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Precarious Employment and Occupational Health in Europe

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Zusammenfassung

Europäische Arbeitsmärkte zeichnen sich zunehmend durch den Einsatz prekärer Beschäftigungsformen aus, die durch vertragliche Befristung und Unterbeschäftigung charakterisiert sind. Studien belegen einen Zusammenhang von prekärer Beschäftigung und schlechter Gesundheit, welcher aus Arbeitsplatzunsicherheit und Armut resultiert. Da der Beitrag von arbeitsbedingten Gesundheitsrisiken weniger erforscht ist, war das Ziel dieser Dissertation, den Zusammenhang von prekärer Beschäftigung mit Präsentismus und sexueller Belästigung am Arbeitsplatz zu untersuchen. Die vorliegende Arbeit umfasst drei empirische Studien basierend auf Querschnittsdaten des *European Working Conditions Survey* (EWCS), einer repräsentativen Erhebung über die Arbeitsbedingungen europäischer Angestellter in 36 Ländern. Die erste und zweite Studie untersuchen, ob unsichere Beschäftigungsbedingungen mit einer erhöhten Wahrscheinlichkeit zusammenhängen, krank zur Arbeit zu gehen. Vor dem Hintergrund der Substitutionsthese wurde angenommen, dass Arbeitnehmer mit befristeten Arbeitsverträgen oder bei hoher Arbeitsmarktunsicherheit eher zu Präsentismus neigen. Die dritte Studie legte den Fokus auf sexuelle Belästigung am Arbeitsplatz. Da prekäre Beschäftigungsverhältnisse oft nachteilige Ausgestaltungen des Arbeitsschutzes aufweisen, wurde unterstellt, dass sexuelle Belästigung am Arbeitsplatz häufiger von Arbeitnehmern in prekären Jobs erlebt wird. In allen Studien kamen Mehrebenenanalysen zum Einsatz, die für soziodemografische und berufsbezogene Merkmale adjustiert wurden. Die Ergebnisse zeigen, dass sowohl befristete Arbeitsverträge als auch eine hohe Arbeitsmarktunsicherheit mit einer höheren Wahrscheinlichkeit für Präsentismus verbunden waren. Darüber hinaus war die Prävalenz selbstberichteter Erfahrung mit sexueller Belästigung am Arbeitsplatz unter Arbeitnehmern in prekären Beschäftigungsverhältnissen höher im Vergleich zu Beschäftigten in Normalarbeitsverhältnissen. Die Ergebnisse deuten darauf hin, dass prekäre und unsichere Beschäftigungsverhältnisse mit höheren psychosozialen Gesundheitsrisiken am Arbeitsplatz einhergehen, insbesondere mit schädlichem Krankheitsverhalten und einer höheren Exposition gegenüber diskriminierenden Erfahrungen am Arbeitsplatz. Ein sinnvoller Ansatz, um diese Probleme anzugehen, könnte die Eindämmung prekärer Beschäftigung sowie die Verbesserung des Arbeitsschutzes und der Arbeitsbedingungen prekär Beschäftigter sein.

Abstract

European labour markets have increasingly shifted towards the use of flexible employment forms that are characterised by contractual temporariness and underemployment. Such non-standard working arrangements are often described with the term 'precarious employment' and were found to be associated with poor mental and physical health. While past studies have shown that precarious workers are more likely to experience health problems resulting from job insecurity and poverty, the contribution of occupational health risks is less explored. The aim of this thesis was therefore to investigate the association of precarious employment with sickness presenteeism and workplace sexual harassment. The dissertation comprises three empirical studies based on cross-sectional data of the *European Working Conditions Survey* (EWCS), a representative survey on working conditions of European employees in 36 countries. The first and the second study investigate if precarious employment conditions are related to sickness presenteeism. Against the background of the substitution thesis, workers were supposed to be more likely to work despite being ill in case of temporary employment contracts or high labour market insecurity. The third study set a focus on workplace sexual harassment. As precarious jobs can be disadvantageously designed in terms of workplace rights and protection, it was assumed that sexual harassment is more often experienced by workers in precarious than in standard employment relationships. In all studies, multi-level analyses adjusted for socio-demographic and occupational characteristics were used. As a result, temporary working contracts and high labour market insecurity were both associated with a higher likelihood of workers to choose presenteeism instead of sickness absence. Further, employment precariousness was related to a higher prevalence of self-reported experiences of unwanted sexual attention and sexual harassment at work. The findings suggest that precarious and insecure employment conditions are accompanied by higher psychosocial occupational health risks, specifically damaging sickness behaviour and higher exposition to discriminatory experiences at work. A reasonable approach to tackle these issues could be to reduce exposition to precarious employment or to prevent negative effects on health through improved workplace rights and protection of precarious workers.

Abbreviations

ALMP	active labour market policies
CBA	controlled before and after study
CI	confidence interval
COVID-19	coronavirus disease 2019
EPL	employment protection legislation
EPRES	Employment Precariousness Scale
EPS	Employment Precariousness Score
EU	European Union
EU-LFS	European Labour Force Survey
EU-SILC	European Union Statistics on Income and Living Conditions
Eurofound	European Foundation for the Improvement of Living and Working Conditions
Eurostat	European Statistical Office
EWCS	European Working Conditions Survey
GDP	gross domestic product
HR	hazard ratio
ILO	International Labour Organization
ITS	interrupted time series
MCAR	missing completely at random
OECD	Organisation for Economic Co-operation and Development
OR	odds ratio
OSH	occupational safety and health
PE	precarious employment
PR	prevalence ratio
$\bar{r}_{ij}$	mean sample-weighted correlation
r_s	Spearman's rank-order correlation
RCT	randomised controlled trial

RR	relative risk
SD	standard deviation
SEP	socioeconomic position
SER	standard employment relationship
SA	sickness absence
SARS-CoV-2	severe acute respiratory syndrome coronavirus 2
SH	sexual harassment
SP	sickness presenteeism
UWSA	unwanted sexual attention

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1 Introduction

Currently, the coronavirus disease 2019 (COVID-19) pandemic is having a massive impact on the global economy, triggered by lower productivity, business closures, trade disruptions, deaths, and the decimation of the tourism industry (Nicola et al., 2020). In June 2020, the number of job seekers in the European Union rose by 824,000 in just one month to a total of over 15 million people (Eurostat, 2020b). While the economic consequences of the pandemic affect the entire working population, job-losses and unemployment disproportionally hit workers with fixed-term or part-time contracts (OECD, 2020c). Such forms of employment, for which the risk of job loss is high, are usually referred to as "precarious employment" (Rodgers, 1989). In the event of unemployment, sickness, or disability, people with precarious jobs are particularly vulnerable as they are not equally protected by social security systems (Spasova et al., 2017).

The current pandemic reveals the economic and social risks associated with precarious employment. However, the situation of millions of employees in Europe is not new, but the result of a long-lasting, worldwide process of labour market flexibilisation. Since the mid-1970s, companies have reacted to financial crises, downturns, technological change, and growing competition on globalised markets by using more flexible forms of employment in order to minimise costs and enhance productivity (Kalleberg, 2009; Marshall, 1989). Accordingly, this has led to a global increase in the share of fixed-term and part-time contracts during the last 40 years, particularly among European countries (Eurofound, 2017a; OECD, 2019). Young workers form a group where precarious employment has become increasingly common (Mills & Blossfeld, 2005). For example, in 2019, every second employment contract among employees below the age of 25 years was of limited duration and every third contained part-time arrangements (Eurostat, 2020a).

Although the use of flexible employment can reduce hurdles to hiring staff and therefore stimulate economic growth (Bosch, 2004), precarious workers are more likely to experience job insecurity, income inadequacy, and a lack of rights and protection (Tompa et al., 2007). Furthermore, epidemiological research has shown that precarious employment is associated with poor health and low well-being (Benach et al., 2014; Rönnblad et al., 2019). Although there is high agreement that precarious employment is a social determinant of health (Caldbick et al., 2014), less is known about underlying mechanisms (Bodin et al., 2020). So far, theoretical frameworks assume that precarious employment negatively affects workers' health through three pathways. The first is that continued job insecurity is a stress experience associated with several mental and physical health outcomes (Cheng & Chan, 2008; Sverke et al., 2002). Second, precarious employment puts people under increased risk of poverty, which can be associated with the

cultivation of unhealthy lifestyle habits, a lack of health-related resources, and unequal access to and use of healthcare (Bartley, 2016; Marmot, 2004). Third, precarious employment could also be linked to increased exposure to unsafe or unhealthy working conditions, notably psychosocial workplace hazards. However, only few studies have addressed this pathway so far (Benach et al., 2016; Bodin et al., 2020; Muntaner et al., 2010; Tompa et al., 2007).

Against this background, the overall aim of this thesis is to extend knowledge about health implications of precarious employment with a focus on psychosocial work hazards. Therefore, three empirical studies investigate if precarious employment is related to sickness presenteeism and workplace sexual harassment (Reuter et al., 2019; Reuter et al., 2020a; Reuter et al., 2020c). Past studies suggest presenteeism and sexual harassment as important workplace hazards negatively affecting physical and mental health (McDonald, 2012; Skagen & Collins, 2016). Presenteeism has currently gained additional relevance during the COVID-19 pandemic, as employees avoiding absence in case of illness can infect other people in the work setting (Eisen, 2020). Importantly, yet it remains unclear to which extent both workloads are related to precarious employment. Therefore, findings of this thesis aim to identify occupational health burdens that link precarious employment with poor health. This can be an important basis for guidelines and policies that aim to reduce health burdens of precarious employment.

All three studies rely on survey data of the European Working Conditions Survey (EWCS), a representative sample of more than 43,850 employees from 35 European countries. I choose a cross-national study design with a clear focus on Europe for three reasons. First, precarious employment has increased at an above-average rate in Europe in global comparison (OECD, 2019, pp. 58–61). Secondly, the application of a multi-country design allows to investigate macro-level determinants of precarious employment on individual-level outcomes. This was carried out in study 2, where the association between labour market insecurity and individual sickness presenteeism was explored (Reuter et al., 2020a). Finally, the use of a data base including a full set of European countries has the advantage to draw more general conclusions, being important for practice or EU-wide policy. The thesis will set a focus on employees without self-employment, which includes individuals working for an employer in exchange for wage or salary (International Conference of Labour Statisticans, 2013). This was done as precarious employment captures aspects of formal labour relations, which cannot apply to the self-employed.

To date, there is no generally accepted definition of precarious employment and researchers from different fields associate a varying number of working and employment conditions with the term (Muntaner, 2016). For these reasons, within the following chapters, I will outline the economic and political background that has led to the emergence of non-standard employment forms (chapter 2.1) and summarise theoretical

contributions in the field (chapter 2.2), serving as a basis to compile an indicator model (chapter 2.3) that will be used throughout to identify precarious employment situations in the empirical studies. Subsequently, I will illustrate the development of flexible working arrangements in Europe based on long-term labour market statistics (chapter 2.4), aiming to demonstrate the growth of precarious employment. Chapter 3 will present the state of research on health implications of precarious employment, with a description of the general evidence (chapter 3.1.), mechanisms that mediate between precarious employment and health (chapter 3.2), and a summary focussing on research gaps (chapter 3.2). Furthermore, I will describe the aims of this thesis (chapter 4) and the data set and analysis strategy used (chapter 5). Findings of the three empirical studies presented in the main part are discussed against the literature and placed in the general research context (chapter 7.1). In chapter 7.2, secondary findings on age and country differences are briefly discussed, while chapter 7.3 will critically evaluate strengths and limitations of the conducted analyses with regard to the study design and measurements used. Finally, chapter 7.4 will discuss results of this dissertation against the background of implications for future research and practice.

2 Precarious employment

In modern societies, paid work is one of the most important dimensions of human identity (Grint & Nixon, 2015). Work takes up a considerable part of our life time, provides access to economic resources, allocates social prestige, and determines our class position within society (Erikson & Goldthorpe, 1992; Ganzeboom et al., 1992; Rose & Harrison, 2007; Treiman, 1977). Work is also an important determinant of health and well-being. For example, studies show that people changing from unemployment to re-employment experience a significant improvement in mental health (Noordt et al., 2014). In general, employment conditions in Western societies have improved steadily over the last 200 years, providing higher economic and social security for individuals. However, as this chapter is intended to show, this achievement seems to be increasingly under threat, as recent labour market developments indicate a return of flexible and insecure employment conditions.

2.1 Economic and political background

Debates of the British House of Commons document the use of the term "precarious employment" already throughout the 19th and early 20th century (Quinlan, 2012). Politicians referenced the working conditions of certain occupations as dockworkers and miners as "precarious", who worked on a daily basis and received hourly wages that were far below the average. Generally, they used the term to address insecure and unstable forms of labour as low-paid, temporary or seasonal jobs with irregular working hours. The term "precarious" was also a label for poor labour market conditions in periods of economic downturns and recessions, where there was an oversupply of labour and workers had to go from job to job. While insecure and poorly paid work was the reality for the majority of the labour force during this time, first academic works addressed the question if people's living and working conditions could be related to their health. For example, Friedrich Engels described how industrialisation has led to a decline in health and living conditions of the working class in England (Engels, 1845). The French physician Louis René Villermé analysed Parisian census data and found that mortality rates were considerably higher in neighbourhoods of lower wealth (Krieger, 2011). The German physician Rudolf Virchow found the Typhus epidemic in Silesia socially patterned across poverty rates of neighbourhoods (Virchow, 1848). William Farr established the first epidemiologic database in England and found that mortality rates were higher in lower occupational class positions (Lilienfeld, 2007).

A turning point was the period after World War II, when the massive expansion of the industrial sector increased the demand of a stable and reliable labour force (Tompa

et al., 2007). Accompanied by a growing unionisation, the share of permanent full-time jobs increased during the 20th century and became the dominant employment form, at least for white, non-immigrant men. In labour market sociology, the term *standard employment relationship* (SER) is used as a label for employment that is arranged on a basis of permanent full-time work for one employer, often lasting a lifetime (Rodgers, 1989; Rubery & Grimshaw, 2003). The SER encompasses a range of advantages for the employee in terms of employment security and regularity, but also with regard to social protection and working rights. For example, employees in SERs are usually protected from arbitrary dismissals, with a right to collective representation, guaranteed minimum wages, pensions, and other nonmonetary benefits.

From the mid-1970s, financial crises and recessions as the 'oil shocks' developed that decreased market stability and stopped economic growth. Simultaneously, the advent of new technologies continuously changed production processes and the demand for qualified workers (Atkinson & Meager, 1986). Both events led to an increase in market fluctuations and set the need of employers to obtain more control over the hiring and firing process of workers, the setting of wages, and the limitation of employment protection policies. To facilitate economic growth, many countries changed from Keynesianism to Neoliberalism by implementing policies of deregulation, globalisation, and reductions in governmental spending (Standing, 2011). The decline of trade unions led to a loss of bargaining power in salaries, working conditions, and social rights and security. At the same time, an increasing number of women and migrant workers entered the labour market, changing the workforce structure, while elevating the overall labour supply (Kalleberg, 2009). Companies responded to these developments by employing people on a more flexible basis, as through temporary contracts, temporary agency work, or part-time working arrangements (Atkinson, 1985; Atkinson & Meager, 1986). In distinction to SERs, those arrangements are referred to as "non-standard employment" or "non-standard working arrangements" (Kalleberg, 2000). Non-standard employment forms enable organisations to implement strategies of downsizing and restructuring more easily, by hiring workers when the economy is doing well and firing them in times of economic downturns. Since especially those in weaker labour market positions are forced to accept unfavourable employment conditions, non-standard employment is usually more common among young workers, women, migrants, ethnic minorities, and workers in lower socio-economic or social class positions (Landsbergis et al., 2014).

