhood characteristics and well-being have identified similar scarring effects (e.g. Daly and Delaney 2013) suggesting these issues may not explain the long-run welfare impact of unemployment. Moreover, the scarring effect of past unemployment may be underestimated because older workers with experiences of prolonged unemployment may self-select into early retirement and thus, be excluded from the study sample of non-retirees. Additionally, the probability of early retirement is likely to differ systematically across countries (Tatsiramos 2010). We found that age of respondents is not significantly associated with past unemployment, suggesting that selection into early retirement is not substantially related to accumulation of past unemployment spells in the study sample. Regardless of these limitations, we identify evidence of the presence of unemployment well-being scarring across Europe. The observed associations between past long-term spells of joblessness and reduced well-being across 14 European countries, irrespective of their different labour market structure and socioeconomic background, is a strong indication of psychological scarring being a broad, international phenomenon.

Despite using imperfect measures of contemporary and past income support policies for the unemployed, adjusting for permanent country-specific characteristics produces a small reduction in the random slopes reflecting between-country variability of the observed scarring effect. This could point to country-specific institutional characteristics as potential moderators of scarring. For example, passive labour market policies could reflect prevailing perceptions of unemployment and attitudes towards the unemployed. Such perceptions and attitudes could determine the extent to which unemployment events impact psychological well-being in the long run. In a country where unemployment is considered to be a personal failure, as is shown to be the case in many liberal welfare regimes where unemployment benefits levels are low, the unemployed may suffer greater social stigma, among other adversities (Biewen and Steffes 2010). Consequently, the psychological damage following unemployment in this context could be greater compared to a country where being jobless is regarded as an accidental event that can happen to anyone.

Furthermore, there are numerous national specificities not observed in the current study that could influence the welfare scarring effect of unemployment. These include employment policies and cultural differences in work norms, values, and beliefs regarding the causes of unemployment. Whilst the current results chiefly point to the universal nature of scarring effects, they also suggest that labour market characteristics, such as the generosity of

unemployment benefits, play at least some role in shaping the strength of scarring effects across nations. Further work is now needed to identify whether there are robust between-country modifiers of the long-run well-being effects of unemployment.

In conclusion, our findings demonstrate that unemployment may have long-run well-being effects that persist for many years and are evident across nations. The potential broad, cross-country nature of well-being scarring suggests that the total welfare cost of unemployment and economic downturns may be greater and longer-lasting than previously estimated. Our results also highlight potential additional benefits of successful labour market activation policies and skills enhancement programmes, which aim to foster resilience, compensate for impaired well-being (Liu et al. 2014), and ameliorate the psychological effects of unemployment.

3.9 Appendix

3.9.1 Section A: descriptive statistics

Table 3A.1 Descriptive statistics by country

	Austria	Germany	Netherlands	France	Switzerland	Belgium
Well-Being						
EURO-D	1.787	1.815	1.928	2.588	1.828	2.391
	(1.929)	(1.731)	(1.920)	(2.343)	(1.848)	(2.213)
CASP	38.640	39.364	41.136	37.980	40.619	38.378
	(5.725)	(5.131)	(4.401)	(5.189)	(4.551)	(5.231)
Life satisfaction	7.875	7.830	8.020	7.524	8.380	7.720
	(1.886)	(1.577)	(1.089)	(1.783)	(1.352)	(1.261)
Unemployment						
Past unemployment	0.345	0.888	0.415	0.634	0.180	1.372
	(1.943)	(2.863)	(2.283)	(2.522)	(1.163)	(4.220)
Currently unemployed	0.040	0.124	0.020	0.063	0.028	0.098
	(0.197)	(0.330)	(0.139)	(0.244)	(0.164)	(0.297)
Adult SES						
Female	0.635	0.614	0.642	0.596	0.605	0.592
	(0.483)	(0.487)	(0.480)	(0.491)	(0.489)	(0.492)
Age	56.985	56.805	57.942	54.506	57.382	56.244
	(6.098)	(5.117)	(5.564)	(4.570)	(5.820)	(5.680)
Married	0.790	0.840	0.834	0.748	0.761	0.812
	(0.408)	(0.367)	(0.373)	(0.434)	(0.427)	(0.391)
No of children	2.255	1.906	2.203	2.215	2.079	2.103
	(1.349)	(1.146)	(1.311)	(1.362)	(1.258)	(1.228)
Monthly hhd income	24,286	37,440	48,072	43,882	56,590	34,039
	(21,769)	(41,626)	(52,370)	(38,866)	(88,450)	(68,387)
Educational qualification	3.095	3.612	3.000	3.089	3.159	3.120
	(1.278)	(1.055)	(1.347)	(1.675)	(1.097)	(1.415)
Childhood SES						
Hospitalisation [b]	0.080	0.108	0.073	0.052	0.081	0.054
	(0.272)	(0.310)	(0.261)	(0.222)	(0.273)	(0.226)
Mental health [c]	0.015	0.010	0.008	0.028	0.010	0.011
	(0.122)	(0.097)	(0.087)	(0.165)	(0.098)	(0.102)
Cognitive skills [d]	3.351	3.356	3.275	3.260	3.402	3.394
	(0.750)	(0.676)	(0.684)	(0.759)	(0.730)	(0.794)
Rooms/ person	0.746	0.804	0.831	0.841	0.923	1.022
	(0.427)	(0.355)	(0.339)	(0.399)	(0.411)	(0.465)
Books (ref: none/few) [e]	0.640	0.761	0.779	0.692	0.777	0.665
	(0.481)	(0.427)	(0.415)	(0.477)	(0.417)	(0.472)
Country-Specific Characteristics						
NBRR (1 yr) [f]	0.678	0.754	0.770	0.739	0.818	0.680
NBRR (5 yrs) [f]	0.579	0.425	0.192	0.371	0.159	0.655
Unemployment rate [f]	5.059	9.409	4.592	8.421	4.480	7.875
Past NBRR (1 yr) [g]	0.311	0.379	0.681	0.579	0.656	0.487
Past NBRR (5 yrs) [g]	0.606	0.635	0.596	0.392	0.132	0.801
Obs	200	735	916	790	618	954

Table 3A.1 Descriptive statistics by country (continued)

	Sweden	Denmark	Spain	Italy	Greece	Ireland	Czech R	Poland
Well-Being								
EURO-D	1.582	1.701	2.510	2.480	1.409	1.793	1.440	3.143
	(1.605)	(1.721)	(2.476)	(2.302)	(1.814)	(1.707)	(1.774)	(2.275)
CASP	40.020	41.232	36.986	34.962	36.177	39.472	35.649	37.095
	(4.088)	(3.998)	(5.877)	(5.553)	(5.175)	(4.688)	(5.225)	(5.976)
Life satisfaction	8.461	8.641	7.428	7.581	7.270	8.307	7.397	6.927
	(1.271)	(1.147)	(1.701)	(1.566)	(1.526)	(1.393)	(1.759)	(1.922)
Unemployment								
Past unemployment	0.236	0.464	0.708	1.237	0.907	0.380	0.096	1.617
	(1.361)	(1.882)	(3.387)	(4.612)	(3.307)	(2.491)	(0.786)	(4.427)
Currently unemployed	0.034	0.048	0.072	0.044	0.025	0.027	0.062	0.141
	(0.182)	(0.213)	(0.259)	(0.206)	(0.156)	(0.163)	(0.241)	(0.348)
Adult SES								
Female	0.555	0.534	0.635	0.625	0.499	0.632	0.515	0.542
	(0.497)	(0.499)	(0.482)	(0.482)	(0.500)	(0.483)	(0.500)	(0.499)
Age	58.383	55.724	55.724	56.739	56.530	57.863	54.504	54.556
	(4.162)	(4.842)	(4.842)	(5.705)	(5.561)	(5.773)	(3.974)	(4.406)
Married	0.829	0.771	0.771	0.890	0.890	0.848	0.801	0.830
	(0.376)	(0.420)	(0.420)	(0.313)	(0.313)	(0.360)	(0.400)	(0.376)
No of children	2.399	2.216	2.216	2.024	1.858	2.900	2.060	2.403
	(1.227)	(1.217)	(1.217)	(1.104)	(0.928)	(1.853)	(0.197)	(1.403)
Monthly hhd income	42,070	55,666	20,247	26,106	16,906	56,555	9,154	6,701
	(35,53)	(26,03)	(29,75)	(33,837)	(27,700)	(111,84)	(9,803)	(5,067)
Educational qualification	3.365	3.906	1.968	2.370	2.747	3.590	2.737	2.778
	(1.434)	(1.290)	(1.481)	(1.325)	(1.569)	(1.596)	(1.050)	(1.191)
Childhood SES								
Hospitalisation	0.056	0.066	0.018	0.046	0.007	0.058	0.085	0.104
	(0.231)	(0.248)	(0.132)	(0.210)	(0.085)	(0.234)	(0.279)	(0.305)
Mental health [c]	0.013	0.015	0.007	0.004	0.001	0.009	0.004	0.011
	(0.115)	(0.121)	(0.086)	(0.067)	(0.032)	(0.095)	(0.061)	(0.105)
Cognitive skills [d]	3.516	3.472	3.155	3.191	3.279	3.437	3.3210	3.244
	(0.720)	(0.803)	(0.688)	(0.720)	(0.761)	(0.741)	(0.758)	(0.679)
Rooms/ person	0.840	0.976	0.644	0.593	0.552	0.780	0.629	0.431
	(0.385)	(0.437)	(0.350)	(0.323)	(0.237)	(0.463)	(0.277)	(0.253)
Books (ref: none/ few) [e]	0.902	0.869	0.433	0.347	0.434	0.684	0.923	0.533
	(0.297)	(0.338)	(0.496)	(0.476)	(0.496)	(0.466)	(0.267)	(0.500)
Country-Specific Characteristics								
NBRR (1 yr) [f]	0.747	0.779	0.768	0.703	0.403	0.639	0.642	0.527
NBRR (5 yrs) [f]	0.217	0.240	0.175	0.180	0.177	0.590	0.239	0.211
Unemployment rate [f]	6.580	3.829	8.342	6.434	8.725	4.596	6.229	11.788
Past NBRR (1 yr) [g]	0.702	0.727	0.670	0.152	-	0.340	-	-
Past NBRR (5 yrs) [g]	0.041	0.708	0.208	0.023	-	0.534	-	-
Obs	674	944	677	675	966	329	532	454

[a] Country- specific mean values are displayed for each variable. Standard deviations are in parentheses. [b] Hospitalisation for 1 month or longer for any reason up to age 15 (binary), [c] Binary indicator for having experienced any psychiatric, emotional or nervous condition during childhood [d] Self-rated skills in maths and language compared to class-mates at age 10 [e] 0= 0-10 books, 1>10 books [f] Country-specific characteristics are averaged over 2006 and 2007. NBRR stands for net benefit replacement rate [g] Average net benefit replacement rate for the period between 1960-2000 weighted with annual unemployment rate.

3.9.2 Section B: interactions between past unemployment & contemporary socio-economic characteristics

Table 3B.1 Past unemployment & CASP (interactions between contemporary and past unemployment)

	(1) [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
Variables			*CASP*			
Past unemployment	-0.031***	-0.022***	-0.017**	-0.016**	-0.015**	-0.015**
	(0.007)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Being currently unemployed [c]		-0.484***	0.446***	-0.439***	-0.440***	-0.439***
		(0.047)	(0.047)	(0.047)	(0.047)	(0.047)
Past unemployment * being currently unemployed		-0.003	-0.005	-0.005	-0.005	-0.007
		(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Unemployment rate					-0.071	-0.082
					(0.067)	(0.063)
Benefit replacement rate (1st yr)					0.100	0.152
					(0.072)	(0.083)
Benefit replacement rate (5 yrs)					0.090	0.038
					(0.057)	(0.067)
Interactions with past unemployment						
x Benefit replacement rate (1st year)						-0.006
						(0.004)
x Benefit replacement rate (5 years)						0.007
						(0.004)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.018***	0.015***	0.012***	0.012***	0.011***	0.008***
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.003)
Random intercept (SD) [i]	0.360***	0.357***	0.329***	0.322***	0.265***	0.256***
	(0.069)	(0.068)	(0.063)	(0.062)	(0.056)	(0.050)
Individual level (SD)	0.922***	0.916***	0.903***	0.899***	0.899***	0.899***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001 [b] Standardised coefficients are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects. [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] the term "random intercept" represents country-dependent deviations of the pooled-sample mean CASP level (intercept).

Table 3B.2 Past unemployment & life satisfaction (interactions between contemporary and past unemployment)

	(1) [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)*[a, b]	*(6)*[a, b]
Variables			*Life Satisfaction*			
Past unemployment	-0.030***	-0.019*	-0.013*	-0.013*	-0.012	-0.012*
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Being currently unemployed [c]		-0.535***	-0.490***	-0.484***	-0.483***	-0.483***
		(0.049)	(0.048)	(0.048)	(0.048)	(0.048)
Past unemployment * being currently unemployed		-0.007	-0.008	-0.008	-0.008	-0.009
		(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Unemployment rate					-0. 155***	-0.148**
					(0.042)	(0.042)
Benefit replacement rate (1st yr)					0.109*	0.109*
					(0.046)	(0.047)
Benefit replacement rate (5 yrs)					0.016	0.022
					(0.036)	(0.037)
Interactions with past unemployment						
x Benefit replacement rate (1st year)						-0.003
						(0.005)
x Benefit replacement rate (5 years)						0.005
						(0.005)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.020***	0.016***	0.014***	0.014***	0.015***	0.012***
	(0.007)	(0.006)	(0.006)	(0.005)	(0.007)	(0.007)
Random intercept (SD) [i]	0.301***	0.294***	0.271***	0.259***	0.136***	0.135***
	(0.058)	(0.056)	(0.052)	(0.051)	(0.028)	(0.028)
Individual level (SD)	0.948***	0.940***	0.922***	0.919***	0.919***	0.919***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001 [b] Standardised coefficients are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] The term "random intercept" represents country-dependent deviations of the pooled-sample mean life satisfaction level (intercept).

Table 3B.3 Past unemployment & EUROD (interactions between contemporary and past unemployment)

Variables	*(1)* [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
			EURO-D			
Past unemployment	0.023**	0.019**	0.008	0.008	0.007	0.007
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Being currently unemployed [c]		0.326***	0.330***	0.322***	0.322***	0.321***
		(0.050)	(0.049)	(0.048)	(0.048)	(0.048)
Past unemployment * being currently unemployed		-0.009	-0.002	-0.002	-0.001	-0.001
		(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Unemployment rate					0.150***	0.148***
					(0.041)	(0.041)
Benefit replacement rate (1st yr)					0.059	0.075
					(0.044)	(0.048)
Benefit replacement rate (5 yrs)					0.021	0.009
					(0.035)	(0.039)
Interactions with past unemployment						
x Benefit replacement rate (1st yr)						0.005
						(0.005)
x Benefit replacement rate (5 yrs)						-0.004
						(0.005)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.020***	0.018***	0.014***	0.014***	0.014***	0.012***
	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)
Random intercept (SD) [i]	0.224***	0.220***	0.206***	0.193***	0.144***	0.143***
	(0.044)	(0.043)	(0.041)	(0.038)	(0.030)	(0.029)
Individual level (SD)	0.972***	0.969***	0.937***	0.932***	0.932***	0.932***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001 [b] Standardised coefficients are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] The term "random intercept" represents country-dependent deviations of the pooled-sample mean EUROD level (intercept).

Table 3B.4 Past unemployment & CASP (interactions between past unemployment and gender)

	(1) [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
Variables			*CASP*			
Past unemployment	-0.031***	-0.022***	-0.024**	-0.022**	-0.021**	-0.023**
	(0.007)	(0.006)	(0.008)	(0.008)	(0.007)	(0.007)
Being currently unemployed [c]		-0.484***	0.453***	-0.447***	-0.449***	-0.452***
		(0.047)	(0.042)	(0.042)	(0.042)	(0.042)
Female			-0.076***	-0.080***	-0.080***	-0.080***
			(0.020)	(0.020)	(0.020)	(0.020)
Past unemployment * female			0.008	0.007	0.007	0.007
			(0.007)	(0.007)	(0.007)	(0.007)
Unemployment rate					-0.075	-0.087
					(0.067)	(0.063)
Benefit replacement rate (1st yr)					0.095	0.150
					(0.072)	(0.083)
Benefit replacement rate (5 yrs)					0.086	0.037
					(0.057)	(0.067)
Interactions with past unemployment						
x Benefit replacement rate (1st year)						-0.007
						(0.004)
x Benefit replacement rate (5 years)						0.006
						(0.003)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
andom slope (SD) [h]	0.018***	0.015***	0.012***	0.012***	0.011***	0.008***
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.003)
Random intercept (SD) [i]	0.360***	0.357***	0.327***	0.320***	0.265***	0.256***
	(0.069)	(0.068)	(0.063)	(0.061)	(0.056)	(0.050)
Individual level (SD)	0.922***	0.916***	0.900***	0.899***	0.899***	0.899***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001[b] Standardised coefficients are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects. [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] the term "random intercept" represents country-dependent deviations of the pooled-sample mean CASP level (intercept).

Table 3B.5 Past unemployment & life satisfaction (interactions between past unemployment and gender)

	(1) [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
Variables			*Life Satisfaction*			
Past unemployment	-0.030***	-0.019*	-0.017*	-0.016	-0.015	-0.015
	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Being currently unemployed [c]		-0.535***	-0.508***	-0.504***	-0.503***	-0.503***
		(0.049)	(0.043)	(0.043)	(0.043)	(0.043)
Female			-0.076***	-0.079***	-0.080***	-0.080***
			(0.020)	(0.020)	(0.020)	(0.020)
Past unemployment * female			0.003	0.002	0.002	0.002
			(0.008)	(0.008)	(0.008)	(0.008)
Unemployment rate					-0. 155***	-0.148**
					(0.042)	(0.042)
Benefit replacement rate (1st yr)					0.109*	0.109*
					(0.046)	(0.047)
Benefit replacement rate (5 yrs)					0.016	0.022
					(0.036)	(0.037)
Interactions with past unemployment						
x Benefit replacement rate (1st year)						-0.003
						(0.005)
x Benefit replacement rate (5 years)						0.005
						(0.005)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.020***	0.016***	0.014***	0.014***	0.015***	0.012***
	(0.007)	(0.006)	(0.006)	(0.005)	(0.007)	(0.007)
Random intercept (SD) [i]	0.301***	0.294***	0.260***	0.259***	0.136***	0.135***
	(0.058)	(0.056)	(0.052)	(0.050)	(0.030)	(0.028)
Individual level (SD)	0.948***	0.940***	0.922***	0.919***	0.919***	0.919***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001 [b] Standardised coefficients are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] The term "random intercept" represents country-dependent deviations of the pooled-sample mean life satisfaction level (intercept)

Table 3B.6 Past unemployment & EUROD (interactions between past unemployment and gender)

	(1) [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
Variables			*EURO-D*			
Past unemployment	0.023**	0.019**	0.006	0.005	0.005	0.006
	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Being currently unemployed [c]		0.326***	0.319***	0.320***	0.320***	0.320***
		(0.050)	(0.044)	(0.044)	(0.044)	(0.048)
Female			0.428***	0.429***	0.429***	0.429***
			(0.020)	(0.020)	(0.020)	(0.020)
Past unemployment * female			0.002	0.002	0.001	0.001
			(0.007)	(0.008)	(0.007)	(0.008)
Unemployment rate					0.150***	0.148***
					(0.041)	(0.041)
Benefit replacement rate (1st yr)					0.059	0.075
					(0.044)	(0.048)
Benefit replacement rate (5 yrs)					0.021	0.009
					(0.035)	(0.039)
Interactions with past unemployment						
x Benefit replacement rate (1st yr)						0.005
						(0.005)
x Benefit replacement rate (5 yrs)						-0.004
						(0.005)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.020***	0.018***	0.014***	0.014***	0.014***	0.012***
	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)
Random intercept (SD) [i]	0.224***	0.220***	0.195***	0.145***	0.144***	0.143***
	(0.044)	(0.043)	(0.039)	(0.030)	(0.030)	(0.029)
Individual level (SD)	0.972***	0.969***	0.932***	0.932***	0.932***	0.932***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464	9,464	9,464	9,464
Number of groups (countries)	14	14	14	14	14	14

[a]Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001[b] Standardised coefficients are reported [c]The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15[f] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects [h]The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i]The term "random intercept" represents country-dependent deviations of the pooled-sample mean EUROD level (intercept).

3.9.3 Section C: historical data

Table 3C.1 Past unemployment & CASP (random intercepts & random slopes-historical data)

	(1) [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)*[a, b]	*(6)*[a, b]
Variables			*CASP*			
Past unemployment	-0.032***	-0.023***	-0.018**	-0.017**	-0.019**	-0.021***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)
Being currently unemployed [c]		-0.493***	-0.473***	-0.464***	-0.469***	-0.470***
		(0.047)	(0.047)	(0.047)	(0.047)	(0.047)
Past benefit replacement rate (1st yr)					0.158***	0.195***
					(0.036)	(0.052)
Past benefit replacement rate (5 yrs)					0.120**	0.121**
					(0.037)	(0.055)
Interactions with past unemployment						
x Past benefit replacement rate (1st year)						-0.005
						(0.005)
x Past benefit replacement rate (5 years)						0.001
						(0.005)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.017***	0.014***	0.012***	0.012***	0.011***	0.011***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)
Random intercept (SD) [i]	0.331***	0.328***	0.311***	0.300***	0.177***	0.173***
	(0.071)	(0.071)	(0.067)	(0.065)	(0.041)	(0.039)
Individual level (SD)	0.904***	0.898***	0.887***	0.883***	0.883***	0.884***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	7,512	7,512	7,512	7,512	7,512	7,512
Number of groups (countries)	11	11	11	11	11	11

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001[b] Coefficients standardised across the pooled sample are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Historical controls include the weighted averages of benefit replacement rates and benefit duration over the period 1990-2000 for each country [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] The term "random intercept" represents country-dependent deviations of the pooled-sample mean CASP level (intercept).

Table 3C.2 Past unemployment & life satisfaction (random intercepts & random slopes model- historical data)

Variables	*(1)* [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)* [a, b]
	LIFE SATISFACTION					
Past unemployment	-0.030***	-0.020***	-0.015*	-0.015*	-0.015*	-0.014*
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)
Being currently unemployed [c]		-0.519***	-0.489***	-0.483***	-0.483***	-0.482***
		(0.048)	(0.047)	(0.047)	(0.047)	(0.047)
Past benefit replacement rate (1st yr)					0.506	0.087
					(0.315)	(0.055)
Past benefit replacement rate (5 yrs)					0.023	0.007
					(0.213)	(0.059)
Interactions with past unemployment						
x Past benefit replacement rate (1st year)						0.002
						(0.006)
x Past benefit replacement rate (5 years)						-0.001
						(0.006)
	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.017***	0.015***	0.013***	0.013***	0013***	0.012***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Random intercept (SD) [i]	0.247***	0.241***	0.215***	0.206***	0.185***	0.185***
	(0.054)	(0.053)	(0.047)	(0.048)	(0.041)	(0.041)
Individual level (SD)	0.911***	0.905***	0.889***	0.887***	0.887***	0.887***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	7,512	7,512	7,512	7,512	7,512	7,512
Number of groups (countries)	11	11	11	11	11	11

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001 [b] Coefficients standardised across the pooled sample are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [f] Historical controls include the weighted averages of benefit replacement rates and benefit duration over the period 1990-2000 for each country [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances are estimated using the independent covariance matrix, calculating one variance parameter per random effect [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] The term "random intercept" represents country-dependent deviations of the pooled-sample mean life satisfaction level (intercept).

Table 3C.3 Past unemployment & EUROD (random intercepts & random slopes model – historical data)

Variables	*(1)* [a,b]	*(2)* [a,b]	*(3)* [a,b]	*(4)* [a,b]	*(5)* [a, b]	*(6)*
			EURO-D			
Past unemployment	0.025***	0.020***	0.011	0.010	0.010	0.012
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)
Being currently Unemployed [c]		0.305***	0.338***	0.328***	0.328***	0.331***
		(0.051)	(0.050)	(0.050)	(0.050)	(0.050)
Past benefit replacement rate (1st yr)					-0.027	-0.030
					(0.037)	(0.038)
Past benefit replacement rate (5 yrs)					-0.023	-0.020
					(0.040)	(0.040)
Interactions with past unemployment						
x Past benefit replacement rate (1st year)						0.007
						(0.005)
x Past benefit replacement rate (5 years)						-0.007
						(0.005)
Adult SES [d]	-	-	Yes	Yes	Yes	Yes
Childhood SES & health [e]	-	-	-	Yes	Yes	Yes
Country-specific characteristics [f]	-	-	-	-	Yes	Yes
Random part [g]						
Random slope (SD) [h]	0.015***	0.015***	0.013***	0.013***	0.013***	0.010***
	(0.007)	(0.007)	(0.006)	(0.006)	(0.007)	(0.007)
Random intercept (SD) [i]	0.166***	0.164***	0.139***	0.127***	0.122***	0.121***
	(0.037)	(0.037)	(0.032)	(0.030)	(0.029)	(0.029)
Individual level (SD)	0.977***	0.975***	0.944***	0.938***	0.938***	0.938***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Observations	7,512	7,512	7,512	7,512	7,512	7,512
Number of groups (countries)	11	11	11	11	11	11

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001 [b] Coefficients standardised across the pooled sample are reported [c] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [d] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [e] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; Hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15. [f] Historical controls include the weighted averages of benefit replacement rates and benefit duration over the period 1990-2000 for each country [g] In the random part of the table, the standard deviation of the random effects and their standard errors are presented. All variances and covariances are estimated distinctly using the unstructured covariance matrix for the random effects [h] The term "random slope" represents country dependent deviations from the average effect of past unemployment (slope) [i] The term "random intercept" represents country-dependent deviations of the pooled-sample mean EURO-D level (intercept).

3.9.4 Section D: alternative past unemployment variable

Table 3D.1 Past unemployment (categorical indicator) & contemporary well-being

Variables	*(1)* [a,b] *CASP*	*(2)* [a,b] *Life satisfaction*	*(3)* [a,b] *EURO-D*
Past unemployment [c]			
1-3 spells	-0.101*	-0.048	0.078
	(0.050)	(0.045)	(0.048)
4-6 spells	-0.188**	-0.193**	0.104
	(0.070)	(0.067)	(0.069)
>6 spells	-0.175**	-0.105**	0.029
	(0.066)	(0.063)	(0.065)
Being currently unemployed [d]	-0.433***	-0.505***	0.309***
	(0.043)	(0.044)	(0.045)
Adult SES [e]	Yes	Yes	Yes
Childhood SES & health [f]	Yes	Yes	Yes
Country-specific characteristics [g]	Yes	Yes	Yes
Random part [h]			
Random Effects (SD) [i]	0.244**	0.140***	0.160***
	(0.046)	(0.030)	(0.032)
Individual level (SD)	0.898***	0.919***	0.932***
	(0.007)	(0.007)	(0.007)
Observations	9,464	9,464	9,464
Number of groups (countries)	14	14	14

[a] Robust standard errors in parentheses- significance levels are denoted as: *p<0.05; ** p<0.01; *** p<0.001 [b] Coefficients standardised across the pooled sample are reported [c] The past unemployment variable is a categorical indicator (0= 0 spells, 1= 1-3 spells, 2= 4-6 spells, 3= >6 spells) [d] The "current unemployment" variable is an indicator which takes the value 1 if the participant was unemployed in the 2nd SHARE wave (vs. employed, in education, homemaker, permanently sick etc.) [e] Controls for age, gender, marital status, number of children, highest educational qualification and monthly household income are included [f] Indicators for numbers of books in the household; number of rooms per person; relative performance at mathematics and language at 10; hospitalisation for one month or longer; and, suffering from psychiatric, emotional or nervous problems before age 15 [g] Country-specific characteristics are averaged over 2006 and 2007 and include net benefit replacement rates during initial period of unemployment, net benefit replacement rates after 5 years of unemployment and national unemployment rates. [h] In the random part of the table, the standard deviations of the random effects and their standard errors are presented. All variances are estimated distinctly using the exchangeable covariance matrix for the random effects [i] the term "random slope" represents country dependent deviations from the average effect of past unemployment (slope)

Chapter 4. Hours-underemployment and psychological health: evidence from Britain

4.1 Abstract

There is rising demand amongst part-time workers to work longer hours; yet, evidence of the potentially detrimental effect of hours-underemployment on psychological health remains unclear. This paper uses samples drawn from two nationally representative British surveys to examine whether working less than 30 hours per week while preferring to work longer hours (hours-underemployment) is damaging to psychological health. Using a sample of workers drawn from the NCDS age 42-sweep, we find that hours-underemployment predicts substantially elevated levels of psychological distress as opposed to working full-time. Notably, the psychological impact of hours-underemployment is not accounted for by observed confounding factors, being adjusted for using propensity score matching. Further, the relationship between individual transitions from full-time employment to hours-underemployment and variations in psychological health are examined during the period between 1991 and 2009, using samples drawn from the BHPS. After controlling for within-person heterogeneity captured by fixed effects, moving from full-time jobs to hours-underemployment predicts positive changes in psychological distress levels. Job earnings and perceptions of job security do not fully explain the psychological impact of hours-underemployment. Overall, these findings point to the detrimental consequences of the recent surge in hours-underemployment on psychological health.

