A job is good,

but is a good job healthier?

Longitudinal analyses on the health consequences of unemployment and precarious employment in Europe.

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Cooperation with co-authors and publications/submissions

The three chapters of this dissertation are based on work that has been submitted or published in scientific journals. The following list gives an overview of the papers and shows which (and how many) co-authors were involved in each project.

Article 1

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Article 3

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When I assumed my Ph.D. position, I knew that a long and challenging journey would open up before me. But I did not expect so many difficulties along the way. Migration, albeit privileged, and a global pandemic were just two of the entanglements that made this journey a little more arduous than expected. Now that I have made it to the end, I would like to thank, first of all, myself for taking on this challenge and seeing it through.

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General Introduction

1. Motivation

1. 1. Opening remarks

Unemployment and precarious employment—generally defined as uncertain, unstable, and insecure employment and in which employees bear the risks of work (Kalleberg and Vallas 2017)—are major problems of modern capitalist economies (Ehlert 2016; Kalleberg 2009). Social scientists uncontestably share the view that employment instability and precarious work are connected to many unfavorable outcomes for individuals, families, and societies as a whole (Kalleberg and Vallas 2017; Brand 2015). As people lose their jobs not only during periodic economic recessions but also because of continuous economic adjustments, the economic and non-economic consequences of unemployment have been on the research agenda for a quite long time (Jahoda, Lazarsfeld, and Zeisel 1974), and they will remain important issues also in the future (Ehlert, 2016). On the other side, the focus on the precarity and insecurities of work as 'new risks' associated with the labor-market has emerged only later in the scientific and political discourse (Castel and Boyd 2003; Bourdieu 1998), consequently to the resurgence of unstable and insecure forms of work arrangements and employment relationships after the Fordist Era (Kalleberg 2009). Many scholars state that the Western European advanced economies have faced several interrelated structural and societal changes that have taken place over the last five decades. Among the others, globalization, international trade, technological change, and deregulation of markets and welfare states are believed to have decreased the chance of workers being employed in standard and adequate jobs with significant adverse effects on their careers and quality of life (Bosch 2004; Kalleberg 2018).

Among all of the negative consequences of job loss and employment precariousness, this study focuses on (maybe) the less noticeable: decreases in individual health. It is a common belief that good health merely means the absence of disease or infirmity and that, consequently, it depends only on the access and quality of health care. However, as defined by the WHO, health can be regarded as 'a state of complete physical, mental and social well-being (WHO 1948) and 'the extent to which an individual or group is able on the one hand to realize aspirations and satisfy needs; and, on the other hand, to change or cope with the environment' (WHO 1984)[1]. In this sense, health is a comprehensive concept covering

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[1] For a discussion on the WHO's health definition, see for instance Bickenbach 2015.

different dimensions of well-being and capacities and a personal and social resource necessary for living. Therefore, besides the most 'proximal' factors such as the formal health care settings and the most obvious being intrinsic biological characteristics such as age, sex, and genes, health and health inequalities[2] depend on a wide range of social determinants[3], including work and employment (Solar and Alec 2010; Link and Phelan 1995; Wilkinson and Marmot 2003). Health, then, is not just a medical issue but a complex social and economic phenomenon and a critical social justice concern (Sen 2002).

Although there are other crucial effects of unemployment and precarious work—such as on future careers as well as on economic well-being or fertility choices (e.g. Scherer 2004; 2009; Giesecke 2009; Giesecke and Groß 2003; Modena and Sabatini 2012; Del Bono, Weber, and Winter-Ebmer 2012; Kreyenfeld 2010; for a review on the far-reaching consequences of job loss see Brand 2015)—the effects on health are arguably the most remarkable. This study aims to advance our knowledge about the health consequences that unemployment and precariousness cause over the life course. In particular, I investigate which moderating factors may offset or increase the impact of employment instability and insecurity on individual health. In doing so, I focus on other social determinants of health, namely, gender, the family, and the broader cultural and institutional context.

1.2. Moderating factors

A relatively solid result in the literature dealing with the social determinants of health is that unemployed[4] people have worse health than employed ones (for reviews, see Paul and Moser 2009; Wanberg 2012; Norström et al. 2014). The direct effect of unemployment on health is usually explained by the deprivation of both economic and psychosocial rewards that are associated with employment (see Nordenmark and Strandh 1999 for a theoretical synthesis). In particular, exposing workers and their families to a sudden and often persistent reduction in income, to poverty (Gallie, Paugam, and Jacobs 2003) and material deprivation (Whelan et

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[2] Health inequalities are generally defined as systematic, plausibly avoidable differences in health, varying according to levels of social advantage, with worse health occurring among the disadvantage (Braveman 2006)

[3] The social determinants of health—also regarded as 'social conditions'— refer to social, economic and political conditions encompassing a wide range of modifiable factors that are outside the scope of medical care (Solar and Alec, 2010).

[4] For the sake of simplicity, throughout this introduction I refer to either 'unemployment' and/or 'job loss' interchangeably, although they are two different concepts. Their definitions and implementations will be better discussed in the articles of this thesis.

al. 2001), unemployment hampers the capability of people to make their needs met, including the achievement of good health.

According to the second mechanism, unemployment is thought to bring along some 'latent' losses connected with individuals' psychological needs (Jahoda 1982), which may also lead to a reduction in health. Joblessness deprives people of economic resources and rewards and of a recognized social role and social standing in society, affecting their sense of self and identity. The interruption of the career path represents a loss of status, prestige, and power entailed in the occupational position. Unemployed persons have been stripped of their social contacts, left isolated, and detached from a safety net of emotional and social support; they suddenly come to miss the time structure of a daily routine, which confers control over life and purposeful time use (Karsten Ingmar Paul, Geithner, and Moser 2007). Moreover, the restriction in personal agency caused by financial deprivation prevents workers from dominating the present and planning a meaningful future (Strandh 2000; Fryer 1986). Finally, unemployment stigmatizes people as non-useful, lazy, or meaningless for society (Young 2012), reducing their confidence, self-conception, and health.

Whether the negative effect of unemployment on health is causal or determined by selection mechanisms, studies have brought evidence for either of the two explanations, and the debate is still contested. Longitudinal studies have shown that unemployment is causally linked to health (Burgard, Brand, and House 2007; Tøge and Blekesaune 2015; Krug and Eberl 2018a), yet selection may play a crucial role (for instance, Böckerman and Ilmakunnas 2009; Salm 2009; Schmitz 2011). My thesis moves its first step from this point, investigating the consequences of entering unemployment and changes in individual health.

Less clear is the evidence on the role of precarious employment as 'emerging' social determinants of health (Benach et al. 2014). Whether there is a causal relationship and whether precarious work has negative (or positive) consequences on individual health are still open questions. Because of the risk of remaining trapped in cycles of poor working conditions, low paid jobs, and unstable employment, people in precarious work may experience unfavorable health outcomes (Ferrie et al. 1999; Julià, Vanroelen, et al. 2017) and even to see the positive health effect of re-employment nullified (Gash, Mertens, and Gordo 2007; De Witte, Pienaar, and De Cuyper 2016; Chandola and Zhang 2018). From this perspective, precarious work does not guarantee the same health protection as non-precarious work (Rodriguez 2002; Van Aerden et al. 2015; 2016), neither it seems to exempt workers from the stress and the health risks typically associated withs unemployment (Karen Van Aerden, Gadeyne, and Vanroelen 2017; Broom et al. 2006; Knabe, Rätzel, and others 2010).

By contrast, unlike the unemployed, precarious workers earn wages and salaries, gain from the latent functions of having a job, and do not suffer the stigma of being jobless. Because of this, they are often considered better off than those who are unemployed. Moreover, specific precarious jobs—those characterized by temporary contractual conditions—are thought to serve as a 'stepping-stone' towards stable and secure employment (Scherer 2004). Indeed, they represent an opportunity for job seekers in terms of human capital gains, network possibilities, and opportunities to signal one's ability and motivation to work (Korpi and Levin 2001). In this view, poor quality employment is assumed to promote good health, at least after the job loss experience (Gebel and Voßemer 2014).

Some scholars argue that these contrasting results are due to the lack of accuracy and consistency in measuring employment precariousness (Benach et al. 2014). Indeed, the operationalization of employment precariousness represents a challenge for social scientists (Düll 2004; Laparra 2004; Barbier 2005) and the present study. Here, I try to reconcile theory and praxis by disentangling the concept of precariousness from a simple dichotomy of temporary versus permanent contracts. Then, by developing a multidimensional, I aim to measure the (causal) effect of having a precarious job on individual health.

Although the role of precariousness for health is not as straightforward as unemployment, it is well-known that the risks and consequences of both labor-market risks are socially stratified (Gangl 2003; Puig-Barrachina et al. 2014; Struffolino 2019). Although the secular increase in female labor market participation in most EU countries, evidence has repeatedly shown that women are more exposed than men to these labor-market risks. Women remain more excluded from labor, have more fragmented careers, are more segregated in precarious jobs, and are less likely to be re-employed after a job loss than men (Mascherini, Bisello, and Rioboo Leston 2016; OECD 2012). Moreover, due to different financial needs, gender role expectations, and socialized gender differences in identity structures, women and men may also react differently to unemployment and employment characteristics, showing a different level of vulnerability (Pugliesi 1995).

As a result of *differential exposure* or *differential vulnerability*, labor market risks may impact men's and women's health differently. Yet, clear evidence on the gender differentials is still missing, and this thesis aims to fill this gap. I am interested in the (causal) effect of gender on the effects of unemployment and employment precariousness on health. In my thesis, I study the moderating effect of gender by looking at it as a socially constructed stratification system rather than an individual attribute. Namely, I look at how opportunities and constraints are differentiated based on sex category and at different social levels: At the individual level, as gender is deeply embedded in our personalities in terms of gendered identities; at the relational level, as men and women face different cultural expectations even when they fill the identical

structural positions our cultural rules; and at the institutional level, as policies and regulations regarding resource distribution and material goods are gender-specific (Risman 2004).

The importance of studying the moderation effect of gender is further confirmed by the fact that gender itself is one of the most profound social determinants of health (Sorensen 2000) and that the gender gap in health is a challenge of global proportions. Although they live longer, women are disproportionally more ill than men across many health outcomes and societies (CSDH 2008; WHO 2015). As for gender inequalities in the labor market, the social factors that influence gender inequalities in health need to be found in the structural conditions that differentiate the lives of men and women at many levels (Verbrugge 1985). Namely, they need to be found in the division of paid and unpaid labor within the family and the broader society, in the policy regime and institutions, and the cultural context. Then, as risks and consequences of unemployment and precariousness stratify along with gender—which is already an axis of health inequality—questions arise about the risk of accumulation of health disadvantages among men and women (Willson, Shuey, and Elder 2007; Cullati et al. 2014) and the way labor market risks contribute to the increasing gender inequality in health. Analyzing by gender is then crucial to understand which group of workers might experience higher risks of poor health at the face of unemployment or employment precariousness and target policy interventions to reduce labor-related gender inequalities in health.

Given the unequal distribution of risks and consequences of employment instability and insecurity, welfare states assume a central role as offsetting factors (DiPrete 2002; Gangl 2003). Because of labor-market-related risks, modern welfare states implement some form of social protection and labor-market policy programs, compensating the losses that come from more or less prolonged periods of unemployment or precariousness. Scholars have argued that generous and universalistic welfare systems are necessary to protect living standards for individuals and families. In turn, they are also essential to guarantee access to healthy lifestyles, health prevention programs, and proper medical care, and, eventually, to reduce health inequities within and among countries (Coburn 2004; Bambra 2005). As it moderates the social determinants of health—such as socioeconomic status—the welfare state is considered another fundamental determinant of health (Raphael and Bryant 2004; Bambra 2007). Many studies have shown that the more generous the welfare state, the better health at the population level (Eikemo et al. 2008; Ferrarini, Nelson, and Sjöberg 2014). However, not all welfare states provide the same level of social protection and, effectively to the same extent, de-commodify labor (Gosta Esping-Andersen 1990). Finally, even the protection offered by the states does not apply equally to all workers. For instance, those who are more often working in marginal employment—such as women—do not have access to unemployment benefits and other measures or subsidies (e.g. short-time work) that can buffer

the negative consequences of labor-market shocks. Thus, welfare states differences are relevant for my thesis, as I try to explain how and why the health costs of employment instability vary across different institutional contexts and among population groups—namely, men and women.

When welfare state intervention is not adequate, other social institutions—such as the family—may take a major role in 'absorbing' the health (and economic) costs of labor-market risks. For instance, previous research has shown that close and intimate family ties are beneficial for individuals' health as they can provide social supports (Umberson and Karas Montez 2010; Umberson and Thomeer 2020), especially in case of threatening life-course risks such as unemployment (Gore 1978; Ross, Mirowsky, and Goldsteen 1990; Milner et al. 2016). Indeed, social support gives people the emotional and practical resources they need to cope with stressful events. Moreover, belonging to a social network of communication and mutual obligation makes people feel cared for, loved, esteemed, and valued. Finally, supportive and positive relationships may also encourage healthier behavior patterns (Umberson and Thomeer, 2020)[5]. Thus, social support has a powerful protective effect on health. As individuals may live in different types of families (e.g. single, partnered, with children, etc.), the support provided by the family to its members is an important source of variation in the individual health effects of labor market risks.

In addition, some scholars have suggested that the 'informal' family welfare is a crucial factor in reducing within and cross-national health inequalities (Bartley 2003). For example, some studies have revealed that in the Southern and Bismarckian welfare states, characterized by a lower level of 'defamilization'[6] (Bambra 2004; 2007) and less generous welfare provisions (Esping-Andersen 1999), health inequalities between employed and unemployed are smaller than in the Northern countries (Bambra and Eikemo 2009). Namely, in some contexts, the family might 'crowd out' or 'help' the state by buffering part of the negative health consequences of employment instability and then, reducing health inequalities. It follows that comprehensive assessments of the health costs of labor market risks not only require focusing on the individual affected workers but also accounting for their family environment and for the interplay between the family and the broader context. Hence, one of the aims of my thesis

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[5] Social support can also be detrimental for health if the network motivates individuals to do unhealthy behaviours – such as drink, smoke, drugs use, etc.

[6] Defamilization is here regarded as the extent to which the welfare state enables women to survive as independent workers and decreases the economic importance of the family in women's lives (Bambra, 2007).

is to investigate how different types of family interact with different welfare states (regimes) to buffer the health damage of job loss across Europe.

When the role of the family is studied at the intersection with the broader context, gendered differences in the health consequences of labor-market risks might also emerge more clearly. As women's employment behaviors are contingent on the family situation —i.e. family structure, care responsibilities, employment and working conditions of the spouse/partner— and from the level of 'defamilization' guaranteed by the state, the way the welfare state and the family interact may affect the gender differential in health linked to labor related risks. It is known, for instance, that the institutional context has a major influence on the relationship between unemployment, gender, and health: joblessness is more negatively related to health among men than among women in contexts where women are less autonomous and economic independent from the family. In contrast, men and women are equally affected by unemployment in more gender-equal contexts. Moreover, evidence shows that factors related to the family explain the gender differential in the less egalitarian context (Strandh et al. 2013). Therefore, to better understand the relationship between labor market risks and health, I will compare welfare and family arrangements in terms of their capacity to smooth (or increase) the role of labor market risks and gender as sources of health stratification within and between societies.