The transformation of labour markets has – with different timing and pace – taken place in developed countries worldwide. In Europe, the pressure for flexibility has additionally increased with the process of the European unification from the 1990s onwards and the European Union (EU) enlargement in the 2000s (Eichhorst et al., 2017; Gutiérrez-Barbarrusa, 2016). The creation of a common economic region has raised the availability of workers and intensified economic competition. To improve

competitiveness and combat joblessness, many countries engaged in policies of labour market deregulation. In Germany, for example, the "Agenda 2010" has introduced a range of active labour market policies (ALMP) while reducing the extent of welfare state benefits (Eichhorst & Marx, 2009). The former Chancellor Gerhard Schröder announced the intended measures as follows:

> We will cut government services, promote personal responsibility and have to demand more personal contribution from each individual. (Translated by the author: Deutscher Bundestag, 2003, p. 2479)

In addition, a number of marginal employment forms (*geringfügige Beschäftigung*) have been implemented, such as the mini-job, the midi-job, or the 450-euro job. Such forms of employment usually involve short working hours and are not within the scope of national insurance. As a reaction to the financial crisis in 2008, many European countries further engaged in labour market reforms and austerity measures that replaced SER jobs with more flexible employment forms. Especially in Greece, Spain, Italy, Portugal, and Ireland, new hiring during the aftermath of the crisis mostly has taken place on the basis of non-standard employment arrangements, which was for many workers the only alternative to unemployment (Broughton et al., 2016).

The general reoccurrence of flexible employment since the mid-1970s was accompanied by an increase in subjective job insecurity in the labour force, which is the perceived risk of job loss in the near future (Greenhalgh & Rosenblatt, 1984; Sverke et al., 2006). Among social epidemiologists, this shift has led to a growing interest to investigate possible health implications of precarious employment. Figure 1 provides information on the appearance of the term “precarious employment” in medical journals. As observable, in the past 30 years, a rising number of studies have directly addressed the topic of precarious employment. The first publication was in 1994, followed by a constant increase, which was further accelerated at the time of the financial crisis in 2008. However, compared to the number of publications including, for example, the term “work stress” (>2,000 publications at PubMed on 11/2020), the topic of precarious employment has received far less attention yet.

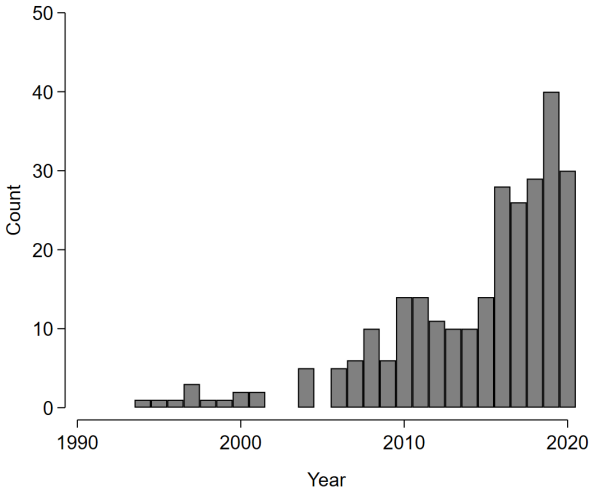

Figure 1: Medical publications including the term “precarious employment”

Source: PubMed. N=270. Accessed 10.08.2020.

2.2 Definition and concept

To date there is no generally accepted definition of precarious employment and a number of different aspects of work are associated with this term. When scanning the scientific literature, the terms “precarious employment”, “precarious work”, "precariat”, “precarity”, or “precariousness” are used interchangeably to refer to employment relations, working conditions, poverty, or even social classes. Further, the terms “non-standard”, “atypical”, or “contingent” work are used synonymously with precarious employment and usually refer to employment based on fixed-term or part-time arrangements (Quinlan, 2012). Precarious employment is also a dimension of the concept of “employment quality”, which evaluates jobs based on unfavourable aspects of the employment relationship (e.g. type of working contract) and general working conditions (e.g. lack of training, long working hours, low support) (Burchell et al., 2014; Van Aerden et al., 2016). Standing (2011) uses the term "precariat" to denote the emergence of a new social class, whose common ground is a life of unstable labour, disadvantaged in terms of social, political and civil rights (Standing, 2011).

The lack of a common theoretical concept is the greatest limitation when collecting evidence on public health implications of precarious employment. Inconsistent definitions make it difficult to compare studies and to apply research findings in the policy process. Compared with the establishment of psychosocial work stress models (Karasek, 1979; Siegrist, 1996), theoretical research on precarious employment is still in its infancy (Benach et al., 2016). An early definition of precarious employment, stemming from the field of labour market sociology, is that of Rodgers (1989):

> There is a tendency to regard regular, permanent wage work as secure, and to consider other forms of work as precarious insofar as they deviate from this norm. (Rodgers, 1989, p. 3)

Consequently, Rodgers (1989) defines precarious employment as working arrangements that deviate from the SER as the former 'gold standard'. Rodgers (1989) describes four dimensions that give rise to precariousness in non-standard forms of employment: (1) low degree of certainty or continuity of work, (2) lack of control over working conditions, wages, or pace of work, (3) lack of protection against discrimination, unfair dismissal, poor working practices, or social security benefits covering health accidents, pensions, or unemployment insurance, and (4) lack of an adequate income that is needed to protect from poverty and social exclusion. This multidimensional approach has been taken up in health science by several authors (Olsthoorn, 2014; Quinlan et al., 2001; Tompa et al., 2007). For example, Tompa et al. (2007) give the following definition:

> We use the term "precarious" to describe work experiences that are associated with instability, lack of protection, insecurity across various dimensions of work, and social and economic vulnerability. (Tompa et al., 2007, p. 210)

Tompa et al. (2007) include further dimensions in their concept of "precariousness". Next to the four dimensions of Rodgers (1989), they also include work-role status, socio-cultural environment, risk of exposure to physical hazards, training and advancement opportunities. However, this concept has some limitations when studying health-related consequences, as it includes physical hazards already as a part of the construct, which is likely to produce circular arguments. The American sociologist Kalleberg (2009), analysing precarious employment in the United States, defines precarious employment as "[...] employment that is uncertain, unpredictable, and risky from the point of view of the worker" (Kalleberg, 2009, p. 2). He uses several categories of evidence for the growth of precarious employment including a decline in attachment to employers (job tenure), increase in long-term unemployment, growth in job insecurity and non-standard employment forms, and a general increase in risk shifting from the employer to employees, for example, in terms of social security and benefits. Finally, the official definition of the International Labour Organization (ILO) integrates several aspects with regard to the multidimensional nature of precarious employment:

> In the most general sense, precarious work is a means for employers to shift risks and responsibilities on to workers. It is work performed in the formal and informal economy and is characterized by variable levels and degrees of objective (legal status) and subjective (feeling) characteristics of uncertainty and insecurity. Although a precarious job can have many faces, it is usually defined by uncertainty as to the duration of employment, multiple possible employers or a disguised or ambiguous employment relationship, a lack of

> access to social protection and benefits usually associated with employment, low pay, and substantial legal and practical obstacles to joining a trade union and bargaining collectively. (International Labour Ogranization, 2012, p. 27)

In previous studies, different definitions of precarious employment have been established. As no commonly-accepted definition of precarious employment is available, this work will focus on the approach taken by Rodgers (1989) and defines precarious employment as employment forms that deviate from the former 'gold standard' of the SER, associated with several disadvantages in terms of job security, income, and social protection. Consequently, the SER has a normative meaning with regard to labour standards and social protection, where a deviation from the SER is understood as deterioration of employment conditions (Giesecke, 2006).

As the level of employment protection, including dismissal protection, in most European countries is lower for temporary compared with permanent workers (Eichhorst et al., 2017), the growth in precarious employment could be seen as a new form of labour market segmentation in terms of employment risks. Labour market segmentation addresses situations, where the labour force is divided into two or more parts, while barriers hinder individuals to change from one segment to another (Reich et al., 1973). In this case, labour market segmentation is created by the expansion of precarious employment relations that divides between secure and insecure jobs. The Organisation for Economic Co-operation and Development (OECD) Employment Outlook report from 2015 has analysed how many workers in temporary jobs change to permanent positions ('upward mobility'), based on longitudinal data of the European Union Statistics on Income and Living Conditions (EU-SILC) (OECD, 2015). After three years, around half of all temporary employees are still on fixed-term contracts, suggesting that temporary employment is rather persistent over time. This may indicate that the growth of precarious employment has created a new form of labour market segmentation in Europe, especially in those countries where the rate of non-standard employment forms is high (Kalleberg, 2003).

2.3 Indicators of measurement

The following chapter aims to describe the selection procedure of indicators used to measure precarious employment in the empirical studies. First, it is important to conceptually separate features of precarious employment from potential causes and consequences. Thus, low socio-economic position, low social class, but also poor working conditions, and adverse health are not part of the construct itself (Bodin et al., 2020; Tompa et al., 2007). This is also true for perceived job insecurity, which is the subjectively experienced threat of a job situation as a consequence of precarious employment (Sverke et al.,

2006). Second, precarious employment is a concept to describe the formal relationship between the employer and employee and not any content of work. As a result of labour market flexibilisation processes, precarious employment covers different types of working relationships that deviate from the former 'gold standard' of the SER (Olsthoorn, 2014; Quinlan et al., 2001; Rodgers, 1989; Tompa et al., 2007). Recently, Kreshpaj et al (2020) conducted a systematic review for definitions and operationalisations of precarious employment in the scientific literature (Kreshpaj et al., 2020). They searched publications with variations of precarious employment in the title or abstract. After cleaning, 63 studies were evaluated, mostly from the disciplines public health or occupational health. Their result underlined the approach of Rodgers (1989), according to which three core dimensions of precarious employment can be identified that imply lack of features served by the SER. These are (1) employment insecurity, (2) income inadequacy, and (3) lack of rights and protection. Figure 2 gives an overview of the related dimensions and indicators.

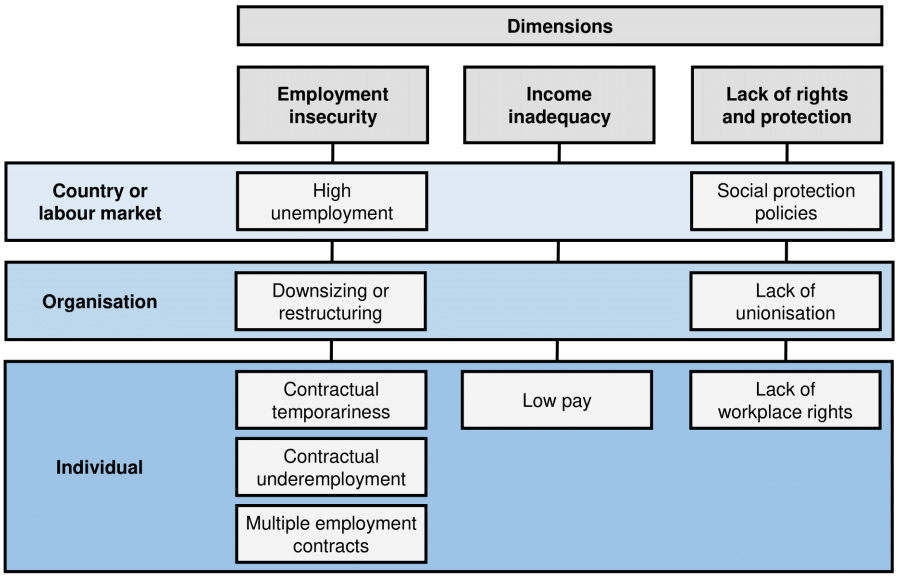

Figure 2: Dimensions and indicators related to precarious employment

Own illustration based on Kreshpaj et al. (2020), supplemented with a multilevel perspective proposed by Bodin et al. (2020).

On the individual-level, the dimension of employment insecurity applies to jobs shaped by contractual temporariness or contractual underemployment. This typically includes fixed-term contracts, temporary agency contracts, and part-time employment contracts. For the individual, these forms of employment are associated with greater uncertainty about the continued existence of the job in the future, which might be most obvious in the case of temporary employment. In the case of part-time workers, the uncertainty can also relate to the amount of working hours which are less predictable. As a consequence,

temporary and part-time workers experience higher levels of job insecurity (Sverke et al., 2006). Part-time employment is also related to lower earnings and puts employees at increased risk of working unpaid and being exploited (Standing, 2011). Non-standard working forms are often not equally covered by social protection systems compared with permanent full-time employment. This can include lower entitlements for sick pay, pension schemes, or less dismissal protection (OECD, 2019; Rodgers, 1989). Studies found temporary and part-time employees also less integrated in organisational networks and processes, resulting in lower support and workplace resources (Gallagher, 2005). The dimension of employment insecurity also covers situations where people are holding more than one working contract at the same time, called "multiple job-holding". While there is a debate about whether to include multiple job-holding in a concept of precarious employment or not (Bouwhuis et al., 2019), it is clearly a result of substituting SERs with non-standard arrangements, leading to unfavourable aspects such as the challenge to manage complex working times, poor work-life balance, and lower social insurance entitlements (Pouliakas, 2017). Although some multiple job-holders are found in higher income groups (e.g. doctors working in hospitals and having a private practice, academic staff working additionally as self-employed lecturers), most of them are low wage earners as cleaners, helpers, personal care and sales workers (Eurofound, 2020a). The second dimension "income inadequacy" only covers the indicator of low pay and is characterised by salaries or wages below a common poverty threshold, mostly defined as lower than 60% of the country-specific median. As it has been mentioned, low pay is often a result of non-standard working forms and it is intuitive that indicators of employment insecurity and income inadequacy are intertwined. The last dimension "lack of rights and protection" refers to aspects as unionisation, social security, or access to and knowledge of workplace rights that prevent workers from arbitrary dismissals, discrimination, harassment, or occupational health and safety risks. Because labour laws of industrialised countries were constructed around the traditional SER, workers in precarious employment relations are less likely to enjoy legal and institutional protection (Tompa et al., 2007).

Precarious employment is considered to be a multidimensional construct, whereby various aspects of the relationship between employer and employee are designed in favour of the employer and the economic and social risks are shifted onto the employee (Kalleberg, 2009; Quinlan et al., 2001; Rodgers, 1989; Tompa et al., 2007). The multidimensional nature of precarious employment has resulted in the construction of several indices, as the Employment Precariousness Scale (EPRES), that aim to measure the accumulation of employment disadvantages (Puig-Barrachina et al., 2014; Vives et al., 2010). However, proposed indices still mix up features of the employment relationship with general working conditions and it remains questionable if they provide a valid measure of employment precariousness. Therefore, most studies rely on single-

dimensional measures and the most common variable used is the type of working contract (Benach et al., 2014; Kreshpaj et al., 2020).