4.2 Introduction

Unemployed people are more likely to suffer from poor mental health compared to the employed, with unemployment's psychological effects being substantial and long-lasting (Daly and Delaney, 2013; Paul and Moser, 2009). However, employment does not always guarantee good mental health. Those who are employed can find themselves trapped in adverse situations, such as labour market recessions, layoffs or even family commitments, where they have to work fewer hours than they desire (McKee-Ryan and Harvey, 2011; McKee-Ryan et al., 2009).

People who work fewer hours than a national-specific threshold related to working time (e.g. 30 hours work per week in the UK) while they are willing and available to work additional hours are defined as being in *hours-underemployment* (ILO, 1998). According to Fryer (1984) and Fryer and Payne (1986), individuals' unique perspective of their employment status is an important determinant of the psychological consequences of employment. Moreover, the status passage theory developed by Ezzy (1993) argues that employment experiences are likely to negatively impact on workers' well-being when they perceive it as not fulfilling their social identity goals and needs. Based on these theories, it is reasonable to assume that undesirable employment statuses, such as hours-underemployment, may have profound and hitherto unexplored adverse psychological effects (McKee-Ryan et al. 2009).

Examining potential hardships following hours-underemployment is important given the prevalence of such part-time positions has been rising quickly in recent years, following the recent economic crisis (Bell and Blanchflower 2013). Hours-underemployment has been shown to be quite sensitive to responses of labour demand to worsening economic conditions (Buddelmeyer et al. 2008). Employers may resort to part-time contracts during recessions as the latter allow them to adjust working hours to uncertain economic conditions and thus, minimise labour costs while avoiding dismissals. For example, in difficult economic periods, employers are likely to curtail working hours and hire less full-time employees while workers who would prefer to work full-time are compelled to work part-time in order to avoid unemployment (OECD, 2010). In the UK, the share of male workers, who work part-time because they cannot find a full-time job, rose from 16.6% of all part-time workers in 2008 to 32.6% in 2013, while for women, hours-underemployment rose from 7.1% in 2008 to 13.5% in 2013 (Office for National Statistics, 2013). Identifying the impact of hours-underemployment on workers' wellbeing is important given the adverse labour market implications of poor psychological health, such as lower on-the-job productivity (Oswald et al., 2015), reduced earnings, retirement due to disability, rising sickness absenteeism (Layard, 2013; OECD, 2015) and future unemployment (Egan et al., 2016).

The impact of hours-underemployment on psychological well-being is likely to be similar to that caused by unemployment. Based on evidence that underemployment did not return to pre-crisis levels following the 2008 recession, recent literature on labour market trends in Europe argues that underemployment has replaced unemployment as an indicator of underutilisation of available workforce (Bell and Blanchflower 2018). Moreover, it is argued that underemployment has characteristics (for example, financial distress, damaged self-image, etc.) that are intermediate between unemployment and adequate employment – hence, it is considered a form of disguised unemployment (Dooley and Prause 2004). As expected evidence suggests, that unsatisfactory employment experiences such as unemployment carry social and health costs for workers that are comparable to those of unemployment (Dooley and Prause 2003).

The objective of the present study is, therefore, to investigate the impact of hours-underemployment on the psychological distress levels of British part-time workers who wish to work more hours both contemporarily and over long time intervals. Because hours-underemployment is usually associated with low pay (Mumford and Smith, 2008), uncertainty about future, and under-utilisation and deterioration of competencies (OECD, 2014), we suggest that it may trigger feelings of anxiety, loss of self-confidence and a generalised negative view of the self, thus producing a decline in psychological health.

4.2.1 Hours-underemployment and psychological distress

Hours-underemployment has been linked to unfavourable work outcomes, such as poor job quality, earnings inequality and lower occupational status (McGovern et al., 2004; OECD, 2014). Those who are in part-time employment and desire to work more hours often find themselves in low-wage, precarious jobs, which underutilise their skills and abilities, thus, leading to various adversities, such as hindering access to rewarding occupations in the long-run (OECD, 2014). Despite regulation introduced in many countries to ensure that part-time and full-time workers are treated equally, substantial differences remain between the two groups (OECD, 2010). In the UK, the effectiveness of the policies implemented to prevent unfavourable treatment of part-time workers and improve quality of part-time jobs, has been criticised (e.g. Bell, 2011). Therefore, part-time workers may still face employment hardships, such as wage penalties, worse working conditions and elevated job insecurity (OECD, 2010) compared to full-time employees. Moreover, socio-economic adversities have been shown to follow exposure to hours-underemployment, including financial strain (Warren, 2015), in-work poverty (Horemans et al., 2016) and reduced family well-being (Wunder and Heineck, 2013). Whilst it is likely that such effects may mean that hours-underemployment leads to negative psychological consequences, this has not yet been established empirically.

Prior studies examining underemployment and well-being and health outcomes (e.g. life satisfaction, psychological distress and subjective health) have not tended to consider both the employment status of employees (full- or part-time) *and* the amount of hours they seek to work, using appropriate study designs (Bardasi and Francesconi, 2004; Booth and Van Ours, 2008; 2009; Rodriguez, 2002). Crucially, considering both factors is necessary to clearly operationalize common definitions of hours-underemployment (e.g. ILO, 1998). We therefore partition part-time workers into: (i) those who desire to work more hours and are likely distressed by their employment situation, and (ii) those who are satisfied with the hours they work and are thus less likely to be distressed by this situation. This avoids prior issues in equating hours-underemployment to part-time employment (e.g. ≤ 30 hours per week) without considering preferences for different working hours. Further, we argue that the negative psychological impact of part-time work is likely to be experienced chiefly by those who would prefer to work more hours than they do currently.

Two lines of evidence provide initial support for this prediction. First, prior research suggests that a reduction in the number of hours worked per week may have negative well-being effects. For instance, moving from working full-time to part-time jobs (i.e. working between 16 and 29 hours per week) has been shown to predict a reduction in life satisfaction, at least amongst women in the UK (Bardasi and Francesconi, 2004). Moreover, hours-underemployment was found to be associated with lower health status among British workers, even though the observed effects were explained chiefly by gender and age (Rodriguez, 2002). Further, Booth and Van Ours (2009) found that full-time employees were happier than part-time employees in Australia, implying that working part-time is potentially harmful to psychological well-being. These studies do not consider working hour preferences and as such cannot identify whether the adverse well-being effect of part-time employment is predominantly experienced by those who wish to work more hours.

A second line of evidence supports this contention: working less hours than desired has been shown to predict reduced life satisfaction, used as a proxy for psychological well-being (Başlevent and Kirmanoğlu, 2014; Wooden et al., 2009; Wunder and Heineck, 2013). For instance, Başlevent and Kirmanoğlu (2014) examined the well-being effect of differences between preferred and actual working time in a cross-country panel at a single point in time. They showed that working fewer hours than preferred reduces life satisfaction across Europe. Further, Wunder and Heineck (2013) used a longitudinal sample of German workers, allowing controlling for unobserved heterogeneity and potential self-selection bias. They found that working fewer hours than desired is more harmful for subjective well-being compared to working more hours than ideally preferred. Taken together these two lines of evidence uncover support for the idea that part-time employment and working fewer hours than desired predicts lower well-being. The current study explicitly aims to integrate these two lines of existing evidence, for the first time, in order to evaluate whether part-time

workers who desire to work more hours per week show particularly pronounced well-being effects.

Consistent with this idea, studies from the psychological literature which consider the hours-preferences of part-time workers find some evidence that hours-underemployment triggers symptoms of depression and low self-esteem (Dooley et al., 2000; Friedland and Price, 2003; Prause and Dooley, 1997), is associated with increased suicide rates (Page et al., 2013) and predicts lower life satisfaction (Friedland and Price, 2003; Wilkins, 2007) and affective well-being (Heyes et al., 2017). These studies are hampered by design limitations, including reliance on cross-sectional samples with limited controls (Page et al., 2013), not adjusting for bias due to self-selection into hours-underemployment (Heyes et al., 2017; Wilkins, 2007) and not distinguishing between preferences for additional or fewer working hours (Heyes et al., 2017). Additionally, they do not examine the impact of changes in employment status on psychological well-being, observing single points in time and not considering how individual labour market trajectories may shape psychological well-being (Friedland and Price, 2003; Prause and Dooley, 1997).

Existing work that has attempted to address these design concerns in examining changes in employment status has focused on the impact of entering and exiting unemployment and inactivity (e.g. Flint et al., 2013; Thomas et al., 2005; Strandh, 2000) or on transitions between regular jobs and temporary (LaMontagne et al., 2014) or insecure (Flint et al., 2013) employment. A single study (Dooley et al., 2000) explores the mental health effect of changes from adequate employment to various types of underemployment, including hours-underemployment, but does so at a single point in time (i.e. 1994, with 1992 being the reference year). Moreover, the authors do not study the impact of transitions to hours-underemployment explicitly, including the latter in a single category among other types of underemployment. In contrast, the current study is the first to use panel data to examine the psychological health effects of transitions between full-time employment and hours-underemployment, thus, providing key information detailing the well-being repercussions of hours-underemployment.

To summarise, whilst there is evidence that those working less hours than desired evaluate their lives as less satisfactory than those satisfied with the number of hours they work per week, the psychological health effects of hours-underemployment have not been yet uncovered. Considering the importance of the detrimental socio-economic consequences that the psychological harm caused by rising hours-underemployment may have, our objective is to explore the extent to which the latter influences psychological well-being. The well-being repercussions of hours-underemployment are analysed using a sample of British part-time and full-time workers drawn from the National Child Development Study (NCDS) age-42 sweep. The propensity score matching method is implemented to create comparable full-time employment and hours-underemployment groups, as done previously in the literature

examining the psychological effect of precarious and temporary employment (Kim et al., 2008; Quesnel-Vallée et al., 2010). The average contemporary effect of hours-underemployment on psychological distress is then examined in the matched sample, using the Generalised Estimating Equations (GEE) technique to adjust for correlations between matched full-time and part-time workers. Further, the possibility that alterations in psychological health can be attributed to transitions from and to hours-underemployment is examined using individual fixed effects models in two subsamples of British adults drawn from the 18 consecutive waves of the BHPS (1991-2008). To further explore the determinants of the psychological effect of hours-underemployment, the direct effects of employment type (*i.e. working more or less than 30 hours per week*) and working-hours preferences *(i.e. preferring to work more hours or not)* on psychological distress are analysed separately in both studies, constructing alternative groups of part-time and full-time workers with respect to working-hours preferences.

Moreover, hours-underemployment is likely to correlate with other adverse experiences in the labour market such as reduced income (Wilkins 2007) and work-related precariousness (Scott-Marshall et al. 2007) that are shown to have a detrimental impact on workers' wellbeing. In line with this evidence, we examine whether job security and earnings explain the psychological impact of hours-underemployment, adjusting for such job-related characteristics in both analyses. It is suggested that feelings about job security both influence psychological reactions to employment (Kim et al., 2008) and could directly affect psychological well-being (Ferrie et al., 2002; Sverke et al., 2002; Virtanen et al., 2002). Moreover, financial strain, being a potential consequence of part-time employment, has been shown to be reliably associated with poor mental health (Zimmerman and Katon, 2005).

In the present paper, we contribute to existing literature by extending prior studies which have: (i) either not considered the willingness of workers to work more hours (e.g. Bardasi and Fransesconi, 2004), or (ii) focused on the relationships between working hours preferences and life satisfaction (e.g. Wunder and Heineck, 2013), which is a cognitive evaluation with rather little relevance to health, without considering employment type (i.e. full-time or part-time), and finally, (iii) not addressed appropriately reverse causality and self-selection biases (as in Friedland and Price, 2003). We consider the psychological impact of working part-time *and* preferring to work more hours per week in order to avoid underestimation of the potential psychological harm attributable to hours-underemployment. We also apply appropriate statistical techniques (i.e. propensity score matching and fixed effects) to control for observed and unobserved sources of heterogeneity and isolate the link from hours-underemployment to poor psychological health. Finally, ours is the first study to analyse the association of individual transitions between full-time and hours-

underemployment with variations in psychological health within a wide time-frame, allowing for a detailed observation of the effects of interest.

4.3 Study 1: materials and methods

4.3.1 Data and measures

The NCDS is a longitudinal survey following participants born in a single week of 1958 in England, Scotland and Wales. We used the sixth wave of the survey, conducted in 1999-2000 (N = 11,419), when participants were aged 42, for the analysis of the contemporary psychological impact of hours-underemployment. This wave features a question about cohort members' preferences regarding the number of hours they work at their current job. In addition, we utilised measures from the third, fourth and fifth sweep (ages 11, 23 and 33) to account for socio-economic characteristics, which may affect both employment status and psychological distress, such as highest educational achievement, prior psychological distress and cognitive abilities during childhood.

The study sample comprises all study subjects who reported that they were either in paid employment or self-employed. Adopting two criteria of the definition of hours-underemployment provided by the ILO (1998), current exposure to hours-underemployment was measured using an indicator which combined two survey questions; one about study subjects' main economic activity and one asking whether they would prefer to work more, fewer or the same hours per week for the same hourly rate. Two basic groups were constructed: (i) a reference group consisting of those who reported that they were working more than 30 hours per week and did not want to work more or less hours (N = 4,135, 90.7%), and (ii) the hours-underemployed who were working less than 30 hours per week and would prefer to work more hours (N = 423, 9.3%). The high share of women in the hours-underemployed group (89.6%) is representative of the trends prevailing in the UK labour market during the 1990s, with the vast majority of part-time workforce being female (Fagan et al., 2003).

Supplementary analyses were conducted using alternative groups of part-time and full-time workers to test whether the psychological impact of hours-underemployment could be attributed to employment type or working-hours preferences. Namely, the following groups were created to examine average differences in their psychological health: i) part-time workers (<30 hours per week) who would not change the number of hours they work per week (N=1,410, 25.4%) and full-time workers (>30 hours per week) with similar preferences (N= 4,135, 74.6%); ii) part-time workers who would rather work more hours (N=423, 56.5%) and full-time workers who would prefer the same (N= 325, 34.5%), and iii) full-time

(N=4,460, 70.9%) and part-time workers (N=1,835, 29.1%), without considering their working-hours preferences. We used the third group to test whether the interaction between employment type and hours preferences is a determinant of psychological distress.

Psychological health was assessed using the 12-item General Health Questionnaire (GHQ-12), a simple screening tool used to detect general non-psychotic, psychiatric morbidity (Goldberg and Williams, 1988). The items primarily capture affective disorders focusing on depression and anxiety (e.g. "*feeling unhappy and depressed"*, "*lost much sleep over worry*"). In addition, the GHQ gauges social dysfunction (e.g. "*able to face problems*", "*playing a useful part*"). Measures created using responses to the GHQ-12 questionnaire are widely used among economists as psychological health indicators (e.g. Clark et al., 2001; Cornaglia et al., 2015). The cohort members were asked to report the frequency of the symptoms they suffered from in a scale ranging from 1 ("*not at all*") to 4 ("*much more/less than usual*"). For each item, a binary variable was created for responses falling in the categories 3 and 4, indicating psychiatric caseness (Makowska et al. 2002), which is defined as being *"at the risk"* of suffering from mental health problems. The 12 binary indicators were then summed to produce a composite psychological distress index ranging from 0 to 12 (Mean (M) = 1.48, Standard Deviation (SD) = 2.26), which demonstrated high levels of internal consistency (Cronbach's alpha=0.87). A standardised GHQ-caseness score was utilised to facilitate comparisons of the findings between the two studies.

Moreover, we adjusted for the influence of the following confounding characteristics: gender, marital status, having any children, long-standing health conditions, highest educational qualifications, psychological distress at age 23 and cognitive ability during childhood (Deary et al. 2005; Koenen et al. 2009), which could influence both adult employment outcomes and psychological health. Finally, we considered two job-related characteristics that may explain the relationship between hours- underemployment and psychological distress: (i) perceived job security and (ii) weekly net take-home pay (in UK pounds) from current job. The descriptive statistics of all variables discussed in this section are presented in table 4A.1 of appendix A.

4.3.2 Methodology

Our objective in this study is to examine the contemporary impact of hours-underemployment on psychological distress at a single point in time. Given that the NCDS respondents are not randomly assigned to employment types, not adjusting for individual characteristics, which could result in self-selection into hours-underemployment, potentially results in overestimation of the true effects. We reduce such self-selection bias by balancing the distributions of observable confounding factors across both employment groups using propensity score matching (Dehejia and Wahba, 1999; Stuart, 2010). The propensity, or

"*balancing,"* scores (PS_i) are the probabilities that each cohort member will enter hours-underemployment conditional on various socio-demographic factors. Namely, we estimate the propensity scores for each study subject as a function of the factors potentially predicting both hours-underemployment and poor psychological health. Study subjects from the group of interest; namely, hours-underemployed workers; are then matched to those belonging to the reference group; full-time workers who are satisfied with the number of hours they work per week; on the basis of the differences between their estimated balancing scores:

$$DS_{ij}=\left|PS_i-PS_j\right| \quad (1)$$

We set the maximum difference (DS_{ij}) between the propensity scores of hours-underemployed and full-time workers allowed for matching to be equal to 0.2 standard deviations of the estimated propensity scores (SD=0.120) (Stuart, 2010). Adopting the radius matching technique, we pair each hours-underemployed worker with all full-time workers having propensity scores, which fall within this maximum distance (*radius*) (Caliendo and Kopeinig, 2008). Radius matching produces matches with all control units within the maximum difference, thus, using all available observations when good matches are feasible (Dehejia and Wahba, 2002). A sample is then created using normalised weights, which reflect the frequency with which each full-time worker was used as a match to an hours-underemployed worker. Detailed information regarding the characteristics of the matched sample is presented in section 2A of the appendix.

The matched sample is used to examine the influence of hours-underemployment on psychological health. Average psychological distress is modelled as a function of individual socio-economic background and employment status:

$$h^*(E[D_i])=(PT_i,X_i^S) \quad (2)$$

where $E[D_i]$ is average psychological distress, PT_i is an indicator showing exposure to hours-underemployment and X_i^S is a vector of socio-economic background variables. h^* represents the identity link function, linking average psychological distress to employment type and demographic background. Equation 2 is estimated using the following empirical specification:

$$E(D_i)=\alpha+\beta PT_i+\gamma_S(X_1+X_2+\ldots+X_S)+e_i \quad (3)$$

where β represents the average effect of interest and e_i is the error term. Job related characteristics are included in the model at a later stage, to examine whether they mediate the psychological impact of hours-underemployment.

Specification 3 is first estimated using the ordinary least square technique in the unmatched sample to obtain the upper boundaries of the effect of interest. Then, the effect of hours-underemployment on population average psychological distress in the matched sample is estimated using a more restrictive method. Particularly, the GEE method for clustered data is adopted to account for correlated outcomes in the matched pairs (Hanley et al., 2003; Kim et al., 2008), which are assumed to be independent.

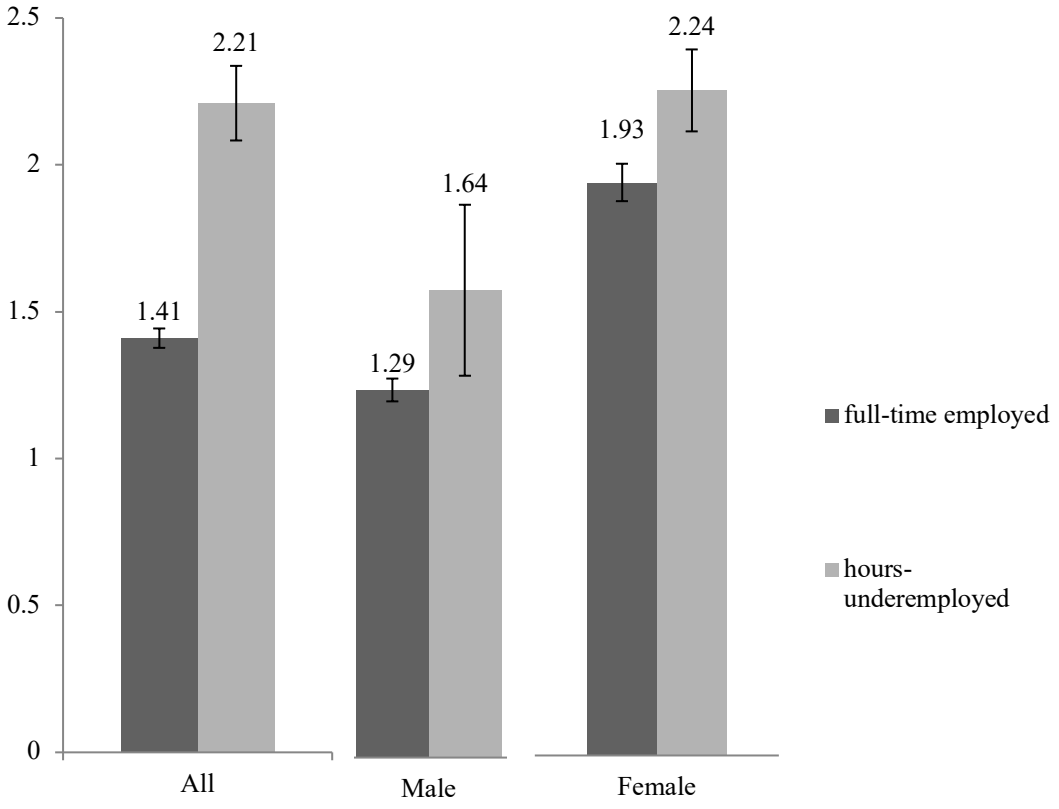

Figure 4.1 Mean psychological distress by employment type and gender

4.4 Study 1: results

As shown in figure 4.1, hours-underemployment is associated with elevated psychological distress, with the mean difference in GHQ caseness scores between the two groups being significant at the 99% level (Mean Difference= -0.8, SE= 0.11, $p<0.0001$, CI=[-1.03, -0.58]). Moreover, hours-underemployed workers of both genders appear to suffer from substantially higher distress levels compared to their full-time counterparts of the same sex, indicating that the psychological health repercussions of hours-underemployment are not likely to be attributed to gender differences.

The relationship between psychological distress and hours-underemployment was first examined in the unmatched sample, using models estimated with the ordinary least squares method. As shown in the upper panel of table 1, hours-underemployment is found to be associated with elevated distress scores by 0.24 SD (SE=0.06, $p<0.001$, CI= [0.13, 0.35]), after controlling for socioeconomic background. Further, as shown in the last rows of the upper panel of table 4.1, controlling for earnings and self-evaluated job security in separate specifications slightly influences the effect of interest.

The link between hours-underemployment and psychological distress was then estimated applying the GEE technique in the matched sample. As shown in table 4.1, the estimate of the average effect of hours-underemployment on psychological distress conditional on socio-economic characteristics is approximately 0.25 SD (SE=0.06, $p<0.0001$, CI= [0.13, 0.37]). Adjusting for self-selection into hours-underemployment does not offset its adverse effect on psychological well-being. Further, the negative psychological repercussions of hours-underemployment are evident after controlling for both financial returns and self-perceived job security, indicating that there are other, unidentified mechanisms driving the observed psychological impact of hours-underemployment.

Table 4.1 Estimates of average psychological effects of hours-underemployment

Unmatched sample (OLS)	Hours-underemployment
Model 3 (without socio-economic confounders) [a]	0.339*** (0.056) [b, c]
Model 3 (with socio-economic confounders) [d]	0.241*** (0.057)
Model 3 + weekly net earnings	0.229*** (0.060)
Model 3 + job security	0.215*** (0.057)
N	4,558
Matched sample (GEE)	
Model 3 (without socio-economic confounders)	0.252*** (0.063)
Model 3 (with socio-economic confounders) [c]	0.249*** (0.061)
Model 3 + weekly net earnings	0.261*** (0.071)
Model 3 + job security	0.228*** (0.062)
N	4,557

[a] This model does not include any controls [b] Standardised coefficients are reported. [c] Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1, [d] Socioeconomic confounders are gender, marital status, having at least one child, highest academic qualification achieved at age 33, distress level at age 23, long-standing illness, childhood cognitive ability, and occupational status at age 33.

Moreover, we conducted supplementary analysis applying the same propensity matching and GEE methodology on samples comprising alternative groups of part-time and full-time workers with respect to individual preferences about working time. As shown in table 4A.2 of appendix A, when preferring to continue working the same number of hours per week, part-time employment is not substantially associated with elevated distress levels compared to full-time employment (b=0.037, SE=0.039, p>0.1, CI=[-0.06, 0.10]). On the contrary, comparing full-time to part-time contracts among workers who would prefer to increase their working hours reveals substantially elevated distress levels for part-time workers before accounting for job-related characteristics (b=0.209, SE=0.106, p<0.05, CI=[0.002, 0.42]). When comparing full-time and part-time workers who would prefer to work more hours per week, adjusting for weekly earnings and feelings about job security offsets the link between hours-underemployment and psychological health. This finding suggests that hours-underemployment may be worse for psychological health compared to full-time employment among full-time and part-time workers who prefer to work more hours because of poor quality of part-time jobs, reflected in lower earnings and job insecurity. Further, interacting employment type with an indicator for preferences for increased working hours showed that working part-time and wanting to work more hours increases psychological distress levels before accounting for job security and weekly earnings (b=0.19, SE=0.11, p<0.1, CI= [-0.03, 0.41]). In summary, the results of study 1 indicate that part-time

employment is a psychologically harmful experience for workers who prefer to work more hours, with alternative specifications further supporting this key result.

4.5 Study 2: materials and methods

4.5.1 Data and measures

The BHPS was used to examine the relationship between employment transitions and variation in psychological distress over 18 years (1991-2009). The BHPS is a household-based, longitudinal survey, annually interviewing adult members of a clustered, stratified sample consisting of 5,500 households around the UK. In the waves, which followed the first one, all household members who became 16 years old were added in the survey. Additional samples of households in Scotland, Wales and Ireland were added in 1999 and 2001. Wave-on-wave response rates were quite high for each wave; for example, 87.7% in wave 2 and 96.8% in wave 13. Participants reported their employment status along with a range of details about their lives each year including their psychological distress levels and their perceptions regarding their jobs (Taylor 2010). Thus, it is possible to assess whether within-person changes in labour market status may affect psychological distress levels over time.