In addition to the state and family welfare, comparative research has also stressed the role of gender culture(s) in affecting women's employment behaviors (Pfau-Effinger 2017) and their relationship with health (Russell and Barbieri 2000). Gender culture can be defined as the 'predominant system of norms and values concerning the 'correct' division of labor between both genders' (Pfau-Effinger 1998). Different gender cultural models can be distinguished based on the specific content of such cultural values and norms. This values system forms the main reference point for the behavior of actors at different social levels (Pfau-Effinger 1998: 150). For instance, at the individual level, the predominant values system serves as a standard against which people build gender-role expectations and gender identities (Eagly and Wood 2012). At the institutional level, it is the 'cultural' basis of welfare state policies (Lewis 1992; Lewis and Ostner 1994). As gender culture and gender order—namely the pertinent structures of gender relationships (i.e. division of labor) as well as the relations between different societal institutions with reference to gender structures (i.e. the family, the market, and the state)—are interrelated but also relatively autonomous, they cannot be treated as a unit and need to be considered separately (Pfau-Effinger, 1998). Therefore, looking at gender culture(s) is relevant for my second and third papers. Herein, I investigate the role of gender values and norms as modifying factors in the relationships between labor market risks and health, distinct from the institutional setting.

From what was described above, the extent of health damage due to unemployment or precariousness emerges from the interplay between the market, the family, and the institutional and cultural context. Transversally, gender-related institutions further contribute to shaping the health experience among the affected workers. The present study starts from these observations and asks how unemployment and precariousness affect the health of individuals within and across different contexts and by gender. In doing so, I want to carve out the mechanisms that stratify health and devise ways to reduce health disadvantages related to labor-market risks. Before describing more in-depth my research questions and the contribution of this thesis, in the following paragraphs, I describe the numerous social, institutional, and cultural changes that European societies have been facing over the last decades, especially in the world of work. These transformations have raised concerns and questions among scholars, organizations, and politicians about the 'future of work' (e.g. Beck 2014; Castel and Boyd 2003; ILO 2019; OECD 2019) and the consequences on people's quality of life (Sennett 1998; Benach et al. 2000; Benach 2002; Kalleberg 2018). Similarly, they also motivate my study.

1.3. Changes in the social organization of work

During the so-called Western capitalism's 'golden age' between the 1950s and 1970s, employment relations in our rich economies were mainly shaped by the Fordist model of industrial production and capital accumulation, the Keynesian model of state economic intervention, generous welfare states, strong labor unions, and strong employment regulation (Vosko 2010). Within a context of economic stability and prosperity, employment relations evolved into a capital-labor 'social contract' that guaranteed workers stable employment, employment-related rights and protections, and the right to collective representation. This model of industrial relations allowed for a decommodification of labor, such that most workers could maintain their livelihood in case of labor-market risks (Esping-Andersen, 1990). Mandatory 'health and safety' collective protection also empowered workers to avoid being exposed to harmful working conditions and hazardous environments (Quinlan, Mayhew, and Bohle 2001). This historical context was characterized by the standard employment relationship (SER), defined as 'stable, socially protected, dependent, full-time job …the basic conditions of which (working time, pay, social transfers) are regulated to a minimum level by collective agreement or by labor and/or social security law' (Bosch, 2004: 618-619). The SER was of value not only to employees but also to firms and society as a whole. While employees and their families were protected from the vagaries of the markets, firms could benefit from a reliable framework within which to plan their work organization

and were able to rely on their employees' cooperation in return for the security they enjoyed. At the societal level, inequalities were reduced, and families were able to invest in their members' human capital (Bosch, 2004). However, this ideal employment relationship was far from equitable or universal because it applied mostly to male, autochthonous, wage-dependent workers. Among the others, many employment options pursued by most women were indeed not covered—their main access to security was through their spouses. More broadly, the SER was integrated into most societies into a distinct 'male-breadwinner/female caregiver' model or 'gender contract,' which excluded many women from the labor market or reduced their prospects when they were in paid employment (see Lewis 1992).

Over the last decades, this social organization of work and the gender contract that sustained it have viewed important transformations due to significant institutional, cultural, and demographic changes. Because of the economic shocks of the 1970s, European governments have implemented a series of reforms with the aim of reducing the rigidity of their labor markets and welfare institutions and increasing their competitiveness in the global market (Rubery 2011; Heyes 2011; Hipp, Bernhardt, and Allmendinger 2015). Regarding the welfare system, by shifting from a 'welfarist' towards a 'workfarist' system, governments have opted for reducing out-of-work benefits and placing a stronger emphasis on active labor market policies (Voßemer 2019). If, on the one side, these reforms are hoped to support the labor market integration of unemployed by providing employees with marketable and up-to-date job skills (Barbieri 2009; Pollmann-Schult and Büchel 2005); on the other side, they are thought to have altered the balance of power between employers and workers by re-commodifying labor (Breen 1992) and creating a 'zone of vulnerability' occupied prevalently by precarious workers (Castel and Boyd 2003).

The described welfare retrenchment likely adds up to the deregulation of labor markets. To make labor markets, employment, and work organization more flexible, a common strategy across Europe was promoting non-standard work and the deregulation of employment protection (Hipp et al., 2015). However, differently across Europe, some countries reduced employment protection for all workers, implying greater overall risks of job loss. In contrast, others focused on labor market outsiders and primarily increased employers' opportunities to use non-standard/atypical employment (Voßemer 2019). The resulting partial and targeted deregulation (Esping-Andersen and Regini 2000) or flexibilization at the margins (Barbieri, 2009) have raised concerns about the unsettling implications for socio-economic and health inequalities within and across countries (DiPrete et al. 2006; Benach et al. 2014). Moreover, these changes are said to have blurred the line between employment and unemployment and thus reduced the positive health effects of work (Gash, Mertens, and Gordo 2007; Burgard and Lin 2013; Benach et al. 2014). Employers' and labor markets' greater flexibility have not

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been balanced with greater workers' security to deal with the growth of precarious employment systems, or at least not to the same extent across all European countries (Tangian 2007; Probst and Jiang 2017).

In addition to the changes discussed above, other 'macro-level forces' are thought to be important sources of the SER's change and workers' insecurity in modern market economies (Kalleberg, 2009). Neoliberal globalization and international trade are examples of these processes, which lead to a profound reorganization of labor markets and employment relations at the global level. Via the off-shoring and out-sourcing of production to lower-wage countries, these new market practices are said to increase the competitiveness of firms at the expense of workers' security (Kalleberg 2013). At the same time, skill-based technological change and, in particular, advancements in the ability to shift specific tasks (and jobs) away from humans to robots and other technical applications (e.g. automation, digitalization) helped (and forced) firms to become more competitive, increasing, however, the risk of skills' and jobs' depletion on the side of workers (e.g. Frey and Osborne 2017). The occupational structure and the work process also changed substantially during this period. Increases in knowledge-intensive work accompanied the accelerated pace of technological innovation (Kalleberg 2009; Oesch 2013): The primacy of the manufacturing-based, mass-production economy as a source of jobs declined in favor of the service and information-based economy, organized around more flexible ways of production (Piore and Sabel 1984).

In addition, I also need to recognize the role of complex forces related to the changing composition of the labor force itself and the transformation of social norms surrounding gender relations, particularly in paid employment and the family. For example, women have become nowadays almost half of the European labor force (World Bank 2019), although this varies largely across countries. Moreover, a general trend towards a more egalitarian gender culture[7] has modernized the traditional family model, which conforms to the idea of a basic differentiation of society into public and private spheres as complementary areas of competence of men and women—i.e. male-breadwinner/female-home-carer. Although with substantial differences across societies, this traditional model has modified into one (or more) model more oriented towards a notion of a symmetrical and equitable integration of both sexes into society (Pfau-Effinger, 1998). Thus, the waged work of women, especially mothers, is much more accepted, and paid employment has gained much more importance in women's lives (and identities) than before.

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[7] According with Pfau-Effinger (1998), gender culture is defined as those norms and values that refer to desirable, 'normal' form of gender relations and of the division of labor between women and men.

However, this revolution has somehow 'stalled.' Much of this new employment of women is not performed under conditions equal to men's. Women across the EU often earn less than men per hour, work in low-paid sectors, and their salaries are also lowered due to their non-standard employment (European Commission 2018). Moreover, even if more women participate in the labor market, the burden of private and care responsibilities—i.e. the unpaid work—still rests largely on their shoulders (Hochschild and Machung 1989; Kan, Sullivan, and Gershuny 2011), though with variation across time and contexts (e.g. Altintas and Sullivan 2016) and over the adult life course (e.g. Kühhirt 2012). Thus, women's increase in working hours doesn't automatically lead to more balanced domestic and caregiving work between women and men. Further, gender restructuring affects women differently according to their age, social position, and ethnicity, within different household forms and across gender regimes (see Lewis 1992; Crompton 1999). Thus, even though there are many areas where (some) women have gained increasing access to the public domain leading to significantly increased opportunities, the picture is complicated by the development of new forms of gender inequality and by the diversity between women.

Together the described developments and changes in the social organization of work imply increased risk of job loss and exposure to de-standardized employment relationships for workers. Moreover, the more diverse, feminine workforce interrogates the capability of European labor markets, welfare states, and other social institutions—such as the family— to guarantee equity in opportunities and social protection to both men and women. The question remains whether these developments also imply consequences for workers' health and to what extent they can lead to the compression or expansion of health inequalities in Western societies.

Overall, these observations motivate the general research questions of this thesis: What are the consequences of unemployment and precariousness for individuals' health in Europe? What are the moderating factors that may offset (or increase) the health consequences of labor-market risks? How do the effects of these risks vary across different contexts, which differ in their institutional and cultural settings? Does gender, regarded as a social structure, play a role, and how? To address these general questions, I raise and answer different and more specific research questions in the following three articles:

1) The first paper's title is *'The buffering role of the family in the relationship between job loss and self-perceived health: Longitudinal results from Europe, 2004-2011'*. After examining the causal relationship between job loss and self-perceived health, the paper investigates whether and how the family moderates the consequences of transitions into unemployment on health by gender and across different welfare states (regimes). This

paper is co-authored with Dr. Raffaele Grotti and Prof. Stefani Scherer and published in *Health & Place Journal* (2018). My contribution to the article is around 67%.

2) The second paper investigates more in-depth the gender differential in health driven by unemployment. It develops a three-fold comparative analysis—by welfare states, cultural contexts, and cohorts—to understand who is more affected among men and women. In particular, it explores two mechanisms—social roles and social selection—in different contexts. The title is: *'Gender roles and selection mechanisms across contexts: A comparative analysis of the relationship between unemployment, self-perceived health, and gender.'* This paper has been submitted to *Sociology of Health and Illness Journal* and is currently under review. I wrote this paper with Dr. Raffele Grotti, and my contribution amounts to 70%.

3) My third and last study analyzed the health consequences of precariousness: *'Bad job, bad health? A longitudinal analysis of the interaction between precariousness, gender and self-perceived health in Germany'*. Herein, I investigate the multidimensional nature of employment precariousness and its causal relationship with health. In particular, I focus on gender differences exploring two alternative hypotheses. I am the only author of this paper submitted to the *Longitudinal and Life Course Studies Journal*.

In addition to what was said in the previous sections, the three studies are motivated by the insights and gaps from the published literature. They can be summarized as follow: First, labor-market risks are assumed to relate to health causally, but health selection may play a role. Second, men and women may have different health experiences of unemployment and precariousness, but the direction of the gender differential is not clear. Third, to fully assess the health costs of labor-market risks, especially in terms of gender differences, it might be necessary to consider the family and the broader institutional and cultural context.

2. Theoretical framework

2.1. Life course in health research

This thesis relies on the life course approach, which offers an interdisciplinary framework for guiding research, including health research. Initially proposed by Merton (1968) and then further developed over several decades (Elder, Johnson, and Crosnoe 2003; Mayer 2004; Bernardi, Huinink, and Settersten 2019; Elder and Shanahan 2006), the concept of 'life course'' frequently appears in the sociology literature, including literature on social mobility and stratification, crime, family life, human development, and aging. Lately, it has also

become popular among medical sociologists (see in Mayer 2009). It enables to elucidate the psycho-socio-economic processes, states, and events that operate across an individual's life course to influence the development of ill-health. According to this approach, health can be regarded as 'a form of life course capital that individuals preserve or deplete at varying rates over time based on the interaction of structure, human agency, and chance' (O'Rand and Henretta 1999 in Willson, Shuey, and Elder 2007). Adopting a life course perspective on health, then explicitly recognized the role of individual action and meso- and macro-level social determinants of health to immediately influence health and provide the basis for health or illness later in life. Notably, it directs attention to the dimension of 'time' to understand causal links between exposures and health outcomes. In this sense, a life course perspective is an informative approach for the longitudinal study of health and its determinants at different social levels and in various life domains.

Central to a life course perspective is a set of fundamental principles about taking into account the context, examining multiple life domains, and multiple levels of analysis (Elder 1994; Bernardi, Huinink, and Settersten 2019). They also guide my research and are related to the content and methods of my papers in different ways. The first principle focuses on the *context,* which is intended as both time and place. Three types of time are central to a life course perspective: individual time, generational time, and historical time. *Individual time* refers to chronological age. It is assumed that periods of life, such as childhood, adulthood, and old age, influence positions, roles, and rights in society. Each phase comes with different responsibilities and expectations. In my study, I predominantly focus on adulthood: a stage of life in which stability and predictability in the work role are central for own identity and future life plans. *Generational time* refers to the age groups or cohorts in which people are grouped based upon their age. For instance, cohort differences may be found in the value system related to gender roles and the gendered division of labor in society. Based on this idea, men and women in different cohorts may attribute different expectations and meanings to their roles in society, in particular, the work role and, then, experience different health changes in relation to job instability and job insecurity. Finally, *historical time* refers to societal or large-scale changes or events and how these affect individuals and families, such as political, social, and economic changes. Historical effects on the life course take the form of a cohort effect in which social change differentiates the life patterns of successive cohorts, such as older and younger women with different values systems. History also takes the form of a period effect when the effect of the change is relatively uniform across individuals and successive birth cohorts (Elder, 1994). The relations between periods of large-scale transformations and shocks—i.e. 2008 economic crisis, modernization, ongoing change of social organization of work—and health experience are covered in my papers. However, they do not constitute the primary and direct focus of my analysis.