While the employment relationship naturally takes place at the individual level, several calls have been formulated to integrate a multi-level perspective (Bodin et al., 2020). This might be useful because contextual features of organisations, labour markets, or welfare regimes are very likely to influence individual experiences of employment precariousness. A good example is that consequences of precarious employment as job insecurity may be stronger pronounced when social protection policies are restrictive, or when high unemployment rates indicate poor chances to find other work. Another point is that certain events as high unemployment, organisational downsizing or the degree of unionisation can reflect the level of precarious employment on the macro-level. As already discussed by Rodgers (1989), high unemployment is a suitable macro-level indicator of employment precariousness, as the weakened position of job seekers in stricken labour markets makes it possible for employers to offer precarious jobs. Thus, high unemployment rates can be considered as an indicator of labour market precariousness (Rodgers, 1989). This perspective has been integrated in Figure 2.

In summary, public health still lacks a generally accepted approach to measure precarious employment. In this chapter, however, I have tried to narrow down the concept in a meaningful way and to identify specific forms of employment that can be characterised as precarious. In this work, precarious employment is understood as the product of labour market flexibilisation processes weakening the formal relationship between the employer and employee. An important criterion is the increased use of non-standard forms of work that enables employers to shift decisive risks onto the employee. Most importantly, the type of employment contract can be used to measure precarious employment. Other indicators considered to be a part of the construct are contractual underemployment, multiple job-holding, low pay, and the lack of protective workplace rights.

2.4 The growth of precarious employment in Europe

The purpose of the following chapter is to describe the prevalence of precarious employment in the European Union and to give evidence on its growth during the last decades. Because this thesis aims to set out health implications resulting from societal changes, it is important to describe these transformation processes and to give evidence on their relevance. According to the indicator model presented in the previous chapter, I will describe changes in the prevalence of several indicators of precarious employment over time. This includes the proportion of temporary contracts, part-time working arrangements, multiple job-holders, and the share of workers perceiving job insecurity

in the EU labour force. I will also include the unemployment rate as a macro-level indicator for "cognitive" job insecurity (the perceived risk of job loss) and labour market insecurity (the perceived availability of alternative job opportunities) (Hipp, 2016). The presented graphic material is based on two data sources, which probably constitute the most powerful resources for investigating changes in working life of Europeans. The first is the European Labour Force Survey (EU-LFS), a continuous quarterly survey measuring the labour status and specific work characteristics of the population in 35 countries (Eurostat, 2019). The EU-LFS serves as the basis for the official labour market statistics of the European Union. The second data source is the EWCS, a repeated cross-sectional study conducted by the European Foundation for the Improvement of Living and Working Conditions (Eurofound) (Eurofound, 2020b). Since 1991, the EWCS collects data about the working conditions in 36 European countries. The following analyses are presented separately for different age groups, taking into account that the emergence of flexible employment relations firstly occurs among young workers (Bukodi et al., 2008). Additionally, analyses are stratified by gender, as indicators as part-time work are likely to be influenced by the increased participation of women in the labour market.

2.4.1 Temporary employment

In 2019, a total number of 26.8 million people had a temporary employment contract in the EU 28, reflecting a proportion of 13.6% among all employees (OECD, 2020a). As Figure 3 shows, the share of temporary contracts in the labour force has constantly increased since the 1980s (1983: 8.2% vs. 2019: 13.6%). As also shown, young workers have experienced the strongest growth from 21.3% (1983) to 42.8% (2019). Today, the share of non-permanent employment among young workers is more than three times above the average of all age groups. Over the entire period, temporary employment is slightly more common among women than men. It is also observable that the overall share of temporary contracts declined during the financial crisis (2008-2010). This is the consequence of the so-called 'honey-moon-effect' (Boeri & Garibaldi, 2007), according to which the use of temporary contracts initially can lead to higher employment rates as long as the economy is doing well. However, in times of economic downturns, employers do not renew these contracts and people end up in unemployment. As also observable, the overall upward trend towards temporary employment has stopped in the last decade, at least for middle- and older-aged workers.

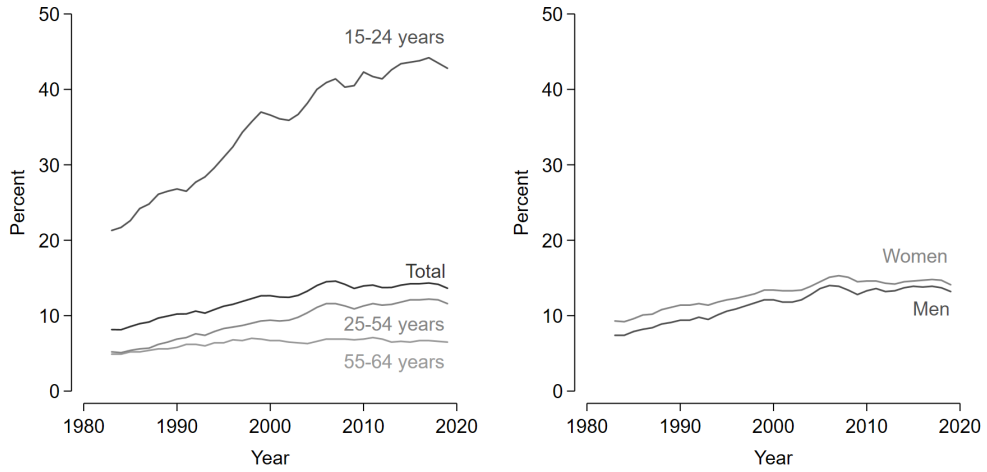

Figure 3: Prevalence of temporary employment contracts (EU-28)

Own calculation based on data of the EU-LFS (OECD, 2020a). Temporary employment refers to jobs based on limited job duration or contracts that terminate after a fixed period or after a period not known in advance. Prevalence among dependent employees.

There are several reasons for having a non-permanent working contract, for example, preferring a flexible employment form or being in a probationary period. However, in 2019, around every second temporary contract (51.5%) was accepted because a permanent job was not available, indicating that a large number of fixed-term jobs are involuntary (Table 1). This is particularly true for middle-aged and older employees. Among young workers, on the other hand, fixed-term employment is more often a result of side-jobs or training positions. Young people are also more likely to work voluntarily on a fixed-term basis. Notably, also among young workers, around every third temporary contract is involuntary.

Table 1: Reason for a temporary employment contract (2019)

	15-24 years (%)	25-74 years (%)	15-74 years (%)
Could not find a permanent job	29.4	60.3	51.5
Did not want a permanent job	16.6	13.2	14.2
In education or training	35.9	6.7	15.0
Probationary period	7.0	9.4	8.7
No response	11.1	10.3	10.5
Total	100.0	100.0	100.0

Source: EU-LFS (Eurostat, 2020a).

As Figure 4 shows, the share of temporary contracts varies widely between European countries. In 2015, the highest rates were found in Spain, Netherlands, Poland, Cyprus

and Portugal, while numbers were fairly lower in Austria, Romania, the UK, Luxembourg, and Lithuania. High rates of temporary employment on the one hand reflect low legal restrictions, and on the other hand, the strategy of firms to use a flexible workforce to deal with changes in demands (Eichhorst et al., 2017).

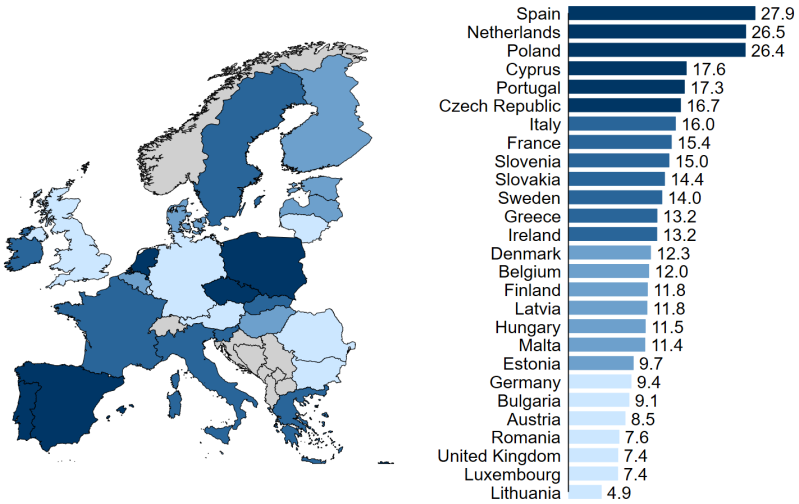

Figure 4: Prevalence of temporary employment by country (2015)

Own calculation based on the cumulative data file of the EWCS (Eurofound, 2020a). *N*=28,752 employees (15-65 years). Post-stratification weights applied. Absolute frequencies are to find in the appendix (Table A1). No data available for grew area.

2.4.2 Part-time work

Part-time employment, as an indicator of underemployment, is to work less hours than it would be the normal case, often defined by a threshold of less than 30 hours per week (International Conference of Labour Statisticans, 2013). In 2019, the share of employees in the EU 28 working part-time was 16.6% (OECD, 2020b). As shown by Figure 5, the number of part-time jobs has slightly but constantly increased over the last 40 years, from 13.2% (1983) to 16.6% (2019). When regarding this development by age and gender, it becomes obvious that the increase in part-time employment has only occurred among men (1983: 3.1% vs. 2019: 7.6%) and young workers (1983: 7.5% vs. 2019: 28.8%). Part-time employment is generally more common among women, as well as young and older compared with middle-aged workers. A higher proportion among older workers can be attributed to forms of gradual and partial retirement while the first might be more likely a result of labour market flexibilisation.

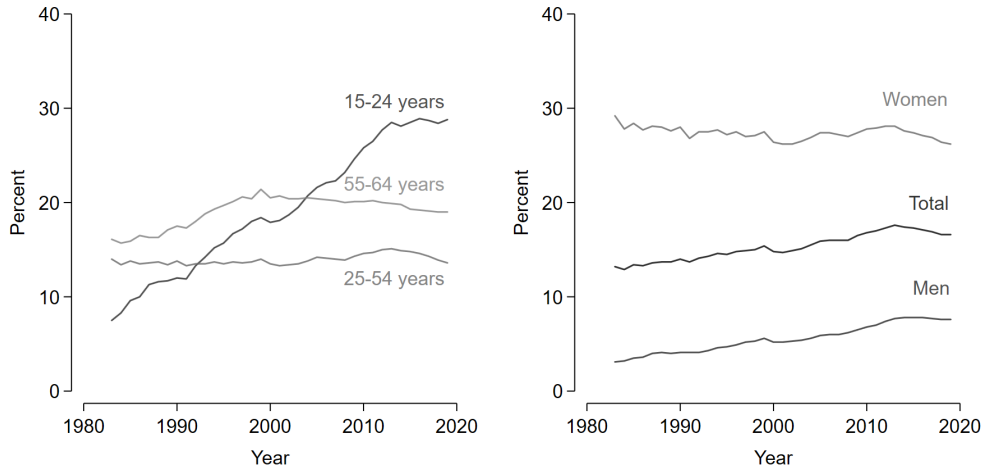

Figure 5: Prevalence of part-time employment (EU-28)

Own calculation based on quarterly data of the EU Labour Force Survey (OECD, 2020b). Part-time work was defined by working less than 30h/week. Prevalence among all dependent employees.

Not every part-time job is ultimately negative, since an increasing number of people also prefer to work less than full-time (Joyce et al., 2010). Therefore, a more useful indicator for underemployment is to compare the performed working hours with those that would be preferred at free choice. As shown by Figure 6, among young workers, 9.6% worked involuntary part-time in 2015. Compared to older workers, underemployment was around twice as likely among young workers. Moreover, both forms of part-time work (voluntary and involuntary) increased between 2010 and 2015.

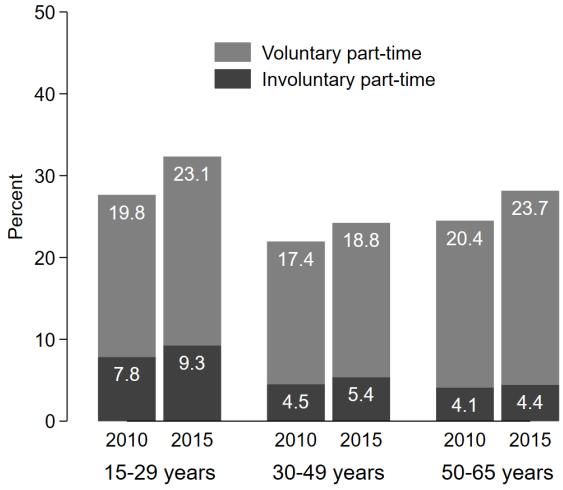

Figure 6: Prevalence of voluntary and involuntary part-time jobs (EU-27)

Own calculation based on the cumulative data file of the EWCS (Eurofound, 2020a). N=55,438 employees (15-65 years). Post-stratification and national weights applied.

Absolute frequencies are to find in the appendix (Table A1). Involuntary part-time was given when workers were working below 35h per week but would prefer to work more.

2.4.3 Multiple job-holding

To have more than one job at the same time is becoming the reality for a growing number of European employees. As mentioned, many workers use multiple job holding to compensate financial issues resulting from underemployment or low pay. Figure 7 shows the prevalence of multiple job-holding between 2000 and 2015. In all age groups, multiple job holding has increased during this time span. In 2015, 7.5% of the employees were working in multiple jobs simultaneously, which represents a growth by 1.5 percentage points compared with 2000. As observable, this holds especially true for young and older workers.

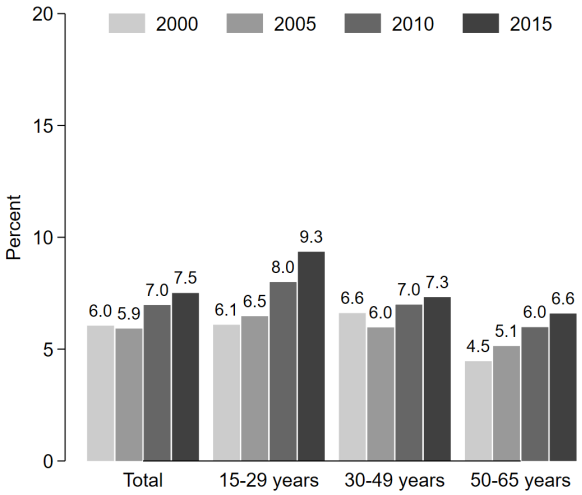

Figure 7: Prevalence of multiple job-holding (EU-27)

Own calculation based on the cumulative data file of the EWCS (Eurofound, 2020a). *N*=104,679 employees (15-65 years). Post-stratification and national weights applied. Absolute frequencies are to find in the appendix (Table A1).

2.4.4 Unemployment and job insecurity

The unemployment rate is the most important parameter for assessing general employment opportunities and risks in labour markets (Tompa et al., 2007). During times of high unemployment, workers increasingly experience job insecurity (Hipp, 2016), while recessions and economic downturns often result in a later growth of precariously designed jobs (Greenhalgh & Rosenblatt, 1984). Figure 8 provides information about the development of the unemployment rate in the European Union for the last two

decades. In 2008, the unemployment rate rose noticeably because of the financial crisis. Since 2013, unemployment again decreased, reaching the pre-crisis level in the end of 2019. The illustration also reveals that young people experience unemployment far more often compared with older workers. During the time of the crisis, the recession has particularly affected young people, as we see an increase in unemployment by 10 percentage points.