As in study 1, we defined hours-underemployment as working less than 30 hours per week while preferring to work more hours. The participants who reported that they worked more than 30 hours per week and wanted to continue working the same number of hours were considered to be in full-time employment. The employment type variable lagged one period (*t-1*) was used to create binary indicators capturing the annual transitions between full-time employment and hours-underemployment. 15,134 employed or self-employed study subjects of working age (16-65 years old), who have participated in at least two consecutive waves and have valid information regarding their labour market status and their psychological health in each wave were selected out of the 32,380 participants in the original, pooled sample. Annual employment transitions were observed in two subsamples, which were created based on comparisons between type of employment and working-hours preferences at years *t* and *t-1*. The psychological effect of moving from hours-underemployment to full-time employment was examined in a subsample of approximately 801 subjects who were hours-underemployed in year *t-1*. In this subsample, around 20.7% of the 2,145 employment episodes recorded annually over the 18 consecutive waves of the BHPS corresponded to transitions from hours-underemployment to full-time jobs. Moreover, the psychological impact of annual transitions from full-time jobs to hours-underemployment was examined using a subsample of 7,864 study subjects who were working full-time in year *t-1*. Only 0.57% of the 37,234 person-year

observations in each wave corresponded to switching from full-time employment to hours-underemployment.

In order to examine whether employment type or hours preferences produce the harmful well-being impact of hours-underemployment, we tested alternative specifications, as in study 1. Namely, we examined the impact on variations in psychological health of the following transitions: i) moving between full-time and part-time jobs when being satisfied with weekly working hours; ii) moving between full-time and part-time jobs while preferring to work less hours; iii) moving from full-time to part-time employment conditional on preferring to work more hours presented by an interaction term. Descriptive information about sample sizes and transitions prevalence in these alternative specifications is presented in section 4B.1 of the appendix.

Similar to study 1, psychological distress was assessed using responses to the 12-item GHQ questionnaire, included in the BHPS dataset. The caseness version of the GHQ-12 score, which is available in all BHPS waves, was used to measure psychological distress. We aimed to incorporate all available measures of socio-economic characteristics included in study 1 to once again control for observed individual heterogeneity which may result in self-selection into hours-underemployment. Gender, marital status, having any children, long-standing health problems, occupational status of participants' current job and highest educational achievement were controlled for. As in study 1, women were over-represented in the hours-underemployed group, reflecting the typical synthesis of the group of part-time workers in the UK during the 1990s. Additionally, we accounted for the influence of age on the association between employment transitions and distress. Moreover, we examined whether weekly net rate of take-home pay, adjusted for inflation using the ILO's series for consumer price indices in the UK, and participants' satisfaction regarding job security explain the psychological impact of employment transitions. The descriptive statistics of all variables discussed in this section are presented in table B1 of appendix section 1B.

4.5.2 Methodology

We assume that moving between hours-underemployment and full-time employment can predict changes in psychological health over time. We model such changes in psychological distress (ΔD) as a function of employment transitions and changes in individual socioeconomic background:

$$\Delta D = f(Transition, \Delta SES) \quad (4)$$

We estimate these relationships between transitions and psychological health using the ordinary least squares technique in the BHPS subsamples for each type of transition, using the following specification:

$$D_{it}=a+\beta_1 Transition_{it}+\beta_{2S}\left(X_{1,it}+X_{2,it}+\ldots+X_{S,it}\right)+t_t+e_{it} \quad (5)$$

where $Transition_{it}$ is a binary variable indicating annual changes in employment type between year t-1 and year t. $X_{1,it}$, $X_{2,it}$,…,$X_{S,it}$ are demographic variables, including age, gender, marital status, having any children, long-standing health problems, current occupational status and highest educational achievement. The term t_t represents a vector of year indicators, accounting for exogenous economic conditions which potentially influence individual labour market trajectories. Finally, e_{it} is the random error term. The estimates we obtained by fitting this linear model could be considered as the upper boundaries of the psychological impact of the transitions.

Further, to rule out unobserved heterogeneity, possibly causing selection bias, the relationship between employment transitions and variation in psychological distress was estimated using individual fixed effects. Individual-specific characteristics, such as personality traits or endogenous susceptibility to distress, which cannot be observed and do not change over time, could predict both changes in psychological well-being and transition events. Fixed effects adjust for all time-invariant characteristics which could simultaneously affect psychological health and predict employment transitions. We estimate the following specification:

$$D_{it}=a+\beta_1 Transition_{it}+\beta_{2S}\left(X_{1,it}+X_{2,it}+\ldots+X_{S,it}\right)+t_t+\gamma_i+u_{it} \quad (6)$$

where γ_i stands for the individual-specific, time-invariant effects and u_{it} is the random error term. $X_{1,it}$, $X_{2,it}$,…,$X_{S,it}$ are all demographic variables which may change over time. Time-invariant socio-economic characteristics, such as gender, mental health prior to the transition and cognitive ability during childhood, are not adjusted for separately. The influence of such characteristics is ruled out by demeaning all variables included in the specification. Within-individual unobserved heterogeneity is adjusted for, by using individual variation around the means to gauge the effects of employment transitions on changes in psychological distress over time. Therefore, bias caused by unobserved, time-invariant factors is reduced, facilitating the inference of the link from employment transitions to changes in psychological health over long labour market trajectories.

The likelihood that job-related characteristics are pathways linking transitions from and to hours-underemployment to changes in distress levels is explored by including these factors in the estimated model. Potential reactions of the estimated psychological effect of employment transitions to the inclusion of job earnings and job security in the models will reveal whether these characteristics explain the psychological repercussions of hours-underemployment.

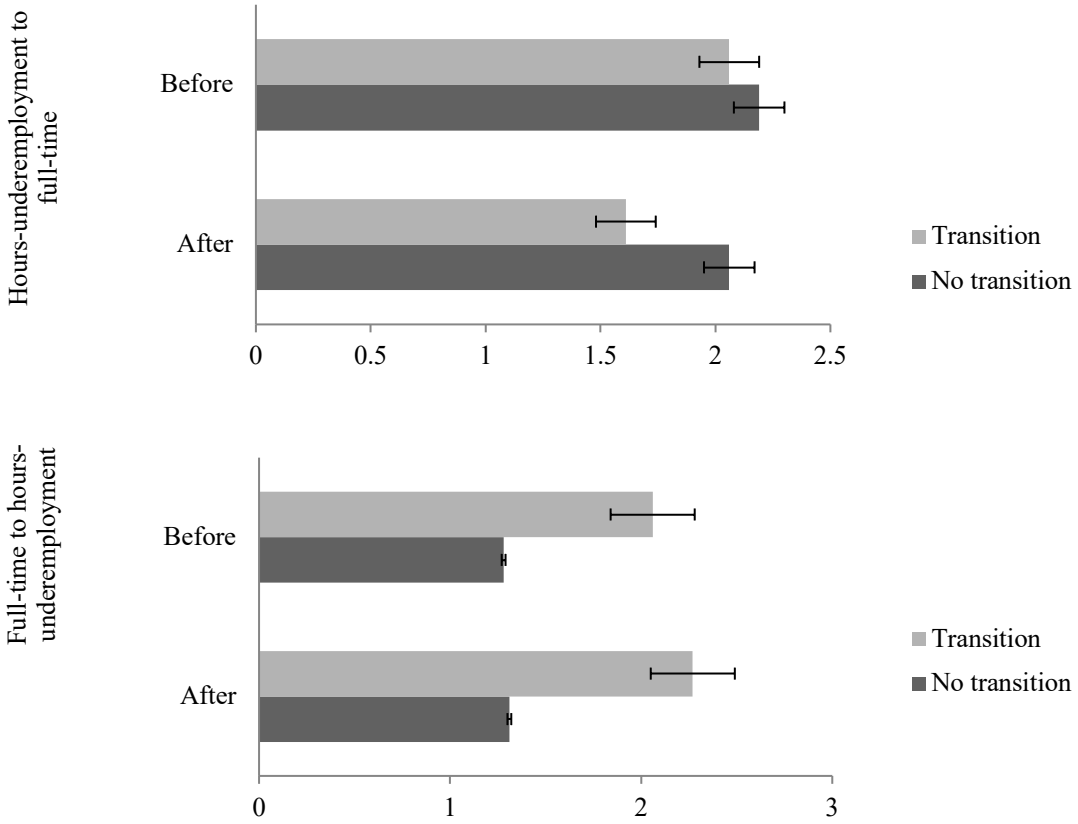

Figure 4.2 Mean distress levels before and after employment transitions

4.6 Study 2: results

Had there not been reverse causality between employment transitions and changes in psychological well-being, the average distress level of those who are about to switch from one type of employment to another would not differ significantly from the distress level of those who will not undergo a transition, the period before the latter occurs (*t-1*). As shown in the upper panel of figure 4.2, this holds for those who were hours-underemployed in year *t-1* in the BHPS subsample. The difference in the GHQ caseness scores between those who would remain in hours-underemployment and those who would move to a full-time job is negligible before the transition (Mean difference =0.14, SE=0.18, $p>0.1$, CI = [-0.22, 0.50]). After the transition has occurred, in year *t*, those who switched to full-time employment demonstrated significantly lower distress levels (Mean Difference = 0.45, SE=0.17, $p<0.01$, CI= [0.11, 0.79]), a change which could be attributed to the transition itself. However, this does not hold for those initially working full-time and then, moving to hours-underemployment. Full-time workers who would retain their position in the market demonstrate substantially lower psychological distress levels compared to those who were about to switch to hours-

underemployment in the next year (Mean Difference = -0.79, SE=0.17, p<0.0001, CI= [-1.12, -0.47]). After the transition, the difference between psychological distress experienced by those who moved to full-time employment compared to the study subjects who remained in hours-underemployment rises in absolute value, potentially as a result of the transition (Mean difference=-0.96, SE=0.17, p<0.0001, CI= [-1.30, -0.63]). However, the difference in psychological health before the transition event could be attributed to expectations regarding the forthcoming change in labour market status. It could also suggest self-selection into hours-underemployment due to poor psychological health. Adopting the fixed-effects estimation framework, we adjust for individual heterogeneity, which could result in self-selection into moving between employment types.

Table 4.2 presents the transition coefficients resulting from the estimation of the specifications linking changes in psychological health to switches between employment types, using OLS (upper panel) and fixed-effects (bottom panel) estimation techniques. The baseline models (models 5 and 6 without controls for socio-economic confounders) only account for the influence of year effects while in the extended models the full set of socio-demographic confounding factors is added. Net weekly earnings and individual feelings about job security are added separately in the extended models. All models were estimated separately for each type of transition.

Table 4.2 Estimates of the impact of employment transitions on psychological distress

Pooled Sample (OLS)	Full-time to hours-underemployment	Hours-underemployment to full-time
Model 5 (without socio-economic confounders) [a]	0.381*** (0.092) [b, c]	-0.183*** (0.050)
Model 5 (with socio-economic confounders) [d]	0.328*** (0.091)	-0.143*** (0.052)
Model 5 + weekly net earnings	0.293*** (0.091)	-0.181*** (0.061)
Model 5 + job security	0.280*** (0.091)	-0.123** (0.052)
N (person-year)	37,234	2,145
Panel Sample (FE)		
Model 6 (without socio-economic confounders)	0.185** (0.094)	-0.178***(0.058)
Model 6 (with socio-economic confounders) [e]	0.184**(0.094)	-0.156***(0.060)
Model 6 + weekly net earnings	0.162* (0.095)	-0.160**(0.074)
Model 6 + job security	0.168* (0.094)	-0.153** (0.060)
N (person-year)	37,234	2,145

[a] This model only controls for year effects [b] Standardised coefficients are reported. [c] Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1, [d] Socioeconomic confounders are gender, age (& squared age term), marital status, having at least one child, highest academic qualification, long-standing illness and current occupational status (professional/managerial/skilled non manual/skilled manual/partly

skilled/ unskilled) [e] Socioeconomic confounders include all the variables reported above apart from gender.

Expectedly, switching from hours-underemployment to a full-time job appears to reduce psychological distress while moving from full-time employment to hours-underemployment predicts elevated distress levels. Adjusting for time-invariant individual characteristics does not appear to attenuate substantially the psychological health effects of employment transitions. In the bottom panel of table 4.2, which displays estimates of the psychological effect of transitions in the fixed-effects models, moving from full-time employment to hours-underemployment predicts distress increased by approximately 0.18 SD (SE=0.09, $p<0.05$, CI= [-0.00, 0.37]), after adjusting for the influence of individual socio-economic background. Additionally, moving from hours-underemployment to full-time work was found to decrease distress levels by approximately 0.16 SD (SE=0.06, $p<0.001$, CI= [-0.27, -0.04]), after controlling for observable demographic characteristics. While the transition from full-time employment to hours-underemployment appears to have almost double the effect on psychological distress compared to moving from hours-underemployment to full-time employment, this difference in the size of the effects is eliminated in the fixed effects model. Therefore, we can reasonably assume that the fixed effects model accounts for unobserved confounding factors producing estimates that are representative of the actual links of interest.

As shown in table 4.2, when job security and net earnings controls are introduced in the models, they reduce the magnitude of the psychological impact of moving to a part-time job while preferring to work more hours. However, these job-related characteristics do not seem to fully offset the psychological repercussions of switching from hours-underemployment to a full-time job. Altogether, controlling for this set of job characteristics does not account for the psychological consequences of employment transitions. It is possible that the psychological health impact of moving from and to hours-underemployment could go beyond job insecurity and financial strain to include factors such as job strain, concerns about employment rights, imbalance between effort and reward and preferences for less controllable work schedules and working conditions.

Analysing transitions between alternative employment situations yielded essentially similar results to the ones discussed in study 1. As shown in table 4B.2 in appendix section 2B, when being satisfied with number of weekly working hours, transitions between part-time and full-time employment do not predict any changes in psychological health. On the contrary, there is an indication that, switching from full-time employment to hours-underemployment does predict increased distress levels among workers who prefer to work more hours (b= 0.27, SE=0.13, $p<0.05$, CI= [-0.02, 0.50]). Further, as shown in table 4B.3,

moving from full-time to part-time employment does not have any substantial impact on psychological well-being (b= 0.00, SE=0.04, p>0.1, CI= [-0.06, 0.06]), while wanting to work more hours is associated with slightly increased distress levels (b=0.07, SE=0.02, p<0.0001, CI= [0.03, 0.11]). Taken together, supplementary analysis suggests that the combination of working part-time and preferring to work more hours predicts the largest increase in individual distress levels.

4.7 Discussion

In this paper, we uncover robust evidence from two complementary studies pointing to hours-underemployment as a psychologically detrimental experience. Hours-underemployment was found to exert a significant impact on psychological distress in two different samples of UK workers. Moreover, we used two statistical techniques (propensity score matching and fixed effects) to account for both observed and unobservable confounding factors. The psychological damage of hours-underemployment was observed both at a single point in time and over long employment labour market trajectories. Taken together, the two studies contribute to our understanding of social costs of hours-underemployment that burden workers who work less hours than desired.

We combined both objective and subjective elements of the ILO's (1998) definition of hours-underemployment, increasing measurement precision. Specifically, we defined hours-underemployment as working below 30 hours per week in the UK context *and* preferring to work more hours. Hours-underemployment was found to predict elevated distress levels among UK workers of the NCDS cohort at age 42, after adjusting for confounding factors using propensity score matching. Further, moving from full-time employment to hours-underemployment was associated with positive changes in distress levels over extensive time periods in a sample of BHPS participants, after having controlled for time-invariant unobserved heterogeneity using fixed effects. These findings are in agreement with the theories developed by Fryer (1984) and Ezzy (1993) arguing that employment can be a psychologically harmful experience when it contradicts individual aspirations and preferences.

Testing alternative combinations of working part-time and working time preferences revealed that working less than 30 hours per week *and* preferring to work longer hours is psychologically damaging rather than part-time employment or working-hours preferences per se. We found that working fewer hours than a specific threshold is not harmful for psychological well-being among workers who are satisfied with their weekly working time. On the contrary, working less than 30 hours per week was psychologically damaging among

full-time and part-time workers who preferred to work longer hours. Additionally, the interaction between working part-time and preferring to work more hours was found to substantially impact on workers' psychological distress. Overall, supplementary analysis suggested that while there might be associations between elevated psychological distress and both working fewer hours than a specific threshold and preferences for additional working hours, the combination of working less than 30 hours per week in the UK context and preferring to work more hours inflicts the greatest damage on psychological well-being.

Taken as a whole, our findings indicate that the well-being effects observed in two lines of literature, looking into the relationships between well-being and part-time employment (e.g. Bardasi and Fransesconi 2004; Rodriguez 2002), and well-being and working hours preferences (e.g. Wunder and Heineck 2013), are likely driven by a group of part-time workers who would prefer to work longer hours. Preferring to work more hours is shown to predict financial strain (Warren 2015) and reduced family well-being (Wunder and Heineck 2013). Part-time employment is shown to be associated with earnings inequality, low occupational status and low-quality jobs (McGovern et al. 2004) while substantial differences remain between full-time and part-time employees in their access to welfare assistance (OECD 2010).

Moreover, in the UK, the effectiveness of the policies implemented to prevent unfavourable treatment of part-time workers and improve quality of part-time jobs, has been criticised (eg. Bell 2011). Notably, the intersection between part-time employment and disparities between actual and ideal working hours is shown to be associated with greater adversities, such as in-work poverty (Horemans et al. 2016), worse working conditions and increased job insecurity (OECD 2010) compared to full-time workers. It is likely that the elevated socio-economic adversities experienced by the subgroup of workers who work part-time because there are no full-time jobs available may have negative psychological consequences. Therefore, a potential suggestion for future work aiming to explore the psychological harm caused by hours-underemployment is the analysis of the paths linking hours-underemployment to poor psychological health.

In summary, we contribute to existing literature by pinpointing the group which is exposed the most to adverse psychological consequences of both actual and preferred working hours; i.e. those who work fewer hours than a specific threshold while they would prefer to work additional hours. To our knowledge, this is the first study that has identified explicitly the welfare effects of the key definition of hours-underemployment (ILO 1998) from a policy perspective. Based on this evidence, policy interventions should focus on the group of part-time workers who consider their job as being inadequate. For example, the psychological health of part-time workers who desire to work longer hours would potentially

improve if they had the chance to enhance their skills in order to be able to seek full-time employment. A possible way to achieve this is by monitoring the implementation of the European Part-time Work Directive in order to ensure that part-time workers have equal access to training and career development as well as equal opportunities to promotion.

Our findings, which imply that hours-underemployed workers are *not* in their labour supply curve, contradict the concept of equilibrium in classic labour economics (see, for example, Pencavel 1986) suggesting that workers are always in their supply curve as they are free to choose freely from a continuum of working hours given the wage rate. These theories underestimate the role of constraints imposed by labour demand on workers' decision making process and consider hours-underemployment as a short-term, out-of-equilibrium effect. The present study is in line with recent literature (Pencavel 2016) which argues that workers' selection of hours-wage combinations is constrained by employers' preferences resulting in employees working more or fewer hours than they prefer in the given wage. Moreover, there is evidence that following the 2008 recession, the UK labour market is moving towards an oligopolistic structure on the demand size – especially at the low-skill segment of the supply side – where underemployment tends to replace unemployment as an indicator of labour market slack (Bell and Blanchflower 2018). In this setting, hours-underemployment turns out to be an equilibrium phenomenon while its long-term impact on workers' psychological health is central to our understanding of the consequences of working less hours than preferred.

Our study was mainly limited by data constraints. First, we used self-reported measures of psychological distress, which are prone to measurement error. Despite GHQ-12 being a valid measure of common mental health disorders in public surveys (e.g. Lundin et al. 2016), it is subject to self-report bias as opposed to objective psychological health assessments by professionals. Moreover, the data we use do not reflect contemporary experiences of work; the contemporaneous associations between hours-underemployment and psychological well-being were observed in 2000 while the long-term links between transitions from and to hours-underemployment and variations in psychological health were monitored in the period between 1991 and 2009. Whilst we uncover evidence of the potentially damaging effects of hours-underemployment on psychological health, the impact of contemporary working-hours contracts and workers' preferences on their psychological well-being remains unclear.

Another limitation is that we were not able to control for all socio-economic factors potentially influencing adult psychological health and selection into hours-underemployment, such as non-cognitive skills (Heckman et al. 2006), mental health prior to labour market entry (Fletcher, 2013), living in poverty (Lund et al. 2010) and parenting and family conditions at early childhood (Allen et al. 2014). However, adjusting for a wide set of observed socio-

economic factors and time-invariant unobservable traits did not offset the associations under study, suggesting that there is a robust link from hours-underemployment to elevated psychological distress which is not accounted for by potentially confounding factors.

Finally, data restrictions did not allow for accounting for the possibility that the psychological effects of hours-underemployment might be conditional on the industries that workers are employed in. For example, workers who are unable to seek full employment (for example, because of health issues) might self-select into industries where it is more likely that they will work part-time. This is mainly the case with industries which require low-skilled labour. In order to control for workers with low skills self-selecting into hours-underemployment, we accounted for the influence of occupational status (i.e. professional, managerial, skilled manual, skilled non-manual and unskilled).

To sum up, our findings draw attention to the importance of the psychological health impact of hours-underemployment, being a prevalent type of inadequate employment and a major case of labour underutilisation. In order to deal with the detrimental socio-economic consequences of poor psychological health among part-time workers, it is important to fully explore the extent of the psychological impact of hours-underemployment and the mechanisms driving this impact. For example, in the present study, job earnings and feelings about job security were found to partly explain the psychological impact of hours-underemployment among part-time and full-time workers who would ideally work longer hours. This finding points to the potentially detrimental well-being consequences of poor quality of part-time jobs, among workers with similar working time preferences. Further research, using contemporary survey data, is granted necessary to uncover the effects of contemporaneous experiences of hours-underemployment, such as zero-hours contracts, on poor psychological health and the potential pathways of such effects.

4.8 Appendix

4.8.1 Section 1A: descriptive statistics

Table 4A.1 Descriptive statistics (study 1)

	NCDS Sample		
Variables	Mean	SD	N [a, b]
Psychological distress	1.482	2.259	4,558
Hours-underemployed	0.093	0.290	4,558
Socio-economic background			
Female	0.385	0.487	4,558
Married	0.693	0.461	4,558
Having any children	0.711	0.453	4,553
Long-standing illness	0.252	0.434	4,558
Psychological distress at age 23	1.027	1.413	3,869
Childhood cognitive skills	41.979	18.831	4,158
Highest educational qualification	2.488	1.526	3,948
Occupational status at age 33	2.764	0.999	3,859
Job related characteristics			
Weekly net earnings	375.734	1,779.172	3,786
Job security	2.241	0.639	4,520

[a] N is the number of individuals observations with non-missing cases [b] Missing values are replaced with each variable's sample mean.

4.8.2 Section 2A: matched sample

The propensity scores, estimated using a logit model, satisfied the balancing property, according to which the conditional distributions of the observed covariates are similar between the hours-underemployed and full-time groups (see Figure A1). To test the validity of the balancing hypothesis, we calculated standardised covariate differences between the groups using the following formula:

$$\text{standardised difference} = \frac{100(\overline{x_{PT=1}} - \overline{x_{PT=0}})}{\sqrt{(s^2_{PT=1} + s^2_{PT=0})/2}} \quad (1)$$

where $\overline{x_{PT=1}}$ stands for the mean value of the covariate x in the part-time employment group and $\overline{x_{PT=0}}$ is the mean value in the full-time group. The terms $s^2_{PT=1}$ and $s^2_{PT=0}$ represent the variances of the variable in the two groups. As shown in Figure A1, the standardised differences between the group means in the matched sample were lower for all covariates compared to the unmatched sample. Moreover, they were less than 0.10, suggesting that the distributional differences in the covariates were negligible in the matched sample (Rosenbaum and Rubin 1985).

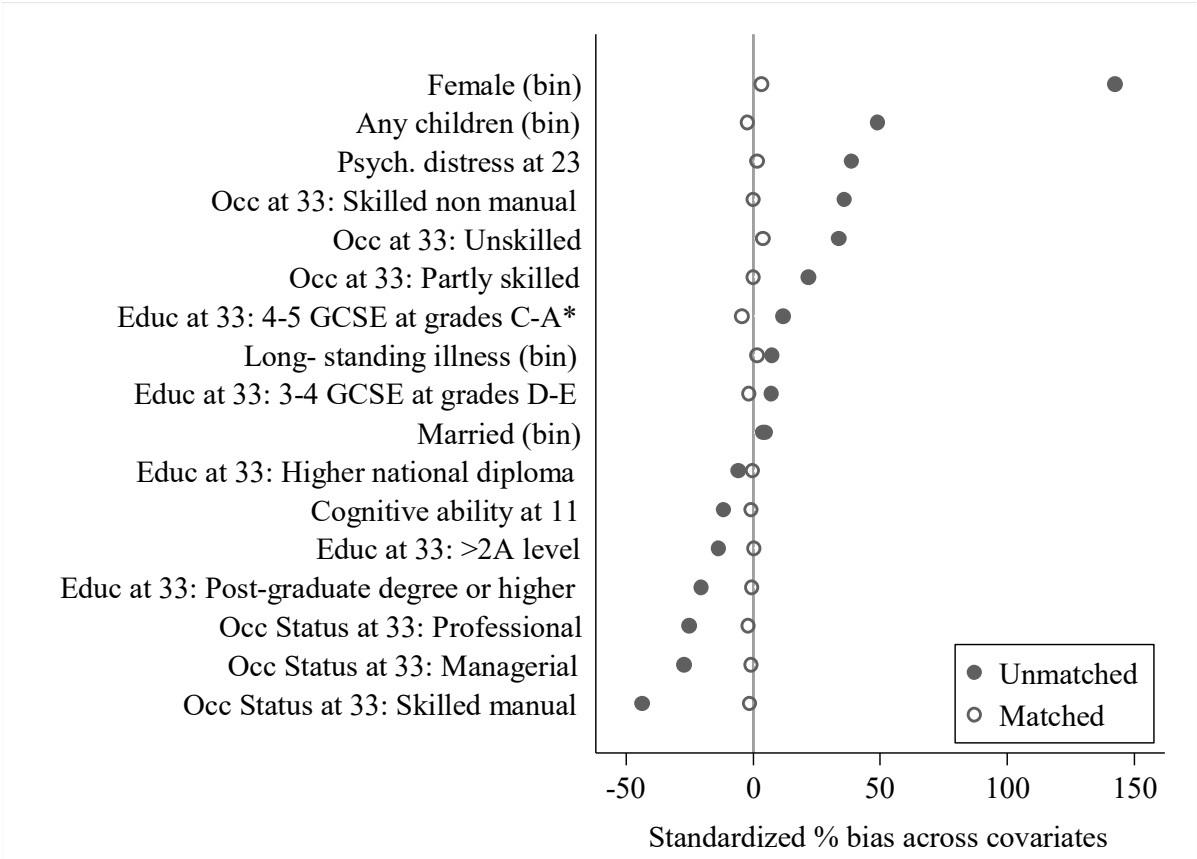

Figure 4A.1 Standardised mean differences of covariates between part-time and full-time employment groups in matched and unmatched sample.

In figure 4A.1, the propensity score density plots for both groups are contrasted before and after matching. After matching, the full-time employment group comprises study subjects who have similar probabilities to end up in hours-underemployment as the survey participants who are involuntarily working part-time. Moreover, there is sufficient overlap in the distribution of the propensity scores of the two groups, as shown in figure 4A.2. Evidently, radius matching produces a balanced sample consisting of part-time and full-time workers similar in their socio-economic background and their probability to engage in hours-underemployment. Therefore, it is suggested that comparisons between the group of interest and the reference group in the matched sample potentially produce reliable estimates of the average psychological health effect of hours-underemployment.