Concerning time, there is also the strong assumption that prior life history strongly impacts later life outcomes. The person acts or behaves based on prior experiences and resources. Accordingly, for life course research in health, the explanatory question is whether health experiences shape certain health outcomes at later stages of the biography. This endogenous causation is also known as path dependency (or state dependence), which, together with reverse causality and unobserved heterogeneity, is one of the sources of selection in the relationship between employment (or social position more in general) and health (Stowasser, Heiss, and McFadden 2012; West 1991). Both in the case of the relationship between unemployment and health and between precariousness and health, indeed, the issue of causation and selection constitutes both a crucial theoretical question and a demanding methodological challenge (see for instance (see for example Bartley 1996; Virtanen et al. 2002; Dawson et al. 2015). The social selection perspective implies that health determines the employment position. One might distinguish between when illness influences the allocation of individuals to employment positions—i.e. direct selection—and when ill-health has employment consequences owing to varying third (unobserved) factors—i.e. indirect selection (West, 1991). On the other side, the causation perspective states that labor-market risks determine health through intermediary factors (i.e. material and psychosocial resources). Selection and causation mechanisms are not mutually exclusive. Instead have a potentially complementary character, reinforcing each other over time (e.g. Korpi 2001). In my study, the principle of path dependency and, more in general, the selection issue are taken into account in specific research questions and my papers' methodological approach. Hereby, I use different types of panel models—i.e. static and dynamic panel models, correlated-random models—which allow me to deal in various ways with the three-fold selection issue (Halaby, 2004; Gunasekara et al., 2014).

In addition to time, considering the 'context' means accounting for *place,* which refers to geographical location and group membership. This principle is strongly related to other important assumptions that focus on *human agency*, *linked lives, and heterogeneity effect* (Elder, 1994; Bernardi et al., 2019). According to the theory, indeed, life course outcomes are the result of personal characteristics and individual action and the outcome of cultural frames, institutional and structural conditions, and collective contexts. Individuals are active agents who mediate the effect of social structure and make decisions and set goals that shape social structure (i.e. *human agency*). This also implies that individuals have different degrees of control over and react differently to life events (i.e. *heterogeneity effect*). People differ in terms of influential dimensions such as gender, family structure, gender values, and their ability to adapt to life course changes can vary with the resources or supports inherent in these elements in the form of economic or psychosocial capital (e.g. income, alternative roles) or

social capital (e.g. family social support). However, individuals' actions and choices depend on opportunity and constraints set by the broad institutional and cultural context where people are embedded (Elder, Johnson, and Crosnoe 2003). An example from my study is men and women facing different health consequences due to unemployment and precariousness because of different context-shaped gender roles, material needs, and gender identities.

Moreover, individuals are not isolated but live in collective contexts such as couples, families, and cohorts *(i.e. linked lives and social ties)*. People's lives are interdependent and social regulation and support occur in part through these relationships (Elder, 1994). This emerges, for instance, in my first paper where the role of the family results to be necessary for buffering the health consequences of unemployment, especially in certain welfare states. All in all, these interrelated principles highlight the multilevel nature of the life course approach, which relates micro-, meso-, and macro-level of analysis, structure, and agency.

Finally, the life course is a multidimensional perspective (Bernardi et al., 2019). Changes in human lives are studied across different mutually related and mutually influencing life domains, often implying interdisciplinary approaches. Applied to health studies, this translates into a focus on multiple social determinants of health, such as work, the family, and the institutional and cultural context. In my thesis, I study how the domain of health and work at the individual level interrelate with the family domain (meso-level) and the broader institutional and cultural contexts (macro-level). Thus, my thesis is an example of interdisciplinarity, merging sociology of labor, sociology of health, family sociology, and comparative studies on welfare states and gender cultures.

According to two popular approaches within the life course prospective, positive and negative changes in the outcome can occur both because of 'trigger' life events—such as job loss — and/or because risk factors at different stages of life add over time, resulting in an 'accumulation of (dis)advantages' (e.g. DiPrete 2002; Ben-Shlomo and Kuh 2002). A less 'strict' version of (dis)advantages accumulation looks at changes in the outcome due to the persisting exposure to a status/social position variable—i.e. being a woman versus being a man—which generates further gains or losses across the life course (see for instance 'the Blau-Duncan approach' in DiPrete and Eirich 2006). While the 'trigger event' approach emphasizes the role of discrete events or 'life course risks' that potentially generate negative changes in the outcome, the latter emphasizes (the growth of) group differences in the returns of status/social position over time. Moreover, life events are one mechanism through which outcome trajectories of advantaged and disadvantaged groups diverge over time (DiPrete, 2002). Specifically, outcome trajectories diverge if a life event has persistent adverse effects, and disadvantaged groups are more likely exposed or more vulnerable to it. These approaches are not exhaustive of the collection of models proposed in the vast literature on life courses

(see DiPrete and Eirich 2006; Mayer, 2009). For instance, 'critical and sensitive period' models are also very popular in epidemiological studies. They help in detecting specific period of life and development during which the risk exposure may result in permanent and even irreversible damage or disease (Ben-Shlomo and Kuh 2002). Although studying the long-lasting health consequences of unemployment and precariousness is undoubtedly a crucial point to address and the long-run process of diverging trajectories, I focus on the short-term health consequences of particular labor-related events/states in my thesis. More specifically, I examine whether exposures to unemployment and precariousness trigger changes in individual health. Moreover, I observe whether they cumulate with the exposure to a persisting 'status variable,' namely gender, expressing the social position of men and women in society.

2.2. Self-rated health: What does it measure?

This section briefly describes my health outcome—namely, self-rated health —which I use as comprehensive operationalization of health in all my papers.

How is your health in general? Is it very good, good, fair, bad, or very bad? This simple question asking respondents to rate their current health status is one of the most frequently used health indicators in sociological health research. It is collected in major national and international surveys, such as EUSILC and SOEP datasets employed in this thesis. The popularity of self-rated health (SRH) owes that it provides a valid, reliable (Cullati et al. 2020; Cox et al. 2009; Lundberg and Manderbacka 1996) and cost-effective means of overall health assessment.

But what is precisely SRH? And what does it measure? According to Jylhä (2009), SRH is the result of an individual cognitive process of health assessment: 'a summary statement about how numerous aspects of health, both subjective and objective, are combined within the perceptual framework of the individual respondent' (Tissue, 1972, p. 93 quoted in Jylhä, 2009). First, the person refers to her situation (e.g. age), health status (e.g. medical diagnosis, symptoms, and sensations), and health history to identify the components that should be taken into account to define 'my health status.' Finally, one decides which of the levels in the preset scale summarizes them best. Although individual and subjective, this cognitive process is by any means arbitrary: The general historical, cultural and social understanding of the health phenomena guides the individual in making the health assessment. Thus, SRH is the result of a cognitive process that is inherently subjective and contextual (see Jylhä, 2009 for an extensive overview of the process).

Although self-rated health is a 'subjective' measure, the basis of self-rated health lies in the biological and physiological state of the individual organism (Jylhä, 2009). Indeed, SRH and objective, medically confirmed health indicators are closely interrelated (Idler, Hudson, and Leventhal 1999; Idler and Kasl 1995; Benyamini, Leventhal, and Leventhal 2004). For instance, its association with mortality (for a review Idler and Benyamini 1997), functional disability (Idler and Kasl 1995), cardiovascular diseases (Yamada, Moriyama, and Takahashi 2012), and the use of health services (Miilunpalo et al. 1997) has been extensively studied in epidemiological research. These studies confirm that (different aspects of) objective health is the core component of SRH assessment. However, SRH seems to be much more inclusive than that. In considering the predictors of SRH, the relation with objective physical health conditions does not explain all the variance (e.g. Kahana et al. 1995). Similarly, research focusing on the association between SRH and mortality has highlighted that a portion of variance remains unexplained after controlling for medical objective health indicators. Then, SRH is thought to carry information also reflecting other health aspects relevant to survival that are not covered by objective health (Mackenbach et al. 2002). One hypothesis is that SRH can capture humoral and biochemical bodily processes (e.g. inflammatory processes), which the individual perceives as sensations, feelings, and emotions (e.g. Kaplan and Camacho 1983; Jylhä 2009). Growing evidence indeed shows that, independently from the effects of objective health indicators, symptoms of chronic pain (Mäntyselkä et al. 2003), fatigue (Molarius and Janson 2002), and depression (Rodin and McAvay 1992) are also essential components of SRH. Then, in the process of health assessment, people seem to account not only for medical conditions and disabilities, but also for a broad range of other relevant information known only to the subject and, in some cases, too minor to be diagnosed.

SRH is a valuable health outcome in research because it is simple, short, and accurately reflects both body and mind states, including aspects that more detailed and objective questions could not capture. However, because of the subjective and evaluative nature of the indicator, SRH also brings some disadvantages. For example, researchers have no control over which aspects of health are emphasized or what criteria people use in their individual assessments. Moreover, even assuming that people living in similar social and cultural environments also use identical criteria in their health evaluations, comparability of SRH across heterogeneous populations or subgroups might be problematic (Jylha et al. 1998). This issue is known as 'heterogeneity report bias' and occurs when individuals with the same level of SRH may have different reference levels against which they judge their health. This difference may depend on individual characteristics such as, among others, gender and culture (Jürges 2007; Schneider et al. 2012). For instance, men and women or people living in different cultures may differ in their willingness to present positive or negative pictures of themselves, consider other health factors when judging their health, or give different

connotations to response categories in the preset SRH scale. Shortly it means that diverse populations or population's subgroups may 'speak different languages' and use other reference points when they answer the same question (Schneider et al., 2012).

To separate the influence of 'true health' from the influence of 'reporting behaviors,' researchers have tried to 'correct' SRH in between-country or across-groups differences by using large sets of diagnosed health measures available in their datasets (Jürges 2007; Rebelo and Pereira 2014)[8]. The problem with this strategy is that it ignores the variance in SRH not measured by the diagnosed health indicators and the complexity of the cultural frame that guides the assessment process (Jylhä, 2009). The content of the adjusted measure, in the end, reflects medical and health variables that were controlled for, which, although diagnosed, are still based on self-report rather than clinically verified. In this sense, they are 'quasi-objective'—namely, subjective information of factual matters—and likely, as much as SRH, to be modified by the same cultural/sub-group evaluation framework (Baker, Stabile, and Deri 2004). Moreover, by catching only the part of variance explained by medical health variables, the adjusted measure ignores the more emotional and psychological dimensions of SRH, which are only known to the subject (Jylhä, 2009). The result is that the 'corrected' health measures are no more comparable and 'true' than the original one.

There is no simple solution to solve this issue, but acknowledging that using SRH for comparisons across groups and populations requires caution. So far, it seems clear that cultural and country comparisons of self-rated health should be based not on assumptions of identical correspondence between self-ratings and objective health indicators (Jylhä, 2009). Moreover, even acknowledging the value of this strategy in reducing reporting bias, it is not easy to find comparative longitudinal datasets with a complete set of quasi-objective health measures. Unfortunately, this is also the case of two datasets used in my thesis, which either do not report the full range of objective health measures (i.e. EUSILC) or do not collect all

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[8] Another method commonly used to account for reporting heterogeneity is anchoring vignettes, which are brief texts describing a hypothetical situation (e.g., the level of health) which respondents are asked to evaluate using the same ordinal scale as for their own self-ratings (see Salomon, Tandon, and Murray 2004). Two important assumptions are made when using anchoring vignettes: response consistency and vignette equivalence. Response consistency implies that an individual evaluates both specific health questions and related hypothetical scenarios in the same way, while vignette equivalence requires that the underlying health level depicted in each vignette be understood in the same way by all respondents, independent of socio-demographic or other characteristics. Although earlier studies found no major violations of the two assumptions (Grol-Prokopczyk, Freese, and Hauser 2011), recent studies, which have used stricter statistical methods to test them, provide clear evidence that respondents from different cultures and socio-demographic groups perceive vignette texts as depicting fundamentally different levels of health (see for instance Grol-Prokopczyk et al. 2015). This new evidence suggests that responses to the health vignettes cannot be used to correct for heterogeneity in health reporting (see Oksuzyan et al. 2019).

information systematically every year (i.e. SOEP[9]). From a methodological point of view, to reduce the potential bias, I use two simple strategies which come from the literature: 1) running separated analysis for sub-groups; 2) using generalized or partial proportional odds models instead of (fully constrained) proportional odds models to check the robustness of my results (Fullerton 2009). Finally, although different contextual frameworks of evaluation may not guarantee an optimal correspondence between positive SRH and good physical health, I believe that findings of poor SRH certainly warrants attention by researchers and policy makers. It is not a case that SRH is used by an organization such as the World Health Organization and the European Commission, among others, to monitor the status of health across populations and subgroups. Overall, notwithstanding these shortcomings, self-rated health is probably the most feasible, most inclusive, and most informative measure of health status in population studies, providing a valuable and convenient tool to measure global health.

3. The contributions of this thesis

In this chapter, I present the contribution of my three papers, separately for the health consequences of unemployment and employment precariousness. In section 3.1., I highlight what is still unknown about the short-term effects of unemployment on health and the heterogeneity effect of gender, the family, and the broader context. Section 3.2 provides detailed background about the theory on employment precariousness, highlighting the challenges and the research questions left unaddressed by previous studies. Finally, in section 3.3., I report the general contributions of this thesis as well as potential venues for future research.

3.1. Unemployment and health

The health consequences of unemployment have been researched across the social sciences since the pioneering work of Jahoda, Lazarsfeld, and Zeisel in the unemployed community of Marienthal in 1931-1932 (1974). By then, a rich amount of evidence has been produced and summarized in several reviews and meta-analyses (Ezzy 1993; Wilson and Walker 1993; Jin,

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[9] Starting in 2002, the SOEP health module in the individual questionnaire is replicated at two-year intervals.

Shah, and Svoboda 1995; Dooley, Fielding, and Levi 1996; McKee-Ryan et al. 2005; Paul and Moser 2009; Voßemer and Eunicke 2015). According to these summarizing studies, the main finding is a negative association between unemployment and health, which is stronger for mental and self-rated health than for physical health and health behaviors. This result is consistent across contexts and holds for different research designs. The theory explains the negative association by either the two mechanisms: one via 'manifest,' material resources deprivation—i.e. income losses—and one via 'latent,' psychosocial resources depletion—i.e. role and identity (see Voßemer and Eunicke, 2015 for a review of theories). From an empirical point of view, it is not clear which one of the two channels is the more relevant, although many studies have found the psychosocial effect to be relatively more important (Young 2012; Paul, Geithner, and Moser 2007; Krug and Eberl 2018b).

Concerning whether the association is due to causal effects or health selection, there is no consensus in the literature, which has highlighted the importance of all two explanations. Some studies finding impacts of job loss and unemployment are Burgard et al. (2007), Toge and Blakesaune (2015), and Krug and Eberl (2018). However, sophisticated studies do not find such evidence (e.g. Böckerman and Ilmakunnas, 2009; Browning et al., 2006; Salm, 2009; Schmitz, 2011). The selective process works via three different channels (Stowasser, Heiss, and McFadden 2012): First, when measured at the same time point, employment may have a causal influence on health, as well as health status may have a causal effect on employment. This mechanism is known as 'reverse causality.' Second, current health status might result from previous health experiences—namely, the result of a 'state dependency' process. 'Unobserved heterogeneity' is the last channel: several unmeasured individual characteristics may confound the relationship between current employment and health. For example, cognitive abilities play a decisive role in employment outcomes and may also have indirect consequences for general health. While some scholars argue that research should instead focus on the interplay of different explanations (Fryer 1997), others think that disentangling the role of causation or selection in the association between unemployment and health is a fundamental issue to address (Stowasser, Heiss, and McFadden 2012). This is because a lack of causal evidence may lead to inappropriate policies and interventions for managing health-damaging risks. However, the question is still highly contested; it is also possible that causative and selective mechanisms producing the association might emerge variously across contexts and periods, as studies show evidence for both. I try to answer this question by measuring the causal effect of unemployment and health and its variation across different family and national contexts.