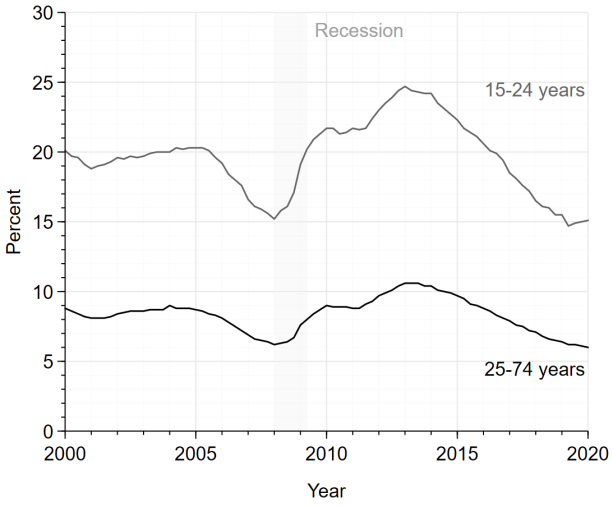

Figure 8: Seasonally adjusted unemployment rate 2000-2020 (EU-27)

Own calculation based on quarterly data of the EU-LFS (Eurostat, 2020a). EU-27 2020 member states without the United Kingdom. The unemployment rate indicates the share of persons among the labour force, who were simultaneously without work, available for work and seeking for work. The labour force is the sum of employed and unemployed persons. Recession was a zero or negative growth of gross domestic product (GDP) in the Eurozone over two successive quarters. Seasonal adjusting controls for predictable seasonal patterns (e.g. changes due to weather, holidays, or harvests).

Figure 9 shows the prevalence of perceived job insecurity over time. Consequently, job insecurity rose shortly after the financial crisis. Moreover, a clear age gradient becomes obvious, according to which younger workers experience job insecurity more often compared with older workers. In 2015, around one out of five workers under 30 years stated that they were likely to lose their job in the coming months.

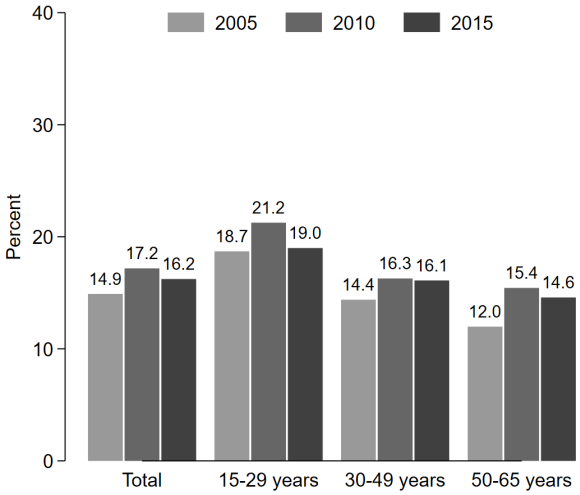

Figure 9: Prevalence of perceived job insecurity (EU-27)

Own calculation based on the cumulative data file of the EWCS (Eurofound, 2020a). *N*=73,203 employees (15-65 years). Post-stratification and national weights applied. Absolute frequencies are to find in the appendix (Table A1). Job insecurity was given when respondents agreed or strongly agreed to the statement "I might lose my job within the next 6 months".

Figure 10 gives a graphical visualisation of the prevalence of job insecurity in different countries. In 2015, job insecurity varied widely, ranging from 7.9 to 27.4%. Numbers were generally higher in Southern and Eastern Europe. The highest rates were in Spain, Slovenia, Poland, Netherlands, Greece, and Italy. In contrast, the countries showing the lowest rates of job insecurity were Germany together with Malta and Slovakia.

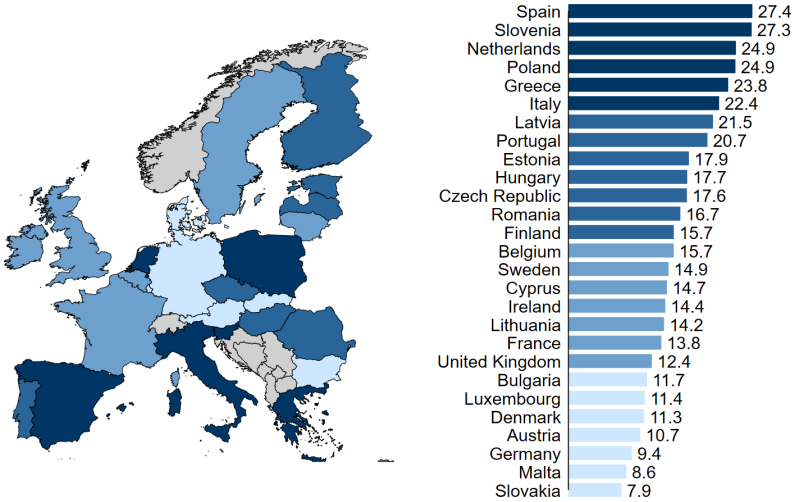

Figure 10: Prevalence of job insecurity by country (2015)

Own calculation based on the cumulative data file of the EWCS (Eurofound, 2020a). Aggregated values of *N*=25,684 employees (15-74 years). Post-stratification weights applied. Job insecurity was given when respondents agreed or strongly agreed to

the statement “I might lose my job within the next 6 months”. No data available for grew area.

Several factors can explain country variations of job insecurity. To some degree differences are due to socio-structural variations, for example different age structures (Erlinghagen, 2008). Most importantly, the overall level of job insecurity can be triggered by a nation’s unemployment rate, the extent to which countries were hit by downturns and recessions in the past, the type of welfare-state and the design of active labour market policies (Lübke & Erlinghagen, 2014). Therefore, higher rates of job insecurity in Greece, Portugal, Spain, and Italy reflect that these countries were affected more severely by the financial crises. On the other hand, job insecurity is the ultimate consequence of precarious employment and a considerable part of the variation between countries can be explained by these factors. For example, Figure 11 shows that there is a strong correlation between a country’s share of temporary contracts and involuntary part-time jobs and the general level of job insecurity.

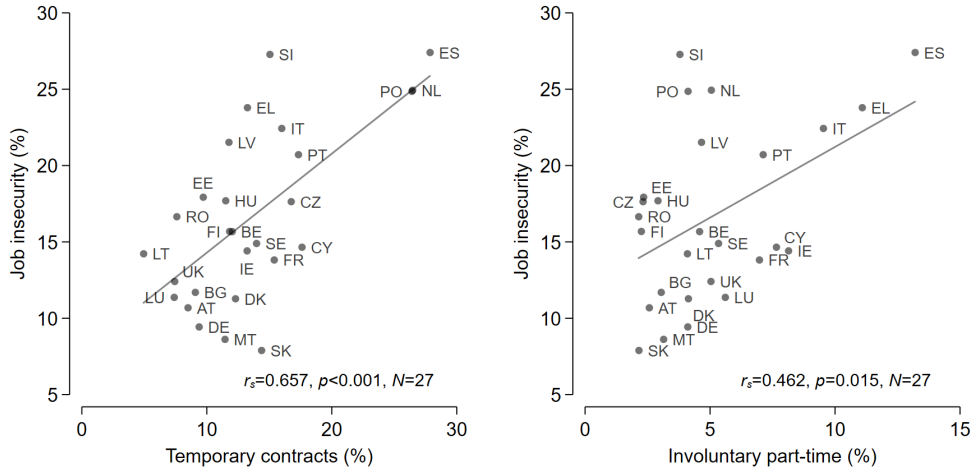

Figure 11: Job insecurity by temporary and part-time employment (2015)

Own calculation based on the cumulative data file of the EWCS (Eurofound, 2020a). Aggregated values of N=25,684 employees (15-65 years). Post-stratification weights applied. Spearman’s rank-order correlation (r_s). A list of EU country codes is to find in the appendix (Table A2).

2.4.5 Country differences

Despite the general increase in non-standard employment worldwide, there are substantial differences across countries. In low-income countries, precarious employment occurs mainly within the informal economy, meaning that it is not taxed or monitored

by the government, and characterised by earnings that are too low to protect people from poverty (Kalleberg, 2009). Precarious employment in developed countries as the EU member states, though, is more a facet of social inequality in terms of job security, relative income and workplace rights. However, as Table 2 reveals, also within Europe the prevalence of precarious employment indicators varies strongly between countries, with the highest prevalence of precarious jobs in the Netherlands, Spain, Poland, Greece, Italy, Ireland, and Slovenia.

Table 2: Prevalence of precarious employment indicators by country (2015)

Country	Temporary contracts (%)	Involuntary part-time (%)	Multiple job-holding (%)	Job insecurity (%)
Spain	27.9	13.2	5.3	27.4
Netherlands	26.5	5.0	11.0	24.9
Poland	26.4	4.1	7.5	24.9
Cyprus	17.6	7.6	6.3	14.7
Portugal	17.3	7.1	6.1	20.7
Czech Republic	16.7	2.3	10.8	17.6
Italy	16.0	9.5	5.2	22.4
France	15.4	7.0	7.9	13.8
Slovenia	15.0	3.8	9.8	27.3
Slovakia	14.4	2.1	7.0	7.9
Sweden	14.0	5.3	15.0	14.9
Greece	13.2	11.1	4.9	23.8
Ireland	13.2	8.1	5.6	14.4
Denmark	12.3	4.1	19.2	11.3
Belgium	12.0	4.6	7.3	15.7
Finland	11.8	2.2	9.6	15.7
Latvia	11.8	4.7	11.4	21.5
Hungary	11.5	2.9	6.8	17.7
Malta	11.4	3.1	11.7	8.6
Estonia	9.7	2.3	15.0	17.9
Germany	9.4	4.1	7.4	9.4
Bulgaria	9.1	3.0	4.0	11.7
Austria	8.5	2.6	12.5	10.7
Romania	7.6	2.1	5.3	16.7
Luxembourg	7.4	5.6	7.2	11.4
United Kingdom	7.4	5.0	6.6	12.4
Lithuania	4.9	4.1	4.5	14.2
Total	13.5	5.9	7.5	16.2

Source: European Working Conditions Survey (Eurofound, 2020a).
Post-stratification weights applied.

2.4.6 Summary

This chapter has shown how the prevalence of precarious employment indicators has changed during the last decades in Europe. A permanent full-time position is still the major form of employment. However, flexible forms of employment are on the rise, which is particularly true for young workers. Accordingly, temporary and part-time employment arrangements are becoming the dominant form for workers under the age of 25 years. Public health research should pay attention to this development, because non-standard employment is often involuntary and associated with lower wages and therefore with a higher risk of poverty. Against this background, people increasingly try to compensate wage losses with additional jobs next to their main job, which can have detrimental effects on social life and social insurance entitlements. As a growing amount of young workers is not able to find a permanent job position, they also experience more often job losses during recessions and a higher level of job insecurity. Young workers, as labour market entrants without any experience or skill, are most vulnerable to the process of labour market flexibilisation (Mills & Blossfeld, 2005). Some describe this situation by calling young workers the "guinea pigs" for non-standard forms of work (Lewchuk, 2017). However, there is also some evidence for an increase in work flexibilisation among higher age groups, as in the case of (very short-termed) temporary employment, involuntary part-time, low pay, and multiple job-holding. This possibly indicates a cohort effect, according to which the increase in precarious employment will not be limited to young workers in the future and might expand to higher age groups.

3 Precarious employment and health

3.1 General evidence

Traditionally, the term precarious employment has been used to describe employment conditions that may be harmful for health (Quinlan, 2012). After several decades of empirical research, solid evidence on precarious employment as a social determinant of health exists. Virtanen et al. (2005b) were the first to conduct a meta-analysis on the relationship between temporary employment and various indicators of mental and physical health. They searched empirical, peer-reviewed studies published between 1963 and 2003, based on samples including temporary and permanent employees. The researchers were able to evaluate a total of 27 studies from Sweden, Finland, France, Belgium, Denmark, Germany, United Kingdom, Spain and the United States. The findings revealed that temporary compared to permanent workers had a higher likelihood for high psychological distress (odds ratio (OR) 1.25, 95% confidence interval (CI) 1.14-1.38). They also found a relationship between temporary work and increased rates of occupational injuries, however, with the number of studies too small to calculate combined effect size. In contrast, findings did not show a significant association between temporary employment and poor physical health (OR 1.08, 95% CI 0.94-1.25) and musculoskeletal disorders (OR 1.24, 95% CI 0.69–2.22). Additionally, temporary compared to permanent workers were found to be significantly less likely for sickness absence (OR 0.77, 95% CI 0.65-0.91). Based on these results, the authors concluded an association between temporary employment and increased psychological morbidity. They also suggested that temporary workers might be at higher risk for occupational injuries and lower sickness absence, with the last being probably a consequence of increased presenteeism due to fearing job loss. Although the meta-analysis of Virtanen et al. (2005b) gave some first systematic evidence that precarious employment can be linked to higher morbidity, the authors were aware of the limitations. As many studies included had a cross-sectional design, null results on physical health indicators could be biased from the 'healthy worker effect'. This effect results from the selection of healthy individuals into the workforce, which can occur during the hiring process (Wilcosky & Wing, 1987). Workers with deteriorating health have also a higher risk of being selected out of the workforce – a risk that is disproportionally higher in temporary compared with permanent workers. Additionally, due to low job tenure, temporary employees are generally exposed to occupational health risks for a shorter period of time.

In the following years, researchers aimed to overcome these limitations by the use of longitudinal study designs or register data. Virtanen et al. (2008) compared the risk of antidepressant use between temporary and permanent workers based on Finnish

register data of 17,071 men and 48,137 women. They found that having a temporary working contract (with a duration > 6 months) was associated with a higher likelihood for antidepressant use in men (OR 1.18, 95% CI 1.03-1.37) but not in women (OR 0.99, 95% CI 0.93-1.06). However, to have a very-short term contract (limited to 6 months or less) was linked to a higher risk in men (OR 1.43, 95% CI 1.19-1.73) and also in women (OR 1.18, 95% CI 1.09-1.28). A more recent study could confirm a link between temporary employment and mental health problems by analysing data on psychotropic medical prescription for over 2.7 million Italian employees (Moscone et al., 2016). Analyses demonstrated that the risk for medical treatment increased with the number of days working under a temporary contract and the number of changes into temporary employment. They also found that changes from temporary into permanent job positions were linked to reduced probabilities of medication prescription afterwards. Nätti et al. (2009) matched a representative sample of Finnish employees surveyed in 1984 with official death records for the years 1985-2000. After controlling for socio-demographic and health-related factors, including age, education, smoking status and long-standing illness, they found involuntary temporary compared with permanent employment associated with a more than twofold mortality risk during the follow-up (hazard ratio (HR) 2.59, 95% CI 1.16-5.80). Notably, voluntary forms of temporary employment were not significantly related to increased mortality. A similar result was obtained by a Cochrane review in 2010, summarising evidence on health effects of flexible working conditions in experimental studies (Joyce et al., 2010). Experimental studies test the effect of an intervention by comparing observations before and after the intervention, mostly by randomly assigning observations to a test and control group that either receive or not receive the intervention. In this case, the intervention includes exposures to work flexibilisation as self-scheduling or flexible employment forms. The authors included 10 studies with sufficient quality that were either randomised controlled trials (RCTs), interrupted time series (ITS), or controlled before and after studies (CBAs). The results indicate that forms of work flexibility as partial retirement can actually have a positive impact on health, in case they are voluntary. In contrast, involuntary forms of flexible work as fixed-term contracts and involuntary part-time were found to have equivocal or negative effects on health.