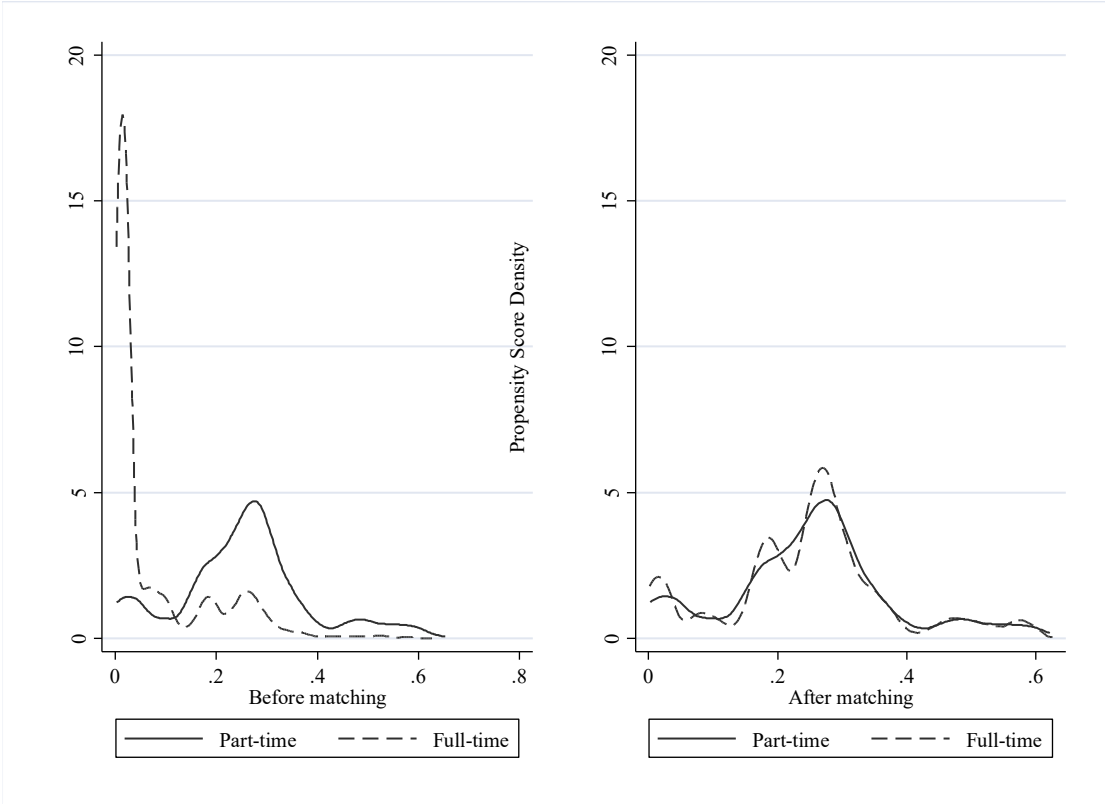

Figure 4A.2 Propensity score distribution of part-time and full-time workers before and after matching

4.8.3 Section 3A: supplementary analysis

Table 4A.2 GEE estimation analysis on matched sample [a]

	Model 3	Model 3 + weekly net earning	Model 3 + job security
		Psychological distress	
Panel A			
Alternative part-time employment group [d]	0.037 [b]	0.024	0.032
	(0.039)[c]	(0.043)	(0.039)
Alternative full-time employment group [e]	0.209**	0.163	0.175
	(0.106)	(0.122)	(0.110)
Socio-economic confounders [f]	Yes	Yes	Yes
Net weekly earnings	No	Yes	No
Job security	No	No	Yes
Panel B			
Working part-time [g]	0.038	0.027	0.033
	(0.039)	(0.042)	(0.039)
Preferring to work more hours	0.016	0.016	0.011
	(0.096)	(0.096)	(0.098)
Working part-time & preferring to work more hours *(interaction)*	0.193*	0.191*	0.178
	(0.112)	(0.112)	(0.114)
Socio-economic confounders	Yes	Yes	Yes
Net weekly earnings	No	Yes	No
Job security	No	No	Yes

[a] Separate models are estimated for each set of part-time and full-time employment groups [b] Standardised point estimates are reported [c] Robust standard errors in parentheses: ***p<0.01, ** p<0.05, * p<0.1 [d] Part-time employment group: Part-time workers who prefer to work same hours vs. Full-time employment group: Full-time workers who prefer to work same hours (size of matched sample=5,533), [e] Part-time employment group: Part-time workers who prefer to work more hours vs. Full-time employment group: Full-time workers who prefer to work more hours (size of matched sample=748) [f] Socioeconomic confounders include: gender, marital status, having at least one child, highest academic qualification achieved at age 33, distress level at age 23, long-standing illness, childhood cognitive ability, and occupational status at age 33 (professional/managerial/skilled non manual/skilled manual/partly skilled/ unskilled) [g] Part-time employment group: Part-time workers who prefer to work *more or same* hours vs. Full-time employment group: Full-time workers who prefer to work *more or same* hours (size of matched sample=6,293)

4.8.4 Section 1B: descriptive statistics

Table 4B.1 Descriptive statistics (study 2)

	BHPS Samples					
	Full-time to hours-underemployment [a]			Hours-underemployment to full-time [b]		
Variables	Mean	SD	N [c, d]	Mean	SD	N [c, d]
Psychological distress	1.333	2.465	37,234	2.019	3.007	2,145
Transition indicator	0.006	0.075	37,234	0.207	0.405	2,145
Socio-economic background						
Age	37.03	11.749	37,234	37.392	12.011	2,145
Female	0.401	0.490	37,234	0.824	0.381	2,145
Married	0.675	0.468	37,234	0.625	0.625	2,145
Having any children	0.310	0.463	37,234	0.474	0.474	2,145
Long-standing illness/disability	0.439	0.496	37,209	0.528	0.499	2,145
Highest educ. qualification	3.559	1.577	36,884	3.086	1.566	2,135
Occupational status (current job)	3.888	1.230	37,015	3.377	1.326	2,135
Job related characteristics						
Weekly net earnings	1,119.378	572.56	37,233	438.860	265.79	2,145
Job security	5.477	1.449	37,092	5.218	1.658	2,114

[a] The subsample consists of 7,864 unique participants [b] The subsample consists of 801 unique participants [c] N is the number of non-missing person-year observations [d] Missing values are replaced with sample means of the variables

4.8.5 Section 2B: supplementary analysis

Table 4B.2 Employment transitions (alternative pecifications- fixed effects) [a]

	Model 6 [c]	Model 6 + net weekly earnings	Model 6+ job security
		Psychological distress	
Transition indicators - alternative part-time employment group [b]			
Full-time to part-time employment (Obs=38,382)	-0.007 [d] (0.037) [e]	-0.014 (0.037)	-0.008 (0.037)
Part-time to full-time employment (Obs=12,883)	-0.024 (0.032)	-0.028 (0.032)	-0.021 (0.032)
Transition indicators- alternative full-time employment group [f]			
Full-time to part-time employment (Ob=1,551)	0.268** (0.132)	0.245* (0.136)	0.256** (0.129)
Part-time to full-time employment (Obs=1,524)	-0.107 (0.084)	-0.119 (0.086)	-0.105 (0.085)

[a] Separate models are estimated for each type of transition [b] Part-time employment: working less than 30h/week and preferring to work same hours. Full-time employment: working more than 30h/week and preferring to work same hours. In the subsample of participants who worked full-time in period *t-1*, 2.46% of the 38,382 person-year observations correspond to moving to part-time employment. In the subsample of participants who worked part-time in period *t-1*, 9.16% of the 12,883 person-year observations correspond to moving to full-time employment. [c] Marital status, age, age squared, whether having any children, highest educational achievement, long-standing health problems, log equivalised household income and occupational status are controlled for. [d] Standardised point estimates are reported. [e] Robust standard errors in parentheses: ***p<0.01, ** p<0.05, * p<0.1. [f] Part-time employment: working less than 30h/week while preferring to work more hours. Full-time employment: working more than 30h/week while preferring to work more hours. In the subsample of participants who worked full-time in period *t-1*, 4.19% of the 1,551 person-year observations correspond to moving to part-time employment. In the subsample of participants who worked part-time in period *t-1*, 7.22% of the 1,524 person-year observations correspond to moving to full-time employment.

Table 4B.3 Transitions from full-time to part-time employment (alternative specifications)

	Model 6 [a b c]	Model 6 + net weekly earnings	Model 6 + job security
	Psychological distress		
Transition indicator			
Full-time to part-time employment	0.007	-0.002	0.005
(Obs=50,835) [d]	(0.031)	(0.031)	(0.031)
Preferring to work more hours	0.080***	0.078***	0.071***
	(0.020)	(0.020)	(0.020)
Full-time to part-time employment &	0.107	0.104	0.097
preferring to work more hours	(0.073)	(0.073)	(0.072)
(interaction) [e]			

[a] Robust standard errors in parentheses: ***p<0.01, ** p<0.05, * p<0.1 [b] Standardised point estimates are reported [c] Marital status, age, age squared, whether having any children, highest educational achievement, long-standing health problems, log equivalised household income and occupational status are controlled for. [d] Being in part-time employment is specified as working less than 30h/week while preferring to work *more* or *same* hours. Being in full-time employment is specified as working more than 30h/week while preferring to work *more* or *same* hours. 4.08% of the 50,835 person-year observations in this sample correspond to transition events. [e] 0.8% of the person-year observations in this sample correspond to moving to part-time employment while preferring to work more hours.

Chapter 5. Adolescent mental health and unemployment over the lifespan: evidence from Sweden

5.1 Abstract

Mental ill-health has been shown to cause severe damage to individual careers. The present study examines the impact of specific adolescent mental health disorders on unemployment prospects over long labour market trajectories. We use extensive registry data, following almost the entire population of Swedish men, who were born between 1950 and 1976, during the period from 1990 to 2012. Evidently, being diagnosed with mental health conditions at age 18 predicts prolonged time spent in unemployment. Alcohol and drug related conditions are the strongest predictors of exposure to future unemployment among other disorders. Adjusting for shared family environment using sibling fixed effects does not account for the impact of mental health conditions on unemployment. Notably, the effect of adolescent mental disorders on subsequent unemployment exceeds the impact of a standard deviation change in intelligence, which is a strong predictor of employment outcomes. Further, we study the influence of macro-economic shocks on the unemployment impact of mental illnesses and find that workers with neurotic, adjustment and alcohol-related conditions were disproportionately more likely to face increased unemployment following the 1990s crisis in Sweden. The present findings suggest that early mental health interventions might reduce labour market hardship for workers who have experienced psychiatric disorders in late adolescence.

5.2 Introduction

Recently, the economic consequences of psychiatric conditions have arisen as a major issue with more than one third of the sickness and disability caseloads in advanced countries being related to mental health problems (Layard 2013). The economic burden of mental ill health was estimated to be 3.5% of GDP in European Union in 2010, with benefit expenditure and productivity losses accounting for 50% of the total cost (Gustavsson et al. 2010; OECD 2015). Under these circumstances, the influence of mental health on career success has been gaining increasing attention lately (Layard et al. 2014). Suffering from poor mental health has been shown to predict a range of adverse economic outcomes, such as weak attachment to the labour market, increased risk of unemployment, reduced earnings (Ettner et al. 1997; Butterworth et al. 2012) and low productivity and absenteeism (Bubonya et al. 2016; Lagerveld et al. 2010; Lerner and Henke 2008). Additionally, there is evidence that workers suffering from mental health issues are disproportionately affected by economic crises such as the Great Recession (Egan et al. 2015; 2016).

With the share of the world population suffering from any diagnosed mental condition ranging from 9.1% to16.9% (Demyttenaere et al. 2004), mapping the links from specific psychiatric conditions to unemployment has important policy implications. The present study observes lifelong labour market trajectories of Swedish males, who have been diagnosed with psychiatric disorders in late adolescence. According to OECD (2013), mental health accounts for 60% of all sickness-benefits cases in Sweden and has turned out to be the central cause for labour market drop-out for Swedish workers. Importantly, young people appear to be particularly vulnerable to the adverse economic repercussions of mental ill health. For example, the share of new disability claims due to mental illness among Swedish adults younger than 25 years old increased by 25% in 2013, with this surge being the largest across OECD countries (OECD 2013).

The present study is concerned with important questions related to adolescent mental health as a predictor of unemployment, which have not been addressed yet. Despite the rising public interest in the economic costs of mental illness, the impact of specific mental conditions on employment trajectories across life has not been fully explored yet. Labour market trajectories of young people who are diagnosed with particular conditions have not been studied in depth thus far, resulting in a gap in the literature regarding the socio-economic burden of particular types of mental health illness. We use a unique sample of all Swedish males who were enlisted at the Swedish army in the period between 1969 and 1989 to explore the downstream effects of adolescent mental health conditions on subsequent unemployment beyond young adulthood, during midlife and up to 60 years of age. Specifically, we examine the relationships between depressive, personality, neurotic, alcohol and substance use- related

disorders and unemployment during long-term follow-up. We also investigate whether individual characteristics, such as intelligence, educational achievement and occupational status, influence the unemployment effects of specific subtypes of mental illness. Finally, we examine the repercussions of macro-economic recessions for workers with poor mental health. Specifically, we explore the influence of Sweden's macroeconomic crisis in the early 1990s on the vulnerability of those with specific mental health conditions to exposure to labour market hardship.

5.3 Background

There is evidence in the literature suggesting that experiencing unemployment has adverse consequences on psychological well-being and mental health, both concurrently and in the long-run (Clark et al., 2001; Daly and Delaney, 2013; McKee-Ryan et al., 2005; Paul and Moser, 2009). Moreover, Darity and Goldsmith (1996) developed a behavioural macro-economic model of labour demand and supply accounting for the fact that exposure to unemployment impairs psychological health, which in turn leads to increased probability of facing more adversities in the labour market. According to the model, workers' psychological health, being a variable that is endogenous to the labour market, explains the phenomenon of unemployment hysteresis – i.e. the persistency of increasing trends in unemployment: high rates of unemployment are likely to be persistent due to damaged psychological health of unemployed workers which then leads to reduced levels of productivity in the work force and weaker attachment to the labour market. The relationship between labour market experiences and emotional health appears to be complex, with evidence pointing to health selection into economic hardships, such as unemployment, for those who suffer from mental health conditions (Kaspersen et al., 2015; Milner, 2013). As labour market attachment and mental disorders could be mutually developed and influence each other, disentangling the link leading from psychiatric illness to unemployment is crucial for understanding the connections between mental health and labour market outcomes.

On theoretical grounds, psychological health exerts a significant impact on workers' trajectories in the labour market. Elements of psychological health, including self-efficacy, positive affectivity, resilience and emotional stability, are conceptually linked to performance and attachment to the labour market (see, for example, Lageverd et al. 2010; Staw et al. 1993). As impaired psychological health reduces effective human capital – i.e. the skills and competencies that workers utilise in the labour market (Darity and Goldsmith 1996), we expect that workers who suffer from psychological disorders will be more exposed to unemployment risks compared to workers without mental health disorders.

5.3.1 Links between poor mental health and adult economic outcomes

Prior work suggests that poor mental health has negative, direct effects on contemporary work outcomes. The employment effects of suffering from any affective, anxiety and/or drugs and alcohol related disorder have been documented in detail, chiefly among populations of workers who live in the US. Chatterji et al. (2007) found that suffering from any mental condition during the last year predicted a 10 percentage point (pp) decrease in the probability of currently being employed among Latino men. They also showed that psychiatric conditions often predict labour-market dropout rather than increased unemployment for this group. Ettner et al. (1997) found similar results for American workers, despite the substantial socio-economic differences between the two study samples. They showed that suffering from any of these conditions in the last 12 months predicted an 11 pp reduction in the probability of being employed.

In a more recent study, Chatterji et al. (2011) observed a link from being currently diagnosed with any psychiatric condition to reduced probabilities of being both employed and actively engaged in the labour market among American workers. Banerjee et al. (2017) extended this analysis by introducing a continuous latent index of mental illness, which captures the severity of psychiatric symptoms relevant to three types of disorders; namely, major depressive disorder, panic attack, social phobia and generalised anxiety disorder. They concluded that poor mental health predicts reduced probability of being employed and increased risk to drop out of the labour force for American and immigrant workers. The common approach shared among these studies to control for potential self-selection into employment hardship is the instrumental variable method. The use of various instruments, including the number of childhood-onset psychiatric disorders, does not attenuate the observed relationships between contemporary poor mental health and employment outcomes.

Another approach to tackle reverse causality is to examine the direct impact of mental health prior to labour market entry on adult economic outcomes. Global health during infancy and childhood has been identified as an important determinant of educational performance and labour market trajectories (Black et al. 2005; Case et al. 2009; Smith 2009; Currie et al. 2010; Goodman et al. 2011). Specifically, childhood psychological problems have been shown to be critically important in shaping later life economic success and generate greater adverse effects than physical health problems across a range of adult outcomes (Currie et al. 2010; Delaney and Smith, 2012; Goodman et al. 2011). Trzesniewski (2006) suggested that adolescents with low self-esteem are more likely to leave school early and face long-term unemployment by age 26. In this study, cognitive ability, physical health, adolescent depression and family background did not fully explain the observed relationships. Moreover, self-evaluated distress during early adolescence has been shown to predict elevated

probability of facing unemployment and increased time spent in unemployment between ages 16 and 21 in a British and an American sample, after controlling for childhood depression (Egan et al. 2015).

Further, Fletcher (2013) showed that self-reported symptoms of depression between ages 12 and18 were associated with a 12% earnings penalty and a 3 pp decrease in the probability of employment at age 30 for American workers. The observed effects were robust to the estimation of school and siblings fixed effects models, which were used to adjust for unobserved family and school factors that may confound the relationship between early mental health and adult outcomes. Moreover, Egan et al. (2016) used an American sample to show that adolescent psychological distress is a predictor of a 2 pp increase in the likelihood of unemployment and a 1 pp increase in the probability of leaving the labour market over 12 consecutive years. High self-reported distress predicted future unemployment even after controlling for observed socio-economic characteristics and unobserved family effects, using sibling fixed effects models. In line with this work, Smith and Smith (2010) adopted similar methodology to show that adolescent psychological conditions, including depression and alcohol and substance abuse, predicted a 29% decrease in family income and an 11 pp increase in the probability of not working at all after the age of 25.

5.3.2 Specific mental health conditions and adult economic outcomes

A subset of studies, which examine the impact of specific psychiatric conditions on labour market performance, adds to the literature on the general links between poor mental health, measured using indicators for diagnoses of any mental condition or self-evaluations of psychological well-being, and economic outcomes. For instance, Ettner et al. (1997) considered the influence of specific adult mental disorders on labour market outcomes. Despite the low prevalence of specific diagnoses hindering the inference of their impact on employment outcomes, major depression and alcohol dependence were found to be substantially associated with low employment probabilities while dysthymia generated the largest reduction in working hours among American male workers. Marcotte et al. (2000) examined the links between currently suffering from affective disorders on employment and earnings and found that depression and dysthymia predicted large income losses for American workers. Using a sample drawn from the same population, Mullahy and Sindelar (1996) showed that contemporary alcohol dependence and abuse were associated to elevated unemployment risk and lower probability of employment. Additionally, personality disorders have been shown to hamper labour market performance, predicting a 2% increase of the risk of being unemployed among American workers (Ettner et al. 2011).

Additionally, there are studies, which look into the relationships between childhood and adolescent specific mental conditions and adult outcomes. In a sample drawn from the

1977 birth cohort in New Zealand, Fergusson et al. (2007) showed that major depression at ages 16-21 predicted welfare dependence and increased probability of being unemployed at least one month over a five year period. Likewise, Jayakody et al. (1998) used objective diagnoses of substance dependence and affective, anxiety and conduct disorders, occurring before age 16, to show that early-onset mental illness determines adult socio-economic outcomes. They found that being diagnosed with any of these disorders in adolescence was associated with lower probability of employment later in life. However, both studies did not account for unobserved confounding factors, which could trigger both the onset of psychiatric conditions and lead to economic hardship.

In one of the key studies regarding the links from adolescent health to individual labour market trajectories, Lundborg et al. (2014) used the same source of conscription data on almost the whole population of Swedish male siblings, born between 1951 and 1970, to explore the relationship between objective assessments of adolescent global health and earnings measured in 2003. After controlling for unobserved family effects in siblings pairs as well as genetic factors in twin pairs using fixed effects models, they showed that early-onset mental health conditions had the most severe earnings penalty compared to other health problems. Specifically, alcohol and drug dependence, personality disorders and neuroses were associated with large reductions in earnings, which were not explained by unobserved family and neighborhood characteristics, non-cognitive abilities and intelligence. Further, the authors suggested that negative effects of poor health on earnings could be driven by worse employment outcomes, for instance working fewer hours, implying that mental ill-health potentially has long-term, detrimental repercussions for individual labour supply.

While the effects of mental health on employment and earnings outcomes are well documented, the links between mental ill-health and unemployment have not been fully explored thus far. For instance, Chatterji et al. (2007) only considered unemployment in their supplementary analysis to test whether the negative effect of poor mental health on employment could be attributed to dropping out of the market or facing involuntary joblessness. Prior literature explicitly examining unemployment as an outcome of mental health is rather limited and has only focused on adult alcohol abuse (Mullahy and Silander 1996) and personality disorders (Ettner et al. 2011). Moreover, the subset of studies looking into early-onset distress and unemployment either relied on subjective evaluations of emotional health (Egan et al. 2015; 2016; Trzesniewski 2006) or used rather poor unemployment measures. For instance, Fergusson et al.'s (2007) main variable of interest was an indicator for spending at least one month in unemployment between ages 21 and 25. Additionally, whilst there is evidence that self-report psychological distress and mental health problems in childhood and adolescent predict adult unemployment, whether this effect varies by diagnostic category remains unknown.

We extend prior work on mental health and economic outcomes (for example, Lundborg et al. 2014 and the American literature) by analysing the long-term repercussions of objective diagnoses of mental health conditions at around age 18 on unemployment outcomes during life-long trajectories. The key contribution of the present study is that we examine the variation in the unemployment impact of poor adolescent mental health by major types of psychiatric illness diagnosed prior to labour market entry. Our sample includes the full population of Swedish adolescent men, born between 1951 and1970, who were tested for mental health conditions at the time of enrollment for compulsory military service. We use objective International Classification of Diseases (ICD-8) diagnoses of psychiatric disorders, rather than self-reported evaluations of mental health, at late adolescence, when it is quite unlikely that labour market experiences have already affected individuals' psychological well-being.

Our second contribution is that we observe employment trajectories spanning over 20 years rather than a single point in individual careers. The various lags between assessment of mental health and adult outcomes follow-up in the period between 1990 and 2012 allows the observation of almost the full span of working life, starting from entry in the market and ending at retirement. Moreover, we include comparisons between siblings to remove unobserved confounding factors at the family level. Building on prior work by Egan et al. (2016), we use sibling fixed effects models to control for family characteristics which could predict both the onset of mental conditions and subsequent unemployment.

Finally, we add to existing literature by examining potential channels of the impact of poor mental health on unemployment, which have been rather neglected thus far in the studies exploring the links from mental health to unemployment. Prior work has uncovered evidence pointing to socio-economic status (Adler et al. 1994; Fletcher 2010) as a potential mediator of the labour market effects of mental health. Following this literature, we examine whether highest academic achievement and adult occupational status can explain the detrimental consequences of adolescent mental conditions on labour market performance. Moreover, we adjust for intelligence, which has been shown to be a major predictor of economic outcomes (e.g. Deary et al. 2005). Given that poor mental health is potentially associated with cognitive deficits (Austin et al. 2001; Currie et al. 2010; Daly 2011; Rock et al. 2014; Salm and Schunk 2012), intelligence might substantially confound the link from adolescent poor mental health to adult employment outcomes.

5.3.3 The influence of economic recessions on the labour market outcomes of mental illness

The long prospective panel we use in the present study allows us to examine how the early 1990s economic crisis in Sweden influenced the labour market prospects of workers who suffered from psychiatric conditions prior to the recession. The Swedish economic crisis was chiefly triggered by monetary policy failures to control inflation, budget deficits and a crash in the housing market (Englund 1999). Labour demand responded to the economic downturn with weakened incentives to offer long-term employment arrangements, leading to a surge in fixed-term contracts. The shift to temporary employment, along with the rise in lay-offs, caused unemployment to rise from 1.6% in 1990 to 8.2% in 1993, while employment fell by 10% across the whole population of Swedish workers (Skans et al. 2009).

Mentally impaired workers, striving to adapt to the unfavourable conditions, were shown to bear disproportionately larger shares of the recession costs compared to their healthy colleagues (e.g. Egan et al. 2015; Evans-Lacko et al. 2013). For example, the 1990s crisis appeared to magnify the probability of unemployment benefit take-up because of poor health among private sector employees in Sweden, with mental disorders being major determinants of job loss during the recession (Bharadwaj et al. 2105).

Moreover, it is likely that the changes in labour market policies launched following the 1990s recession in Sweden could have persisting effects, especially for vulnerable groups of workers. For example, less than 50% of the flows into unemployment received benefits in the early 1990s (Carling et al. 1996). Additionally, the enforcement of employment protection laws become weak after the recessions and remained like this in the following years (Bharadjwai et al. 2015). These policy shifts that impact on unemployment are likely to have lingering effects on the trajectories of young labour market entrants. Especially for workers with weak coping mechanisms, reduced incentives to work and barriers to access to employment support as a result of mental illness, austerity measures in the labour market can have far-reaching effects leading to increased risk of unemployment or even dropping out of the labour market.

We contribute to this literature by examining whether the early 1990s macro-economic shock followed by changes in labour market policies worsened the potentially detrimental effect of specific types of adolescent mental health disorders on employment prospects. Particularly, we observe the probability of facing unemployment among those with mental health conditions before and after the 1990s Swedish crisis. Subsequently, we compare them to those with no such diagnoses to identify the extent to which poor mental health results in difficulty to recover after periods of economic decline. Our purpose is to identify whether mental illness is a predictor of labour market inequalities during economic downturns and

highlight the vulnerability of workers who suffer from major psychiatric disorders to adapt to labour market decline. Understanding the economic consequences of various type of mental illness potentially facilitates the design of effective early prevention programmes and rehabilitation interventions aiming to reduce the individual and social burden of poor mental health.

5.4 Sample and data description

5.4.1 Study sample

The study sample consists of approximately a million and a half (1,465,987) Swedish men and is drawn from the combination of multiple Swedish registries; mainly, the multi-generation register, the integrated database for labour market research (LISA) and the conscription register. A unique identification number for each individual is used to link the information of the various sources. All males, who have complete military enlistment records and for whom at least one biological parent can be identified, are included in the original sample. These men, who were born between 1951 and 1976, enlisted in military services in the period between 1969 and 1994, when serving in the Swedish defense was mandatory. At conscription, their physical and mental health was assessed by medical professionals. Further, their labour market trajectories were monitored from 1990 to 2012. Detailed employment outcomes, such as days spent in unemployment, were recorded annually during this period.

Using the migration and death 2012 registries, we could identify those who had died (46,475 individuals) and those who had left the country (39,694 individuals) and exclude them from the sample. Further, we eliminated those born after 1970, as they were very young (14-19 years old) and quite likely to still be in education in 1990, when labour market events were first recorded. Additionally, we excluded those who undertook conscription tests after 1989 because their mental health diagnoses were categorized according to ICD-9 classification, which is not fully comparable to ICD-8 being used up to then (as in Lundborg et al., 2014). Additionally, we did not include in the sample those who had missing conscription information (156,399 individuals); for example, conscription year, conscription centre and county of residence at conscription. Finally, we came up with a sample of 929,191 Swedish males for whom there was valid information on physical and mental health status at conscription and labour market trajectories between1990 and 2012. For 407,100 out of them at least one full brother could be identified in the sample. This large study population is expected to facilitate precise estimates of unemployment levels among individuals diagnosed with mental disorders, despite the low prevalence of these disorders.