Another focus of research on unemployment and health is the heterogeneity effect. Among the moderating factors that have received the most attention—e.g. age and socio-economic

status—I focus specifically on gender, the family, and the broader context. Concerning the gender differential, most studies show that women suffer less than men. However, while this has been found repeatedly and in a meta-analysis (Paul and Moser, 2009), evidence is neither consistent nor undisputed (see McKee-Ryan et al. 2005). The gender differential has been usually attributed to women's lower financial responsibilities, commitment or attachment to the labor market, and the availability of alternative roles as wives and mothers. The main idea is that women assign lower importance to work, which traditional gender roles can explain: men are the breadwinners of the family and carry the responsibility of providing for them, while women care for the children and the household. Therefore, according to that, it would be 'easier' for women to become unemployed, because, first, they would likely not be the primary source of income, and, second, they could transition to the role of housewife, which compensates the vacuum of 'no employment.' By comparison, men would experience the effects of no longer fulfilling their traditional roles of 'breadwinner.' While this is a common explanation for the gender differential, I explore for the first time a different mechanism, which refers to social selection (West 1991; McDonough and Amick 2001)—namely, the role played by health selection contingently to gender and the context.

Effect heterogeneity has also been investigated at the meso- and macro-level. Meso-level factors—such as the family—take into account that individuals are not isolated. Their lives are interrelated with those of others who are economically dependent and emotionally close to them. This principle of 'linked lives' is relevant for my thesis, as I consider the family as a moderating factor in the relationship between unemployment and health. The family provides its members with social support, which refers to the perceived emotional, practical, or informational support provided by non-professionals (e.g. a sense that one is loved, cared for, and listened to) (Umberson and Karas Montez, 2010). Besides the well-known positive, direct effect on health, social support acts as an essential psychosocial resource to cope with stressful events (Pearlin et al. 1981)—e.g. unemployment. While many studies have documented the beneficial buffering effect of social support during unemployment (see Paul and Moser, 2009; McKee-Ryan, 2005), recent research underlines that it is insufficient to fully compensate for the adverse health effects of unemployment (Milner et al., 2016). In fact, in the context of unemployment, partners can offer emotional support and direct tangible support by stabilizing the couple's financial situations (Hahn 1993; Becker 1981; DiPrete 2002). Thus, economic resources provided by one partner can compensate for the negative health consequences of financial stress (Peirce et al. 1996). Although the two mechanisms are straightforward, no previous research has sought to understand to what extent the two dimensions of family support – social or economic – may come together to protect the health of the unemployed. I try to address this point in article 1.

Effect heterogeneity at macro-level has been studied chiefly using variation across countries, regions, or overtime, focusing on factors such as institutional settings and (gender) culture[10]. Numerous and consistent results are available with respect to the institutional setting and, specifically, to welfare states' ability to de-commodify labor (Esping-Andersen, 1990). Evidence provides strong support for the idea that unemployment is less of a menace for health if welfare states mitigate the adverse financial effects through sustained income replacement (McKee-Ryan et al. 2005; O'Campo et al. 2015; Paul and Moser 2009). Indeed, the relationship between unemployment and health varies considerably across welfare states (Tøge and Blekesaune 2015), some being more effective than others in reducing dependence on the market. Usually, Northern European countries' relatively generous and universal welfare provisions effectively enhance population health and assure acceptable living standards (Norström and Grönqvist 2015; Chung and Muntaner 2007; Eikemo et al. 2008). Nevertheless, employed-unemployed health inequalities are also present in the Scandinavian countries and are even wider than in other Western countries, such as Southern and Eastern countries in Europe (Bambra and Eikemo 2009). It has been argued that the role of a 'traditional family model' in these countries may be a potential explanation for this sort of 'puzzle'. The informal welfare provided by the family in these contexts means additional material and non-material support to the unemployed members, thus buffering the impact of unemployment on health and reducing health inequalities (Bambra and Eikemo 2009; Bartley 2003). As empirical evidence at the micro-level on this hypothesis is lacking, in my article 1, I explore the role of the family in different institutional contexts (i.e. welfare regimes) characterized by varying levels of de-commodification.

Differences in institutional factors may be relevant also to explain why the relationship between unemployment and health varies among men and women. The gender differential has been usually attributed to women's lower financial responsibilities and work commitment and the availability of alternative roles as wives and mothers. Yet, (dis)incentives for women to participate into the labor market are largely contingent to various features of the welfare state—such as childcare subsidies, parental leave and flexible working time arrangements— as well as labor market institutions—such as employment protection legislation, tax schemes and systems of unemployment benefit (Mascherini et al., 2016). For example, Esping-Andersen (1990: 159) argues that the Social Democratic welfare states, such as Sweden, enable women to work via the creation of a large public sector, which both provides the necessary support services (e.g. childcare) and creates a demand for female labor. In contrast, Conservative welfare states, including Italy and Germany, are believed to discourage female

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[10] Numerous studies have also looked at the structural contexts such as unemployment rate.

employment. Also, feminist welfare typologies such as Lewis (1992) and Sainsbury (1994) have assessed how welfare states support traditional male-breadwinner household forms and whether women are treated primarily as mothers or workers. In more gender-equal contexts, where men and women have similar roles and responsibilities in society, gender differences in the health consequences of unemployment are indeed found to be less. According to that, Norström and colleagues (2014)) suggest accounting for the context to reconcile contrasting findings on the gendered health consequences of unemployment. Some insights from the literature on life satisfaction (Russell and Barbieri, 2000) and psychological distress (Strandh et al. 2013) support the context explanation. Hence, taking up these insights, in my second paper, I focus on the variation among men and women of the relationship between unemployment and health. I apply a comparative perspective to account for the role of welfare states and institutions.

Another moderating factor that has not been fully explored yet is culture. While some evidence exists on the influence of different beliefs and attitudes toward work (see Hammarström 1994) and the level of individualism in society (see Paul and Moser, 2009), very little evidence exists on the role of gender culture—i.e. beliefs on the 'correct' division of work between men and women—as a moderator in the relationship between unemployment and health[11]. Gender culture indeed could be a source of variation among genders but also across contexts. Indeed, it has been documented that there exist different gender culture models across Europe (Pfau-Effinger, 1998) and that differences in employment behaviors between men and women within and across countries are strongly shaped by them (e.g. Pfau-Effinger, 2017; Mascherini et al. 2016). A long scholarship tradition on gender equity has also pointed out that the cultural context is interrelated and relatively autonomous from the institutional context, which largely shape how values and norms on gender are lived (for example, Charles and Grusky 2004). However, while accounting for culture seems to be particularly relevant for understanding the variation in the health consequences of unemployment, comparative studies tend to focus only on institutional differences or regard institutions and culture as a unit (i.e. Strandh et al., 2013). The contribution of my article 2 is to analyze how and why the relationship between unemployment and health varies by gender by applying a three-step comparison across different contexts—cross-countries, cross-regions, and across birth-cohorts. In doing so, I address and disentangle differences in the institutional setting and differences in cultural norms, advancing previous literature (Strandh et al., 2013).

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[11] Russell and Barbieri (2000) include gender culture in their comparative analysis on the individual unemployment experience using life satisfaction as outcome.

3.2. Precariousness and health

Over the last four decades in all Western economies and even at a faster peace due to the economic crises of 2008-2009, employment patterns have critically changed. Standard employment has gradually decreased, making way for more unstable and insecure employment relationships (Kalleberg, 2009). Terms such as insecurity and precarity entered the employment-related lexicon and came to assume relevance in the scientific debate among sociologists (Bourdieu 1998; Beck 2014; Castel and Boyd 2003; Kalleberg 2011), epidemiologists (Ferrie et al. 1999; Ferrie 2001), psychologists (De Witte 1999) and economists (Rodgers 1989; Böckerman, Ilmakunnas, and Johansson 2011). While there is a large consensus among scholars over the fact that work has become more precarious, defining and measuring employment precariousness is still a big challenge for social scientists (Laparra 2004; Vosko 2006; Vosko, MacDonald, and Campbell 2009; Burchell et al. 2014; Campbell and Price 2016). Various and different approaches have been developed to operationalize the EP concept (Scott-Marshall and Tompa 2011; Olsthoorn 2014; Vives et al. 2010; 2015; Van Aerden et al. 2014). However, the attempts to an empirical translation of the EP concept have been not always coherent with their theoretical framework, partially grasping the complexity of the phenomenon (Vosko, MacDonald, and Campbell 2009; Laparra 2004; Benach, 2014) and its health consequences (Gash, Mertens, and Gordo 2007; Rodriguez 2002; Gebel and Voßemer 2014).

Moreover, due to the relative novelty of the debate, many questions have not been answered yet, especially those in relation to the health consequences of employment precariousness (Benach and Muntaner 2007; Benach et al. 2016). For instance, cross-sectional evidence documents a negative association between employment precariousness and health, particularly strong for mental health and SRH (Julià, Vanroelen, et al. 2017). Mechanisms explaining the direct effect have been explored, highlighting that precariousness affects health via three main channels: the lack of financial instability, psychosocial stress, and harmful working conditions (e.g. Bosmans et al. 2016; Waenerlund, Virtanen, and Hammarström 2011; Aronsson et al. 2005; Saloniemi, Virtanen, and Vahtera 2004). However, concerning the question on whether the association is due to a causative or selective process, evidence is not enough yet to offer solid answers. The results of cross-sectional studies may be confounded by the health-related selection, i.e. people with poor health may be at risk of being selected into precarious employment in favor of people in good health. Moreover, it is still not clear whether increased uncertainty in employment affects all individuals' health equally or if classic inequality patterns, such as that based on gender, continue to shape individual

health vulnerability to labor market risks (Menéndez et al. 2007). The aim of my thesis is to answer these questions and overcome the shortcomings of previous literature.

3.2.1. What is employment precariousness? And how to measure it?

Many authors have confronted themselves with the question: What is employment precariousness (EP)?[12] without conclusively achieving a shared answer, though. Any definition does not seem to be broad enough or specific enough to fit the needs of all types of research. Even if the term has typically been connected with insecure, volatile, or vulnerable human situations that are socioeconomically linked to the labor-market dynamics (Della Porta et al. 2015), precariousness can also penetrate other life domains of individuals and groups of people (Butler 2004; Ross 2009). Several theoretical suggestions have popularized the idea that our societies have entered an 'age of insecurity' (Doogan 2005) that involves holistically every sphere of social and working life and against which individual human agency is more and more helpless (e.g. Sennett 1998; Beck 1992). In this sense, precariousness seems to describe a hazardous lack of security and stability that exceeds the realm of labor to contaminate life as a whole. Yet, there remains ambiguity regarding what constitutes insecurity when applied to the sphere of employment: EP has been defined in so many different and often incompatible ways that the answer to the question seems to depend significantly on the empirical approach adopted.

In broad terms, labor market scholars understand employment precariousness (EP) as 'employment that lacks standard forms of labor security.' Insecurity, then, is the starting point for describing precarious work relationships, but insecurity may take different forms (Standing 2011; Burgess and Campbell 1998). Several scholars suggest two(/three) main ways in which social scientists have focused on insecurity to develop an analytical concept of EP (Vosko, MacDonald, and Campbell 2009; Burgess and Campbell 1998). Both ways treat precariousness as relative to a 'standard': The common point of departure is the conceptualization of EP as 'deviation' from the standard employment relationship (SER)— permanent and full-time employment with a sufficient income to allow independent subsistence, full integration into the social security system and strong collective protection

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[12] As it is customary to speak about 'precariousness', 'precarity', 'precarious job', 'precarious worker' and even 'precariat', it would be more appropriate to speak about a family of concepts more than a single concept. See Campbell and Price (2016) for a conceptual clarification of the terms.

(Kalleberg 2011; Kalleberg 2009; Bosch 2004). However, they differ in terms of the number and type (objective vs. subjective) of insecurity dimensions that are included in the concept.

The first line of argument directly identifies EP with specific forms of non-standard employment, which may be the most spectacular and important result of employment relationships' de-standardization started in the 80s (Kalleberg 2009; Kahn 2010). Today, fixed-term and temporary contracts account for 14% of paid employment in the European Union (Eurofound 2018). While non-standard employment may take different forms (e.g., fixed-term, agency employment, part-time), the majority of empirical studies tend to treat it as a homogeneous group of 'temporary' work—namely, waged work under a contract of limited duration that lacks the security of the standard, permanent contract. In this approach, the notion of precariousness is rather one-dimensional, linked primarily to 'job insecurity,' namely a deficit in protection at the job level, which disrupts worker expectation of continuing employment. Scholars embracing this approach erect a simple dichotomy in which temporary (precarious) jobs are contrasted to permanent (non-precarious) jobs. This approach is problematic in several regards (see Vosko, MacDonald, and Campbell 2009; Barbier 2005 for extended discussions). The most relevant for this review is the inconsistency in evidence about the health consequences of EP (see Virtanen et al. 2005; Benach et al. 2014 for reviews). Even using advanced methods for causal inference, some studies find substantial adverse effects of temporary/marginal over permanent employment (e.g., Gash, Mertens, and Gordo 2007; Rodriguez 2002), while others report only minor differences (Gebel and Voßemer 2014). The main reason for this inconsistency is thought to rely on the fact that the non-standard category is inappropriate to grasp the EP phenomenon fully. Indeed, precariousness is concentrated in non-standard employment; it is by no means confined to nonstandard work (e.g., Tangian 2007).

While the temporary contract is the objective operationalization of 'job insecurity,' many scholars prefer a focus on workers' subjectivity using self-perceived job insecurity to measure EP. Indeed, approached both with a single-item measure (see De Witte 1999; Sverke, Hellgren, and Näswall 2002) and more recently also with a two-item approach[13] (Russo and Terraneo 2020), subjective job insecurity results to be a strong predictor of poor health, in particular psychological well-being, regardless the duration of the contract and controlling for health selection. Although this evidence highlights the importance of the subjective dimension

[13] In the literature, the notion of job insecurity is usually considered to be a threefold conceptual framework based on 'cognitive job insecurity' (self-perceived probability of losing one's current job), 'affective job insecurity' (personal fear of losing current job) and 'labor market insecurity' (self-perceived probability of finding equally remunerated employment in the case of a job loss) (see for instance Anderson and Pontusson 2007). All of them are self-reported (Russo and Terraneo 2020).

of precariousness, this approach raises doubts about the validity of the measurement (Benach 2002). Indeed, studies of perceived job insecurity may be subject to reporting bias—that is, the tendency to accentuate the negative situation (Ferrie 2001)—and may also reflect factors above and beyond the extent of precariousness—such as the decline of an economic sector or specific labor market policies and characteristics (e.g., Hipp 2016).