In their comprehensive literature review, Benach et al. (2014) firstly look at health implications of multiple dimensions of employment precariousness. Findings suggest a very consistent link between experiences of downsizing or organisational restructuring and poor health. For the survivors, downsizing does mostly lead to greater workload and subjective job insecurity. Similar to the studies of Virtanen et al. (2005b) and Virtanen et al. (2008), the review of Benach et al. (2014) reports consistent associations between temporary employment and increased psychological morbidity and rather mixed results on somatic disorders. Studies using multidimensional approaches towards precarious

employment, by constructing formative indices around several indicators as part-time work, low pay, or lacking workplace rights and protection, are still scarce. However, previous findings show a correlation with poor self-rated health and increased medication use. In 2019, Rönnblad et al. (2019) systematically reviewed the evidence of mental health effects of precarious employment in longitudinal studies. They identified five studies that investigated different multidimensional scales and met the quality criteria for quantitative meta-analysis. They found precarious employment linked to a twofold risk for depressive symptoms, psychological distress or medication use (OR 2.01, 95% CI 1.60-2.53).

3.2 Mechanisms

The overall evidence suggest that precarious employment has negative effects on worker's health, in particular on psychological well-being. This raises questions about underlying mechanisms (Benach et al., 2016; Muntaner et al., 2010). In recent years, some works aimed to systematise research findings and to identify different pathways that mediate between precarious employment and poor health (Benach et al., 2014; Bodin et al., 2020; Tompa et al., 2007). Figure 12 provides a visual illustration of the main pathways that can lead to higher health risks of precariously employed workers. The direction of the respective arrow indicates the causal direction of the effect relationship. The first pathway ("a") describes health risks arising from the situation of uncertainty in terms of job continuity, which can be a stressful experience. The second pathway ("b") covers health risks associated with the work domain, as physical or psychosocial work hazards. For example, some studies presented above suggest that temporary workers have a higher risk to experience occupational injuries and accidents. The third pathway ("c") relates to the level of social and material resources. For example, precarious employment is often associated with low wages and increased poverty risks. Notably, pathways "f", "g", and "h" illustrate that increased burdens in terms of job insecurity, working hazards, and deprivation can subsequently affect health and well-being. Finally, job insecurity and deprivation might also be associated with increased work hazards. For example, workers fearing job loss might be less concentrated and more likely to experience occupational accidents. Further interplays are possible that were due to reasons of clarity not illustrated here. For instance, poor health can also lead to increased deprivation or job insecurity just as much as vice versa. The following chapter will summarise the state of research about health implications of precarious employment and uses the 'three-pathway model' as guidance for systematisation.

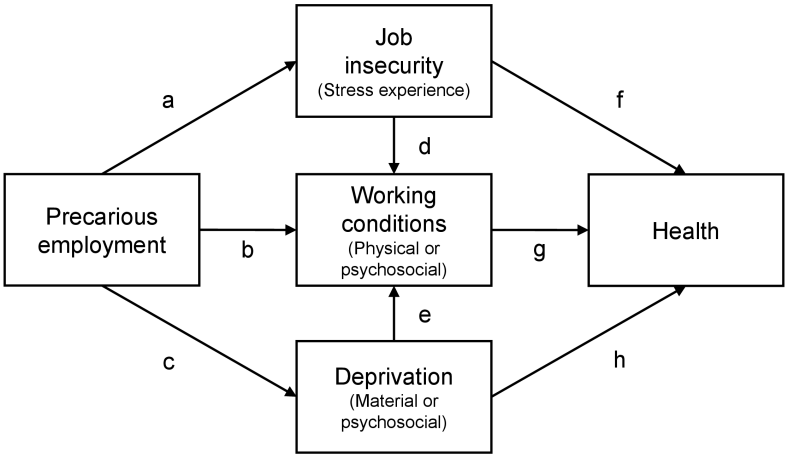

Figure 12: Pathways between precarious employment and health

Modified illustration based on Benach et al. (2014), Bodin et al. (2020), and Tompa et al. (2007).

3.2.1 Job insecurity as stress experience

Perceived job insecurity is possibly the most intuitive and well-explored mediator in the relationship between precarious employment and poor health (Hünefeld & Köper, 2016). Many workers in precarious employment arrangements report increased levels of job insecurity, as they experience usually greater uncertainty about the continued existence of employment in the future (Sverke et al., 2002). Perceived job insecurity is defined as the experience of "powerlessness to maintain desired continuity in a threatened job situation" (Greenhalgh & Rosenblatt, 1984, p. 438), or the "overall concern about the continued existence of the job in the future" (Sverke et al., 2002, p. 243). Both definitions cover job insecurity by the anticipation of an undesired job loss that generates feelings of threat or fear. While personal characteristics can moderate how likely job insecurity will be stimulated from objective conditions, it was found that there is a high correlation between objective and subjective measures and how they are related to health (De Witte, 2005; Klandermans et al., 2010).

Since security is an elementary human need, the situation of uncertainty is considered to be a stressor (Karasek, 1979; Katz & Kahn, 1978; Lazarus & Folkman, 1984; Siegrist, 1996). A stressor is an actual or perceived threat to an organism that is answered with a stress response. The stress response includes the activation of several neural, neuroendocrine, and neuroendocrine-immune mechanisms, a process called "allostasis", which mobilises biological resources to maximise the possibility of successfully adapting to the stressor (McEwen, 1998). A typical stress response is given by the fight or flight behaviour. In the situation of an acute stress response, the body temporarily

suppresses several body functions that are not essential in the short-term as digestion, tissue repair, or specific immune functions. Allostasis is a vital process that enables organisms to adapt to their changing environment and thus ensures survival. However, if the allostatic system has been activated too much over a long time, as in the case of chronic stress, this can be problematic for health and result in a so-called "allostatic load". In this case, permanently activated stress responses hinder elementary body functions to perform adequately, leading to various harmful outcomes as increased blood pressure or suppressed immune reactions. Chronic stress can therefore be linked to many high prevalent diseases as coronary heart disease, cancer, stroke (Cohen et al., 2007), as well as mental health problems as depression or post-traumatic stress disorder (Marin et al., 2011).

As shown by Table 3, two meta-reviews based on a total of 133 cross-sectional and longitudinal studies have been conducted. The meta-correlation in both studies indicate that job insecurity is associated with lower mental and physical health (Cheng & Chan, 2008; Sverke et al., 2002). The strongest meta-correlation in both studies was found for mental health followed by physical health.

Table 3: Findings of meta-analyses on job insecurity and health

	Mental health			Physical health		
	Samples	N	$\bar{r}_{ij}$	Samples	N	$\bar{r}_{ij}$
Sverke et al. (2002)	37	14,888	-.24	19	9,704	-.16
Cheng and Chan (2008)	77	72,339	-.28	44	56,934	-.23

Associations by the mean sample-weighted correlation ($\bar{r}_{ij}$).

Both studies performed moderator analyses and found no differences in associations between men and women. However, consequences of job insecurity tended to be more adverse for older compared with young workers. This phenomenon has often been explained with reference to the theories of job adaption (Hulin, 1991) and job dependence (Greenhalgh & Rosenblatt, 1984), according to which older workers are not as flexible as young workers to find new employment and are more involved in their current job due to higher job tenure. Therefore, older workers are considered to be more susceptible for adverse consequences of job insecurity.

While both meta-studies give evidence for a general relationship between job insecurity and health, further studies have shown links with several diseases and preclinical conditions. For example, job insecurity was found to be a risk factor for depressive symptoms, burnout, reduced life satisfaction, sleeping disorders, increased blood pressure, and atherosclerosis (De Witte et al., 2015). Meta-analyses based on data of several

cohort studies found that job insecurity is followed by increased risks of incident diabetes (19 studies, OR 1.19, 95% CI 1.09–1.30) (Ferrie et al., 2016) and clinically verified coronary heart diseases (13 studies, OR 1.32, 95% CI 1.09-1.59) (Virtanen et al., 2013). A meta-analysis based on 22 mainly cross-sectional studies found a link to higher suicidality (OR 1.91, 95% CI 1.22-2.99) (Milner et al., 2018). Another study showed that job insecurity can be even more harmful for health compared with experiences of unemployment (Dekker & Schaufeli, 1995). This has been explained by the fact that job loss is something people can adapt to, while continuous job insecurity constitutes a chronic stressor. In addition, job insecurity and poor health can also be related to each other in a reciprocal way, where job insecurity leads to poor health in the first place, and poor health leads to even higher job insecurity afterwards (De Witte et al., 2016; Urbanaviciute et al., 2019). Again, this can be explained with regard to the healthy worker effect, according to which temporary workers with poor health have usually lower chances to get a follow-up contract or to obtain a permanent job position, which can further reinforce the interplay between job insecurity and health.

3.2.2 Social and material deprivation

A second path covers the social and material restrictions that can result from precarious employment and affect the private life of individuals outside the work domain. Most obviously, non-standard working careers consisting of disrupted and discontinuous employment trajectories are associated with lower earnings and therefore with a higher risk of poverty. In turn, poverty comes along with a number of adverse behavioural, resource and healthcare-related factors that can cause poor health (Bartley, 2016; Marmot, 2004). For example, poverty is associated with unhealthy environments, poor housing conditions, and the cultivation of unhealthy lifestyle habits, as smoking, low physical activity, poor nutrition, or alcohol abuse. Poverty can be related to lower resources that are important to buffer experiences of stress and illness, including a lower level of social support and integration. Poverty is also related to unequal access to health care and prevention programmes. For example, a study found part-time and temporary workers less likely to use health care services, which was mostly driven by a lack of money (Min et al., 2016).

A second aspect is that people in precarious jobs have more difficulties in life planning. Studies suggest that individuals tend to postpone the timing of parenthood if they experience their job as insecure (Bernardi et al., 2008; Kreyenfeld, 2010; Matysiak et al., 2020). This might result in lower life satisfaction and well-being, but also be problematic in view of the aging population in Europe. Workers in precarious employment were also found to have a lower likelihood for homeownership (Lersch & Dewilde, 2015), which is an important determinant of health and well-being in later life (Vanhoutte et al., 2017).

Consequently, increasing numbers on precarious employment among young people can also be seen as a phenomenon of social injustice between generations.

A third point is that precariously employed workers enjoy lower social protection in case of unemployment, sickness, disability, and retirement. For example, all EU member states provide the right of sick leave (to be absent when ill without fearing dismissal) combined with sick pay or sickness benefits (some level of earnings replaced by the employer or the social protection system). However, temporary workers are less likely to fulfil minimum contribution periods due to a shorter job tenure and are therefore less often entitled for paid sick leave in the event of illness (Spasova et al., 2016). This has often been debated against the background of temporary workers being less likely taking sickness absence and instead going to work in the case of illness (Johns, 2010). A theme that is dealt with in the empirical part of this dissertation. Precarious employment can also lead to lower entitlements to statutory pension and unemployment schemes, as in some EU member states, access to this is not mandatory in case of non-standard employment (Spasova et al., 2017). Since employment biographies of temporary and part-time workers are more disrupted, they have naturally lower contribution levels compared with permanent, full-time workers resulting in lower pension and unemployment benefits. Socioeconomic disadvantages and non-standard employment histories have been found to link with poor health in later life and retirement age (Hoven et al., 2020; Wahrendorf, 2015; Wahrendorf et al., 2019).

3.2.3 Harmful working conditions

The third path refers to the role of unhealthy and unsafe working conditions, assuming that precarious workers could be more often exposed occupational safety and health (OSH) risks. Occupational risk factors can include, but are not limited to, safety risks and workplace hazards, such as exposure to chemical, physical, biological or psychosocial hazards (Concha-Barrientos et al., 2004). Currently, work-related infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an example for a biological workplace hazard. Physical hazards include exposures such as noise, vibrations, or extreme temperatures. Chemical hazards can be dusts, gases, liquids, or solids that are toxic or carcinogen. Furthermore, psychosocial hazards are non-material expositions related to the social environment and the organisation of work. The most important psychosocial hazards were found in high work stress, lack of social support, long working hours, emotional demanding work, and experiences of discriminatory or unfair behaviour such as violence, bullying, or sexual harassment (European Agency for Safety and Health at Work, 2007).

Compared to stress- and poverty-related pathways, a smaller body of empirical research on precarious employment has dealt with occupational health risks. For example,

temporary compared to permanent workers were found to be more often exposed to noise, extreme temperatures, fume and dust, chemicals, repetitive movements, carrying heavy loads, or working in painful or tiring positions (Benach et al., 2002; Eurofound, 2001; Park et al., 2019). However, analyses on this are descriptive and not adjusted for possible confounding factors as age, job tenure, occupational position, and working sector. Temporary employees have usually a shorter job tenure resulting in less experience and knowledge of workplace hazards (Benavides et al., 2006). However, a recent study found temporary compared with permanent workers to have less access to and awareness of protective OSH measures (Dragano et al., 2018). Accordingly, a meta-review based on 17 studies found that temporary workers and multiple job-holders have a higher risk to experience occupational accidents and injuries (Koranyi et al., 2018).

Studies in the field of psychosocial hazards mainly focussed on the role of work stress, which is conceptualised according to the job demand-control model (Karasek, 1979) or the effort-reward imbalance model (Siegrist, 1996). Studies show that the level of experienced work stress tends to be equivocal or even lower in temporary compared with permanent jobs (Bartoll et al., 2019; Leineweber et al., 2020). Although temporary workers usually report to have less control over their work and to receive lower rewards in terms of job security or job promotion, their tasks were found to be less demanding compared with that of permanent employees (Eiken & Saksvik, 2009; Inoue et al., 2010; Inoue et al., 2011).

3.3 Summary

In sum, precarious employment is a social determinant of health that creates and sustains social inequalities in health. Most consistently, empirical evidence suggests that precarious employment is a risk factor for psychological morbidity, while evidence on somatic disorders is more heterogeneous. A large body of empirical work has focussed on examining different mechanism underlying the relationship between precarious employment and poor health. Taken together, research highlights the importance of increased stress experiences due to job insecurity and increased risk for poverty and poorer chances in life planning. Studies also suggest that precarious workers are more often exposed to occupational health risks. However, evidence apart from work accidents and physical hazards are scarce yet. The presented findings in the area of working conditions indicate that precarious jobs can be disadvantageously designed in terms of occupational health risks. However, research on psychosocial hazards has exclusively focussed on work stress and less is known about other aspects of work. For example, as precarious employment is associated with lower workplace rights and protection, precariously employed workers could be more likely to experience discriminatory and

unfair behaviour such as workplace sexual harassment (SH). Another point is that, due to job insecurity or lacking access to sick pay, temporary workers might be more inclined to go to work while being sick.

4 Aims of thesis

The dissertation aims to extent knowledge about health implications of precarious employment. This is of high public health relevance due to an increasing number of individuals – especially young people – working in flexible and unsecure employment relations. As the working conditions of precarious workers are less explored (Benach et al., 2016; Bodin et al., 2020; Muntaner et al., 2010; Tompa et al., 2007), the thesis will investigate the relationship between precarious employment and two occupational health risks, namely sickness presenteeism and workplace SH and unwanted sexual attention (UWSA). This can be relevant during policy processes managing sexual harassment and presenteeism, but also to improve our understanding of how precarious employment affects workers' health. Table 4 gives an overview of the conducted studies included in this thesis.