The sample average age at conscription was 18.4 years, with minimum (maximum) age being 16 (26) years old. The oldest cohort members were born in 1950 and aged 40 to 63 years over the period from 1990 to 2012, when unemployment has been assessed. The youngest cohort members were born in 1970 and aged 20 to 42 years over the post-conscription follow-up period. Integrating multiple waves of conscription data allows the examination of unemployment over the full span of working life from young adulthood and almost to age of retirement, which is approximately 65 years of age in Sweden. Mental disorders, registered by ICD-8 diagnoses at conscription, were used as exposure information potentially predicting increased risk of unemployment in later life. Finally, the population and housing censuses (1960, 1970, 1975, 1980, 1985 and 1990) were linked to the database, providing information on subjects' socioeconomic background.

5.4.2 Measures and methods

Adolescent mental health conditions

Mental health diagnoses were registered as part of conscription examinations, when participants were in their late adolescence. All conscripts were first interviewed by a psychologist. If signs of psychiatric illness were detected, they were referred to a psychiatrist, who made the final diagnosis. Diagnoses were grouped according to ICD-8 codes as documented in prior papers (e.g. Gale et al. 2014). The following diagnostic categories were available in the dataset: schizophrenia; other non-affective psychotic disorders; bipolar disorders; [9]depressive disorders; neurotic/adjustment disorders; personality disorders; alcohol-related disorders; and other substance use disorders. Finally, to examine the average unemployment effect of mental health, we produced an indicator of whether each subject has been diagnosed with '*any* mental condition', having a prevalence of around 6.5-7% in the full and the sibling samples.

The share of study subjects who had more than one condition was quite low (0.29%). More than half of this group had both depressive and neurotic disorders (53.3%), which typically show a high level of comorbidity. Specifically, anxiety conditions, which belong to the neurotic disorders category, are shown to be highly comorbid with depression episodes (Kessler et al. 1996).

Unemployment

Unemployment was observed each year from 1990 to 2012, using the records of the Swedish Public Employment Services. This variable captures whether an individual was

[9] The very low prevalence of schizophrenia and other psychotic disorders and bipolar disorders in the sample (193 and 32 subjects, respectively) did not allow us to explicitly analyse the unemployment effects of adolescent schizophrenia, psychoses, manic episodes and bipolar conditions.

registered as unemployed at any point during each year. The contrast group comprises all other forms of activities, including being employed and out of the labour force (due to disability, education, housekeeping etc.). The number of days spent in unemployment was also recorded annually for the period between 1992 and 2012. Given that the unemployment indicator available in the LISA registry does not distinguish between the employed and the inactive groups, the direct effect of being diagnosed with mental illness on the probability of being unemployed versus being in employment cannot be accurately inferred. To avoid underestimating the labour market effects of mental health, we focus on time spent in unemployment, using the average number of unemployment days during 1992-2012 as the primary outcome of interest. However, when examining the potential impact of the 1990s Swedish macroeconomic crisis we use the binary indicator of whether the subject was unemployed in 1990 and/or 1991 as the number of days spent unemployed was not recorded in these years.

Confounding factors

We adjust for the influence of individual demographic characteristics, which might affect both the onset of mental health conditions and the likelihood of spending prolonged time in unemployment. First, we control for childhood socio-economic status, which has been shown to impact on mental health (e.g. Gilman et al. 2002; Harkonmäki et al. 2007) and adult outcomes (Gregg and Machin 2001; Caspi et al. 1998). Specifically, we include controls for maternal occupational status during childhood, measured in a scale from 1 to 7 (1= *others/not classified*, 2=*unskilled worker*, 3= *skilled worker*, 4= *farmer/ self-employed*, 5=*non-manual worker at lower level*, 6= *non-manual worker at intermediate level*, 7= *non-manual worker at higher level*). Moreover, we take under consideration the influence of early physical health, which has been found to have long-term effects on adult outcomes, including health, work and income (e.g. Delaney and Smith 2012; Smith 2009). We adjust for adolescent body mass index (BMI), which has been both linked to economic outcomes in this cohort (Lundborg et al. 2014) and shown to predict the onset of depression (Luppino et al. 2010). Additionally, we control for height, systolic and diastolic blood pressure and muscle strength measured at conscription.

Further, we adjust for the influence of intelligence on the connection between pre-labour market mental health and future unemployment. There is evidence that poor mental health is substantially associated with cognitive deficits (e.g. Austin et al. 2001; Rock et al. 2014). Moreover, cognitive skills have been shown to be strong predictors of individual achievements in the labour market (Deary et al. 2005; Lindqvist and Westman 2011). Further evidence suggests that adjusting for intelligence attenuates the association between mental health and subsequent economic outcomes (e.g. Daly 2011). To test whether cognitive skills

confound the impact of poor mental health on future economic outcomes, we use measures of intelligence based on scores achieved in four subtests assessing verbal, technical, logical and spatial skills. The test of general intellectual capacity conducted at Swedish conscription resembles the US Armed Forces Qualification Test (AFQT) and demonstrates high construct validity (Carlstedt 2000; Carlsted and Mardberg 1993). A number between 1 and 9 was assigned to each recruit to indicate his overall cognitive ability. Test scores appear to approximate the normal distribution for each cohort of recruits.

Moreover, we test whether highest educational achievements and adult occupational status are potential pathways linking mental health to employment prospects. Early onset psychological disorders were found to predict reduced years of schooling and school dropout (Fletcher 2010), which could then lead to poor labour market outcomes. Additionally, mental ill health has been shown to be associated with lower socio-economic position (Adler et al. 1994). For instance, those diagnosed with mental health conditions could end up in jobs of lower occupational status, thus, having weaker labour market attachment and facing elevated risks of employment hardship. We used measures of educational level and adult occupational status to identify whether the detrimental repercussions of mental health are driven through selection into lower status jobs and/or inadequate accumulation of skills, being reflected in lower educational achievements.

Age at conscription, year of testing, conscription testing centre, and county of residence are also controlled for. Standardised versions of all continuous variables, namely, BMI, height, systolic and diastolic blood pressure, muscle strength and IQ scores, are included in the models.

5.4.3 Methodological approach

We model adult unemployment outcomes as a function of adolescent mental health disorders and childhood and adult socio-economic background, using the following specification:

$$U = f(MD, X, \varepsilon) \quad (1)$$

where U is exposure to unemployment and MD stands for medical diagnosis of psychiatric conditions in late adolescence. X is a vector of individual socio-economic factors, which potentially are correlated with adolescent mental health problems and adult unemployment. Particularly, we consider the influence of childhood socio-economic background, adolescent physical health and cognitive ability and adult socio-economic background. Finally, ε represents random error terms, indicating individual deviations from the relationship between unemployment and mental health implied in this function.

We use the following empirical equivalent of the above model to infer the link from early-onset mental illness to future unemployment:

$$U_i = b_0 + b_1 \text{ Adolescent mental disorders }_i + b_2 \text{ Childhood background factors }_i + b_3 \text{ Adolescent physical health }_1 + b_4 \text{ Adolescent intelligence }_i + b_5 \text{ SES }_i + e_i \quad (2)$$

where U_i is the average number of days spent in unemployment during the period spanning from 1992 to 2012. We add each term at separate stages in order to observe the process of gradually isolating the link from mental illness to subsequent unemployment. We include controls for adult occupational status and educational achievement at later stages to examine whether such factors could act as pathways linking mental health conditions to prolonged time spent in unemployment.

Despite the fact that several confounding factors are adjusted for in specification (2), we cannot rule out the possibility that unobserved individual differences, which could explain the effects of interest, are omitted. Family-specific characteristics may have an impact on both the likelihood of mental illness and poor performance in the labour market. For instance, growing up in a dysfunctional household environment has been shown to predict poor psychological well-being and adverse socio-economic outcomes at early adulthood (e.g. uptake of health risk behaviors, criminality, teenage pregnancy) that could markedly impair labour market trajectories (Felitti et al. 1998; Hillis et al. 2004). We estimate the empirical equivalent of model (1) using sibling fixed effects to adjust for unobserved confounding factors at the family level. We estimate the following specification, using a subsample restricted to full brothers:

$$U_{ij} = b_0 + b_1 \text{ Adolescent mental disorders }_{ij} + b_2 \text{ Childhood background factors }_{ij} + b_3 \text{ Adolescent physical health }_{ij} + b_4 \text{ Adolescent intelligence }_{ij} + b_5 \text{ SES }_{ij} + s_j + e_{ij,} \quad (3)$$

where j is an index indicating the family each individual belongs to. The term s_j stands for the sibling fixed effects, capturing the common family characteristics shared between siblings. The identification of the effect of early-onset mental health disorders on days spent in unemployment relies on the within-family variation in onset of mental illness and labour market outcomes. [10]

[10] The subsample of siblings who are discordant in diagnoses of mental conditions is used to infer the link from adolescent mental health to adult unemployment. 12.3% of the siblings sample belong to families where at least one sibling was diagnosed with any mental condition at adolescence and at least one sibling was not diagnosed. The subsample of discordant siblings faced higher average number of unemployment days per year (mean=23.620, sd=34.982), demonstrated lower IQ scores by 0.7 units (mean=4.367 sd=2.018) and had lower adult occupational status by 0.5 units (mean=2.976, sd=1.766) compared to the full siblings sample. In terms of physical health, maternal socio-economic background

Our second objective is to examine whether the economic repercussions of mental health diagnoses in late adolescence are magnified during economic downturns. For this purpose, we adopt the difference-in-differences approach; a quasi-experimental method used to compare the differences in the probability of facing unemployment between those with and without mental disorders in the periods before and after the crisis. We estimate the following specification:

$$PU_{it} = b_0 + b_1 \textit{Adolescent mental disorders}_i + b_2 \textit{Adolescent background factors}_i + b_3 \textit{Recession}_t + b_4 \textit{Adolescent (mental disorders}_i * \textit{Recession}_t) + b_5 \textit{Adolescent physical health}_i + b_6 \textit{Adolescent intelligence}_i + \varepsilon_{it}$$

where $b_4 = [(\hat{y}_{\text{postrecession, mental health cond.}} - \hat{y}_{\text{postrecession, others}}) - (\hat{y}_{\text{prerecession, mental health cond.}} - \hat{y}_{\text{prerecession, others}})]$ (4)

The effect of interest is the interaction term b_4, which shows the difference between the impact of adolescent mental health on the probability of unemployment before and after the crisis. [11] PU_{it} is the probability of being registered as unemployed in any given year of the period of interest. $Recession_t$ is a binary indicator taking the value 1 for the post-crisis period and 0 for the years prior to the crisis. As study subjects' unemployment experiences are recorded from 1990 and onwards, years 1990 and 1991 are considered the period prior to the recession. The post-crisis era is defined as the time frame between 1993 and 1997. We select these five years in the period following the crisis to cover the whole era of labour market decline (Bharadjwai et al. 2015; Holmlund 2003). In 1992, the Swedish unemployment rate rose to approximately 5.6%, which is nearly double compared to the 1990 (1.6%) and 1991 (3%) levels. It is likely that the transition from remarkable labour market performance to decline, which started in 1993 with national unemployment rate rising to 8.6% and remaining there until 1997, took place during this time. As it is ambiguous whether this particular year should be categorised in the pre- or post-recession period, it is not included in the analysis.

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and educational achievement, concordant sibling pairs were not substantially different from the full siblings sample.

[11] Given that we are interested in examining how the marginal effects of mental diagnoses on the probability of facing unemployment in any given year differ in the periods before and after the crisis rather than average unemployment probabilities by diagnostic category, we fit a linear probability model to the observed data. We estimate specification (3) using the ordinary least squares method to obtain the b_4 coefficient. Despite of the flaws of the linear estimation regarding the prediction of average probabilities it has been shown that it yields consistent and unbiased estimates of marginal effects, which do not differ substantially from the probit and logit outcomes (Angrist and Pischke 2008; Wooldridge 2003).

5.5 Results

5.5.1 Descriptive statistics

Table 5.1 presents descriptive statistics for all the basic variables used in the analysis in both the full and the siblings samples. Both the prevalence of mental conditions and the distribution of the covariates in the sibling sample are similar to those of the full sample, indicating that the latter is representative of the study population. Moreover, there are no major differences in the average number of days spent in unemployment across the two groups. As shown in table 5.1, the neurotic and adjustment disorders group has the highest prevalence (around 4.5%) in both samples. Despite depression being a quite common mental health problem, a very small share of study subjects were diagnosed with depressive disorders. This low share potentially indicates that only severe depressive episodes and clinical disorders rather than common depressive symptoms are diagnosed at enlistment.

In appendix tables 5A.1 and 5A.2, the distribution of the main variables is shown by psychiatric diagnoses for both the siblings and the full sample. There appears to be substantial variation in cognitive ability and socio-economic status across the diagnostic categories. For instance, those diagnosed with alcohol-related disorders have the poorest cognitive skills, scoring almost two units below the sample average on the IQ test, followed by those with personality disorders and those with drugs-related disorders. Suffering from alcohol and other substance abuse and dependence in adolescence appear to be associated with the lowest socio-economic position in adulthood.

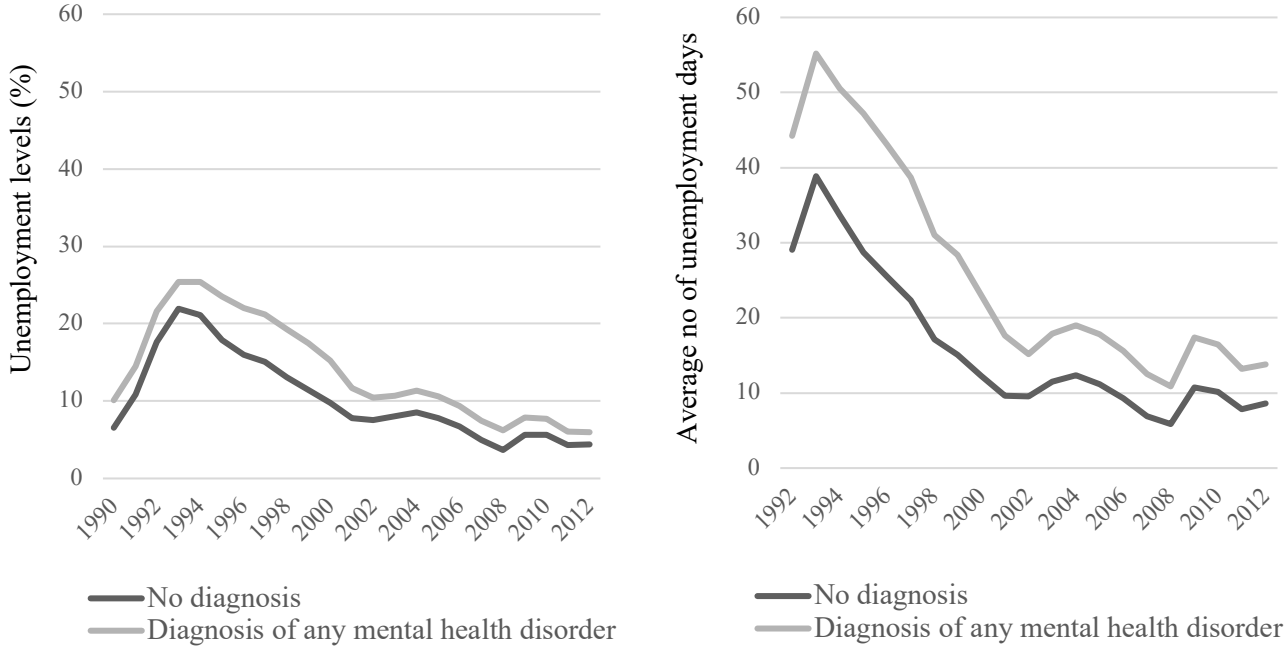
In figure 5.1, the average number of days spent in unemployment for each year between 1992 and 2012 and unemployment levels between 1990 and 2012 for those who have been diagnosed with any mental disorder at conscription are plotted against the relevant figures for those without any mental disorder. Adolescent mental illness appears to be associated with increased probability of being unemployed and also increased number of days spent in unemployment in each year during the period of interest. Additionally, exposure to unemployment appears to have increased disproportionally for those with adolescent mental disorders during the post-recession period (1993-1997). This excessive rise in time spent in unemployment among those who suffered from psychiatric problems could reflect their susceptibility to the detrimental consequences of the recession. As shown in the appendix figures 5A.1 and 5A.2 displaying the annual unemployment days and levels by each diagnostic category, those suffering from disorders related to alcohol and other substances appear to have faced disproportionately higher risk of unemployment following the crisis.

Table 5.1 Descriptive statistics in full and sibling samples

	Full Sample		Sibling Sample	
Diagnoses	**Share (%)**	**Prevalence**	**Share (%)**	**Prevalence**
Any mental disorder	7.06	65,585	6.57	26,738
Depressive disorders	0.22	2,052	0.18	733
Neurotic/adjustment disorders	4.59	42,637	4.23	17,219
Personality disorders	0.98	9,130	0.87	3,532
Alcohol related disorders	0.29	2,703	0.28	1,144
Other substance use disorders	0.45	4,192	0.41	1,661
Observations (N)	921,191		407,099	

	Mean	**SD**	**N**	**Mean**	**SD**	**N**
Unemployment days [b]	16.730	28.97	921,191	16.815	28.924	407,099
Childhood SES						
Maternal SES [c]	3.611	1.499	921,970	3.626	1.477	405,784
Physical health at conscription						
Height (cm)	179.0	6.493	916,841	178.9	6.498	402,364
BMI (kg/cm)	21.53	2.760	916,570	21.51	2.724	402,247
Systolic blood pressure [d]	128.4	10.95	916,788	128.4	10.91	402,335
Diastolic blood pressure [d]	67.80	9.88	916,667	67.29	9.900	402,265
Muscle strength	2,080	311.3	916,489	2,084	313.5	402,165
Cognitive ability						
Global IQ	5.170	1.935	919,532	5.112	1.949	403,530
Own SES						
Educational achievement [e]	3.773	1.394	921,191	3.747	1.389	406,665
Occupational status [f]	3.381	1.949	921,191	3.311	1.909	406,235
Conscription information						
Age at conscription	18.444	0.683	929,191	18.404	0.664	407,099

[a] Descriptive statistics before imputations of the missing values and standardisation of the variables are presented (missing values are replaced with sample means) [b] Average number of days spent in unemployment during the period between 1992 and 2012 [c] Maternal occupational status:1= Others, not classified, 2= Unskilled workers, 3= Skilled workers, 4= Farmers and self-employed, 5= Non-manual workers at lower level, 6= Non-manual workers at intermediate level, 7= Non-manual workers at higher level (missing values replaced with paternal occupation status if available) [d] Blood pressure is measured in mmHg [e] 1= less than 9 years, 2= 9-10 years, 3= Secondary education (at most 12 years), 4= Full secondary education (at least 12 years, at most 13 years), 5= University, less than 3 years, 6= University, at least 3



years, 7= PhD ᶜRecorded between 1990 and 2012) ᶠMeasured in 1990.

Figure 5.1 Unemployment levels and average days between 1990 and 2012 across groups with and without any mental disorder.

5.5.2 The unemployment effect of adolescent mental conditions

The effect of being diagnosed with any mental condition in late adolescence is analysed first in the full sample of Swedish conscripts. The results of estimating specification (2) are presented in table 2.[12] After adjusting for maternal socio-economic status and adolescent physical health, having any type of psychiatric symptoms around age 18 predicted approximately 10 more days in unemployment per year. Evidently, alcohol and other substance related disorders were excessively harmful for future performance in the labour

[12] As shown in table 5.2, controls for demographic characteristics are added successively in specification (2) until the full specification is estimated (column 6). High maternal socio-economic background during childhood predicted decreased unemployment days per year while poor physical health at conscription had a detrimental impact on future unemployment. High BMI and diastolic blood pressure predicted increased unemployment days. On the contrary, systolic blood pressure, muscle strength and height were negatively associated with number of days spent in unemployment. As expected, high adult occupational status and cognitive ability at conscription predicted decreased average unemployment days. Surprisingly, any educational achievement was associated with increased unemployment days compared to the group who had spent less than 9 years in education. However, the higher the level of educational achievement the smaller the increase in average unemployment days compared to the group with minimal educational attainment.

market, being associated to 16 and 17 more days in unemployment per year, respectively. Personality disorders predicted around 11 more unemployment days, while neurotic and adjustment conditions were associated with a 9 days increase in time spent in unemployment annually. Despite depression having been identified as a major determinant of labour market adversities (e.g. Egan et al. 2016), it has the least severe effect on unemployment (6 days per year) in our sample.

Remarkably, the impact of all subtypes of mental disorders on adult unemployment exceeds the direct effect of a standard deviation change in intelligence, suggesting that pre-labour market mental health is a strong predictor of adult career success.[13] Moreover, cognitive ability appeared to explain around 23% of the effects of suffering from most mental conditions. In the case of depressive and drugs related disorders, cognitive ability accounted for 16% and 14%, respectively, of the unemployment effects. These results are in line with the outcomes of the supplementary analysis, which was conducted by Smith and Joyce (2011) to address Daly's (2011) point that childhood intelligence may influence the link from childhood emotional problems to adult socio-economic success. Namely, they showed that cognitive ability explains around 20-30% of the effect of childhood mental health problems on adult income at ages 23 and 42 among workers in the UK.

[13] Estimates of the direct effects of adolescent intelligence on adult unemployment are shown in appendix table 5B.1.

Table 5.2 Estimates of the effects of diagnoses on average unemployment days (full sample)

	(1) [a]	(2) [a]	(3) [a]	(4) [a]	(5) [a]	(6) [a]
	Average number of unemployment days (1992-2012)					
Diagnostic Categories [b, c]	Conscription [d]	Childhood SES [e]	Physical health [f]	Cognitive ability [g]	Education [h]	Own SES [i]
OLS						
Any mental disorder	11.194***	10.555***	9.967***	7.654***	7.861***	6.730***
	(0.146)	(0.146)	(0.146)	(0.146)	(0.146)	(0.144)
Depressive	7.051***	6.833***	6.348***	5.308***	5.348***	4.110***
	(0.773)	(0.770)	(0.770)	(0.769)	(0.764)	(0.763)
Neurotic & adjustment	10.157***	9.557***	8.952***	6.832***	7.010***	6.152***
	(0.176)	(0.176)	(0.176)	(0.175)	(0.175)	(0.172)
Personality	12.483***	11.753***	10.999***	8.443***	8.699***	6.951***
	(0.401)	(0.400)	(0.400)	(0.399)	(0.396)	(0.392)
Alcohol-related	17.726***	16.618***	15.901***	12.220***	12.568***	10.453***
	(0.775)	(0.774)	(0.774)	(0.775)	(0.770)	(0.766)
Other substance use	19.001***	18.185***	17.188***	14.827***	14.824***	12.078***
	(0.624)	(0.624)	(0.626)	(0.626)	(0.622)	(0.622)

[a] Robust standard errors are included in parentheses: *** p<0.001, ** p<0.01, * p<0.05 [b] The sample consists of 929,191Swedish males [c] Separate models were estimated for each diagnostic category [d] Conscription age, conscription year, conscription centre and county of residence controls are included [e] Controls for maternal socio-economic background are added [f] Controls for physical health (systolic blood pressure, diastolic blood pressure, bmi, height, muscle strength and exercise capacity) assessed at conscription are added [g] IQ results from tests at conscription are added. [h] Controls for highest educational qualification between 1990-2012 are added [i] Controls for own occupational status in 1990 are added.

Further, highest educational achievement had a direct effect on future unemployment but did not appear to influence the relationship between adolescent mental health and subsequent unemployment, after having adjusted for maternal socio-economic background, adolescent physical health and cognitive ability (column 5, table 5.2). Given that a positive relationship between schooling and cognitive ability has been observed among the Swedish youth (Carlsson et al. 2015), this finding potentially suggests that disruptions in the process of skills accumulation due to mental illness could be the mechanism driving both educational failure and future unemployment. Moreover, occupational status appears to be a possible pathway linking early life mental health to adult labour market trajectories. Individuals who suffered from mental illness in adolescence could be more likely to find themselves in low status, non-regular jobs, potentially because of stigmatisation, fewer opportunities and inadequate support from the public employment services. In the full model (column 6, table 5.2), depressive disorders predict 4 more days in unemployment per year, while personality and neurotic conditions are associated with around 7 and 6 more unemployment days,

respectively. Alcohol and drug dependence appear to inflict the greatest harm, predicting approximately 10 and 12 more unemployment days on an annual basis, respectively.

The upper panel of table 5.3 displays the results of estimating the same specifications derived from model (1), using the subsample of Swedish male siblings. The links between adolescent psychiatric symptoms and subsequent unemployment, which are observed in the sibling subsample, are of similar magnitude and direction compared to those estimated using the full sample.

The bottom panel of table 5.3 presents the results of estimating specification 3 using sibling fixed effects. Evidently, adjusting for unobserved individual differences on the family level attenuates the impact of suffering from mental illness on unemployment. As shown in figure 5.2, considering the family environment patients with depressive symptoms grew up in counteracted the detrimental repercussions of such disorders on future unemployment. On the other hand, adjusting for shared family environment among siblings caused approximately a 50% decrease in the effects of other adolescent mental disorders on future unemployment observed in the full sample. This finding suggests that unobserved childhood adversities, such as inadequate parenting, parental divorce or lack of family cohesion, are potentially correlated with both mental illness and future economic hardship. However, the unemployment impact of adolescent mental conditions is not fully explained by such family characteristics, suggesting that there are additional, unobserved mechanisms driving these effects.

Moreover, evidence suggests that birth order is an important determinants of later life outcomes and a potential source of inequality in life chances among siblings (see, for example, Barclay 2018; Härkönen 2013). Age differences between siblings are shown to go beyond outcomes such as educational attainment and impact on that are important for performance in the labour market (e.g. Rainer and Siedler 2009). Therefore, birth order could have an important impact on the link from adolescent mental health to unemployment in siblings pairs. However, controlling for age at conscription, which is an indicator of differences in birth cohort among siblings, did not appear to influence the impact of adolescent mental ill-health to increased risk of unemployment.