The second line of argument treats EP as a multidimensional concept, defined as a 'deficit in multiple forms of security.' The dimensions span different social levels—such as job-, workplace- and institutional level—and follow the criterium of 'objectivity.' While there is no universal agreement over the number and the content of the dimensions, they often substantially overlap. The pivotal contribution by Rodgers (1989: 3), commissioned by ILO and upon which many authors will develop other conceptualizations further on, identifies four dimensions:

1) Degree of uncertainty over the continuity of employment;

2) Lack of individual and collective control over work: (e.g. over working conditions, working time, shifts, and schedules);

3) Lack of protection in employment (legal, collective or customary protection against unfair dismissal, discrimination, and unacceptable working practices; and social protection);

4) Insufficient pay and salary progression.

One popular definition alluded to in many empirical studies is the one by Kalleberg (2011), which suggests that EP has three main components:

1) uncertainty, instability, and insecurity associated with the job;

2) limited social and economic benefits and

3) lack of statutory entitlements.

Other authors' conceptualizations offer even longer lists of EP dimensions. For instance, Standing (1999) identifies seven forms of securities that characterized SER-employment in the Fordist labor market and that, conversely, describe EP insecurities in the post-Fordist Era:

1) Labor market security, i.e. adequate employment opportunities at the macro-level;

2) employment security, i.e. protection against arbitrary dismissal;

3) job security, i.e. opportunities for employability;

4) work security, i.e. workplace rights;

5) skill reproduction security, i.e. training and skill development;

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6) income security and

7) representation security, i.e. protection of collective voice[14].

Suppose EP is multi-dimensional, as in this second approach, more than be defined by one specific dimension or another. In that case, their combination (or accumulation) determines the 'degree of precariousness' of a job (Rodgers 1989). In this sense, precariousness can be thought of more as a continuum than a dichotomy of conditions (Rodgers, 1989; Vosko, 2009). Accordingly, there is no binary opposition between employment precariousness and employment security, but many forms of EP are quantitatively different in their degree of insecurity. In this sense, EP can be potentially found in any job, though the form and the degree may vary (Rodgers 1989).

The multidimensional conceptualizations of EP described here share a common orientation to objective job-level and institutional-level characteristics. However, other scholars have proposed extending the EP concept by incorporating the worker-level[15]—namely, the specific individual circumstances under which precarious works are pursued. This approach has been explicitly advocated by Loughlin and Murray (2013). They support accounting for 'employment status congruence' in assessing job quality, i.e. the extent to which an individual's employment status might conflict with his/her personal situation. Similarly, Campbell and Price (2016) propose a conceptual tool to capture the complex and contingent relationship between precarious work and precarious workers. Olsthoorn (2014) expands upon Kalleberg's definition and incorporates the (precarious) conditions of (precarious) workers. In his version, EP is then conceptualized as the *linking of (1) the vulnerable worker to (2) insecure jobs and (3) unsupportive legal and welfare entitlements* (Olsthoorn 2014). Overall, the central idea is that the threat posed by precariousness can only be assessed by examining the type of worker 'matched' to a potentially precarious job or, better, by accounting for the worker's potential 'vulnerability' to a precarious job (Vosko 2006). Such careful conceptualization is needed, given the diversity of individual work experiences and their varied connections to other domains of life. In contemporary Western societies, indeed, workers are more and more engaged in precarious work. Still, the experience and the potential consequences are likely to differ in a complex but non-random way (Vosko 2009). Individuals differ in their vulnerability in the face of precarious work, and these differences are likely to be socially patterned.

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[14] These definitions do not exhaust the long list that appears in the literature: Other authors have taken similar approaches and built their own concepts of precarious employment (Vosko 2006; Scott-Marshall and Tompa 2011; Vives et al. 2010), which, however, slightly differ from each other.
[15] Anderson (2010 in Campbell and Price, 2016) defines the precarious worker as a person 'not just engaged in precarious work but also enduring the necessary consequences of precariousness'.

While the worker-level is needed to identify the 'truly precarious' workers (Olsthoorn 2014), it is by no means an open door for the inclusion of worker's subjectivity. As Campbell and Price warn (2016: 317), one common temptation in acknowledging the diversity of individual experiences is identifying this diversity with differences in personal attributes—such as perceptions, attitudes, choice, work orientations, and subjective identities—usually classified as 'subjective.' While it is certainly true that human agency is fundamentally shaped by the institutions and social relations within which individuals are embedded (Archer 2000), it remains challenging to disentangle its objective from the subjective parts. To what extent, for instance, the participation of a woman in part-time work can be considered a voluntary choice or the results of 'constraints' that shape that choice, i.e. the availability of child care services? Thus, while the social context constraining or enabling social action is undoubtedly central to the discussion, it is necessary to refer to it more objectively.

But it much depends on how 'vulnerability' is understood. In struggling with social context, some authors have suggested using the notions of 'social location' and 'social condition' to identify individual vulnerability. For instance, the family structure or the household's living conditions may account for the social condition of the worker occupying a potentially precarious job (Vosko 2006; Olsthoorn 2014; Stuth 2018) and can 'activate' the risks of precariousness, making the workers vulnerable to its consequences. While a potential criticism of this approach is that accounting for workers' social context outside the workplace does not qualify the character of work as precarious, it is fundamental to understand to what extend the precariousness of work is transmitted to the worker (Campbell and Price 2016). When applied to the impact of precarious work, this perspective sees the employment relationship as a fundamental social structure in capitalists societies that can shape the experiences of individual workers inside and outside the workplace. Nevertheless, the precise impact of EP is likely to depend both on specific characteristics of the employment relation and elements of the broader social context—for example, conditions that activate the risks of precariousness (e.g. Campbell and Price 2016; Lewchuk, Clarke, and De Wolff 2008; Underhill and Quinlan 2011; Vosko 2006).

Multidimensional approaches to EP in health research

In light of the limitations of the one-dimensional approach, epidemiological and health scholars have recently received and adopted the multidimensional concept of EP in health research (see Julià et al. 2017 for an extended review). Yet, with some adaptations. The most substantial difference is eliminating those aspects strictly related to working conditions and the content of work from the list of EP dimensions (Vives et al. 2010; Puig-Barrachina et al. 2014). The reason for this 'purge' lies essentially in the intention to provide more space for an upstream sociological perspective to work and health and less emphasis on social

psychology (Muntaner and O'Campo 1993). For years, prevailing ways of thinking about the relationship between labor and health have tended to focus narrowly on the proximal psycho-social work environment determinants of health—namely, the nature of work in itself, the workers' tasks and the socio-physical environment in which the work occurs—e.g., the effort-reward model by Siegrist (1996) or the demand-control model by Karasek (1979). Yet this approach addresses a small portion of a complex system involving labor markets, employment status, employment relations, and health. While working conditions and the work environment are important influences on health, they must be considered within the broader context of the social organization of work and employment relationships, which have dramatically changed over the last half-century. Focusing on the new forms of engagement between labor and capital puts workplace occupational health in a contextual perspective. It is seen as a consequence of employment relations rather than an exogenous determinant of worker health (Benach et al. 2010).

Drawing on previous literature, I embrace the multidimensional model of EP as an analytic and heuristic tool to study workers' health in my third paper. First, following Kalleberg (2009), I build on the general concept of employment relations as the 'dynamic social, economic, psychological, and political linkages between individual workers and their employers.' In this sense, the SER model serves as a point of analytical reference from which to assess diverging characteristics of employment, at the job- and institutional level. Further, I also incorporate Olsthoorn's (2014) and other scholars' suggestions to account for the workers-level by focusing on objective features of workers' social context—namely, household's material conditions. Finally, following health scholars, I focus on those 'deviations' representing the 'causes of the causes' and go beyond the more proximate quality of work and working tasks. All in all, my EP construct encompasses seven dimensions that capture various objective features of precarious employment relations: 1) income insecurity; 2) social insecurity; 3) legal and statutory insecurity; 4) employment insecurity; 5) working time insecurity; 6) representation insecurity and 7) workers' vulnerability.

Developing a multi-dimensional measurement for empirical analyses is a challenge and the reason why, although the promising conceptualization, this approach has produced relatively meagre results. While theoretically agreeing on the multidimensional nature of EP, eventually, scholars depart from the theory and/or turn back to existing categories of employment conditions (see, for instance, Rodgers 1989; Vosko 2009; Keller and Seifert 2013; Laparra 2004; Puig-Barrachina et al. 2014). For example, the case of studies that account for multiple dimensions of precariousness, but measure them separately—i.e. the traditional variable-based approach. Studies of this kind offer important insights into the key dimensions of the precarious work experience (Laparra 2004; Tangian 2009; Puig-Barrachina

et al. 2014) and on their influence on health (Scott-Marshall and Tompa 2011; Quinlan, Mayhew, and Bohle 2001). However, because they focus on identifying the independent associations of the multiple dimensions of EP with health—assuming other aspects to be constant—they fail to consider the joint distribution and the simultaneous occurrence of the different aspects of EP, eventually not going beyond the one-dimensional approach.

Other scholars (Van Aerden et al. 2014) use latent class cluster analysis (LCCA) to develop from seven dimensions (and 15 indicators) a typology of five different types of jobs, which vary qualitatively in terms of employment quality. LCCA redistributes employees in a limited number of categories based on the degree of similarity of their jobs regarding a set of proxy indicators for employment quality. Later empirical applications of the typology have confirmed its validity and the negative relation with different dimensions of well-being, including self-perceived health (Van Aerden et al. 2015; 2016). Van Aerden and colleagues' typology satisfies the 'multidimensionality assumption' and represents a novelty in categorizing changing employment arrangements. Moreover, it is a comprehensive, innovative measurement of EP that can be easily used with secondary data. Nevertheless, this typology departs from a different conceptualization that rejects EP's idea as a continuous and gradational phenomenon. The five categories found by Van Aerden and colleagues, indeed, represent qualitatively different 'deviations' from the SER rather than 'different degree' of EP.

Finally, an approach that operationalizes EP considering both the assumptions of multidimensionality and continuity is the Employment Precariousness Scale, developed by the EMCONET research network in Spain. Respondents are positioned on a measurement scale of increasing EP, which is thought to synthesize six dimensions (see Vives et al. 2010). The scale has been validated and used in survey research, and its empirical applications have significantly contributed to our understanding of the relationship between precarious employment arrangements and health (Benach et al. 2014; Vives et al. 2013; Julià, Vives, et al. 2017). First, it has been shown that EP is not necessarily a dichotomous matter, confirming that the binary opposition of good jobs vs. bad jobs needs more nuances, especially concerning workers' health. Second, these studies report a negative and gradational association between EP and psychological health, confirming the nature of EP as a continuous phenomenon. However, the EPRES scale has been developed for the Spanish context and is not yet available in other European questionnaires. Developing, validating, and testing new scales and subsequently collecting sufficient data to test the related hypotheses is very time-intensive and costly, and it is beyond the scope of this work.

Alternatively, in my third paper, I propose a complementary strategy. I use proxy indicators available in existing surveys and combine them into a synthetic theory-coherent EP measure. Although using proxies has its methodological limitations, it permits large-scale evidence using existing data sources. This approach, indeed, aims to construct a summary scale in which all my seven dimensions contribute jointly to the measured experience of precariousness and its health impact. To combine the different indicators, I apply multiple correspondence analysis (MCA), which helps me obtain a continuous measure of EP, which is the best representation of the seven dimensions in terms of variance. In this way, the scale coherently operationalizes my EP theoretical concept, fulfilling the two assumptions on multidimensionality and continuity. To my knowledge, this paper is the first attempt of this kind, which offers a solution to reconcile theory and praxis.

3.2.2 What do we know about the relation between EP and health?

The potential of the EP constructs to grasp and explain the health consequences of contemporary employment relations very much depends on the empirical approach adopted. As already mentioned, evidence coming from approaches focusing on non-standard employment has produced inconsistent and mixed results (see reviews and meta-analysis by Virtanen et al., 2005; De Cuyper et al. 2008; Joyce et al. 2010). Findings for self-rated health are contested: some studies describe negative associations (I.-H. Kim et al. 2008; M.-H. Kim et al. 2008; Rodriguez 2002), and others describe positive associations (Liukkonen et al. 2004; P. Virtanen et al. 2003). Evidence regarding mental health and psychiatric disorders is also mixed (Bardasi and Francesconi, 2004; I-H Kim et al., 2008; Kim et al. 2006; Quesnel-Vallée, DeHaney, and Ciampi 2010; Artazcoz et al. 2005; Virtanen et al. 2008), but some studies indicates that psychological ill-health increases with a rising degree of employment instability (e.g., Virtanen et al., 2008; Virtanen et al., 2003). Regarding physical health, some studies describe a higher overall mortality among temporary employees, especially for alcohol- and tobacco-related causes of death (Kivimaki 2003) and higher chronic disease conditions such as musculoskeletal disorders among the same groups (I-H Kim et al., 2008), but the combined risk estimate reported in a meta-analysis for these outcomes is nonsignificant (Virtanen et el., 2005).

Many authors argue that part of the inconsistencies across studies may depend on methodological limitations, such as the sampling procedure or the cross-sectional design. Most notably, while many authors treat non-standard employment arrangements as a homogeneous group, many others have highlighted the critical differences between specific

types of temporary arrangements—especially in terms of employment stability and security—(Virtanen et al., 2003; Tangian 2007; Guest 2004) and their varying association with health outcomes (Rodriguez, 2002; Aronsson, Gustafsson, and Dallner 2002; Silla, Gracia, and Peiró 2005; Pirani 2017). Moreover, given the cross-sectional research design of many studies, Virtanen and colleagues (2005) suggest that most studies could not control for possible selection effects, which may bias the results. In these regards, however, later studies that both use advanced methods for causal inference and that account for the heterogeneity in temporary forms of work still report ambiguous and mixed results (e.g. Gash, Mertens, and Gordo 2007; Pirani and Salvini, 2015; Rodriguez 2002; Gebel and Voßemer 2014). Analyses that oppose permanent and (different forms of) temporary contracts do not coincide with a clear-cut division between precarious and non-precarious employment.