Table 4: Overview of the included research articles

Study	Independent variable	Dependent variable	Reference
1	Temporary employment contract	Sickness presenteeism	Reuter et al. (2019)
2	Labour market insecurity	Sickness presenteeism	Reuter et al. (2020a)
3	Employment precariousness score	SH and UWSA	Reuter et al. (2020c)

Sickness presenteeism, which is when employees are going to work despite being ill (Johns, 2010), has gained increased relevance during the last years. People attending work during illness are less productive (Collins et al., 2005), exhibit a higher risk for future health problems (Skagen & Collins, 2016), and can infect other people in the work setting (Eisen, 2020). The topic has received further relevance during the COVID-19 pandemic, where presenteeism can facilitate to spread the virus in populations (Reuter et al., 2020b). Against the background that people have two options in the event of illness, which are absenteeism or presenteeism, the so-called 'substitution thesis' predicts that individuals will choose presenteeism when absence is a less available option (Caverley et al., 2007). Due to job insecurity and limited access to paid sick leave, sickness absence might be experienced as an option less available for temporary workers. Therefore, the objective of the first study was to test if temporary compared with permanent workers are more likely to opt for sickness presenteeism. This assumption has been formulated multiple times in the past, but studies on this are scarce and findings were highly inconclusive so far (Johns, 2010; Miraglia & Johns, 2016). Previous studies, however, were restricted to single, mostly Scandinavian countries and had several shortcomings in the measurement of presenteeism (Gerich, 2016).

The second study complemented the first by adding a multi-level perspective. The aim

was to investigate whether labour market insecurity resulting from high unemployment can explain local differences in presenteeism. As outlined in the introduction, workers are embedded in specific contexts, such as nations or labour markets, and features of these contexts can determine the experience of employment precariousness (Bodin et al., 2020; Tompa et al., 2007). This can be the case when high regional unemployment elevates job insecurity and indicates that chances to find another job are low (Hipp, 2016). Therefore, study 2 tested if sickness presenteeism is more common in stricken labour markets where local unemployment is high. Because consequences of job insecurity can be more severe if workers are highly dependent on their job (Greenhalgh & Rosenblatt, 1984), a second objective was to test interactions with factors of occupational disadvantage, indicated by low pay or low skill-level.

During recent years, the topic of workplace SH has gained increased relevance in public debate. Next to the fact that SH is violating personal rights, the experience of UWSA at the workplace is a serious public health concern (McDonald, 2012). Studies show that SH is often followed by major mental health problems as depression or post-traumatic stress disorder (Willness et al., 2007). As the relationship with precarious employment is unclear, the third study tested if precarious employment is linked to a higher prevalence of self-reported experiences of SH or UWSA at work. In all studies, associations between precarious employment and outcomes were analysed separately for young, middle-aged, and older workers with reference to the theories of job adaption (Hulin, 1991) and job dependence (Greenhalgh & Rosenblatt, 1984), which predict older workers with higher boundaries to their workplace and lower prospects to find other work being more susceptible for the consequences of job insecurity.

Study 1 and Study 3 were produced as part of an international research project between the Heinrich Heine University Düsseldorf and the Sapienza University of Rome, which was carried out from 2017-2019. The project was supported by funding from the Italian National Institute for Insurance against Accidents at Work [grant number: INAIL BRIC 2016 No. 47]. The funder did not play any role in the study design, data analysis, decision to publish or preparation of the manuscripts. No funding was received for the work on study 2. The Ethics Committee of the Medical Faculty of the Heinrich Heine University Düsseldorf approved all studies (2018-40-RetroDEuA).

5 Methods

5.1 Data

All empirical studies rely on data of the European Working Conditions Survey (EWCS), which is an anonymised public-use data file disseminated by Eurofound (2020a). For the purpose of study 2, individual survey data of the EWCS was matched with official unemployment rates of 232 European regions obtained from Eurostat (2020c). The EWCS is a cross-sectional study that is carried out every five years. The EWCS collects detailed information on working conditions of the labour force in 36 European countries, covering issues as exposure to physical and psychosocial working hazards, occupational health, and well-being. According to the definition of the ILO, participants are 15 years or older and work for pay or profit for at least one hour per week. A representative sample in each country is drawn by using a multi-stage, stratified, random sampling technique. Data were used from wave 5 (Eurofound, 2012) and wave 6 (Eurofound, 2017b), covering the years 2010 and 2015, respectively. Realised sample sizes range from 1,000 to 4,000 cases per country in wave 5, and from 1,000 to 3,300 per country in wave 6. Interviews were conducted face-to-face at respondents home between January and August 2010 (wave 5), and between February and September 2015 (wave 6). Average response rates were 44% (wave 5) and 43% (wave 6). A five-stage process was applied for the translation and verification of the questionnaire. A more detailed description of the methodology can be found in the technical reports (Eurofound, 2010a, 2015). Wave 6 was used in study 1 and study 2, while study 3 additionally relies on wave 5, which was done to increase the sample size, as the 12-month prevalence of SH was low.

5.2 Study sample

The original sample comprised 43,816 interviews in wave 5 and 43,850 interviews in wave 6. Since the thesis set a focus on the employment relationship, the study sample was generally restricted to employees without self-employed. Employees were people paid a salary or wage by an employer or an agency. Self-employed included directors of own business, partners in business practices, subcontractors, and freelance workers. Further I excluded interviewees that were unemployed, retired, in full-time education, or unable to work due to long-term illness or disability at the time of the survey. Samples were further restricted to employees working a minimum of 10 hours a week, and being between 15 and 65 years. Further inclusion criteria for the studies on sickness presenteeism were to have reported at least one day of sickness absence or sickness presence during the previous year, because workers without any health event were not

of interest. In accordance with past studies (Garrow, 2016), participants reporting more than 70 days of sickness absence or presence were excluded to control for chronic health problems. Detailed description of criteria for inclusion are to find in respective studies.

5.3 Statistical analyses

In all three studies, multi-level regression models were used to analyse the relationship between precarious employment and workplace hazards. Multi-level models are appropriate when the data structure is hierarchical or clustered (Hox, 2010), meaning that observations are not independent and share common features that make them similar to each other. Since the EWCS is a cross-country data set, individuals were nested within nations. As standard regression models generally assume independence of observations, common techniques would lead to incorrect estimates of standard errors and biased results. Multi-level models calculate separate regression equations for each level-2 unit and can thus account for the multi-level structure of the data. The degree of country variation can be estimated through a clustered variance calculation. Multi-level Poisson regression with robust standard errors was used to calculate prevalence ratios (PRs) (Zou, 2004). A multi-level generalised linear model with a binomial probability distribution and a logit link function was used to estimate the presenteeism propensity, which was non-normally distributed. Main analyses were adjusted for socio-demographic (gender, age, type of household, migration background) and occupational factors (job tenure, working hours, occupational position, working sector, company size), in order to control for possible confounding effects and to adjust for compositional differences of European regions when studying level-2 predictors. Missing values were filled by multiple imputation with a predictive mean matching procedure (Enders, 2010; Rubin, 1987), as Little's missing completely at random (MCAR) test revealed evidence that missing data was not missing completely at random and a complete case analysis could lead to biased estimates (Little, 1988). All analyses were performed using Stata 15.1 MP or Stata 16.1 MP (64-bit, StataCorp LLC, College Station, TX, USA).

A detailed description of the procedure for forming the study sample, the definition and operationalisation of variables, analysis of missing values, as well as the applied statistical methods can be found in the methods section of the respective publication.

6 Published original articles

6.1 Do Temporary Workers More Often Decide to Work While Sick? Evidence for the Link between Employment Contract and Presenteeism in Europe, Reuter, M., Wahrendorf, M., Di Tecco, C., Probst, TM., Ruhle, S., Ghezzi, V., Barbaranelli, C., Iavicoli, S., Dragano, N., International Journal of Environmental Research and Public Health, 16(10), p. 1868, (2019)

6.2 Working while sick in context of regional unemployment: A Europe-wide cross-sectional study, Reuter, M., Dragano, N., Wahrendorf, M., Journal of Epidemiology and Community Health, 75(6), pp. 574-580, (2020)

6.3 Precarious employment and self-reported experiences of unwanted sexual attention and sexual harassment at work. An analysis of the European Working Conditions Survey, Reuter, M., Wahrendorf, M., Di Tecco, Probst, TM., Chirumbolo, A., Ritz-Timme, S., Barbaranelli, C., Iavicoli, S., Dragano, N., PLOS ONE, 15(5), p. e0233683, (2020)

7 Discussion

The growth of precarious employment creates new challenges for public health to investigate the role of non-standard employment forms in exacerbating health inequalities in the labour force. Occupational epidemiological research in this field is of high importance in order to understand mechanisms through which precarious employment adversely affects health. This is of interest to design policies that protect workers and make them less vulnerable against adverse consequences of precarious employment. Against this background, the three original articles in this thesis contribute to the field by investigating links between precarious employment and two psychosocial workplace hazards, namely sickness presenteeism and workplace sexual harassment. The following chapters will evaluate the findings against the background of the literature, discuss strengths and limitations, and notes implications for future research and intervention measures.

7.1 Main findings

7.1.1 Findings on sickness presenteeism

Prior studies recognise sickness presenteeism as a workplace hazard of increasing relevance for employees' health (Skagen & Collins, 2016; Webster et al., 2019). During the COVID-19 pandemic, sickness presenteeism has been declared as a public health concern, as people attending work despite symptoms can spread the virus in organisations and populations (Eisen, 2020; Kinman & Grant, 2020; Reuter et al., 2020b). By contrast, presenteeism is a common work behaviour. In the case of Germany, for example, a representative survey in 2018 revealed that around 21% of employees work during illness, even against medical advice (Waltersbacher et al., 2018).

Study 1 and 2 set out with the aim of assessing the importance of precarious employment conditions in relation to sickness presenteeism. The first study sought to determine if workers with a temporary employment contract were more likely to choose presenteeism in the event of illness compared with permanent employees (Reuter et al., 2019). Among a sample of 20,240 European workers with at least one health event in the previous year, I found that the average presenteeism propensity was 0.39 (standard deviation (SD) 0.41), indicating that the share of days worked while ill among all days with illness was 39%. After controlling for socio-demographic and occupational covariates, the presenteeism propensity for workers with a temporary employment contract (limited to one year or more) was 1.11 times higher compared with permanent workers (relative risk (RR) 1.11, 95% CI 1.05-1.18, $p<0.001$). Furthermore, workers with a

very-short termed contract (limited to less than one year) were even 1.29 more likely to decide for presenteeism compared with permanent employees (RR 1.29, 95% CI 1.17-1.42, $p<0.001$).

This finding accords with the prediction of Caverley et al. (2007) substitution hypothesis, arguing that employees will avoid sickness absence and choose presence when factors as job insecurity indicate absence as a choice that is unavailable or associated with negative consequences. Temporary workers might use presenteeism in a strategic way, by signalling job engagement or good health to increase the chance of further employment or a permanent job position in the future. This explanation was further confirmed as adjustment for subjective job insecurity partly attenuated the relationship between contract type and presenteeism. Prior research has assumed precarious employment to be a pressure factor for presenteeism (Johns, 2010), but empirical studies either found no relationship between type of working contract and presenteeism (Aronsson & Gustafsson, 2005; Hansen & Andersen, 2008; Miraglia & Johns, 2016), or found temporary employment associated with less presenteeism (Aronsson et al., 2000; Heponiemi et al., 2010; Janssens et al., 2016). The divergence to previous studies is likely to be a result of differences in the measurement of presenteeism. One advantage over previous studies was to measure presenteeism by its propensity and not by the absolute number of days worked while sick (Gerich, 2015). As mentioned earlier, a frequent bias when studying associations between temporary employment and health outcomes is the healthy worker effect (Wilcosky & Wing, 1987), resulting from increased health selection within the group of temporary workers. The presenteeism propensity can adjust for this, because it indicates the relative proportion of presenteeism days regardless of the absolute number of illness days.

One unanticipated finding was that controlling for job insecurity did not fully mediate the association between type of contract and sickness presenteeism. It is therefore likely that temporary workers have additional reasons to avoid sickness absence. With regard to the three-pathway model (Figure 12), another mechanism mediating between precarious employment and presenteeism might exist with regard to monetary aspects. As in many European countries temporary employees are less likely to be entitled for paid sick leave (Spasova et al., 2016), they may avoid sickness absence for financial reasons. A recent study compared the presenteeism behaviour of US workers before and after introducing a law expanding employees' access to paid sick leave in Washington State in 2018 (Schneider, 2020). After the law took effect, the share of workers with presenteeism significantly decreased from 70% to 59%, while no difference was observable in states that did not implement this law. This observation supports the idea that presenteeism is more likely when entitlement for paid sick leave is low or does not exist. To investigate the role of European social protection policies in the context of presenteeism may therefore be a possible direction for future research.

Within the scope of the second study, the relationship between precarious employment and presenteeism was tested using a multi-level approach. As precarious employment experiences can also be determined by contextual factors (Bodin et al., 2020; Hipp, 2016), the aim was to investigate the association between labour market insecurity and sickness presenteeism (Reuter et al., 2020a). Several calls have been made to investigate the role of contextual factors for individual sickness presenteeism (Ruhle et al., 2020).

The results of the second study indicate a link between high labour market insecurity and sickness presenteeism in a sample of 20,974 employees from 232 European regions. More specifically, a change in regional unemployment by +10 percentage points was associated with a change in the presenteeism propensity by +5 percentage points (95% CI 1.2-8.6). Along with the findings of the first study, this result confirms the substitution hypothesis (Caverley et al., 2007), predicting that workers will choose presenteeism when high labour market insecurity indicates sickness absence as a risky choice. Additionally, results also support the so-called 'discipline hypothesis' (Allebeck & Mastekaasa, 2004), which assumes that workers are more cautious about taking sickness absence when poor labour market conditions indicate low chances for finding other work. The result of study 2 accords with observations of prior empirical works that found high unemployment related to lower sickness absence and decreased medical rehabilitation use (Askildsen et al., 2005; Reichert et al., 2015; Virtanen et al., 2005a). It can thus be suggested that workers in precarious labour markets try to protect themselves against dismissal through avoidance of sickness absence. This speaks also in line with the finding that the link between unemployment and presenteeism was further qualified by factors of occupational disadvantage. Most notably, low-paid and low-skilled workers reacted to high unemployment with presenteeism more strongly than employees in higher occupational positions or income groups. A possible explanation for this can be provided by the job dependence theory, predicting that people in lower occupational positions are more financially depending on their job, which makes negative consequences of job insecurity more likely (Sverke et al., 2006).

Within the scope of the dissertation, the overall finding of study 1 and study 2 is that precarious employment conditions are related to a higher likelihood of choosing presenteeism. This could be verified for contractual temporariness as well as for high labour market insecurity. This finding completes evidence for a link between precarious employment conditions and higher occupational health risks, as shown by the three-pathway model presented in the introduction (Figure 12). Accordingly, precarious employment conditions that elevate job insecurity (pathway a), can further lead to higher psychosocial work hazards (pathway d), such as sickness presenteeism, and finally lead to poor health (pathway g). An unexpected finding, however, was even after controlling for perceived job insecurity, there were still significant differences in presenteeism according to the employment contract. It can thus be suggested that the

link between precarious employment and presenteeism is also mediated through higher material deprivation due to lacking sick pay of precarious workers (pathway c).