Table 5.3 Estimates of the effects of diagnoses on average unemployment days (siblings sample)

	(1) [a]	(2) [a]	(3) [a]	(4) [a]	(5) [a]	(6) [a]
	Average number of unemployment days (1992-2012)					
Diagnostic Categories [b, c]	Conscription [d]	Childhood SES [e]	Physical Health [f]	Cognitive Ability [g]	Education [h]	Own SES [i]
OLS						
Any mental disorder	11.790*** (0.232)	11.070*** (0.231)	10.443*** (0.232)	7.923*** (0.232)	8.192*** (0.231)	7.094*** (0.228)
Depressive	6.048*** (1.236)	5.740*** (1.225)	5.267*** (1.223)	4.038** (1.238)	4.016** (1.226)	2.757* (1.212)
Neurotic & adjustment	10.929*** (0.281)	10.234*** (0.280)	9.601*** (0.280)	7.234*** (0.279)	7.470*** (0.278)	6.604*** (0.274)
Personality	13.126*** (0.653)	12.281*** (0.651)	11.445*** (0.651)	8.659*** (0.649)	8.998*** (0.643)	7.366*** (0.634)
Alcohol-related	18.737*** (1.207)	17.445*** (1.204)	16.706*** (1.203)	12.855*** (1.208)	13.293*** (1.200)	11.062*** (1.198)
Other substance use	20.025*** (1.004)	19.290*** (1.001)	18.209*** (1.006)	15.704*** (1.007)	15.785*** (0.999)	13.142*** (0.999)
Sibling FE						
Any mental disorder	5.161*** (0.304)	5.158*** (0.304)	4.922*** (0.305)	3.865*** (0.305)	4.046*** (0.304)	3.566*** (0.301)
Depressive	1.817 (1.555)	1.827 (1.556)	1.543 (1.558)	1.035 (1.566)	1.002 (1.549)	0.443 (1.542)
Neurotic & adjustment	4.667*** (0.363)	4.663*** (0.363)	4.432*** (0.364)	3.465*** (0.363)	3.626*** (0.361)	3.265*** (0.358)
Personality	5.273*** (0.816)	5.276*** (0.816)	5.073*** (0.816)	4.023*** (0.817)	4.275*** (0.810)	3.646*** (0.803)
Alcohol-related	6.668*** (1.568)	6.670*** (1.568)	6.454*** (1.565)	5.383*** (1.566)	5.732*** (1.559)	4.958** (1.543)
Other substance use	9.472*** (1.315)	9.467*** (1.315)	9.119*** (1.315)	8.133*** (1.314)	8.270*** (1.301)	6.871*** (1.293)

Robust standard errors clustered at the family level are included in parentheses: *** p<0.001, ** p<0.01, * p<0.05
[b] The sample consists of 407,100 Swedish male siblings [c] Separate models were estimated for each diagnostic category [d] Conscription age, conscription year, conscription centre and county of residence controls are included [e] Controls for maternal socio-economic background are added [f] Controls for physical health (systolic blood pressure, diastolic blood pressure, bmi, height, muscle strength and exercise capacity) assessed at conscription are added [g] IQ results from tests at conscription are added. [h] Controls for highest educational qualification between 1990-2012 are added [i] Controls for own occupational status in 1990 are added.

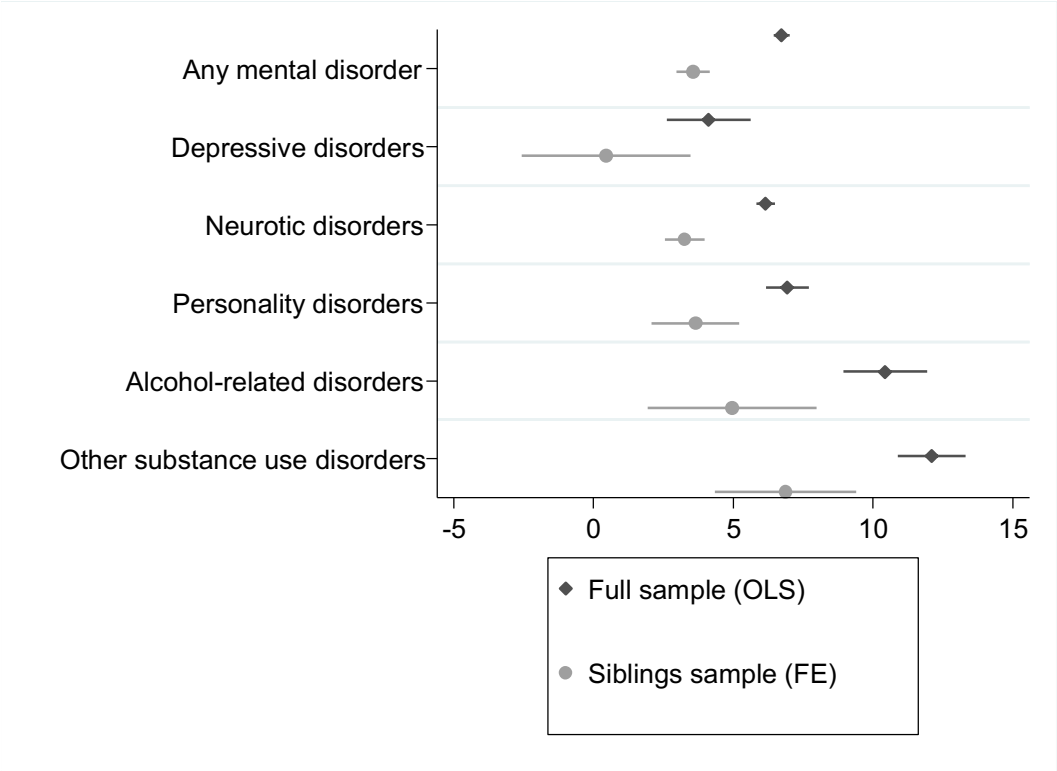


Figure 5.2 Estimated effects on average number of days spent in unemployment by diagnostic category in the full and siblings sample

5.5.3 The unemployment effect of adolescent mental conditions during the 1990s Swedish crisis

The differences in the marginal effects of being diagnosed with adolescent psychiatric symptoms on the probability of being unemployed before and after the crisis are presented in table 5.4. Model 3 is estimated using both the full and siblings samples, yielding consistent results. Figure 5.3 displays the estimated probabilities of facing unemployment before and after the crisis by category of mental illness in the siblings sample. Evidently, those who have been diagnosed with any type of mental illness prior to the crisis faced a 1.6 pp (1.4 pp) higher risk of facing unemployment in the period following the labour market shock in the siblings (full) sample compared to those with no diagnoses. Workers who have suffered from neurotic and alcohol related disorders around age 18 seem to have been disproportionately harmed by the recession. Thus, the observed unemployment impact of suffering from any mental condition is likely to be largely attributable to the elevated unemployment probability after the crisis among those diagnosed with neurotic and adjustment conditions or alcohol abuse and dependence.

Table 5.4 DiD estimates of the effects of diagnoses on unemployment probability before and after the 1990s crisis [a, b]

Diagnoses	Full Sample			Sibling Sample		
	Pre-Crisis [d]	Post-Crisis	DiD [c]	Pre-Crisis	Post-Crisis	DiD
Any mental	0.029***	0.044***	0.014***	0.030***	0.046***	0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Depressive	0.034**	0.019**	-0.014	0.020***	0.009	-0.012
	(0.005)	(0.004)	(0.006)	(0.007)	(0.006)	(0.010)
Neurotic & adjustment	0.027***	0.044***	0.017***	0.027***	0.048***	0.021***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)
Personality	0.031***	0.035***	0.003	0.033***	0.035***	0.002
	(0.002)	(0.002)	(0.003)	(0.004)	(0.003)	(0.005)
Alcohol-related	0.053***	0.066***	0.017***	0.051***	0.070***	0.019**
	(0.005)	(0.004)	(0.006)	(0.008)	(0.006)	(0.010)
Other substance use	0.054**	0.058***	0.002	0.065***	0.054***	-0.011
	(0.004)	(0.003)	(0.005)	(0.007)	(0.005)	(0.008)
N	929,191	929,191	929,191	407,099	407,099	407,099
Person-year obs	1,853,432	4,621,003	6,474,435	812,312	2,025,236	2,837,548

[a] All reported marginal effects are calculated based on the estimation of dif-in-dif linear probability models including the following controls: parental socio-economic background during childhood; own socio-economic background in 1990; highest educational achievement; health measures at conscription (systolic & diastolic blood pressure, height, bmi, muscle strength); global IQ at conscription; age at conscription, conscription year and centre, county of residence. [b] Swedish males who underwent conscription examinations before 1990 are included in both estimation samples to rule out any possibility that the forthcoming crisis would affect study subjects' mental health at conscription [c] The difference in marginal effects of mental illness on unemployment between those with and without mental conditions diagnosis before and after the crisis is the DiD coefficient, or the estimated impact of the interaction between the crisis indicator and the mental diagnosis indicator. [d] Crisis indicator (0=1990 & 1991, 1=1993-97) [e] Robust standard errors, clustered at the individual level, are in parentheses: *** p<0.001, ** p<0.01, * p<0.05

Persistently high unemployment rates and worsening of labour market conditions resulted in a 2.1 pp (1.7 pp) increase in the risk of unemployment among those who suffered from severe stress, anxiety, obsessive-compulsive and other adjustment and neurotic disorders in the siblings (full) sample. Those who were diagnosed with alcohol-related disorders faced elevated probability of unemployment by 1.9 pp (1.7 pp) during the post-crisis period in the siblings (full) sample. It has been shown that people with symptoms related to neurotic disorders and alcohol abuse and dependence face high labour market costs reflected in lower productivity (Dewa and Flin 2000; Ford et al. 2011; Kessler and Frank 1997; Lim et al. 2000). During economic crises, when unemployment increases and competition rises, work impairment due to mental health disorders could result in elevated risk of layoffs and imperfect job search practices. Specifically, suffering from symptoms such as exaggerated worry, tension, fatigue and irritability, which are common in neurotic and alcohol-related disorders, could damage individual strategies for coping and adaptation to harshening economic environments. These particular symptoms, being common in these types of disorders, potentially explain why workers who have been diagnosed with neurotic and alcohol-related conditions at adolescence appear to be vulnerable to exposure to unemployment following economic downturns.

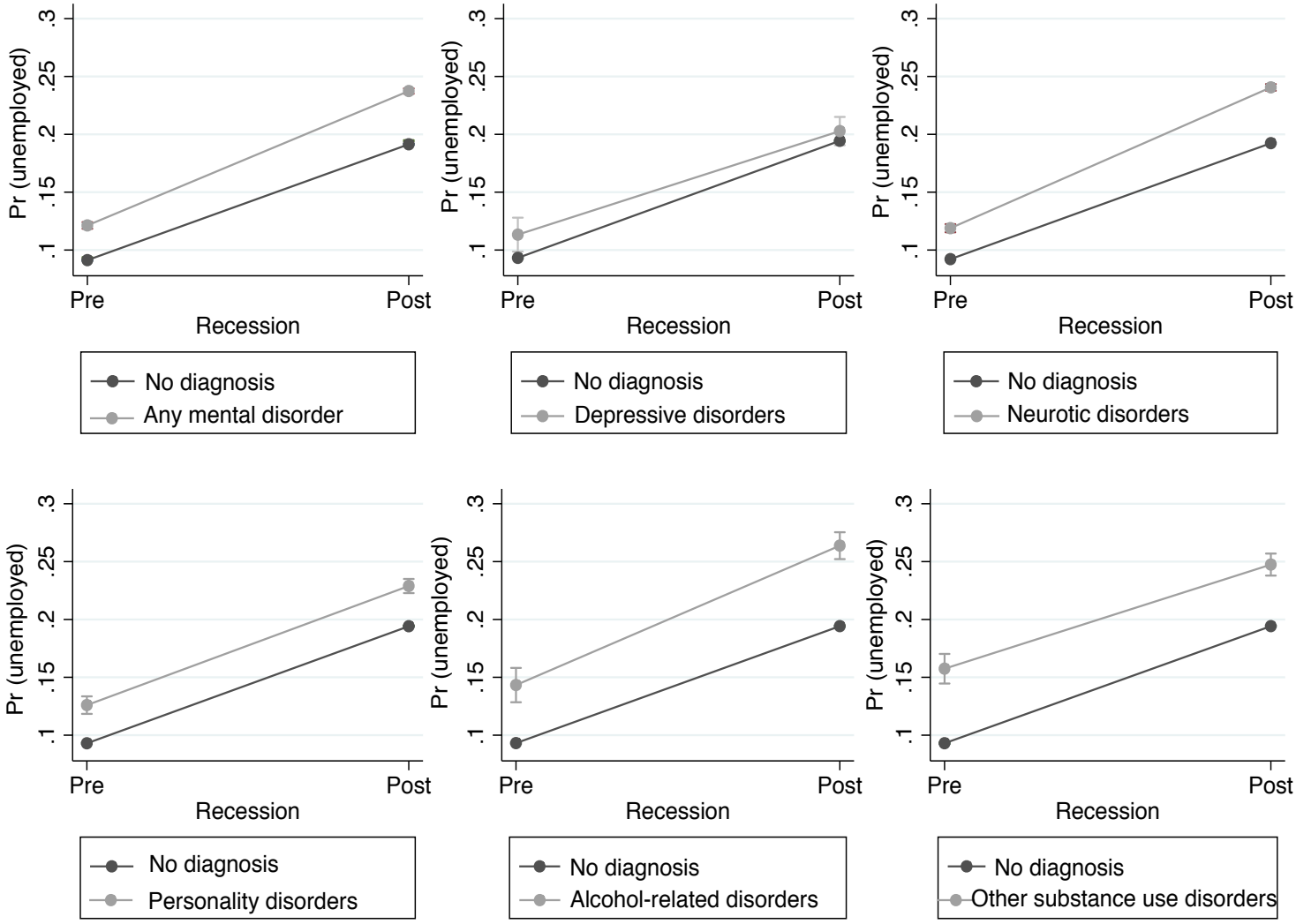


Figure 5.3 Predictive margins with 95% confidence intervals showing predicted probabilities of unemployment in periods prior to and following the recession by diagnostic category.

5.5.4 Robustness tests

As shown in table 5.1, one of the main outcomes of interest, the average days spent in unemployment, is over-dispersed, with the variance being larger than the mean. In addition to the OLS estimation of specification 1, we fit a negative binomial model to adjust for over-dispersion in the number of days spent in unemployment during each year.[14] As shown in

[14] It has been shown that the fixed-effects negative binomial model fails to capture time-invariant individual heterogeneity (Allison and Waterman 2002). Given that negative binomial models cannot be estimated with adjusting for siblings fixed effects, we adopted OLS as the core methodology throughout the paper.

figure 4, the average effects calculated after estimating negative binomial models have smaller confidence intervals and are smaller in magnitude compared to the OLS findings. Despite OLS potentially resulting in minor overestimation of the true effects, the two techniques evidently result in estimates, which do not differ substantially. Average effects of adolescent mental disorders on unemployment days estimated using negative binomial specifications are shown in table 5C.1 in appendix section C.

Moreover, to examine whether the observed effects of adolescent mental health on future unemployment are driven by labour market experiences prior to conscription which might trigger psychiatric symptoms, we reduced the study samples to those aged 19 years or younger at conscription. While mean conscription age is approximately 18 years, the age of the study population ranged from 16 to 26 years at that time. Approximately 97% of the sample were younger than 19 when they went through conscription examinations. Even though it is quite uncertain whether this group had any employment or job search experiences in the period before mental health status was assessed, it is quite unlikely that they had strong attachment to the labour market at such young age. As shown in appendix section D, we found effects of the same magnitude and direction when excluding Swedish males who were older than 19 years old at conscription from the samples. These findings suggest that the negative link between early-onset mental conditions and subsequent unemployment is not likely to mask self-selection into labour market hardships because of mental ill-health.

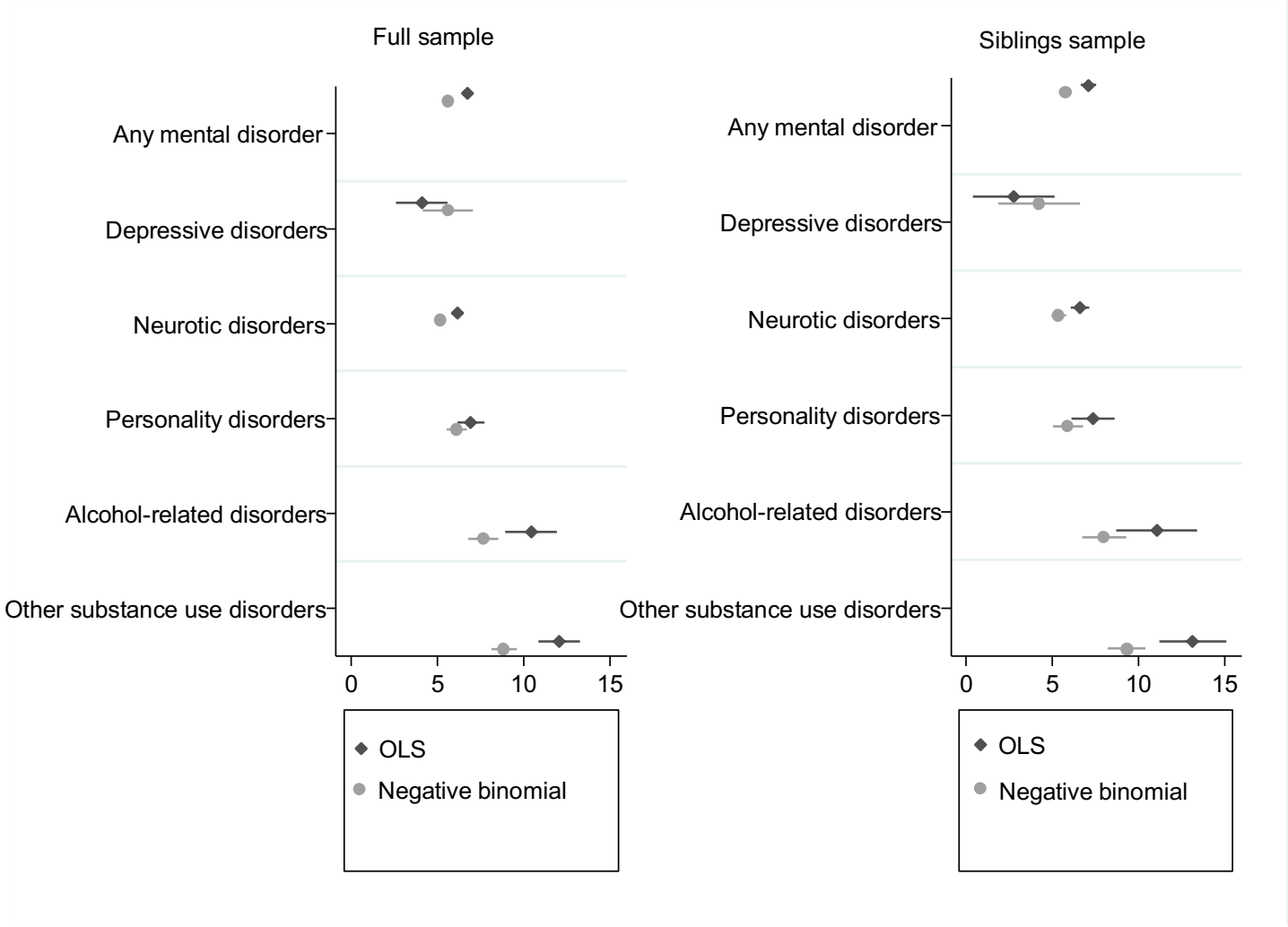


Figure 5.4 Effects on average number of days spent in unemployment by diagnostic category in the full and the siblings samples estimated using OLS and negative binomial models.

Finally, we used an annually recorded indicator of disability benefits take-up to identify study subjects who were likely to be out of the labour force. In Sweden, young workers with mental illness are disproportionately represented in the group receiving disability assistance and are likely to drop out of the labour market because of long-standing illness (OECD, 2013). Thus, including such workers in the sample might mask the real risk of unemployment faced by workers who are actively participating in the labour market and result in underestimation of the true effects. After excluding workers who received disability benefits at least once during the period between 1992 and 2012, we examined whether adolescent mental health disorders predict increased days spent in unemployment as opposed to being employed or in education. Moreover, in the analysis of the influence of the crisis on the unemployment consequences of adolescent mental health, we eliminated the person-year

observations for which disability benefit take-up was reported. Therefore, the control group was reduced to Swedish males who were either employed or in education.

Tables 5E.1, 5E.2 and 5E.3 in appendix section E present the results from replicating the analysis using this restricted subsample. As expected, excluding individuals who might have dropped out of the labour market because of long-standing illness resulted in larger effects of adolescent mental health conditions on future unemployment. These findings suggest that the impact of adolescent mental illness on adult unemployment might have been underestimated because data limitations did not allow adjusting for workers with mental disorders self-selecting out of the labour force. Suffering from neurotic, personality, alcohol and other substance use related disorders is likely to predict both greater risk of exposure to unemployment and increased probability of dropping out of the labour market. Further research is required to unfold the detrimental impact of poor mental health on distinct labour market outcomes, including unemployment and labour force participation.

5.6 Discussion and conclusions

The current study extends the literature by examining the long-term influence of pre-labour market mental disorders on future unemployment among the full population of Swedish male workers born between 1951 and 1970. Our findings validate the hypothesis motivated by theoretical work on the links between psychological health and employment outcomes (see for example, Goldsmith et al. 1996; Staw et al. (1993)) that impaired mental health is an important determinants of employment hardship. The key contribution is that we identify the impact of specific subtypes of adolescent mental illness to subsequent exposure to unemployment. We use objective diagnoses of depressive, neurotic, personality, alcohol and other substance use related disorders rather than self-reported conditions or cut-off scales. We follow a unique sample, which contains all Swedish males who went through conscription between 1969 and 1989, through their trajectories in the labour market between 1990 and 2012. Being diagnosed with any type of mental disorder around age 18 is identified as an important predictor of adult unemployment, with the unemployment effects of mental disorders exceeding that of a standard deviation change in intelligence. Depressive disorders were not substantially associated with unemployment, potentially because of the low prevalence of such conditions, which might suggest that such diagnoses represent the extremity in terms of depressive symptoms. On the other hand, the category of neurotic and adjustment disorders, which is potentially more inclusive as it also contains depression-related symptoms, was robustly related to subsequent unemployment. Exhibiting alcohol and other substances abuse and dependence behaviours in late adolescence was found to inflict the greatest harm on future career success compared to other types of mental health disorders.

Interestingly, the links from mental health disorders to increased risk of unemployment persisted even after controlling for unobserved family characteristics, captured by sibling fixed effects.

The second major contribution of the present study is that we explore the influence of economic downturns on career prospects of workers who suffer from poor mental health. We show that the 1990s Swedish recession, which resulted in an unprecedented shock to the labour market, magnified the adverse consequences of mental illness on unemployment outcomes. Suffering from adolescent mental health disorders prior to the recession resulted in disproportionately increased probability to end up in unemployment in the period following the shock compared to not having any experience of adolescent mental illness. Austerity measures implemented following the recession in Sweden (including changes in employment protection and support as well as unemployment policies) might explain the elevated risks of unemployment for vulnerable groups of workers.

Notably, those who had experienced symptoms of neurotic and alcohol-related conditions while young were the most vulnerable to unemployment exposure after the crisis. While workers with poor mental health have been shown to be at higher risk of unemployment following recessions (e.g. Egan et al. 2015; Evans Lacko et al. 2013), the present findings point to variations in the socio-economic costs of specific subtypes of mental illness, being likely to be exaggerated during periods of economic hardship.

Further, we uncover evidence that occupational status is a potential pathway linking adolescent mental health to subsequent exposure to unemployment. Workers who have been diagnosed with mental health disorders might self-select into low socio-economic status (Johnson et al. 1999), resulting in weak attachment to the labour market and exposure to hardships (Bartley and Owen 1996), such as unemployment. Adjusting for occupational status partly explains the link from adolescent psychiatric conditions to subsequent unemployment, pointing to the importance of selection of occupation as a mechanism driving the adverse impact of mental illness on employment success. Moreover, the present findings highlight intelligence as an important confounding factor of the relationship between poor mental health and unemployment. Given that intelligence is shown to predict economic success (e.g. Deary et al. 2005), cognitive dysfunctions due to depressive, adjustment, personality and substance abuse disorders (Triverdi 2006) may harm individual labour market trajectories, causing the negative impacts of adolescent mental ill health to compound over time. Future research is necessary to delineate the connections between cognitive ability, mental health and economic outcomes, by testing whether cognitive abilities mediate or confound the link from poor mental health to unemployment.

The present study faced one major limitation. Due to data constraints, we were not able to identify workers who were out of the labour force. Therefore, we examined the impact of adolescent mental health on subsequent unemployment as opposed to being employed and out of the labour force among Swedish male workers. Therefore, it is likely that we underestimated the true effects of adolescent psychiatric disorders to subsequent unemployment among workers who are actively participating in the labour market. Estimating the baseline specifications using a subsample which excludes disability-benefits recipients revealed that adolescent mental disorders indeed inflict greater harm on the employment prospects of active labour market participants. Given the generosity of the Swedish welfare state, mental illness is very likely to result in welfare dependence and labour inactivity (OECD 2013), calling for further research to delineate the links from poor pre-labour market mental health to a series of outcomes, including labour market dropout and unemployment.

Another limitation of the present study is that we were not able to control for the possibility that mental ill health of one sibling might also have an effect on later life outcomes for healthy siblings. Evidence suggest that growing up with an ill siblings is likely to have lingering negative effects on the psychological well-being of healthy siblings (e.g. Besier et al 2010; Fleary and Heffler 2013), which might in turn lead to adverse labour market outcomes. For example, the need to take care of a sibling with diagnosed mental health disorder might result in severe decline of family resources (e.g. parental time, effort, income, etc.) for healthy siblings which would have a negative impact on their development. On the other hand, there is evidence that having to grow up with an ill sibling might trigger the development of positive characteristics that can act as protective factors when having to cope with stressful later life events (Fleary and Heffler 2013). Further research is necessary to shed light upon the wider impact of mental health disorders within families.

In summary, we underscore the long-standing influence of psychiatric disorders diagnosed at late adolescence on employment outcomes of young workers through their lifelong trajectories in the labour market. Our findings point to the importance of mental health treatment programmes for young patients, which potentially entail substantial economic benefits by improving their future employment prospects. Importantly, cognitive skills and selection of occupation appeared to be possible pathways linking adolescent mental health to future unemployment. Therefore, mental health interventions should be focused on the improvement of cognitive development of patients, thus, further enhancing human capital accumulation, which could lead to career success.

5.7 Appendix

5.7.1 Section A: descriptive statistics by diagnostic category

Table 5A.1 Descriptive statistics by diagnostic category in the full sample [a]

	Any disorder	Depressive disorders	Neurotic disorders	Personality disorders	Alcohol-related disorders	Other substance use disorders
Unemployment days [b]	26.147	21.323	25.687	26.863	33.367	35.349
	(36.773)	(35.379)	(36.224)	(38.512)	(40.650)	(40.691)
Childhood SES						
Maternal SES [c]	3.357	3.601	3.383	3.306	3.090	3.227
	(1.434)	(1.404)	(1.471)	(1.320)	(1.234)	(1.452)
Physical health at conscription						
Height	178.05	178.4	178.1	177.4	177.6	177.7
	(6.574)	(6.414)	(6.552)	(6.616)	(6.343)	(6.276)
BMI	21.28	21.03	21.27	21.01	21.83	20.84
	(3.040)	(2.708)	(3.055)	(2.906)	(3.029)	(2.539)
Systolic blood pressure	127.1	126.4	127.1	127.0	127.7	125.8
	(10.91)	(11.23)	(10.88)	(11.16)	(10.89)	(10.71)
Diastolic blood pressure	69.91	71.18	70.01	71.22	70.82	68.98
	(9.473)	(9.394)	(9.404)	(9.195)	(9.655)	(9.527)
Muscle strength	1,987	1,963	1,989	1,948	2,051	1,977
	(329.0)	(314.51)	(329.6)	(329.8)	(319.9)	(311.0)
Cognitive ability at conscription						
Global IQ	4.185	4.806	4.257	4.000	3.462	4.076
	(2.038)	(2.066)	(2.042)	(2.042)	(1.707)	(1.896)
Own SES						
Educational achievement	3.213	3.519	3.264	3.037	2.644	3.015
	(1.293)	(1.477)	(1.309)	(1.279)	(0.904)	(1.138)
Occupational status	2.884	3.247	2.945	2.828 (1.799)	2.363	2.338
	(1.800)	(2.033)	(1.825)		(1.374)	(1.630)
Conscription information						
Age at conscription	18.889	18.975	18.874	18.980	19.319	19.309
	(1.082)	(0.911)	(1.072)	(0.987)	(1.348)	(1.236)

[a] Descriptive statistics before imputations of the missing values and standardisation of the variables are presented [b] Average number of days spent in unemployment during the period between 1992 and 2012 [c] Maternal occupational status (missing values replaced with paternal occupation status if available).