Some scholars suggest that the reason behind the inconsistences across studies using the one-dimensional approach needs to be found in a conceptual shortcoming. To reconcile earlier results and better study how precarious work affects workers' health, some scholars undertake a transitional stage of conceptual development. They shift the focus from job insecurity and non-standard work to a multidimensional look at how society changes labor relations (e.g. Benach et al., 2002; 2014; Tompa et al., 2005). This conceptual move has stimulated a series of empirical studies that are credited with highlighting the role of employment precariousness as an 'emerging' social determinant of health (Benach et al., 2014; see Julià et al., 2017 for a comprehensive review). Empirically, the multidimensional approach to EP has been deployed in two ways. A first strategy has been to use proxy indicators available in existing surveys. For instance, using an eight-dimensional EP model and looking at them separately—namely, the variable-based approach—Scott-Marshall and Tompa (2011) find a relation with poor self-rated health and functional limitations for some of the dimensions and a stress-related pathway to ill-health. Alternatively, different proxy indicators are combined in a synthetic employment quality measure. Developed by Van Aender and colleague, the typological approach using Latent Class Cluster Analysis (LCCA) finds five job types[16] (see Van Aerden et al., 2014) that show clear relationships to the health of the workers involved: Higher risks

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[16] The first employment arrangement in the typology is labeled ''SER-like job type'' because it is characterized by overall beneficial employment conditions and relations and thus resembles the SER model of employment. The second, ''instrumental job type,'' contains stable and financially sustainable employment with standard working times but with limited rewards, a lack of training opportunities, and poor employment relations. The third, ''precarious unsustainable job type,'' is characterized overall by rather adverse employment features, but specifically by high probabilities of low income and involuntary part-time employment. The fourth job type is labeled ''precarious intensive'' because of its overall adverse employment quality and the very high probability of intensive working hours. The fifth, ''portfolio job type,'' is distinguished by overall beneficial employment conditions and relations, except for the high probability of intensive working times. See Van Aerden et al., (2014) for an extensive description of the typology.

of poor general health and mental health have been found in every job type than the SER-like one, net of job content and working conditions, with precarious intensive jobs showing the highest risk (Van Aerden et al., 2016; Gevaert et al., 2020). With the same approach, little difference has also been found between unemployment and precarious intensive job type in general and mental health (Van Aerden et al., 2017), adding to the idea that de-standardized forms of employment relationships have blurred the line between having and not having a job.

A second strategy develops a theory-based, multidimensional measurement scale obtained by collecting ad hoc data. It is the case of the Employment Precariousness Scale (EPRES) developed by Vives and colleagues (2010) and included in the Spanish Psychosocial work environmental Survey. In 2005, the first evidence using the EPRES in a salaried workers' sample started to emerge. It shows the negative association between precariousness and poor mental health (Vives et al., 2011), which is gradational and somewhat stronger among women (Vives et al., 2013). In 2010, the EPRES was used in a sample of Catalonian workers to study the relationship of EP with general health in addition to mental health (Benach et al., 2015). Results for mental health report that workers in the highest quartile of the EPRES had on average three times poorer mental health than those in the lowest quartile. Although these results were found for both men and women, women had poorer health than men in all levels of precarious employment. Regarding self-rated health, the prevalence of workers in the highest compared to the lowest quartile of EP was almost triple for males and double for female workers. A further study explores the EP-health association stratified according to temporary and permanent contracts. While in both permanently and temporarily employed men and women, there was a gradual, positive relation between employment precariousness and poor mental health, surprisingly the association was stronger with permanent employment than those in temporary employment, and no gender difference was found.

While clear progress has been made on documenting the association of precarious employment with health and well-being, gaps in the literature remain on *how* precarious employment relates to these outcomes and *which groups* are more vulnerable. In particular, the question of whether the association is due to causative or selective mechanisms has not been answered yet. Previous studies, indeed, use cross-sectional datasets, which do not allow to control for health selection. Moreover, although women are disproportionally exposed to precariousness (Puig-Barrachina, 2014; Van-Aerden et al., 2014; Vives et al., 2010), it still is not clear whether there exists a gender differential and which gender is more vulnerable in terms of health when EP is experienced (Julià et al. 2017; Benach et al. 2015; Vives et al. 2013). My third paper investigates these two main questions, placing itself in the strand of

research that looks at EP as a multidimensional phenomenon capable of negatively affecting affected workers' health.

3.3. Main findings and general contribution of this thesis.

In section 3.3.1, I summarize the main findings of the articles, discuss their limitations and give an outlook for future research. Based on this, in section 3.3.2, I draw some general conclusions.

3.3.1. Main findings of the articles

In Article 1, '*The buffering role of the family in the relationship between job loss and self-perceived health: Longitudinal results from Europe, 2004-2011*', I and my co-authors, Raffaele Grotti and Stefani Scherer, find new insights into the importance of the family in compensating for the negative effect of job loss on self-perceived health. In addition, we show that family support works through different channels and varies across welfare state regimes in Europe.

Focusing on close ties within households, we consider the presence of a stable partner and his/her working status, as a source of social and economic support. According to some authors, having a partner should reduce the stress from adverse events, thanks to the symbolic and emotional dimensions that such a relationship entails, regardless of any economic benefits (Milner et al. 2016). Our results, however, suggest that benefits linked to the presence of a (female) partner also come from the economic stability that she can provide in terms of a second income. We find partners' employment to be at least as important as the mere presence of the partner in reducing the negative effect of job loss on the individual's health by maintaining the household's standard of living and decreasing economic strain on the family. Our results are in line with previous research, which has highlighted that some people cope better than others with adverse life circumstances, and the support provided by the family is an important resource in that regard (Gore 1978; Pearlin et al. 1981; Milner et al. 2016; Umberson, Crosnoe, and Reczek 2010; Ross et al. 1990).

We also report an important interaction between the family and the welfare state in moderating the health consequences of unemployment, showing how the compensation effect of the family varies across welfare regimes. The countries where we found this mitigating role of the family, namely Southern and Eastern welfare states, are characterized by less developed social protection systems and – especially the Southern – high level of familism (Esping-Andersen 1999; Eikemo and Bambra 2008; Ferrera 1996). Social protection in Southern countries is very much dependent on informal welfare provided by the family, which plays a

decisive role in cushioning the adverse consequences of labor market risks. Furthermore, mechanisms of support and solidarity might also be possible in Eastern European countries, where the health consequences of unemployment have been shown to be smaller than in other welfare state regimes (Bambra and Eikemo 2009; WHO 2009). We also find important gender differences in relation to job loss, the family, and the context, which motivate article 2.

Then, our results demonstrate that the welfare state shapes the nature and distribution of certain risks, mitigates their consequences, and interacts with other important inequality-generating institutions, like the family. In less generous settings, the family comes into play to a greater extent, which cannot but lead to increased stratification of inequalities across European countries, including inequalities in health. The family and especially the economic support that women's employment provides have the capacity to affect the distribution of economic resources themselves (Grotti and Scherer 2016), as literature has shown, and the distribution of health.

Article 2, *'Gender roles and selection mechanisms across contexts: A comparative analysis of the relationship between unemployment, self-perceived health, and gender,'* co-authored with Raffaele Grotti, further explores the gender differential between unemployment and SRH. Being a highly contested issue in the literature (McKee-Ryan et al. 2005; Paul and Moser 2009; Norström et al. 2014), our aim is to study whether men are more penalized than women or the other way around and which are the mechanisms that may explain the gender difference. In order to do that, we rely on two theoretical arguments: the availability of alternative roles (Nordenmark and Strandh 1999) and social selection (West 1991; McDonough and Amick 2001). Further, relying on the idea of different gender regimes, we extended these arguments to comparison across contexts (Lewis 1992; Salisbury, 1999; Pfau-Effinger 1998; 2005). In contexts where being a caregiver is assumed to be women's traditional and primary roles and the primary bread-winner role is reserved to men, unemployment is less stigmatized, and taking up alternative roles is more socially accepted for women than for men. Accordingly, social (self-)selection should be stronger for women than for men in traditional contexts, where in case of ill-health, the separation from work is eased by the availability of alternative roles. To study these hypotheses, we apply a three-step—cross-country, cross-region, and cross-cohort—comparison, focusing on contexts representing different gender regimes. This approach serves us to disentangle gender culture and institutional setting, thus going beyond previous research (Strandh et al. 2013).

In line with previous meta-analysis (Nörstrom et al. 2014) and empirical studies (Strandh et al. 2013), we find no gendered effect of unemployment on health in the egalitarian context (i.e. Sweden). Conversely, in a more traditional context (i.e. Italy), we observe substantive and statistically significant gender differences in the effect of unemployment on bad health,

with women suffering less than men. We find the same pattern for comparing East and West Germany and younger and older cohorts in West Germany. Therefore, our analysis supports our first hypotheses, which assumes that the context where people are embedded structures the relationship between unemployment, health, and gender.

Moreover, the comparisons within-country and within-region enable us to capture the "cultural effect" of gender norms, irrespective of the "structural effect"—i.e. the effect that might stem from institutional and economic differences across countries. This emerges quite convincingly from the cohort-comparison in West-Germany. In this context, the set of welfare policies (e.g. family-based taxes) and the inadequate provision of child-care services (see Trappe, Pollmann-Schult, and Schmitt 2015), indeed, might still shape how norms are lived out, constraining the egalitarian orientations of women (and men). However, we believe that our results—especially those on cohorts—speak in favor of the existence of two opposing values systems within the same context and, then, the role of culture in shaping the gender differential in the relationship between unemployment and health independently from the institutional setting. Thus, our findings extend previous research (Strandh et al. 2013) and make an important contribution to the literature on unemployment, health, and gender.

On the contrary, our results do not support our theoretical argument on social selection. We find that in egalitarian contexts, women are more selected out of employment than men. In contrast, in traditional contexts, health selection does not seem to be the primary mechanism behind the gender differential, despite the fact the institutional and the cultural context would offer them a more comprehensive range of 'alternative roles' relative to men. One potential explanation for this result is that we only address selection into unemployment while neglecting transitions into inactivity due to ill-health. As women are most notably selected into inactivity, especially in traditional gender regimes (Esping-Andersen 1999), our analyses fail to catch a substantial part of the social selection mechanism, leading us to reject our Hp2. Further research that addresses selection into inactivity is needed to evaluate the interplay between selection and social roles across gender regimes.

Finally, my Article 3, *'Bad job, bad health? A longitudinal analysis of the interaction between precariousness, gender and self-perceived health in Germany'* studies the consequences of employment precariousness on self-rated health and the variation by gender. The evidence seems to be in line with previous cross-sectional literature (Julià et al. 2017; Vives et al. 2013; Van Aerden et al. 2016), supporting the hypothesis that employment precariousness could be detrimental for workers' health. Although the results are not significant, my analyses showed a negative and substantial 'effect' of EP on self-perceived health for both men and women. Further, my results show the crucial role of third unobserved common causes in shaping the

health consequences of precarious employment. This is particularly important as evidence accumulates, yet it is still mostly descriptive.

Further, my results falsify the previous theory that assumes women being more penalized than men when employment precariousness is experienced (Menéndez et al. 2007). Taking into account the role of gender norms and the way men and women internalize their traditional gender roles (i.e., breadwinner/housekeeper) as personal gender identities (Eagly and Wood 2012), I assume that men in precarious work could experience role conflict to a larger extent than women, as their self-standard is supposed to be the stereotypical breadwinner man with a good and well rewarded job. My evidence supports this hypothesis: when EP increases, the risk of experiencing poor health increases much more for men than for women.

Finally, my paper contributes to the methodological debate on precariousness by developing a multi-dimensional and continuous indicator. Coherently with the theory, it synthetizes multiple dimensions of insecurity and powerlessness in the employment relationship (Rodgers 1989). It is conceived to maintain the continuous nature of EP (Rodgers 1989; Vosko 2006; Vosko, MacDonald, and Campbell 2009). Results from the multiple correspondence analysis showed a latent variable of EP that seven different dimensions can express: social insecurity, legal insecurity, income insecurity, 'working time' insecurity, job insecurity, representation insecurity, and vulnerability.

3.3.2. General conclusion

Next to the main findings of the articles, this thesis also offers several general conclusions on research and policy on the non-economic consequences of employment instability and insecurity.

My thesis shows the value of the general theoretical and methodological model related to the life course perspective of the (short-term) non-economic consequences of employment instability and insecurity. Endorsing the key principles of time, place, multiple levels and multiple life domains, my analyses confirm the assumed effects on each other. Specifically, Article 1 and 3 show that job loss and precariousness affect individuals' chances for good health in adulthood, a phase of life in which stability and predictability in the work role is central for own identity and future life plans. The findings further illustrate the importance of the 'place' as an offsetting factor by highlighting its role in shaping the consequences of unemployment and precariousness. Place means social location and groups' membership—such as gender, cohort, family— and geographical and contextual location—such as welfare state and cultural context. As all my articles demonstrate, unemployment and precariousness

affect individuals' health according to gender, indicating society's structural social location. Furthermore, results on the moderating role of welfare states and gender cultures reveal the centrality of the 'place' as a set of opportunities and constraints in which human agency is embedded. Moreover, they support the idea of health as a result of a multilevel life course in which contextual factors can smooth (or amplifying) health stratification processes related to triggering labor-market events and states and gender. As I find a considerable variation in the effects of job loss on health across different family compositions and economic situations, I also provide empirical evidence for the idea that individuals are not isolated entities, but their lives are interrelated with those of economic dependent and emotionally close people. This result, in particular, illustrates the importance of implementing an encompassing evaluation design, which accounts for the interrelatedness of multiple life domains and multiple levels of analysis.

Furthermore, complementarities are revealed in the results of unemployment and employment precariousness. Concerning the trends of rising employment instability and insecurity described in the motivation section, the findings of my thesis have two implications: Policy-makers need to be aware that the full costs of unemployment and precariousness go far beyond the economic and material realm, penetrating other fundamental life domains such as individual health. Moreover, they need to balance the trade-off between protecting adequately unemployed people and fostering high-quality employment in reaction to the highlighted market pressures. In this sense, the further development of a (universalistic) welfare state certainly helps mitigate the adverse health effects of unemployment and, therefore, the future costs in terms of both individuals' health and welfare spending. In addition, the presence of a working partner is crucial for reducing the health consequences of employment instability. Therefore, policies aiming to increase female labor market participation should be promoted, especially in those contexts where the welfare state is less developed.

The usefulness of my thesis is further confirmed in the analyses on effect heterogeneity, which support the significance of taking account of a gender perspective in health research. The findings of the three articles show that job loss, unemployment, and precarious employment, in general, have negative effects on men's health but less or absent consequences for women's health. Indeed, this suggests the importance of labor and health policies that consider and further distinguish the specific needs of the male and female labor force in Europe. Nevertheless, a further implication emerges, namely that the health consequences of employment instability and de-standardization need to be investigated in light of the gender arrangements and the transforming gender relationships in specific cultural and institutional contexts. My results indeed seem to suggest that women's health advantage may be a transitory phenomenon, contingent on the predominant gendered institutional and cultural

context. As the structural difference between men's and women's position in society is eroded, and egalitarianism becomes the dominant normative status, so will probably be the gender difference in the health consequences of job loss and precariousness. Therefore, while gender equality in opportunities and roles is a desirable aspect for contemporary societies and a political goal that cannot be postponed further, this thesis raises a further and maybe more crucial question: What kind of equality should be pursued to provide men and women with both good life quality and equal chances in the public and private spheres? In this sense, I believe that social and labor policies aiming to reduce gender inequality in society should focus on improving women's integration into the labor market, implementing policies targeting men, and facilitating their involvement in the private sphere of life. Equal redistribution of social roles could then activate a crucial transformation of gender roles and the cultural models that sustain and still legitimate gender inequality in our Western societies.

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Article 1. The buffering role of the family in the relationship between job loss and self-perceived health: longitudinal results from Europe, 2004-2011.

1. Abstract

Unemployment has numerous negative consequences for health, but the family and the welfare state can mitigate these consequences. How the family supports its members and whether and to what extent this interacts with the broader context is still an open question. Our evidence show that job loss is causally linked to significant declines in health for men, but not for women. Yet, the increased risk of poor health is lower for coupled men, especially if the partner is employed. This suggests that both emotional and economic support play a role. Moreover, the family's mitigating role widely varies across different welfare regimes in Europe and it is particularly strong in Southern and Eastern regimes, characterized by "rudimentary" welfare systems and a more traditional family model.