7.1.2 Findings on sexual harassment

The objective of the third study was to explore if precarious employment is related to a higher probability of experiencing SH or UWSA at work. The study found that 1.8% of the workers reported to have experienced UWSA during the last month, while the prevalence of SH during the last 12 months was 0.8%. Both numbers were around three times higher among women compared with men, and up to five times higher among the youngest compared to the highest age group. Moreover, the prevalence on SH was considerably lower compared with UWSA, although the item on SH covered a larger reference period. Consequently, not all experiences of UWSA were classified as SH. This is already known from other studies, which demonstrate that a small proportion of victims of UWSA label this experience as SH, according to personal believes about what behaviours constitute SH (Giuffre & Williams, 1994; Marshall, 2003; Tinkler, 2008).

With regard to the objective of study 3, it was found that several indicators of precarious employment, as well as the cumulative EPS, showed significant associations with UWSA and SH. After adjustment for socio-demographic and occupational variables, an increase of one scale point in the EPS was associated with a 1.39-fold higher prevalence of UWSA among men (95% CI 1.25-1.54, $p<0.001$) and with a 1.28-fold prevalence among women (95% CI 1.19–1.39, $p<0.001$). For SH, a one scale point increase in the EPS was linked to a 1.58-fold higher prevalence in men (95% CI 1.30-1.92, $p<0.001$) and a 1.17-fold higher prevalence in women (95% CI 1.04-1.33, $p=0.011$). Associations were found both in 2010 and 2015, without considerable variation between survey waves. Findings suggest that unwanted sexual behaviour at work is more common in work settings where several disadvantageous aspects of precariousness accumulate in the same job.

More heterogeneous results were obtained for analyses on single indicators of precarious employment. Employees with a temporary employment contract were more likely to report experiences of UWSA compared with permanent workers (Men: PR 1.65, 95% CI 1.29-2.13, $p<0.001$; women: PR 1.45, 95% CI 1.22-1.74, $p<0.001$). However, when controlling for socio-demographic and occupational covariates these associations were reduced in strength and significance (Men: PR 1.28, 95% CI 0.99-1.67, $p=0.061$; women: PR 1.12, 95% CI 0.94-1.35, $p=0.207$). A closer inspection showed the correlation to be confounded by age, because young people were more often working in temporary arrangements whilst being the primary target of UWSA and SH.

As this was the first study investigating links to UWSA and SH by using a score based on multiple indicators to measure precarious employment, similar results have not

been described in the literature. Just two previous studies investigated links between employment arrangements and sexual harassment. LaMontagne et al. (2009) analysed variations in self-reported UWSA according to employment arrangements in a representative sample of 1,101 Australian workers. They found that workers in temporary employment arrangements were around three times as likely to report experiences of UWSA, even when adjusting for age, gender, and occupational skill level (OR 3.11, 95% CI 1.36-7.11). One explanation for this divergent finding might be that the question on UWSA in LaMontagne et al. (2009) did not contain a time frame, while the item in the EWCS was referencing on experiences during the last month. Consequently, the prevalence of UWSA in the EWCS was much lower (1.8%) compared with that reported by LaMontagne et al. (2009) (4.8%). A shorter reference period might be more prone for underestimating the relationship between precarious employment and unwanted sexual advances at work, since experiences that occurred more than one month ago are not taken into account. The second study in this field is that of Lee et al. (2014), who analysed associations between work factors and workplace violence among 29,171 male and female workers participating in the Korean Working Conditions Survey (KWCS). The KWCS, as the name indicates, is the Korean version of the EWCS and uses a methodology and questionnaire that is very similar. The study revealed in temporary compared with permanent workers a higher 1-month prevalence for UWSA (1.4% vs. 0.8%, Chi-squared test: $p<0.05$) and SH (0.8% vs. 0.3%, Chi-squared test: $p<0.05$). However, associations were not controlled for socio-demographic and occupational factors in multivariable analyses. Instead, regression analyses were performed on workplace violence, an item constructed around several experiences of discriminatory and threatening behaviours at work, additionally including verbal abuse, humiliating behaviour, physical violence, and bullying. Nevertheless, analyses adjusted for covariates, including age, showed that workplace violence was more common in temporary compared with permanent employment relations (OR 2.38, 95% CI 2.01-2.84).

Results of study 3 together with previous findings suggest a relationship between precarious employment and workplace SH, particularly when several aspects of precarious employment are simultaneously present. A possible explanation could be that job insecurity might discourage workers in precarious settings from making formal or informal complaints as they fear job loss. A study that retrospectively reviewed 88 cases of formal complaints of workplace SH in California found that most perpetrators were supervisors and that around every second victim of SH was fired after not agreeing on sexual advances (Coles, 1986). It might be also possible that perpetrators of SH fear less consequences if their victim is a temporary member of the organisation with limited job tenure. However, a note of caution is due here since findings on temporary employment were mixed and the number of epidemiologic studies is sparse yet. A further investigation could address this question using items on UWSA that cover broader time spans.

Furthermore, the observed association between the multidimensional EPS and UWSA and SH could also be attributed to limited workplace rights and lacking formal protection systems in precarious employment settings. Thus, a particular high correlation between schedule unpredictability, low information on OSH risks, and multiple job-holding with UWSA and SH, even after controlling for socio-demographic and occupational factors, may point to the role of lacking working standards in precarious jobs, which also have been described in other studies (Becker & Engel, 2018). Notably, a lack in workplace rights and organisational procedures as complaint systems are an important driver in the occurrence of sexual harassment at work (Clancy et al., 2014).

In summary, findings of the third study could contribute to the field by adding evidence for a link between precarious employment and elevated exposure to discriminatory experiences at work. This demonstrates one possible pathway by which precarious employment affects health, as experiences of sexual harassment are followed by reduced mental and physical health, and increased risk for post-traumatic stress disorder (Willness et al., 2007). The combination of findings provides support for the conceptual premise that poorer working conditions contribute to health disparities between precarious and non-precarious workers. With regard to the three-pathway model (Figure 12), findings of study 3 suggest that precarious employment relations are associated with increased exposure to psychosocial occupational health risks (pathway b), which then leads to poor health (pathway g). This is an important issue when designing policies to combat sexual harassment, because precarious employment settings should receive increased attention. Second, to manage precarious employment as a social determinant of health, it could be worthwhile to set a focus on occupational health risks.

7.2 Secondary findings

7.2.1 Age differences

While associations between precarious employment and UWSA and SH did not systematically vary between age groups, a consistent finding in the first and second study was that links between precarious employment and presenteeism were somewhat stronger for older compared with younger workers. This age gradient can be corroborated with other epidemiological studies on job insecurity and health-related outcomes (Cheng & Chan, 2008). According to the job dependence theory (Greenhalgh & Rosenblatt, 1984), negative consequences of job insecurity are more strongly pronounced if people are reliant on their job. Compared with older people, young workers have less family obligations and, at the beginning of their careers, even more flexible to find new employment. A second explanation can be derived from the job adaption theory (Hulin,

1991), which predicts that consequences of job insecurity are more severe if people have a strong bond with their workplace. As young workers have usually a lower job tenure compared with older workers, they have less organisational commitment and higher turnover intentions.

7.2.2 Country differences

All three studies relied on a cross-national data set including up to 35 European countries, which are not homogeneous in terms social, political, and economic features (Lübke & Erlinghagen, 2014). As shown by Figure 13, the strongest differences in presenteeism between temporary and permanent workers – with some exceptions – were found in Southern and Eastern European countries, where social security systems are less developed and unemployment rates are high (Bambra & Eikemo, 2009). Both factors may explain country differences, as presenteeism could be stimulated more easily from job insecurity when the outlook to find other work is poor and unemployment benefits are low. This can also be corroborated with what is known from other studies showing welfare states being able to buffer adverse consequences of precarious employment or high psychosocial work stress (Dragano et al., 2011; Kim et al., 2012). As also shown by Figure 13, in the United Kingdom and Estonia, temporary workers were less likely to choose presenteeism than permanent employees. One possible explanation might be that temporary employment rates are generally low in these countries (Eurofound, 2017a). As mentioned in the introduction, low rates of non-standard employment forms indicate labour markets that are less segmented between temporary and permanent employees according to employment insecurity (Eichhorst et al., 2017; Kalleberg, 2003; Rodgers, 1989). This means that employment protection legislation (EPL), also for permanent workers, is low and that contractual temporariness is less shaped by precariousness and can have other reasons, for example to be in the probationary period.

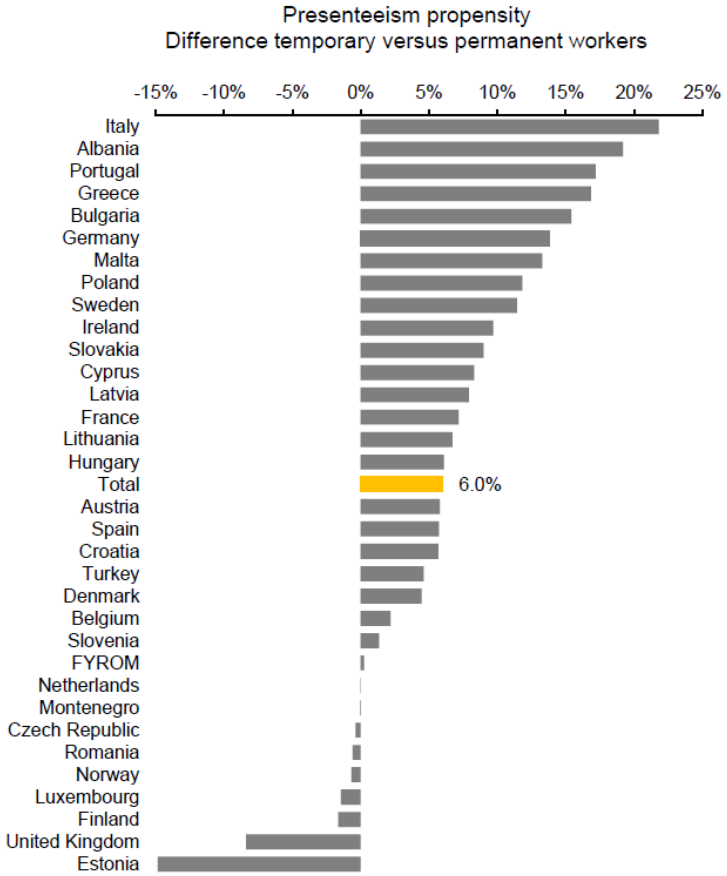

Figure 13: Additional analysis from study 1 (not published)

Data source: EWCS (2015). *N*=20,240 European employees. Frequencies adjusted for sex, age, occupational position, working sector, company size, job tenure, weekly working hours, income, and the total number of illness days.

Figure 14 illustrates the relationship between the employment precariousness score and UWSA (combined for men and women) separately for each country. In general, with every scale point the score increased, the prevalence of UWSA changed by +28%. This association was observed in most countries, however, with some unsystematic variation in strength and significance. One reason explaining country variation could be that employment precariousness in some countries was more driven by indicators that were not associated with UWSA, for example involuntary part-time or low pay.

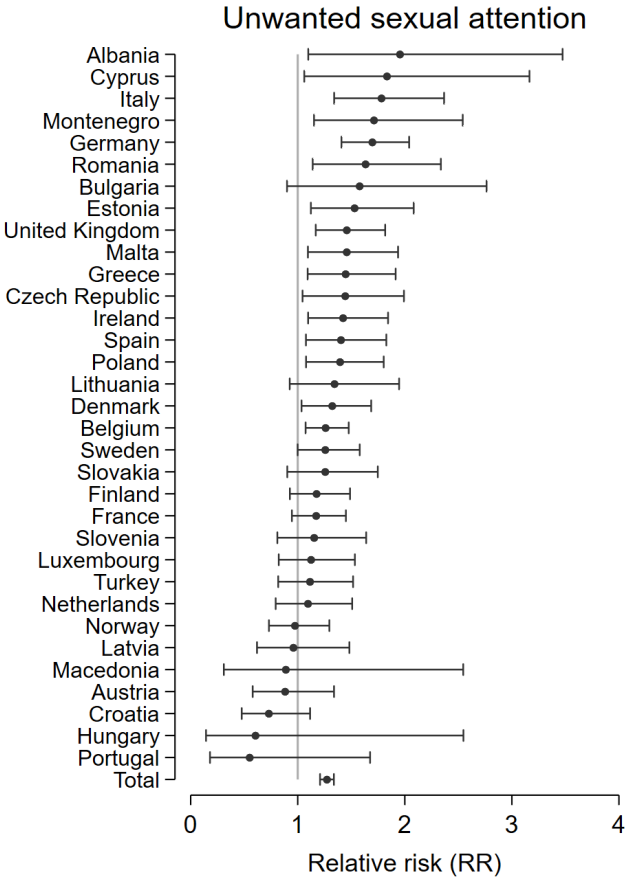

Figure 14: Relationship between EPS and unwanted sexual attention by country

Data source: EWCS (2010, 2015). *N*=63,966 European employees. Frequencies adjusted for sex, age, job tenure, working hours, and survey year. Additional analyses, not published.

7.3 Strengths and limitations

7.3.1 Use of a multi-country cross-sectional data set

As all three studies rely on cross-sectional data, findings are limited in terms of drawing causal inferences. However, as the aim of this thesis was to assess occupational health burdens in the group of precarious workers, the use of cross-sectional data provides advantages as representativeness, high sample size and assessment of multiple work characteristics and outcomes at once. The lack of a longitudinal study design in both studies on sickness presenteeism might be less problematic, as presenteeism is unlikely to cause a temporary employment contract or high regional unemployment in terms of reversed causality. Due to the use of cross-sectional data, study 3 was limited to a descriptive examination of the prevalence of UWSA and SH depending on employment

precariousness. Thus, study 3 does not inform about a causal relationship. On the one hand, precarious employment does affect protection and job security of workers, which can make them more vulnerable against unwanted sexual advances. On the other hand, victims of sexual harassment might be more likely for job changes and downward mobility, causing elevated precariousness. Regardless of the methodological limitation, the results give reason for future studies to test both considerations with longitudinal data.

A general strength was the use of a cross-national data set including an almost exhaustive number of European countries. Study 1 and study 2 were the first works assessing the presenteeism propensity by making use of a representative, multi-national data set. Consequently, this allowed for estimating the prevalence of presenteeism in a sample of 35 European countries using a common method and survey design. This offered first insights into the variation of presenteeism across European countries. A multi-country data set further allows for more general conclusions giving important practical implications for EU-wide policies. Another strength of the EWCS is the broad range of socio-demographic and occupational characteristics available. This allowed to control for possible confounders but also gave insight into the variation of presenteeism and sexual harassment along these factors. High numbers of individual- and country-level observations in the EWCS further avoided sample size limitations.

7.3.2 Indicators of precarious employment

For the purpose of precarious employment measurement in study 1 and 3, proxy indicators were chosen that capture the deviance of employment relations in comparison to the SER (Kalleberg, 2009; Quinlan et al., 2001; Rodgers, 1989; Tompa et al., 2007). In the first study, the type and duration of the working contract was used, which is the predominant indicator of precarious employment in the literature (Kreshpaj et al., 2020). In contrast to perceived job insecurity, the type of working contract is considered to be a 'objective' measure, which does not depend on the respondent's perception of a certain phenomenon (Witte & Näswall, 2003). Accordingly, the probability for any response bias is low. Temporary working contracts are considered to give valid information on health consequences of precarious employment in terms of stress experiences and material deprivation, because temporary workers can be less certain about the existence of their job in the future (Greenhalgh & Rosenblatt, 1984; Sverke et al., 2006) while often being disadvantaged in terms of eligibility criteria for social insurance benefits (Eichhorst et al., 2017; Spasova et al., 2016; Spasova et al., 2017). However, as discussed in the introduction, the meaning of temporary employment can vary between countries (Eichhorst et al., 2017). Thus, the working contract might provide limited information on precariousness in countries where the number of temporary contracts is rather low.