Table 5A.2 Descriptive statistics by diagnostic category in the siblings sample [a]

	Any disorder	Depressive disorders	Neurotic disorders	Personality disorders	Alcohol-related disorders	Other substance use disorders
Unemployment days [b]	27.055	20.864	26.775	27.751	34.632	36.417
	(37.068)	(33.815)	(36.617)	(38.940)	(40.689)	(41.244)
Childhood SES						
Maternal SES [c]	3.363	3.593	3.380	3.322	3.063	3.286
	(1.398)	(1.324)	(1.439)	(1.243)	(1.141)	(1.401)
Physical health at conscription						
Height	177.9	178.2	177.9	177.1	177.2	177.6
	(6.535)	(6.407)	(6.513)	(6.606)	(6.232)	(6.176)
BMI	21.287	21.036	21.24	21.05	21.89	20.85
	(3.032)	(2.796)	(3.016)	(3.005)	(3.090)	(2.518)
Systolic blood pressure	127.2	127.0	127.1	127.2	127.9	125.9
	(10.81)	(11.27)	(10.76)	(11.02)	(10.87)	(10.66)
Diastolic blood pressure	69.41	70.12	71.02	70.70	70.55	68.79
	(9.529)	(9.525)	(9.379)	(9.401)	(9.597)	(9.656)
Muscle strength	1,993	1,960	1,954	1,967	2,059	1,970
	(327.0)	(308.5)	(326.8)	(326.0)	(319.4)	(310.9)
Cognitive ability at conscription						
Global IQ	4.017	4.624	3.816	3.796	3.322	3.935
	(2.024)	(2.114)	(2.017)	(2.014)	(1.693)	(1.927)
Own SES						
Educational achievement	3.152	3.404 (1.392)	2.966	2.960	2.621	3.000
	(1.257)		(1.241)	(1.233)	(0.879)	(1.132)
Occupational status	2.792	3.071 (1.908)	2.752	2.688	2.285	2.293
	(1.716)		(1.723)	(1.711)	(1.317)	(1.564)
Conscription information						
Age at conscription	18.841	18.942	18.829	18.941	19.322	19.277
	(1.101)	(0.956)	(1.098)	(1.001)	(1.361)	(1.334)

[a] Descriptive statistics before imputations of the missing values and standardisation of the variables are presented [b] Average number of days spent in unemployment during the period between 1992 and 2012 [c] Maternal occupational status (missing values replaced with paternal occupation status if available)

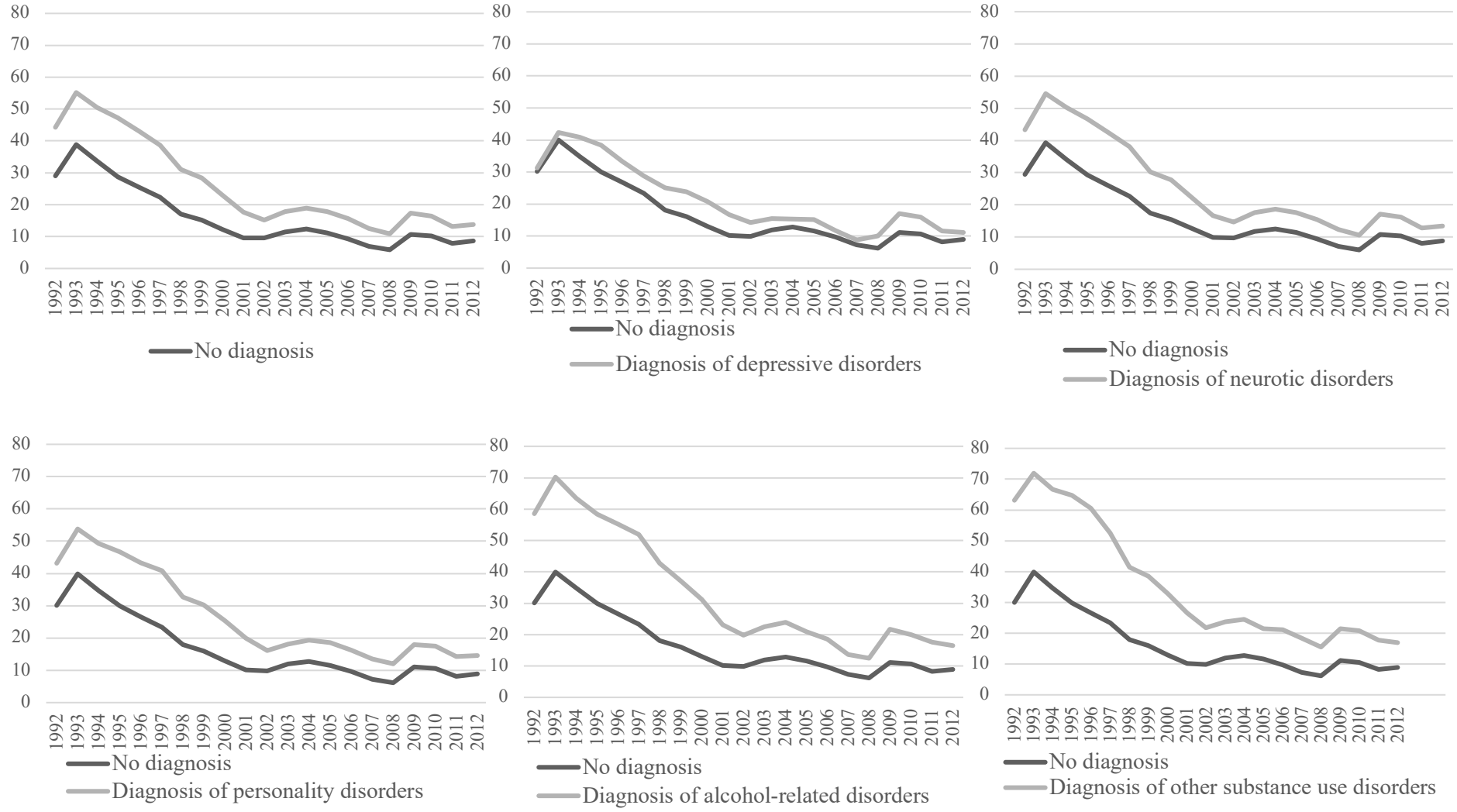


Figure 5A.1 Average number of unemployment days by diagnostic category (1992-2012)

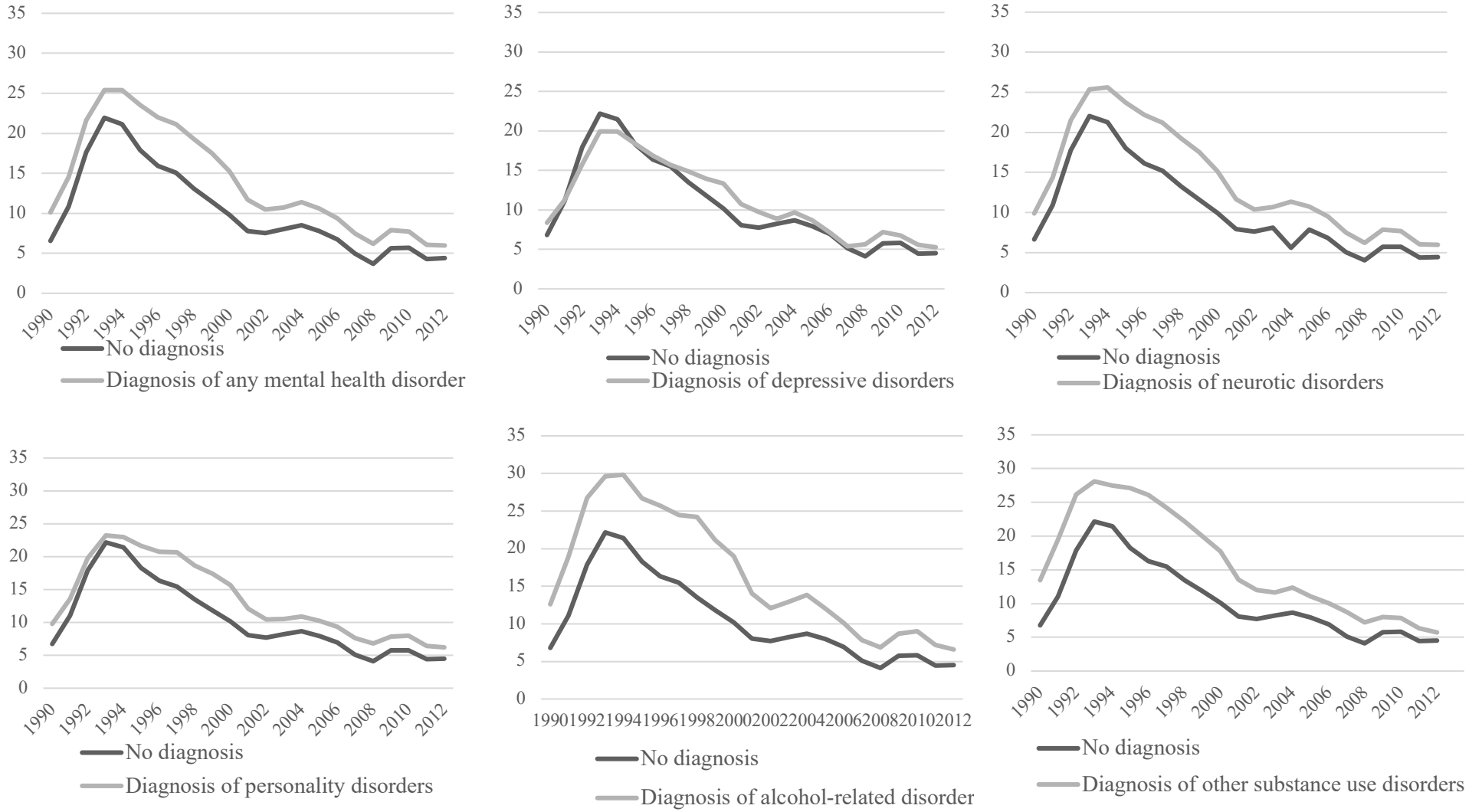


Figure 5A.2 Levels of unemployment by diagnostic category (1990-2012)

5.7.2 Section B: effects of intelligence on average number of unemployment days

Table 5B.1 Estimates of the effects intelligence on average unemployment days [a, b, c]

	Any mental disorder	Depressive	Neurotic & Adjustment	Personality	Alcohol-related	Other substance use
Full sample – OLS						
Diagnostic category	6.730***	4.110***	6.152***	6.951***	10.453***	12.078***
	(0.144)	(0.763)	(0.172)	(0.392)	(0.766)	(0.622)
Intelligence	-4.340***	-4.521***	-4.420***	-4.492***	-4.504***	-4.504***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Siblings sample – OLS						
Diagnostic category	7.094***	2.757***	6.604***	7.366***	11.062***	13.142***
	(0.228)	(1.212)	(0.274)	(0.634)	(1.198)	(0.999)
Intelligence	-4.525***	-4.728***	-4.612***	-4.697***	-4.708***	-4.708***
	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)
Siblings sample – FE						
Diagnostic category	3.566***	0.433	3.265***	3.646***	4.958***	6.871***
	(0.301)	(1.542)	(0.358)	(0.803)	(1.543)	(1.293)
Intelligence	-3.694***	-3.794***	-3.737***	-3.779***	-3.788***	-3.783***
	(0.089)	(0.089)	(0.089)	(0.089)	(0.089)	(0.089)

[a] Robust standard errors are included in parentheses: *** p<0.001, ** p<0.01, * p<0.05 [b] The full sample consists of 929,191 Swedish males and the siblings sample includes 407,100 Swedish males [c] Coefficients from estimation of full model are presented (specification 6)

5.7.3 Section C: negative binomial models

Table 5C.1 Negative binomial estimates of the effects of diagnoses on average unemployment days

	(1) [b]	(2) [b]	(3) [b]	(4) [b]	(5) [b]	(6) [b]
	Average number of unemployment days (1992-2012)					
Diagnostic Categories [b, c]	Conscription [d]	Childhood SES [e]	Physical health [f]	Cognitive ability [g]	Education [h]	Own SES [i]
Full sample						
Any mental disorder	9.323*** (0.106)	0.865*** (0.107)	8.382*** (0.110)	6.576*** (0.114)	6.628*** (0.115)	5.626*** (0.118)
Depressive	6.832*** (0.633)	6.693*** (0.643)	6.374*** (0.646)	6.158*** (0.683)	6.043*** (0.679)	5.162*** (0.740)
Neurotic & adjustment	8.287*** (0.126)	7.911*** (0.128)	7.442*** (0.130)	5.850*** (0.136)	3.904*** (0.137)	5.169*** (0.141)
Personality	10.632*** (0.263)	10.035*** (0.267)	9.439*** (0.270)	7.505*** (0.284)	7.525*** (0.282)	6.098*** (0.298)
Alcohol-related	13.127*** (0.414)	12.329*** (0.419)	11.899*** (0.426)	9.132*** (0.440)	9.308*** (0.437)	7.658*** (0.443)
Other substance use	13.497*** (0.322)	13.030*** (0.328)	12.402*** (0.334)	11.000*** (0.350)	10.755*** (0.347)	8.860*** (0.366)
Siblings sample						
Any mental disorder	9.668*** (0.162)	9.159*** (0.164)	8.623*** (0.167)	6.631*** (0.174)	6.747*** (0.175)	5.739*** (0.177)
Depressive	6.150*** (1.031)	5.659*** (1.049)	5.142** (1.046)	5.499** (1.145)	5.262** (1.121)	4.221* (1.211)
Neurotic & Adjustment	8.781*** (0.193)	8.369*** (0.197)	7.830*** (0.199)	6.024*** (0.208)	6.136*** (0.210)	5.371*** (0.212)
Personality	10.971*** (0.414)	10.199*** (0.418)	9.601*** (0.424)	7.423*** (0.440)	7.444*** (0.440)	5.890*** (0.442)
Alcohol-related	13.504*** (0.610)	12.478*** (0.614)	11.986*** (0.621)	9.208*** (0.647)	9.512*** (0.645)	8.001*** (0.646)
Other substance use	13.833*** (0.497)	13.335*** (0.502)	12.676*** (0.514)	11.132*** (0.540)	10.965*** (0.534)	9.319*** (0.560)

[b] Robust standard errors are included in parentheses: *** p<0.001, ** p<0.01, * p<0.05 [b] The full sample consists of 929,191Swedish males while 407,100 study subjects are in the siblings sample [c] Separate models were estimated for each diagnostic category [d] Conscription age, conscription year, conscription centre and county of residence controls are included [e] Controls for maternal socio-economic background are added [f] Controls for physical health (systolic blood pressure, diastolic blood pressure, bmi, height, muscle strength and exercise capacity) assessed at conscription are added [g] IQ results from tests at conscription are added. [h] Controls for highest educational qualification between 1990-2012 are added [i] Controls for own occupational status in 1990 are added.

5.7.4 Section D: restricted sample excluding study subjects who were older than 19 years old at conscription (robustness analysis)

Table 5D.1 Estimates of the effects of diagnoses on average unemployment days (full sample of study subjects aged 19 years old or younger at conscription)

	(1) [a]	(2) [a]	(3) [a]	(4) [a]	(5) [a]	(6) [a]
	Average number of unemployment days (1992-2012)					
Diagnostic Categories [b, c]	Conscription [d]	Childhood SES [e]	Physical health [f]	Cognitive ability [g]	Education [h]	Own SES [i]
OLS						
Any mental disorder	11.089*** (0.152)	10.443*** (0.151)	9.918*** (0.152)	7.572*** (0.151)	7.793*** (0.151)	6.695*** (0.149)
Depressive	7.173*** (0.808)	6.867*** (0.805)	6.405*** (0.805)	5.309*** (0.804)	5.341*** (0.799)	4.081*** (0.799)
Neurotic & adjustment	10.284*** (0.183)	9.676*** (0.182)	9.128*** (0.182)	6.950*** (0.182)	7.140*** (0.181)	6.277*** (0.178)
Personality	12.504*** (0.423)	11.739*** (0.422)	11.087*** (0.421)	8.404*** (0.420)	8.703*** (0.417)	6.981*** (0.413)
Alcohol-related	19.001*** (0.879)	17.798*** (0.879)	17.212*** (0.879)	13.280*** (0.880)	13.682*** (0.874)	11.415*** (0.869)
Other substance use	19.700*** (0.698)	18.742*** (0.697)	17.924*** (0.699)	15.376*** (0.699)	15.430*** (0.694)	12.653*** (0.693)

[a] Robust standard errors are included in parentheses: *** p<0.001, ** p<0.01, * p<0.05 [b] The sample consists of 907,243 Swedish males who were 19 years old or younger at conscription[c] Separate models were estimated for each diagnostic category [d] Controls for conscription age, conscription year, conscription centre and county of residence are added [e] Controls for maternal socio-economic background are added [f] Controls for physical health (systolic blood pressure, diastolic blood pressure, bmi, height, muscle strength and exercise capacity) assessed at conscription are added [g] IQ results from tests at conscription are added. [h] Controls for highest educational qualification between 1990-2012 are added [i] Controls for own occupational status in 1990 are added.

Table 5D.2 Estimates of the effects of diagnoses on average unemployment days (siblings sample of study subjects aged 19 years old or younger at conscription)

	(1) [a]	(2) [a]	(3) [a]	(4) [a]	(5) [a]	(6) [a]
	Average number of unemployment days (1992-2012)					
Diagnostic Categories [b, c]	Conscription [d]	Childhood SES [e]	Physical Health [f]	Cognitive Ability [g]	Education [h]	Own SES [i]
OLS						
Any mental disorder	11.678*** (0.241)	10.945*** (0.240)	10.380*** (0.241)	7.832*** (0.240)	8.105*** (0.239)	7.041*** (0.236)
Depressive	7.361*** (1.312)	6.971*** (1.303)	6.535*** (1.296)	5.226*** (1.309)	5.189*** (1.298)	3.854** (1.283)
Neurotic & adjustment	11.128*** (0.292)	10.420*** (0.291)	9.844*** (0.291)	7.429*** (0.290)	7.674*** (0.289)	6.802*** (0.284)
Personality	13.148*** (0.689)	12.229*** (0.686)	11.513*** (0.686)	8.557*** (0.684)	8.918*** (0.679)	7.354*** (0.669)
Alcohol-related	19.994*** (1.364)	18.495*** (1.362)	17.829*** (1.360)	13.769*** (1.362)	14.259*** (1.352)	11.860*** (1.351)
Other substance use	20.202*** (1.117)	19.360*** (1.111)	18.454*** (1.115)	15.614*** (1.114)	15.721*** (1.107)	12.985*** (1.105)
Sibling FE						
Any mental disorder	5.017*** (0.317)	5.016*** (0.317)	4.785*** (0.318)	3.688*** (0.318)	3.866*** (0.316)	3.423*** (0.314)
Depressive	2.551 (1.667)	2.558 (1.667)	2.263 (1.669)	1.575 (1.681)	1.524 (1.661)	1.026 (1.650)
Neurotic & adjustment	4.672*** (0.381)	4.668*** (0.381)	4.441*** (0.381)	3.420*** (0.381)	3.584*** (0.379)	3.252*** (0.375)
Personality	5.408*** (0.870)	5.416*** (0.870)	5.216*** (0.870)	4.054*** (0.869)	4.314*** (0.864)	3.726*** (0.857)
Alcohol-related	7.696*** (1.806)	7.701*** (1.806)	7.466*** (1.801)	6.181*** (1.801)	6.493*** (1.792)	5.671** (1.774)
Other substance use	9.420*** (1.449)	9.420*** (1.449)	9.078*** (1.449)	7.909*** (1.449)	8.030*** (1.437)	6.543*** (1.427)

[a] Robust standard errors clustered at the family level are included in parentheses: *** p<0.001, ** p<0.01, * p<0.05
[b] The sample consists of 398,389 Swedish male siblings who were 19 years old or younger at conscription [c] Separate models were estimated for each diagnostic category [d] Conscription age, conscription year, conscription centre and county of residence controls are included [e] Controls for maternal socio-economic background are added [f] Controls for physical health (systolic blood pressure, diastolic blood pressure, bmi, height, muscle strength and exercise capacity) assessed at conscription are added [g] IQ results from tests at conscription are added. [h] Controls for highest educational qualification between 1990-2012 are added [i] Controls for own occupational status in 1990 are added.

Table 5D.3 DiD estimates of the effects of diagnoses on unemployment probability before and after the 1990s crisis (samples of study subjects aged 19 years old or younger at conscription) [a, b]

	Full Sample			Sibling Sample		
Disorder Diagnoses	Pre-Crisis [d]	Post-Crisis	DiD [c]	Pre-Crisis	Post-Crisis	DiD
Any mental	0.029*** (0.001)	0.043*** (0.001)	0.015*** (0.001)	0.029*** (0.002)	0.046*** (0.001)	0.017*** (0.002)
Depressive	0.033*** (0.005)	0.017*** (0.004)	-0.017 (0.006)	0.024*** (0.008)	0.017*** (0.007)	-0.007 (0.010)
Neurotic/ adjustment	0.028*** (0.001)	0.045*** (0.001)	0.017*** (0.002)	0.028*** (0.002)	0.049*** (0.002)	0.021*** (0.002)
Personality	0.031*** (0.002)	0.034*** (0.002)	0.003 (0.003)	0.033*** (0.004)	0.037*** (0.003)	0.005 (0.005)
Alcohol-related	0.050*** (0.005)	0.072*** (0.004)	0.022*** (0.007)	0.051*** (0.009)	0.075*** (0.007)	0.024*** (0.011)
Other substance use	0.057*** (0.004)	0.061*** (0.003)	0.004 (0.006)	0.064*** (0.007)	0.047*** (0.005)	-0.017 (0.009)
N	907,246	907,246	907,246	398,390	398,390	398,390
Person-year obs	1,809,829	4,512,297	6,322,126	795,004	1,982,053	2,777,057

[a] All reported marginal effects are calculated based on the estimation of dif-in-dif linear probability models including the following controls: parental socio-economic background during childhood; own socio-economic background in 1990; highest educational achievement; health measures at conscription (systolic & diastolic blood pressure, height, bmi, muscle strength); global IQ at conscription; age at conscription, conscription year and centre, county of residence. [b] Swedish males who underwent conscription examinations before 1990 are included in both estimation samples to rule out any possibility that the forthcoming crisis would affect study subjects' mental health at conscription [c] The difference in marginal effects of mental illness on unemployment between those with and without mental conditions diagnosis before and after the crisis is the DiD coefficient, or the estimated impact of the interaction between the crisis indicator and the mental diagnosis indicator. [d] Crisis indicator (0=1990 & 1991, 1=1993-97) [e] Robust standard errors, clustered at the individual level, are in parentheses: *** p<0.001, ** p<0.01, * p<0.05 * total no of person year observations: 6,474,435

5.7.5 Section E: restricted sample excluding study subjects who received disability benefits between 1990 and 2012 (robustness analysis).

Table 5E.1 Estimates of the effects of diagnoses on average unemployment days (restricted full sample)

	(1) [a]	(2) [a]	(3) [a]	(4) [a]	(5) [a]	(6) [a]
	Average number of unemployment days (1992-2012)					
Diagnostic Categories [b, c]	Conscription [d]	Childhood SES [e]	Physical health [f]	Cognitive ability [g]	Education [h]	Own SES [i]
OLS						
Any mental disorder	11.988*** (0.166)	11.398*** (0.165)	10.692*** (0.166)	8.498*** (0.165)	8.694*** (0.164)	7.808*** (0.160)
Depressive	7.843*** (0.911)	7.649*** (0.909)	7.077*** (0.907)	6.130*** (0.901)	6.227*** (0.895)	5.522*** (0.882)
Neurotic & adjustment	10.891*** (0.198)	10.321*** (0.198)	9.601*** (0.198)	7.567*** (0.196)	7.747*** (0.196)	7.031*** (0.191)
Personality	13.872*** (0.486)	13.223*** (0.485)	12.354*** (0.483)	9.913*** (0.480)	10.153*** (0.478)	8.826*** (0.466)
Alcohol-related	21.431*** (0.982)	20.353*** (0.982)	19.456*** (0.979)	15.670*** (0.978)	16.006*** (0.973)	14.212*** (0.953)
Other substance use	23.336*** (0.797)	22.585*** (0.796)	21.271*** (0.797)	19.007*** (0.794)	18.995*** (0.790)	16.668*** (0.777)

[a] Robust standard errors are included in parentheses: *** p<0.001, ** p<0.01, * p<0.05 [b] The sample consists of 861,189 Swedish males [c] Separate models were estimated for each diagnostic category [d] Conscription age, conscription year, conscription centre and county of residence controls are included [e] Controls for maternal socio-economic background are added [f] Controls for physical health (systolic blood pressure, diastolic blood pressure, bmi, height, muscle strength and exercise capacity) assessed at conscription are added [g] IQ results from tests at conscription are added. [h] Controls for highest educational qualification between 1990-2012 are added [i] Controls for own occupational status in 1990 are added.

Table 5E.2 Estimates of the effects of diagnoses on average unemployment days (restricted siblings sample)

	(1) [a]	(2) [a]	(3) [a]	(4) [a]	(5) [a]	(6) [a]
	Average number of unemployment days (1992-2012)					
Diagnostic Categories [b, c]	Conscription [d]	Childhood SES [e]	Physical Health [f]	Cognitive Ability [g]	Education [h]	Own SES [i]
OLS						
Any mental disorder	12.430*** (0.259)	11.757*** (0.258)	11.030*** (0.258)	8.641*** (0.257)	8.891*** (0.256)	8.026*** (0.250)
Depressive	6.361*** (1.428)	6.049*** (1.419)	5.489*** (1.413)	4.272** (1.421)	4.277** (1.412)	3.496* (1.380)
Neurotic & adjustment	11.580*** (0.313)	10.902*** (0.312)	10.161*** (0.312)	7.889*** (0.309)	8.113*** (0.308)	7.388*** (0.302)
Personality	13.952*** (0.779)	13.245*** (0.776)	12.283*** (0.774)	9.662*** (0.771)	9.997*** (0.766)	8.838*** (0.743)
Alcohol-related	22.698*** (1.501)	21.418*** (1.502)	20.578*** (1.498)	16.746*** (1.497)	17.187*** (1.490)	15.233*** (1.463)
Other substance use	24.343*** (1.248)	23.651*** (1.245)	22.310*** (1.247)	19.823*** (1.243)	19.883*** (1.236)	17.600*** (1.215)
Sibling FE						
Any mental disorder	6.120*** (0.346)	6.118*** (0.346)	5.750*** (0.347)	4.698*** (0.346)	4.831*** (0.345)	4.433*** (0.340)
Depressive	1.844 (1.875)	1.851 (1.876)	1.438 (1.879)	0.771 (1.886)	0.746 (1.871)	0.390 (1.850)
Neurotic & adjustment	5.355*** (0.414)	5.352*** (0.414)	4.996*** (0.414)	4.011*** (0.413)	4.143*** (0.411)	3.798*** (0.406)
Personality	7.036*** (0.993)	7.038*** (0.993)	6.701*** (0.993)	5.621*** (0.990)	5.814*** (0.984)	5.396*** (0.965)
Alcohol-related	11.045*** (2.061)	11.045*** (2.060)	10.708*** (2.053)	9.581*** (2.047)	9.820*** (2.043)	9.002*** (2.006)
Other substance use	13.665*** (1.681)	13.662*** (1.682)	12.974*** (1.680)	11.842*** (1.677)	11.879*** (1.663)	10.627*** (1.634)

[a] Robust standard errors clustered at the family level are included in parentheses: *** p<0.001, ** p<0.01, * p<0.05 [b] The sample consists of 379,914 Swedish male siblings [c] Separate models were estimated for each diagnostic category [d] Conscription age, conscription year, conscription centre and county of residence controls are included [e] Controls for maternal socio-economic background are added [f] Controls for physical health (systolic blood pressure, diastolic blood pressure, bmi, height, muscle strength and exercise capacity) assessed at conscription are added [g] IQ results from tests at conscription are added. [h] Controls for highest educational qualification between 1990-2012 are added [i] Controls for own occupational status in 1990 are added.