2. Introduction

The family's role in buffering the negative effects of unemployment on health is well established in the literature (Gore 1978; Pearlin et al. 1981; Milner et al. 2016). However, despite the number of studies on this subject, it is less clear how the family absorbs the health consequences of job loss. While the family is generally considered both a source of emotional and economic support for its members (Ross, Mirowsky, and Goldsteen 1990; Umberson, Crosnoe, and Reczek 2010), studies have generally focused on only one or the other dimension, and very few have adopted a dynamic perspective (Milner et al. 2016). After examining the causal relationship between job loss and self-perceived health, the first contribution of this study is to investigate the moderating role of the family, and to disentangle the economic from the emotional and social support provided by one partner when the other loses their job.

As well as the family, the welfare state is an important institution in providing a safety net against labor market risks (Esping-Andersen 1999). Moreover, the consequences of unemployment for health tend to vary substantially across welfare states (Bambra and Eikemo 2009). However, previous studies have neglected to investigate whether the buffering role of the family varies across different welfare states regimes. Thus, our second contribution is to examine how different types of families, in terms of composition and labor market attachment,

may interact with different sets of institutional arrangements in shaping the relationship between job-loss and self-perceived health. We apply fixed-effects models to investigate within-person changes in self-perceived health for European men and women, comparing the role of social and economic family's support when a person transits from employment to unemployment.

2.1. Job loss and Health

Unemployment is one of the major contemporary risks for individuals' and families' health (WHO 2009; CSDH 2011). The relationship is consistent across countries and holds for different measures of health (Bambra and Eikemo 2009; Catalano et al. 2011). It has long been established that employed people fare better than those who are unemployed (Marmot et al. 1991; Steele, French, and Bartley 2013; Riumallo-Herl et al. 2014). The mechanisms are straightforward. Unemployment may lead to financial strain, material deprivation, and poverty, strongly affecting individuals' and families' private lives, including health (Tøge 2016). Moreover, job loss is an acute stress factor that affects personal coping resources and psychological balance, tracing the path for serious mental diseases (Jahoda 1982). Unemployment may also induce substance abuse and other unhealthy behavioural changes (Golden and Perreira 2015). Finally, labor-related inequalities in health may be the result of an opposite process known as "health selection" by which individuals with poor health are selected into unemployment at a higher degree, and have less probability of re-employment than their healthier counterparts (Korpi 2001; Flint et al. 2013).

2.2. The role of the family

Some people are able to cope with job loss better than others. In addition to the well-known positive, direct effect on health (Milner et al. 2016; Wood, Goesling, and Avellar 2007), the family's support plays a fundamental role in buffering the detrimental consequences of stressful events, such as unemployment, on health (Gore 1978; Pearlin et al. 1981; Milner et al. 2016). Most studies have focused on social support, underlining the beneficial effect of emotional help provided by intimates (familiars and friends) on mental and physical health (Gore 1978; Pearlin et al. 1981; Milner et al. 2016). However, recent research underlines that while social support improves the health of unemployed people, it does not completely eliminate the negative health effects of unemployment. (Milner et al. 2016).

Moreover, partners can offer not only emotional support, but also material and tangible support (Ross, Mirowsky, and Goldsteen 1990). Having an employed partner may increase economic well-being by providing additional income sources and by generating economies of scale within the household (Hahn 1993; Becker 1981; DiPrete 2002). By stabilizing the couple's financial situation, economic resources provided by one partner can compensate for the negative health consequences of financial stress (Peirce et al. 1996). Thus, while single people are particularly vulnerable to the economic consequences of job-loss, being in a relationship means being better sheltered against this risk especially when there is more than one earner in the couple.

Although there is an abundance of literature, no previous research has sought to understand to what extent the two dimensions of family's support – social or economic – may come together to protect the health of the jobless. Thus, by disentangling the two main health benefits of the family, and in particular of partnership as a fundamental aspect of the broader family situation, this paper aims to go beyond the current state of research. Indeed, it is reasonable to think that when an individual loses their job the partner may be more able to compensate better for the health losses if s/he can provide also financial resources, rather than emotional support only. Since the economic buffering capacity of the family is generally determined by the labor market participation of the partner (DiPrete 2002), we regard the partner's employment condition as a measure that reflects both the family structure and its financial potential. As a direct measure of emotional support is not available in the data we use, we assume that a beneficial effect of the presence of a non-working partner would be due to emotional support. It is indeed largely accepted that (stable) partnership relations are characterized by the special qualities of "trust and intimacy", which are the pillars of emotional support (Pearlin et al. 1981).

Given the previous considerations, our first two hypotheses are: Hp1) *the transition into unemployment has a negative causal effect on individuals' health status;* Hp2) *compared to single people, the effect of job loss on health is less negative for those who have a partner, especially in the case of working partner. These hypotheses should hold for both men and women.*

2.3. The family and welfare state regimes

Unemployment is less problematic for individual and population health if there is a welfare state able to cushion some of the negative consequences (Esping-Andersen 1999; Bambra and Eikemo 2009; Norström and Grönqvist 2015; Esping-Andersen 1990). High levels of

generosity, coverage and effectiveness of welfare provisions benefit the society as a whole and not just those that receive the benefits (Sjöberg 2010). Moreover, extensive unemployment insurance programmes may reduce transitions into ill-health at the country–level and mitigate the socio-economic gradient in health (Ferrarini, Nelson, and Sjöberg 2014). Welfare provisions (e.g., unemployment insurance and social security transfers) are particularly important for the wellbeing of individuals and families that have to deal with adverse life events, including unemployment. It has been found that there exists a consistent relationship between unemployment and self-reported health across Europe. This relationship, however, varies considerably across welfare regimes (Bambra and Eikemo 2009). Therefore, it seems that some welfare states are more effective than others in reducing dependence on the market, and assuring acceptable living standards.

Generally, the relatively generous and universal welfare provisions of the Scandinavian countries enhance population health (Norström and Grönqvist 2015; Chung and Muntaner 2007; Eikemo et al. 2008). Nevertheless, recent studies document that Scandinavian countries are failing to outperform other Western countries in reducing socio-economic inequalities in health (Bambra and Eikemo 2009; Eikemo et al. 2008b; Eikemo et al. 2008c). In particular, Southern and Eastern countries are characterized by the smallest relative health inequalities between employed and unemployed people (Bambra and Eikemo 2009). A possible explanation of this sort of "puzzle" may be found in the role of the family. Indeed, "the more traditional family model in these countries means that additional material, and non-material, support is provided by the family to unemployed members, thus buffering the impact of unemployment on health", as suggested by Bambra and Eikemo (2009, p, 97). Nevertheless, empirical tests on this point are still lacking.

Although many studies have investigated the role of the family or welfare provisions in shaping labor-related health inequalities, little is known about how and to what extent they interact to mitigate the negative consequences of job loss on self-perceived health. The literature on welfare regimes underlines that great variation exists across countries in the way social risks are addressed and in how the responsibilities of social protection are divided between the state, the market, and the family (Esping-Andersen 1990; 1999). Thus, welfare relies to different extents on the family, and states are not equally effective in sheltering their citizens from risks. For example, Southern European countries are characterized by a "rudimentary" welfare state, and social risks are mostly borne by the family. The, redistribution and pooling together of financial resources at the family level is a fundamental source of welfare in these countries (Eikemo and Bambra 2008; Ferrera 1996). In these countries, there is extensive need for individuals to rely on support and solidarity from their families to cope with social risks (Esping-Andersen 1999; Eikemo and Bambra 2008; Ferrera

1996). Thus, we expect to find a large variation in the family's buffering role across welfare regimes, and more precisely (Hp3) *a significant buffering effect of the partner – especially the working partner – in more familialistic and sub-protective welfare state regimes, whereas in the other states, effects should be smaller or even absent.*

3. Methods

3.1. Data

The empirical analysis is based on the European Union Statistics on Income and Living Condition (EU-SILC) provided by Eurostat for the years 2004 to 2011, which has the advantage of providing internationally comparative data for many European countries (we use 24). We restrict the sample to men and women aged between 35 and 55 years old, since this age range represents a life stage in which individuals have typically already formed a family and entered the labor market. We further exclude from the analysis people who were permanently sick and disabled, retired, doing community or military service, or out of the labor market for family reasons. The analytical sample contains 270,385 respondents: 139,432 men and 130,953 women. It is an unbalanced sample and respondents are observed for 2 years on average.

Our outcome variable is self-perceived (bad) health (SPH), which has been shown to be a valid and powerful predictor of mortality, and a reliable measure for comparison across socio economic status (Idler and Benyamini 1997; Idler and Kasl 1995; Burström and Fredlund 2001). Moreover, self-perceived health is a general measure able to capture several dimensions of health, both physical and mental (Knäuper and Turner 2003). In EU-SILC, it is surveyed with the question "How is your health in general; would you say it is... very good, good, fair, bad, very bad". In line with the literature, the five-point scale is recoded as a binary variable, collapsing "very good" and "good" to 0, and "fair", "bad" and "very bad" to 1 (Bambra and Eikemo 2009; Ferrarini, Nelson, and Sjöberg 2014).

Job loss is defined as moving from employment to unemployment, indicating that a person has experienced at least one transition within the observation window. It is coded 1 if the respondent is observed to be unemployed at the time of the interview, conditional on being employed in one of the previous interviews. Job loss might include persons who become unemployed for reasons other than involuntary job loss. However, restricting the sample in age (35-55) and to the active population, allows us to exclude people who have not yet entered

(i.e., school leavers) or have transitioned out the labor market (i.e., early retired), and limits possible bias due to this imprecision.

We investigate the buffering effect of living with a partner as a proxy for the broader family situation. Family situation is initially measured via a (time-constant) dummy variable coded 0 if the observed person is single, and 1 if s/he has a spouse or a cohabiting partner (Tøge and Blekesaune 2015). Furthermore, we distinguish family situation taking into account the partner's employment status: living with a working partner, living with a non-working partner (unemployed or out of the labor force), and the absence of a partner.

Following the epidemiological literature, 24 European countries are clustered in five Welfare Regimes: Conservative (Austria, Belgium, France, Luxembourg, the Netherlands), Southern (Cyprus, Spain, Greece, Italy, Portugal, Malta), Social Democratic (Denmark, Finland, Norway, Iceland, Sweden); Liberal (Ireland, United Kingdom) and Eastern (Czech Republic, Estonia, Hungary, Poland, Slovakia, and Slovenia) (Ferrera 1996; Bambra 2007).

3.2. Analysis

The probability of experiencing "bad health" following a transition to unemployment is estimated by applying linear probability models which control for household disposable income, age (centred) and age squared (centred), and presence of children under 16 years old.

We undertake separate analyses for men and women. While the literature suggests that consequences of unemployment on health may follow similar patterns for men and women (Tøge and Blekesaune 2015; Catalano et al. 2011), studies have shown that men and women respond differently to diverse dimensions of support provided by the partner. In terms of health, women seem to be more sensitive to economic support, whereas men seem to benefit more from emotional support and the preventing-control provided by the partner (Gove 1972; Umberson 1992; Hahn 1993). In addition, gender differences may emerge when both the family and the welfare state are taken into account (Strandh et al. 2013). A detailed investigation of gender differences in the consequences of unemployment on health is beyond the scope of this paper, but it is nonetheless important to take into account the possible heterogeneity in this respect between men and women.

As mentioned, we perform the analyses using linear probability models (LPM). Whether the use of LPM is appropriate when the dependent variable is dichotomous is a highly debated issue in the literature. While it is true that LPMs can lead to biased estimates in certain situations, it has been shown that in most of the cases estimates are reliable, and the violation

of assumptions may be of little practical importance (Hellevik 2009). In this paper, we employ LPMs because of the straightforward interpretation of coefficients, and because they allow for comparison of estimates across different models (Mood 2010). However, we reproduced our analysis using logit models and computed average marginal effects. Results of these checks are in line with our results based on LPMs (see Table 4A and Table 5A in the Appendix).

3.3. Health selection and the identification of causality

Causal claims are challenges for social scientists, and a fundamental issue to address in health research (Stowasser, Heiss, and McFadden 2012). A lack of causal evidence may lead to inaction or inappropriate policies to address health-damaging risks. Considering the contributions of health selection is an important step for assessing the causality nexus in the relationship between employment transitions and health.

In this study, we rely on the counterfactual definition of causality (Rubin 1974) that defines the causal effect as the difference between what we actually observe in the case of treatment and what we would have observed in the case of no-treatment (King, Keohane, and Verba 1994). While the idea behind this definition is the experiment, a counterfactual causal effect can be identified also in a non-experimental setting, once health selection is addressed.

The health selection issue is threefold. First, there is the simultaneity problem (Stowasser, Heiss, and McFadden 2012): when measured at the same time point, employment may have a causal influence on health, as well as health status may have a causal influence on employment. The second issue is the omitted-variable bias (Stowasser, Heiss, and McFadden 2012): a number of unmeasured individual characteristics may confound the relationship between current employment and health. For example, cognitive abilities play a decisive role for employment outcomes, and may also have indirect consequences for general health. Finally, among these personal characteristics, early health status may also affect both health and the likelihood of unemployment. The current health status might be the result of previous negative or positive trends in health, i.e., the result of "state dependence" processes that characterise health dynamics. Put simply, health statuses tend to be associated over time (Sarti and Zella 2016; Blackwell, Hayward, and Crimmins 2001). A common strategy to solve this issue is to include a measure of early life, or previous health status in the model (Tøge and Blekesaune 2015).

This paper firstly addresses health selection by applying fixed-effects models, which control for unobserved (and observed) time-invariant heterogeneity. These allow us to estimate the

relationship between a change over time in the exposure variable and a change in the outcome variable, using the within-individual variation (Halaby 2004). Secondly, we address "state dependence" mechanisms via the inclusion in the model of a measure of health at t-1 (Halaby 2004). Specifically, we do this by applying a dynamic Arellano-Bond (AB) model (table 1), a Generalized Method of Moments that controls for true state dependence, instrumenting lagged dependent variables as covariates (Halaby 2004).

However, it has to be noted that while the AB model provides more robust estimates because it better controls for possible health selection, the inclusion of information on health at t-1 has the drawback of strongly reducing the number of observations. Hence, in our analytical strategy, we decided to apply static fixed-effects estimators in the other sets of models (table 2 and 3).

4. Results

Table 1 reports changes in probabilities of experiencing bad health at the time of job loss (descriptive analyses are reported in Table 1A and 2A in the Appendix). Data are pooled by country. Moving from Model 1 (between estimator) to Model 1c (Arellano-Bond), the effect of the transition to unemployment on health decreases in size, being better adjusted for selection. In Model 1 (between effects LPM), our independent variable job loss is used to explain the between-individual variation of self-perceived health. Results reveal that both unemployed men (+0.13***) and unemployed women (+0.12***) have higher probabilities of experiencing poorer health than their employed counterparts. However, this model may be contaminated by direct and indirect health selection.