Within the scope of the second study, high labour market insecurity as a macro-level determinant of precarious employment was used (Hipp, 2016). Unemployment rates were obtained from official labour market statistics disseminated by Eurostat (2020c). Thus, the measurement of labour market insecurity was unable to be affected by reporting bias or common method bias (Siemsen et al., 2010).

Study 3 on sexual harassment relied on a multidimensional concept of precarious employment (Rodgers, 1989; Tompa et al., 2007). Accordingly, precariousness was measured by multiple indicators as well as a cumulative score derived from them. The selection of indicators was guided by the approach of previous studies using a multidimensional approach (Julià et al., 2017; Puig-Barrachina et al., 2014; Vives et al., 2010). However, indicators that did not relate to the employment relationship were deliberately not included. This involved indicators considered as possible outcomes (e.g. discriminatory or unfair behaviour, rights for sick leave). The EPS was constructed as a formative index (Latcheva & Davidov, 2014) based on the sum of seven dichotomous indicators: temporary employment, contractual duration of less than one year, schedule unpredictability, involuntary part-time, low OSH information, low pay, and multiple jobholding. To assess analytical applicability, plausible associations with socio-demographic and occupational covariates were tested. For example, elevated scores were found in young workers, women, low-educated, migrant workers, lower occupational class positions, small businesses (<10 employees), as well as in 2010 compared with 2015. These patterns reflect well-established correlations (Landsbergis et al., 2014). Multidimensional scores measure the accumulation of several disadvantageous aspects that give rise to precariousness, which might help to reduce ambiguity. Therefore, the EPS might be more appropriate when a cross-country study design is used. A disadvantage is a loss of information about mechanisms that relate precarious employment to health risks. Thus, it is not possible to conclude if stress-, work-, or poverty-related mechanisms come into play, which is, however, important to give recommendations for policy and practice. One strategy can be to analyse both, single indicators and a score derived from them, as was done in study 3.

7.3.3 Self-reported sickness days, presenteeism propensity

A limiting factor of both studies on presenteeism may result from the use of self-reports to measure days of sickness absence and sickness presence, which could be inaccurate or affected by recall bias (Coughlin, 1990). However, the use of self-reports is inevitably to assess presenteeism, since no register data on sickness presence is available. Registry-based information on sickness absence is also less comparable between countries due to varying definitions (Eurofound, 2010b). Days of sickness absence and presence were retrospectively assessed in reference to the last 12 months, which has the advantage

to compensate fluctuations due to seasonal diseases (e.g. flu, cold). However, longer time periods are more likely to be affected by poor memory (Ruhle et al., 2020). A meta-analysis comparing self-reported absence days with registry-based information showed, though, satisfactory reliability and validity of self-reported measures (Johns & Miraglia, 2015). More precisely, the average reliability of self-reports was $\bar{r}_{ij}$=0.89 (4 samples, n=300) and the validity was $\bar{r}_{ij}$=0.73 (19 samples, n=11,479). In consequence, findings on sickness presenteeism are less likely to be biased by the use of self-reports. A strength of both studies was to measure the decision for or against presenteeism by the presenteeism propensity (Gerich, 2015) instead of relying on the absolute number of presence days. This made it possible to account for different health conditions of temporary and permanent workers, resulting from the healthy worker effect (Wagenaar et al., 2012; Wilcosky & Wing, 1987).

7.3.4 Measurement of sexual harassment

Information on experiences of UWSA and SH in the EWCS was restricted to single-item questions. Therefore, it was not possible to control the fact that people have different ideas about what constitutes UWSA or SH (McDonald, 2012). Consequently, the measurement of UWSA and SH is likely to be biased by personal characteristics. However, associations between UWSA and SH with covariates as gender, age, education, occupation, and country were comparable with those reported in the EU-wide survey "Violence against women", where SH was ascertained by a set of behavioural categories (e.g. "unwelcome touching, hugging or kissing" or "sexually suggestive comments or jokes that made you feel offended") (European Union Agency for Fundamental Rights, 2015). Surprisingly, both surveys found higher prevalence of SH in Northern and Western European countries, which points to some possible bias resulting from contextual factors as the level of public awareness. Another possibility to measure SH more objectively would be to use register data. However, registry data obtained from formal complaint systems is very likely to suffer from selection bias, as studies found that only a minority of victims of SH fill in a formal complaint (Ilies et al., 2003). Additionally, precarious workers might experience a higher burden to report cases of SH because of higher job insecurity. Thus, to measure workplace sexual harassment remains problematic and reporting bias was a limitation that was not possible to fully control for. However, observed associations of UWSA and SH with young age, female gender, migration background, working in healthcare, or in opposite-gender dominated workplaces reflect plausible patterns with high agreement to the literature (McDonald, 2012).

7.4 Implications

7.4.1 Implications for future research

Several questions still remain to be answered. First, the most obvious finding albeit of analysing occupational health burdens in context of precarious employment were the lack of a commonly-accepted definition of precarious employment. As discussed in the introduction, the latent construct behind the term "precarious employment" is not clearly defined in research. There is a definite need for a commonly-used concept of precarious employment in public health. This concept should orientate on the premise that precarious employment describes the erosion of the standard employment relationship. In my view, there are good arguments for limiting the measurement to aspects of the formal relationship between employer and employee, the most meaningful of which is certainly the employment contract. The arguments for this are the avoidance of circular reasoning, in which possible health-related consequences of precarious employment are already integrated into the construct. One limitation when studying precarious employment by the use of single-items is that compatibility between countries is unclear, because political systems can use different strategies to increase work flexibility and temporary work is just one possibility. One solution might be to integrate questions on reasons for temporary employment in surveys monitoring working conditions (voluntary, probationary period, no job alternative available on an open-ended basis). For example, no such perspective is integrated in the EWCS survey yet.

Second, study 2 on sickness presenteeism has demonstrated that workers increase attendance behaviour when unemployment is high. Against the background the economic consequences of the COVID-19 pandemic, a further study could assess the impact of rising unemployment on presenteeism behaviour in the European labour force. At the time of the study, no such data was available. A second point is the effect of the current crisis on the growth of precarious employment in general. The economic consequences of the pandemic might further erode SER jobs and replace them with precariously designed jobs in the aftermath. This has been observed, for example, in many European countries during the financial crisis 2008 (Broughton et al., 2016; Gutiérrez-Barbarrusa, 2016). Thus, this calls for studies monitoring the incidence of precarious employment as well as health-related consequences.

Third, as already mentioned, further studies regarding the association between precarious employment and sexual harassment would be worthwhile. Future studies should rely on longitudinal study designs and a measurement of sexual harassment that includes wider time spans as well as behavioural categories instead of single-item questionnaires. No such data was available at the time of the dissertation.

7.4.2 Intervention strategies

The results of the dissertation complements with previous studies, suggesting that precarious employment is associated with elevated occupational health risks that create and exacerbate health inequalities in the labour force. Consequently, the increased reliance on flexible employment forms should be seen critically in view of the consequences for public health. Possible interventions may aim to reduce exposition to precarious employment or prevent the negative effects on health (Table 5). A reduction in the incidence of precarious employment in Europe can be achieved, for example, through national or EU-wide legislation. One possibility would be to raise incentives for companies to create full-time, permanent jobs through tax reliefs. For example, in 2013, Slovenia, France, and Italy have each raised the employer's rate for unemployment insurance contributions for non-permanent jobs, but granting contribution release for some time when a temporary job is converted into a permanent one (Eichhorst et al., 2017). Another possibility is to strengthen labour standards for temporary employees by raising dismissal protection, social rights, and minimum wages (Marmot, 2010). For example, in most European countries, there are far fewer formal guidelines regarding the termination of a non-standard form of employment compared with SER jobs (Eichhorst et al., 2017). Another strategy may aim to increase the level of training of temporary workers in order to improve employability. This could be implemented on the organisational-level, including training programs and continuing education. This might be key, as precarious employment is far more often to find among low-educated or low-qualified workers, who are more inclined to accept precarious employment conditions as the only alternative to unemployment (Landsbergis et al., 2014). Another set of strategies can aim to reduce health effects of precarious employment. As the first two studies have shown, workers precarious settings perceive higher burdens in taking sickness absence, possibly caused by a mix of job insecurity with monetary aspects. Thus, strengthening social protection by universal healthcare coverage could effectively dismantle hurdles to sickness absence and prevent workers from cultivating damaging sickness behaviour. More generally, the implementation of policies increasing social security and protection as universal health care is important to prevent precarious workers from poverty-related health risks. In a more general sense, this addresses the political strategy of "flexicurity" (Wilthagen & Tros, 2004). Flexicurity (a portmanteau of "flexibility" and "security"), is a type of welfare state model that aims to balance between organisations' demand for flexible employment forms and workers' needs for social security by establishing policies of flexibility in combination with ALMP, life-long learning and adequate social protection. In 2007, the European Commission defined flexicurity as a key policy concept to address the challenges of globalisation (European Commission, 2007). However, to date, no protective effect of flexicurity for health inequalities could be identified since only few

Table 5: Intervention strategies

	Lower-level (Individual/Organisation)	Higher-level (Country/EU)
Reduce exposition to precarious employment	Training programs - Skill-development - life-long learning	Strengthen labour standards of non-standard employment forms - Dismissal protection - Minimum employment conditions - Raising minimum wages Raising incentives for creating permanent jobs - Tax relief for the creation of permanent jobs - Financial 'penalties' in case of high reliance on a temporary workforce
Reduce health effects of precarious employment	Improving workplace rights and protection - Equalise awareness of and access to OSH measures between temporary and permanent workers - Improve access to complaints procedures	Strengthening social protection - Implementing flexicurity policies - Universal healthcare coverage

European countries have taken the security part of flexicurity serious and adequately adopted related policies (Shahidi et al., 2016). On the organisational-level, prevention from health risks as presenteeism and discriminatory experiences can be archived by the integration of protective working standards. A good example is the establishment of monitoring and documentation procedures, awareness raising campaigns, and the nomination and training of safety staff. Those strategies were found to be effective in order to reduce occupational health disparities (Landsbergis et al., 2014).

8 Conclusion

The thesis set out to extend our knowledge on health-related consequences of precarious employment. As previous studies mainly focussed on stress and poverty-related outcomes, the three empirical studies of the thesis could show that precarious employees are more often exposed to psychosocial occupational health risks. In a representative sample of European workers from 35 countries, it has been shown that employees exposed to insecure employment and labour market conditions are more prone to avoid sickness absence and choose presenteeism in the event of illness. Additionally, precarious employment was related to higher likelihood for self-reported experiences of workplace sexual harassment. Taken together, precarious and insecure employment forms are likely to play a role for the emergence and exacerbation of health disparities in the European workforce. This calls into question the increasing use of non-standard forms of employment in Europe, which is currently seen as a necessary condition for job creation and productivity. However, against the background of the numerous disadvantages in occupational health, it would be advisable to question the massive use of precarious employment forms, particularly among young people. To prevent a further increase in health inequalities, one possibility would be to improve social protection of temporary and part-time employees. Accordingly, entitlements to social benefits, for example sick pay in the event of illness, should apply equally to both temporary and permanent employees. Another point relates to the improvement of occupational safety measures. To prevent precarious workers from the experience of discriminatory behaviour, extending workplace rights and protection systems might be key. This could be especially effective in sectors where non-standard employment forms are clustered, as in industries where a large number of low-paid and low-skilled workers are employed on a flexible basis. Regarding future research on precarious employment, considerably more effort will need to be made to develop a meaningful concept of precarious employment for public health research. This is important in order to bundle evidence from various studies on the health consequences of precarious employment and to transfer it to the policy process.

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10 Appendix

Table A1: Sample description European Working Conditions Survey

	2000		2005		2010		2015	
	N	%	N	%	N	%	N	%
Gender								
Men	14,693	55.0	11,174	53.6	15,321	53.0	14,490	50.3
Women	12,044	45.0	9,679	46.4	13,590	47.0	14,323	49.7
Total	26,737	100.0	20,853	100.0	28,911	100.0	28,813	100.0
Age group								
15-29 years	6,869	25.7	5,020	24.1	6,412	22.2	5,629	19.5
30-49 years	14,612	54.6	11,398	54.7	15,574	53.9	14,775	51.3
50-74 years	5,256	19.7	4,435	21.3	6,925	24.0	8,410	29.2
Total	26,737	100.0	20,853	100.0	28,911	100.0	28,813	100.0
Type of working contract								
Permanent	21,963	82.1	16,012	76.8	22,980	79.5	23,106	80.2
Temporary	3,322	12.4	2,827	13.6	3,831	13.2	3,869	13.4
Other	1,250	4.7	1,782	8.5	1,966	6.8	1,778	6.2
Missing	202	0.8	232	1.1	134	0.5	61	0.2
Total	26,737	100.0	20,853	100.0	28,911	100.0	28,813	100.0
Invol. part-time employment								
No	0	0.0	0	0.0	26,327	91.1	26,060	90.4
Yes	0	0.0	0	0.0	1,431	4.9	1,621	5.6
Missing	26,737	100.0	20,853	100.0	1,153	4.0	1,133	3.9
Total	26,737	100.0	20,853	100.0	28,911	100.0	28,813	100.0
Multiple job holding								
No	24,990	93.5	19,427	93.2	26,704	92.4	26,572	92.2
Yes	1,608	6.0	1,221	5.9	2,000	6.9	2,156	7.5
Missing	139	0.5	204	1.0	207	0.7	85	0.3
Total	26,737	100.0	20,853	100.0	28,911	100.0	28,813	100.0
Low-paid job								
No	0	0.0	0	0.0	17,424	60.3	20,486	71.1
Yes	0	0.0	0	0.0	3,088	10.7	4,282	14.9
Missing	26,737	100.0	20,853	100.0	8,399	29.1	4,045	14.0
Total	26,737	100.0	20,853	100.0	28,911	100.0	28,813	100.0
Job insecurity								
No	0	0.0	16,920	81.1	22,314	77.2	22,102	76.7
Yes	0	0.0	2,962	14.2	4,626	16.0	4,279	14.8
Missing	26,737	100.0	971	4.7	1,971	6.8	2,432	8.4
Total	26,737	100.0	20,853	100.0	28,911	100.0	28,813	100.0
Sample size	26,737		20,853		28,911		28,813	

Table A2: European Union country codes

Country	Code
Belgium	BE
Bulgaria	BG
Czechia	CZ
Denmark	DK
Germany	DE
Estonia	EE
Ireland	IE
Greece	EL
Spain	ES
France	FR
Croatia	HR
Italy	IT
Cyprus	CY
Latvia	LV
Lithuania	LT
Luxembourg	LU
Hungary	HU
Malta	MT
Netherlands	NL
Austria	AT
Poland	PO
Portugal	PT
Romania	RO
Slovenia	SI
Slovakia	SK
Finland	FI
Sweden	SE
United Kingdom	UK

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