Table 5E.3 DiD estimates of the effects of diagnoses on unemployment probability before and after the 1990s crisis (restricted sample) [a, b]

Disorder Diagnoses	Full Sample			Sibling Sample		
	Pre-Crisis [d]	Post-Crisis	DiD [c]	Pre-Crisis	Post-Crisis	DiD
Any mental	0.030*** (0.001)	0.053*** (0.001)	0.023*** (0.001)	0.031*** (0.002)	0.055*** (0.001)	0.024*** (0.002)
Depressive	0.028*** (0.001)	0.035*** (0.004)	-0.005 (0.006)	0.024*** (0.008)	0.017*** (0.007)	-0.007 (0.010)
Neurotic/ adjustment	0.028*** (0.001)	0.052*** (0.001)	0.025*** (0.001)	0.027*** (0.002)	0.055*** (0.002)	0.028*** (0.002)
Personality	0.034*** (0.002)	0.051*** (0.002)	0.016*** (0.003)	0.036*** (0.004)	0.049*** (0.003)	0.014*** (0.005)
Alcohol-related	0.050*** (0.005)	0.083*** (0.004)	0.033*** (0.006)	0.051*** (0.008)	0.087*** (0.006)	0.036*** (0.010)
Other substance use	0.056*** (0.004)	0.077*** (0.003)	0.021*** (0.005)	0.067*** (0.007)	0.072*** (0.005)	0.005 (0.009)
N	923,246	923,246	923,246	395,397	395,397	395,397
Person-year obs	1,839,390	4,549,352	6,388,742	807,160	1,997,855	2,805,015

[a] All reported marginal effects are calculated based on the estimation of dif-in-dif linear probability models including the following controls: parental socio-economic background during childhood; own socio-economic background in 1990; highest educational achievement; health measures at conscription (systolic & diastolic blood pressure, height, bmi, muscle strength); global IQ at conscription; age at conscription, conscription year and centre, county of residence. [b] Swedish males who underwent conscription examinations before 1990 are included in both estimation samples to rule out any possibility that the forthcoming crisis would affect study subjects' mental health at conscription [c] The difference in marginal effects of mental illness on unemployment between those with and without mental conditions diagnosis before and after the crisis is the DiD coefficient, or the estimated impact of the interaction between the crisis indicator and the mental diagnosis indicator. [d] Crisis indicator (0=1990 & 1991, 1=1993-97) [e] Robust standard errors, clustered at the individual level, are in parentheses: *** $p<0.001$, ** $p<0.01$, * $p<0.05$ * total no of person year observations: 6,474,435

Chapter 6. Conclusions and discussion

The purpose of the present thesis was to explore the complex relationships between psychological well-being and unfavourable labour market experiences. We uncovered robust evidence that going through adversities such as hours-underemployment and unemployment has damaging effects on psychological well-being both contemporarily and in the long-run. Moreover, we showed that suffering from poor psychological health prior to labour market entry predicts self-selection into unemployment. In this chapter, we summarise the main findings, highlight the contributions of the present work to existing literature and discuss the limitations of the study. Finally, we discuss the implications of the findings for policies aiming to improve both workers' psychological well-being and their careers and provide suggestions for future research.

6.1 Summary

6.1.1 Findings and contributions

Each chapter presents empirical research aiming to examine a unique aspect of the intricate links between psychological well-being and labour market outcomes. Chapter 3 studies the impact of prolonged time spent in unemployment through lifelong trajectories in the labour market on various components of psychological well-being; namely, quality of life, psychological distress and life satisfaction. Using a cross-country sample drawn from SHARE, multi-level models linking past unemployment to contemporary well-being were estimated across 14 European countries. Each past spell of unemployment which lasted six months or longer predicted a 0.017 SD reduction in self-reported quality of life and a 0.014 SD reduction in satisfaction with life after age 50. Adjusting for various individual socio-economic characteristics did not fully explain the impact of past unemployment on contemporary psychological well-being. Notably, accounting for the influence of country-specific unemployment benefits duration and generosity and labour market conditions reflected in national unemployment rates appeared to slightly influence the cross-country variability in the psychological scarring effect of unemployment. This finding suggests that country-specific institutional characteristics are potential moderators of unemployment scarring. This is the first longitudinal, comparative study of the long-term psychological effects of past unemployment across countries. It contributes to existing literature, which examines the contemporary psychological impact of past unemployment (e.g. Clark et al. 2001; Daly and Delaney 2013; Knabe and Rätzel 2011; Lucas et al. 2004; Strandh et al. 2014; Wadsworth et al. 1999) by uncovering evidence that the psychological scarring effect of unemployment occurs both within and across Western countries. Moreover, it adds to the

literature examining the detrimental psychological effects of unemployment across countries (e.g Gallie 2000; Whelan and McGinnity 2000; Wulfgramm 2014) by focusing on unemployment scarring in a cross-national setting.

Chapter 4 further explores the links from unfavourable employment outcomes to psychological health. This chapter focuses on the impact of hours-underemployment on psychological distress among British workers. ILO's (1998) definition of hours-underemployment was adopted, taking into consideration both weekly working hours and workers' preferences regarding their working hours. Specifically, hours-underemployment was defined as working less than a UK specific number of hours per week (i.e. 30 hours), while preferring to work more hours. First, the 42-sweep of the NCDS cohort was used to observe the contemporaneous impact of hours-underemployment on psychological health. The analysis was based on a sample of full-time and hours-underemployed workers who were similar in their socio-economic characteristics predicting both selection into underemployment and poor psychological health, which was constructed using propensity score matching. In this matched sample, working below than 30 hours per week in the UK context while preferring to work longer hours was shown to predict a 0.25 SD increase in self-reported levels of psychological distress.

Second, the links from transitions between full-time employment and hours-underemployment to variations in psychological health were examined during the period between 1991 and 2009. Using evidence of changes in psychological well-being following individual transitions between hours-underemployment and full-time employment recorded annually over 18 consecutive years allows for tracing out the underlying potentially long-term link from hours-underemployment to reduced well-being in the population of workers in the UK.

Models of changes in psychological distress, being presented as a function of employment transitions, were estimated using individual fixed effects to adjust for unobserved heterogeneity. Moving from a full-time to a part-time job while desiring to work more hours was found to predict a 0.18 SD positive change in psychological distress among British workers who participated in the BHPS. Further, switching from hours-underemployment to full-time employment was shown to decrease distress levels by 0.16 SD. Alternative combinations of working hours and individual preferences were tested in both the NCDS and BHPS samples to examine whether number of weekly working hours or workers' preferences about their working time drive the observed results. This study contributes to prior work (e.g. Bardasi and Fransesconi 2004; Rodriguez 2002; Wunder and Heineck 2013), by revealing that part-time workers who are not satisfied with their working hours are

potentially exposed the most to the damaging psychological effects of disparities between actual and ideal working time and weekly working hours.

Finally, in chapter 5, the reverse direction of the relationships between employment adversities and psychological well-being was analysed. Specifically, the long-term impact of psychological health prior to labour market entry on subsequent unemployment was investigated over long time intervals. The labour market trajectories of a sample of Swedish workers, which was drawn from almost the whole population of men who were enlisted in the Swedish army in the period between 1969 and 1989, were observed from 1990 up to 2012. While prior studies have mainly focused on the links between self-reported assessments of pre-labour market mental health and adult outcomes (e.g. Egan et al. 2015; Currie et al. 2010; Delaney and Smith 2012; Goodman et al. 2011; Trzesniewski 2006), chapter 5 examines the impact of objective diagnoses of specific subtypes of adolescent mental health disorders on subsequent unemployment. Additionally, chapter 5 adds to the small literature exploring the relationship between specific conditions at early life (Fergusson et al., 2007; Jayakody et al., 1998; Lundborg et al., 2014) and employment prospects by explicitly considering exposure to unemployment over long time intervals as an outcome of mental health disorders diagnosed in adolescence. Namely, suffering from psychiatric conditions, such as depressive, personality, neurotic, alcohol and substance use- related disorders, before entry in the labour market was found to predict 6.7 more unemployment days per year, after adjusting for childhood socio-economic status and cognitive ability. Moreover, controlling for siblings fixed effects did not offset the impact of adolescent mental disorders on future unemployment, suggesting that suffering from poor mental health has a direct effect on employment prospects, which is not explained by family conditions during childhood. Interestingly, suffering from neurotic and adjustment disorders was identified as an important predictor of worsened employment outcomes. Further, adolescent dependence on alcohol and other substances appeared to inflict the greatest harm on individual careers.

Additionally, the impact of the early1990s Swedish labour market shock on the associations between adolescent mental health and adult unemployment was examined. The differences in the impacts of adolescent mental health disorders before and after the recession were estimated using difference-in-differences models. It was revealed that the recession magnified exposure to unemployment for those who had been diagnosed with any type of mental illness prior to the recession by 1.4 (1.6) percentage points in the full (siblings) sample. Those who were harmed the most by the economic downturn were the groups suffering from neurotic and adjustment conditions and alcohol-related disorders. Namely, those with neurotic disorders faced a 2.1 pp higher probability of unemployment in the period following the crisis. Moreover, those who were alcohol-dependent at around age 18 were disproportionately affected by the crisis, facing a 1.9pp rise in the risk of unemployment.

Thus far, recessions have been shown to worsen the employment prospects of workers who suffer from poor mental health, with prior work mainly focusing on the influence of labour market shocks on the effects of general assessments of mental health on individual careers (e.g. Egan et al., 2015; Evans Lacko et al., 2013). Therefore, the major contribution of the present study is that it examined the variations in the unemployment effects of poor mental health during economic downturns by specific subtypes of mental disorders, highlighting the importance of distinguishing between the contributions of specific subtypes of mental disorders to subsequent unemployment.

6.1.2 Limitations

The present thesis faced three main limitations. First, the analyses were constrained by survey data either reflecting outdated employment experiences or comprising self-reported information on employment events and evaluations of psychological well-being. For example, chapter 3 relied on self-reported historical data to measure past unemployment. SHARE respondents were asked to report their employment experiences in each year from their entry in the labour market, spanning from the early 1950s to 2009 when the SHARE retrospective wave was conducted. As the interval between the time of the survey and the events they recalled was very long, the accuracy of their responses is likely to be questionable (Hassan 2006). Additionally, recollections of memories of past unemployment have been shown to be subject to recall errors (e.g. Mathiowetz and Ouncan 1982). Moreover, unemployment policies (see, for example, Carr and Chung 2014; Cylus et al. 2014) and other factors that are shown to mitigate the psychological effect of unemployment (such as support from family networks which is shown to moderate and protect from psychological health problems (e.g. Burgha et al. 2005)) are likely to impact on memories of past experiences of unemployment. For example, we cannot eliminate the possibility that workers who had received training as part of participating in an Active Labour Market Programme while being unemployed in the past might remember this period as a preparatory stage before employment rather than as an unemployment spell per se. Moreover, workers might not interpret a period of not working but receiving economic support as well as potential prospects of job access through family and friends networks (O'Regan and Quigley 1993) as going through unemployment. Therefore, it is possible that only a fraction of respondents' actual unemployment experiences was observed potentially leading to underestimation of the true effects of past unemployment on contemporary psychological well-being. It is also likely that the effect of getting support by social networks on interpreting past spells of unemployment mitigates the impact of country-specific employment policies in the cross-country sample. For example, the important role of family

networks in social life in Italy might explain why the impact of unemployment is weak in this subsample. Even though unemployment policies might be less developed in Italy compared to other countries in the sample, individual experiences of unemployment are not found to be worse in terms of their psychological consequences there potentially because of extended social support networks.

Chapter 4 used self-reported data on experiences of full-time employment and hours-underemployment reported in 2000. Moreover, transitions between full-time employment and hours-underemployment were documented in the period between 1991 and 2009. Observing experiences of older types of hours-underemployment and psychological well-being might reveal intertemporal negative links between working less hours than a specific threshold while preferring to work more hours and psychological health. However, data limitations did not allow for the examination of the psychological repercussions of contemporary experiences of hours-underemployment, such as zero-hours contracts. Further, it has been shown that self-reported economic variables may be subject to memory bias even in prospective panels (Bound et al. 2001). However, BHPS and NCDS participants were asked to report their contemporary employment state and their preferences regarding their weekly working hours in each wave. Therefore, recall bias is minimised and thus, self-reporting of employment events is unlikely to result in serious underreporting of hours-underemployment in this case.

Measures of the outcomes of interest in both chapters 3 and 4 were constructed using self-assessments of psychological well-being, and thus, they are subject to measurement error. Individual evaluations of emotional well-being and psychological health appear to be prone to bias, as people tend to overestimate emotional intensity and underestimate positive affect even over short recall periods (for example, 3 weeks prior to time of reporting) (Thomas and Diener 1990. To address this issue, we used measures which either employed various response categories (Andrews and McKennell 1980) or comprised various questions aiming to capture several dimensions of well-being (OECD 2013). For example, in chapter 3, the life satisfaction variable presented cognitive evaluations of well-being ranging from 0 to 10. In the same chapter, measures of life quality consisted of various questions on different domains, including control over life, sense of autonomy, self-realisation and pleasure. In line with the above, we measured psychological distress using 12 GHQ items, detecting various symptoms related to common affective disorders and social dysfunction.

Second, data limitations did not allow for the distinction between employed individuals and those who were out of the labour force in chapter 5.While registry data and objective diagnoses of mental health disorders minimise self-report bias and measurement error, the long-term unemployment impact of adolescent mental health among economically active

populations might have been underestimated. To test if this was the case, the analysis was replicated using a subsample excluding workers who were receiving disability pensions and benefits. Expectedly, the unemployment effects of mental health at age 18 were magnified after excluding a fraction of workers who might have been out of the labour market.

Third, while robust associations between employment hardship and poor psychological well-being were identified, causal relationships between hours-underemployment and unemployment and psychological well-being were not established. As discussed elsewhere in this thesis, psychological well-being and employment outcomes are likely to develop mutually, resulting in potential self-selection of workers who suffer from psychological problems into labour market hardship. Chapter 3 adjusted for a wide set of socio-economic confounders which could predict both poor psychological well-being and employment adversities, such as childhood and adult socio-economic status, mental health at young age and cognitive ability. In chapter 4, full-time employed workers were matched with hours-underemployed workers who were similar in their demographic characteristics. Propensity score matching was adopted to create a sample, which resembled a random sample consisting of workers with the same probability to end up in hours-underemployment. Moreover, the links between employment transitions and variations in psychological distress were estimated using individual fixed effects to capture unobserved individual traits, which may predict switches between full-time employment and hours-underemployment. Adjusting for factors, which may confound the relationships under study, reduced the magnitude of the observed effects but did not fully account for the impacts of unfavourable employment outcomes on psychological well-being in all cases. Finally, chapter 5 examined the unemployment impacts of mental disorders diagnosed in adolescence, when the majority of Swedish males are not likely to have already entered the labour market. Therefore, the possibility that labour market experiences had already shaped study subjects' psychological health is minimised.

6.2 Policy implications

The present thesis reveals evidence that adverse experiences in the labour market, including unemployment and hours-underemployment, and workers psychological well-being are jointly determined. Going through spells of unemployment and hours-underemployment in shown to predict reduced psychological well-being while damaged psychological well-being is shown to predict negative labour market outcomes for workers. Taken together, these findings are in agreement with prior work highlighting the high economic costs of poor psychological health for workers (e.g. OECD 2015).

6.2.1 Implications for policy implementation and appraisal

As psychological health appears to be an important determinant of labour supply, policy makers should explicitly take into consideration the effects of planned policies on workers psychological well-being. Subjective well-being and psychological health of workers should be accounted for in the analysis of wider costs and benefits from different decisions.

For example, the policy decision between fiscal expansion and austerity measures as a response to an economic downturn should consider among other things the impact that the implemented policy is expected to have on workers' psychological health. While austerity measures such as reductions in unemployment benefits or a freeze in active labour market policies can be considered as an appropriate way to reduce government spending, such changes can have damaging psychological effects that persist throughout workers' trajectories in the labour market. Therefore, such measures can lead to a long-term increase in wider mental health costs leading to outcomes that are different than expected.

6.2.2 Recommendations for the design of short-term interventions

We suggest that policy aiming to reduce such costs should follow two directions: i) short-term interventions aiming to protect workers from the psychological damage caused by unemployment and hours-underemployment and, ii) long-term programmes targeting psychological health before labour market entry. The complex relationships between psychological well-being and unfavourable labour market outcomes require a multidimensional approach to policy intervening broadly in the pathways linking career prospects to psychological well-being. To ameliorate well-being losses due to adversities in the labour market and prevent workers with psychological problems from self-selecting into employment hardship, both short-term and long-term interventions should be implemented. Short-term, protective interventions should be centred on training and preparing unemployed and underemployed workers for regular employment, thus, boosting their well-being. On the other hand, long-term, preventive interventions should focus on treating psychological disorders being manifested early in workers' lives and enhancing individual human capital and psychological health prior to labour market entry.

Declines in the psychological well-being of the unemployed have been shown to impact negatively on job-search behaviour through damaging coping mechanisms and causing discouragement (e.g. Korpi 1997; Waters and Moore 2002). Therefore, training and job search programmes aiming to offer to unemployed and underemployed workers ways back to regular employment should also compensate for well-being losses due to employment difficulties. Even though active labour market programmes (ALMPs) do not explicitly target

unemployed workers' psychological health, prior research has shown that ALMP participants exhibit higher levels of subjective well-being compared to those being in open unemployment (e.g. Andersen 2008; Korpi 1997; Strandh 2001; Wulfgramm 2011). For example, Wulfgramm (2011) showed that participants of the One-Euro-Job activation programme in Germany demonstrated higher levels of life satisfaction as opposed to workers who did not receive any assistance in finding a job. Moreover, there is evidence in the literature that participation in occupation schemes and training programmes alleviates the psychological burden of unemployment both within Western countries over time and across countries (Wulfgramm 2014). Moreover, it is argued that the mechanisms driving the impact of ALMPs on well-being are both pecuniary and non-pecuniary. Despite not substituting for regular employment, ALMPs serve important psychosocial functions, such as social interactions, time structure and engaging in meaningful activities (e.g. Wulfgramm 2011). Additionally, activation programmes have been shown to improve unemployed workers' well-being through protecting them from stigmatisation and enhancing their social status (Wulfgramm 2014).

Based on this evidence, active labour market policies should explicitly take into consideration the potential added value of prioritising the promotion of participants' well-being. For example, a study by Caplan et al. (1989) highlights the merits of an experimental activation scheme, explicitly setting mental health and coping mechanisms of the participants as primary outcomes of the intervention. They showed that the combination of engendering skills, enhancing motivation and self-efficacy and providing social support led to both increased probability of re-employment and higher quality of re-employment. Further, participants exhibited lower levels of depression and anxiety and higher self-esteem in the post-intervention period. Likewise, a Finnish job-search programme, which explicitly targeted participants' self-confidence, resulted in increased probabilities of maintaining high-quality employment and reduced depression symptoms during 2 years of follow-up (Vuori and Silvonen 2005). In line with these findings, a recent meta-analytic review indicated that job-search and training schemes are more effective in motivating workers to regain employment when they take steps to enhance participants' well-being, such as promoting self-confidence and emphasising social support (Liu et al. 2014). Based on this evidence, short-term interventions, such as training and job-search programmes, aiming to alleviate the psychological burden of unemployment and assist unemployed workers in obtaining regular employment, should focus on both skills developments and well-being enhancement.

Further, hours-underemployment, being a prevalent type of economically inadequate employment, has been shown to resemble more to unemployment rather than regular employment in terms of its psychological repercussions (Dooley 2003). Therefore, job-search interventions are likely to be beneficial for hours-underemployed workers as well. Being

unsatisfied with their employment state and experiencing high levels of psychological distress, underemployed workers should benefit from interventions designed to enhance their skills and motivation to engage in fruitful job search activities. The adaption of ALMPs to the specific job-seeking needs of underemployed workers potentially entails various merits, including enhancement of their psychological well-being, higher probability of obtaining regular employment and thus, reductions in the socio-economic costs of poor mental health due to underemployment.

6.2.3 Recommendations for the design of long-term prevention programmes

Besides short-term interventions aiming to assist workers who face employment adversities, long-term preventative programmes should be implemented to enhance human capital and psychological health of workers who are at risk of mental ill-health prior to their entry in the market. Our findings explicitly underscore the connections between poor psychological health and future labour market failures, implying that prevention of psychological problems during childhood and adolescence might entail lifelong economic benefits. Therefore, the focus of early-intervention programmes aiming to improve participants' lifelong economic outcomes should be twofold: i) promoting positive psychological health at young age and ii) treating mental illness prior to labour market entry. Recently, there has been a shift towards the development of interventions aiming to protect children and adolescents from high-risk behaviours and prevent psychological morbidity (e.g. Catalano et al. 2012; Fazel et al. 2014). A recent review of 48 meta-analyses on early-life interventions has shown that both mental illness prevention and positive psychological health promotion programmes had small but long lasting effects on depression, anxiety, anti-social behaviour and substance use. Moreover, it was shown that children, youths and young adults who were at greater risk of suffering from psychological issues received more benefits from the programmes compared to lower-risk groups (Sandler et al. 2014). Additionally, it is suggested that the development of soft, emotional and social, skills which are essential for positive labour market outcomes; for example, resilience, achievement motivation, control, teamwork and confidence; is effectively addressed by interventions at school, long before labour market entry (Guerra et al. 2014).

We have also uncovered evidence that cognitive skills are potential moderators of the connections between poor adolescent mental health and future employment hardship. Therefore, early life interventions should potentially benefit from setting the development of cognitive skills as a target. For example, Kautz et al. (2014) showed that investing on fostering cognitive skills during childhood predicts positive adult outcomes, such as college completion and career success. Moreover, they found that the younger the target group the most effective the intervention, with programmes aiming to enhance cognitive skills at

elementary school or kindergarten having more long-lasting impacts on adult outcomes compared to interventions in adolescence. Taken together, evidence on the associations between poor psychological health and cognitive deficits (e.g. Austin et al. 2001; Rock et al. 2014) and findings suggesting that early intervention programmes targeting cognitive skills result in adult achievements (e.g. Heckman 2006) point to the need for multifaceted programmes targeting both psychological health and skills formation.

6.3 Future research

The current thesis has presented empirical evidence of the long-term connections between unfavourable employment outcomes, such as unemployment and hours-underemployment, and poor psychological well-being. As discussed previously, the findings are not free from limitations, chiefly stemming from constraints imposed by the datasets we used and the statistical methods we adopted. This section discusses directions for future research arising from the limitations we have identified.

One potential direction for future research on the links from employment hardship to poor well-being would be the use of objective and updated data regarding employment experiences and psychological health. Replication of the present findings using registry data on labour market experiences and clinical assessments of psychological health would further establish the observed associations. While acquiring such data is itself an ambitious project, adjusting for measurement error is important for identifying the actual impact of labour market adversities on well-being. For example, using registry data on individual employment trajectories and objective diagnoses of mental health disorders in chapter 5 contributed in the identification of pre-labour market mental health as an important determinant of future employment prospects. Likewise, objective observations of unemployment and hours-underemployment and psychological well-being would further contribute in the exploration of individual emotional responses to employment experiences.

Even though the contemporaneous and short-term psychological impacts of unemployment have been well documented thus far (Wanberg 2012), the majority of recent studies use data from mid-2000s not allowing for the analysis of the impacts of contemporary unemployment experiences on workers' psychological health and well-being. For example, while there are studies delineating various detrimental outcomes of the recent economic crisis (e.g. Karanikolos et al. 2013), the well-being repercussions of prolonged unemployment have not been studied extensively in the context of the recent crisis. A recent study, which examined the relationships between unemployment and depression before and after the financial crisis in Greece, revealed that involuntary joblessness inflicted greater damage on

mental health during the post-crisis period, when unemployment rates were higher (Drydakis 2015). Research focusing on the impact of the recent crisis on the psychological harm caused by unemployment in Western economies is necessary to deepen our understanding of how contemporary labour market conditions influence the connection between unemployment and psychological health.

Additionally, research on hours-underemployment as a determinant of well-being would benefit from updated data on contemporary experiences of engaging in part-time or zero-hours contracts while preferring to work more hours and their psychological aftermath. Moreover, whilst the links from contemporary unemployment to psychological well-being have been documented both at the individual level and cross-nationally, the relationships between underemployment and human welfare have not been studied across countries yet. However, there is some evidence suggesting that country-specific factors may moderate the psychological consequences of underemployment. For instance, it is shown that workers who engage unwillingly in non-typical employment contracts do not receive similar level of support from the welfare state compared to the regularly employed (Maynard and Feldman, 2011). Not being entitled to benefits such as maternity pay, sickness allowance or paid holiday leave could result in psychological damage, triggered by feelings of insecurity and financial strain. Additionally, Heyes et al. (2017) suggest that the 2008 financial crisis magnified the negative well-being impact of several types of underemployment, including skills- and time-related underemployment, in the UK. Therefore, country-specific policies towards the underemployed and prevailing economic conditions could potentially affect the well-being consequences of underemployment. Further research is necessary to shed light on the cross-country differences in the well-being effects of unwillingly participating in employment arrangements, which are of lesser quality compared to workers' preferences.

Another possible direction for further research is the investigation of potential pathways connecting experiences in the labour market and psychological well-being. For example, we identified feelings about job security and weekly earnings as mediators of the psychological damage associated with working part-time while preferring to work more hours in the UK labour market. Additionally, we showed that impairments in cognitive ability and self-selection into occupations of lower status might explain the impact of poor mental health prior to labour market entry to subsequent unemployment. However, we did not explicitly analyse the latent processes potentially transmitting the complex effects between employment hardship and psychological well-being. For example, we did not explore whether cognitive deficits link early-life mental health to adult employment outcomes. It has been shown that cognitive ability directly influences personal achievements, particularly labour market outcomes such as wages, employment and choice of occupation and skills acquisition (Heckman et al. 2006). Therefore, cognitive impairments due to

adolescent mental disorders may predict subsequent unemployment through disrupted formation of skills leading to selection into low-status occupations. Identifying the underlying mechanisms connecting psychological health and individual performance in the labour market is crucial for informing policy aiming to both compensate for losses in psychological well-being due to employment hardships and offer employment assistance to workers who suffer from poor psychological health.

Finally, while the findings of the present thesis revealed that labour market trajectories potentially influence and are influenced by psychological well-being, we did not establish links of causality between psychological well-being and employment outcomes. Causal inference of the links between psychological health and individual careers would require random assignment of study subjects to employment situations, such as full-time employment, unemployment or hours-underemployment, so that emotional responses to placement at a state of interest (e.g. unemployment) can be observed in contrast to placement at a control state (e.g. employment). However, it is not feasible to randomly assign workers to employment states and observe whether exposure to adversities increases the probability that they will suffer from poor psychological health. Remarkably, there are statistical techniques, which have been shown to approximate causal inference in observational studies, such as sibling fixed effects (McQue et al. 2010) and propensity score matching (Rubin 2007). Building on existing literature using such methods to identify causal links from employment outcomes to psychological well-being (e.g. Kim et al. 2008), future work should focus on the adoption of statistical methodology which allows for effective estimation of unobserved, counterfactual outcomes (Hernán 2004).

Chapter 7. References

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