Fixed-effects models address these problems. Model 1a implements static fixed-effects estimators that control for unobserved time-constant individual characteristics (indirect selection) that are associated with both unemployment and self-perceived health (e.g., ability, education level, conditions in early life, genetic disposition). As expected, the size of the coefficients for both men and women are strongly reduced when unobserved third factors are controlled for (Model 1a). Entering unemployment leads to an increase of 3 percentage points in the probability of experiencing a negative change in perceived health for men, and an increase of 2 percentage points for women. Although part of the association between unemployment and health is explained by indirect selection, the health consequences of job loss persist. The relationship holds even when time-varying covariates are included in the Model 1b. Although small in magnitude, these figures have nonetheless a substantial impact

on health, considering the incidence of bad health among 20 and 23 per cent of men and women respectively (see table 1A in the Appendix).

Indirect health selection is further addressed in Model 1c. As this model shows, prior health status exerts a sizeable effect on current health status for both men (+0.09***) and women (+0.10***), revealing the path dependence mechanism of health selection. Moreover, results suggest that causation and selection work differently for men and women. Indeed, when in the last model direct and indirect selection are cleaned out, the causal relationship between entering unemployment and self-perceived health persists for men (+0.03***), whereas for women the effect decreases and becomes non-significant (+0.01). Health selection therefore seems to play a larger role for women than for men in explaining the relationship between job loss and self-perceived health. This result is in line with other studies that have found health differences between the employed and the unemployed being bigger among women than men (Bambra and Eikemo 2009). These socio-economic inequalities in health could indeed be explained by the fact that ill-health selects women into unemployment to a greater extent than men (Bambra and Eikemo 2009). Relying on the more robust estimates provided by the AB specification, we conclude that a causal effect of job loss on health exists for men.

Table 1
Self-perceived health as result of job loss and covariates

	Model 1 BE (unadjusted)		Model 1a FE (unadjusted)		Model 1b FE (adjusted)		Model 1c AB	
	Men	Women	Men	Women	Men	Women	Men	Women
Job loss	0.13***	0.12***	0.04***	0.02**	0.03***	0.02**	0.03***	0.01
Income (ln)					-0.01***	-0.00	-0.01*	-0.00
Age					0.00***	0.00***	0.00***	0.00**
Age squared					0.00**	0.00**	0.00**	0.00**
Child < 16 y.o.					0.01	-0.01	0.01	-0.01
Health at t-1							0.09***	0.10***
Constant	0.20***	0.23***	0.19***	0.23***	0.28***	0.27***	0.22***	0.21***
R^2	0.04	0.05						
R^2 (FE within)			0.0004	0.0001	0.001	0.0005		
N observations	287,172	264,016	287,172	264,016	287,172	264,016	138,413	121,029
N individuals	139,432	130,953	139,432	130,953	139,432	130,953	82,861	73,433

Legend: *p<.05; ** p<.01; *** p<.001.
Adjusted for Robust Standard Errors
Test for Zero Autocorrelation for the AB model

The next step is to investigate the role of the family as a source of social and economic support in buffering the adverse health consequences of becoming unemployed. While the estimates

of the static (FE) and dynamic (AB) models in Table 1 differ at least for women, results for these two models are equivalent for both sexes once we include the family status variable17. However, as previously mentioned, the AB model provides more robust estimates in terms of causality at the expense of the number of observations. Because of this, we preferred to use the FE specification throughout the rest of the analyses.

Table 2
Self-perceived bad health. Interaction between job loss and partner (time-constant)

| | Model 2a | | Model 2b | |
	Men	Women	Men	Women
Job loss	0.05***	0.00	0.05***	0.01
Job loss#With Partner	-0.03*	0.02		
Job loss#No-working Partner			-0.02	0.02
Job loss#Working Partner			-0.04**	0.01
Income(ln)	-0.01***	-0.00	-0.01***	-0.00
Age	0.01***	0.00***	0.01***	0.00***
Age squared	0.00**	0.00**	0.00**	0.00**
Child <16 y.o.	0.01	-0.01	0.01	-0.01
Constant	0.28***	0.27***	0.28***	0.27***
R2 (FE within)	0.001	0.0006	0.001	0.0006
N observations	287,172	264,.016	287,172	264,016
N individuals	139,432	130,953	139,432	130,953

Legend: *p<.05; ** p<.01; *** p<.001
Adjusted for Robust Standard Errors

Table 2 reports estimates of two static fixed-effects models with interaction terms between job loss and the two variables for partner presence and partner's economic status. Model 2a shows that the presence of a spouse or cohabiting partner in the household mitigates the negative effect of job loss for men. When transiting to unemployment, the probability of experiencing bad health increases by 5 percentage points (+0.05***) for single men, but by only 2 percentage points (0.05 - 0.03) for partnered men. The interaction effects for women are radically different. Single women seem not to suffer from job loss, and the presence of a partner at the time of transition increases their risk of perceiving themselves as in poor health conditions (+0.02). Results for women are, however, not statistically significant.

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[17] Checks show similar results for model 2a and model 2b by using either static or dynamic estimators (ask the authors for results).

Model 2b distinguishes the partner's employment status with a view to understanding the extent to which the buffering effect of a partner comes from the partner's economic support rather than from its emotional support. For men, having a non-working partner (either unemployed or inactive) when becoming unemployed reduces by 2 percentage points the probability of experiencing poor health. A working female partner, instead, nullifies the detrimental consequences of unemployment (0.05 – 0.04) and thus strongly shelters men. This is true even when controlling for the overall economic situation of the family at any given point in time. The interaction coefficient between job loss and partner's employment status is statistically significant (-0.04**).

The risk of poor health after job-loss seems to be less strong for a single woman (+0.01) than for a single man (+0.05***), but for women with a partner the risk slightly increases. No matter what the male partner's working status is, for women the presence of a partner does not ameliorate the harmful consequences of losing the job. However, even in this model, coefficients for women are not statistically significant.

Overall, the analysis confirmed our first and the second hypotheses for men. Entering unemployment causes a negative change in self-perceived health among men, but being in a relationship buffers the impact. Moreover, this protective effect is more effective when the female partner can ensure financial stability for the family by providing a second revenue.

Family and Welfare State

The role of the family in moderating the consequences of unemployment is likely to vary with the broader welfare context (Hp.3). In Table 3, this is investigated separately for the five welfare state clusters by estimating Model 2b from table 2, thus interacting job loss with the partner's working status. Our results confirm that the consequences of job loss on health depend on the broader welfare context. The results support the idea that the family plays a fundamental role in welfare provision in Southern and Eastern European countries, especially for men. The negative consequences of job loss are cushioned by the presence of a non-working partner (0.08-0.05) and almost completely absorbed by the presence of a working partner (0.08-0.07) in the Southern regime. Moreover, having an employed female partner even reverses the sign of the effect of job loss for Eastern European men (0.04-0.06). In Conservative and Liberal countries, job loss is associated with an increase in the probability of experiencing bad self-perceived health for single men, as is the case in Southern countries. However, family has no impact in Liberal, nor in Conservative welfare states, where the coefficients for the interaction terms are not statistically significant.

Limitations

This study is not free of limitations. EU-SILC provides only a very short observation window (4-years panel). This implies that previous life-course events can be considered only to a very limited extent and we could not control for health selection in earlier work history, leaving unresolved other causality-related problems such as the possible bias driven by unobserved time-varying heterogeneity (Halaby 2004). This study has dedicated little attention to possible mediating mechanisms such as health behaviours as EU-SILC provides only very limited information. Lack of information in the data also prevented us from properly defining and measuring the emotional support provided by the partner. Neither information on the quality of the relationship (i.e., stability), nor a direct measure of emotional support are present in the dataset. Furthermore, our definition of the family – the presence of a partner and his/her employment situation – is maybe too reductive. For future research, a more detailed distinction of family types, individuals' health behaviours, and more accurate national life-history analyses would be desirable.

5. Conclusions

This study provided new insights into the importance of the family in compensating for the negative effect of job loss on self-perceived health. In addition, it showed that family support works through different channels and varies across welfare state regimes in Europe. Previous research has highlighted that some people cope better than others with adverse life circumstances, and the support provided by the family is an important resource in that regard (Gore 1978; Pearlin et al. 1981; Milner et al. 2016; Umberson, Crosnoe, and Reczek 2010). Focusing on close ties within households, we considered the presence of a stable partner and his/her working status, as a source of social and economic support. According to some authors, having a partner should reduce the stress coming from adverse events, thanks to the symbolic and emotional dimensions that such a relationship entails, regardless of any economic benefits (Milner et al. 2016). The evidence presented here, however, suggests that benefits linked to the presence of a (female) partner also come from the economic stability that she can provide in terms of a second income. We find partners' employment to be at least as important as the mere presence of the partner in reducing the negative effect of job-loss on the individual's health, by maintaining the standard of living of the household and decreasing economic strain on the family (Ross, Mirowsky, and Goldsteen 1990).

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Table 3

Self-perceived bad health as result of job loss and the presence of partner across welfare regimes.

	Conservative		Nordic		Southern		Liberal		Eastern	
	M	W	M	W	M	W	M	W	M	W
Job Loss	0.06*	0.00	-0.00	-0.02	0.08***	-0.01	0.09*	0.09+	0.04	0.03
Job loss # With No working Partner	0.00	0.02	0.01	0.02	-0.05*	0.06+	-0.06	-0.04	-0.01	-0.03
Job loss # With working Partner	-0.02	0.01	0.01	0.03	-0.07**	0.03	-0.03	-0.07	-0.06*	0.01
Income(ln)	-0.01	-0.01	-0.01	-0.00	-0.01*	-0.00	0.01	-001	-0.01	-0.00
Age	0.01***	0.01***	0.00	0.00	0.00	0.00	0.01***	-0.00	-0.00	-0.00
Age squared	0.00	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.00*	0.00*
Child <16 y. o.	-0.00	-0.00	0.02	0.00	-0.00	-0.01	0.00	-0.03	0.02	-0.01
Constant	0.28***	-0.25***	0.24***	0.15	0.28***	0.24***	0.09	0.26**	0.33***	0.34***
R2 (FE within)	0.005	0.004	0.0003	0.0001	0.001	0.0004	0.005	0.001	0.0006	0.0004
N observations	61,950	55,137	37,314	34,819	101,216	84,606	19,371	19,242	67,321	70,212
N individuals	25,602	23,354	18,146	17,274	51,161	44,333	10,971	11,001	33,552	34,991

Legend: (+p<.01); *p<.05; ** p<.01; ***p<.001
Adjusted for Robust Standard Errors

Moreover, we also found important gender differences in relation to both job loss and family effects. This suggests the importance for labor and health policy makers to consider and further distinguish the specific needs of men and women in Europe.

We also reported an important interaction between the family and the welfare state in moderating the health consequences of unemployment, showing how the compensation effect of the family varies across welfare regimes. The countries where we found this mitigating role of the family, namely Southern and Eastern welfare states, are those characterized by less developed social protection systems and – especially the Southern – high level of familialism (Esping-Andersen 1999; Eikemo and Bambra 2008; Ferrera 1996). Social protection in Southern welfare states is very much dependent on informal care and support at the household level. Thus, the family plays a decisive role in cushioning the adverse consequences of labor market risks. Furthermore, mechanisms of support and solidarity might also be possible in Eastern European countries, where the health consequences of unemployment have been shown to be smaller than in other welfare state regimes (Bambra and Eikemo 2009; WHO 2009).

Our results demonstrate that the welfare state not only shapes the nature and distribution of certain risks and mitigates their consequences but also interacts with other important inequality-generating institutions, like the family. In less generous settings, the family comes into play to a greater extent, which cannot but lead to increased stratification of inequalities across European countries, including inequalities in health. The family and especially the economic support that women's employment provides have the capacity to affect the distribution of economic resources themselves (Grotti and Scherer 2016), as literature has shown, and the distribution of health.

Two conclusions can be drawn from our results. First, the further development of a (universalistic) welfare state certainly helps to mitigate the negative health effects of unemployment and, therefore, the future costs in terms of both individuals' health and welfare spending. Second, the presence of a working partner is of crucial importance. Contrary to the role often attributed to emotional support, our results underline the relevance of employment rather than the mere presence of a partner, indicating, once more, the relevance of employment policies directed at bringing women into paid work. In this sense, policies aiming to increase female labor market participation should be promoted, especially in those contexts where the welfare state is less developed.

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7. Appendix

Table 1A
Descriptive statistics. Mean of *bad health* by exposure and sample characteristics.

Variables	Description	SPH Mean (St.Dev)		Min	Max
		M	**W**		
Bad health	Self-perceived health	0.20 (0.40)	0.23 (0.42)	0	1
Working Status	Self-defined economic status			0	1
Employed		0.19 (0.39)	0.21 (0.41)		
Unemployed		0.36 (0.48)	0.37 (0.48)		
Age	Age centred at 43	0.19 (0.39)	0.22 (0.41)	-13	12
Partner	Married or cohabitant			0	1
Partnered		0.20 (0.40)	0.22 (0.41)		
Not Partnered		0.20 (0.40)	0.26 (0.44)		
Household income	Equivalised disposable income (ln)			1	15
1° quintile		0.30 (0.46)	0.35 (0.47)		
2° quintile		0.23 (0.42)	0.27 (0.44)		
3°quintile		0.18 (0.38)	0.21 (0.41)		
4° quintile		0.15 (0.36)	0.17 (0.37)		
5°quintile		0.12 (0.32)	0.13 (0.34)		
Welfare	Welfare state regimes				
Nordic		0.14 (0.34)	0.15 (0.36)		
Conservative		0.17 (0.37)	0.19 (0.39)		
Liberal		0.17 (0.37)	0.19 (0.39)		
Southern		0.19 (0.39)	0.22 (0.41)		
Eastern		0.29 (0.45)	0.32 (0.47)		

Table 2A
Sample size and number of transitions.

	Frequencies		
	M	**W**	**Total**
N observations	287,172	264,016	551,188
N respondents	139,432	130,953	270,385
N of unemployed observations	20,261	24,900	45,161
N of respondents with unemployed observations	14,600	18,052	32,652
N unemployment transitions	3,881	3,823	7,704

Table 3A

Gender difference in the relationship between job loss and bad-health.

	Model 1b FE (adjusted)
Job loss	0.03***
Woman	omitted
Job loss*Woman	-0.02*
Income	-0.01***
Child < 16	0.00
Age	0.01***
Agesq	0.00***
Constant	0.28***
R^2 (FE within)	0.0007
N observations	551,188
N individuals	270,385

Legend: *p<.05; ** p<.01; *** p<.001
Adjusted for Robust Standard Errors

Table 4A

Fixed effect logistic regression model (OR)

	Model 1b FE (adjusted)	
	M	W
Job loss	1.32***	1.16**
Income	0.90***	0.95
Child < 16	1.09	0.93
Age	1.07***	1.04***
Agesq	1.00	1.00*
N observations	52,801	49,068
N individuals	18,539	17,450

Legend: *p<.05; ** p<.01; *** p<.001
Adjusted for Robust Standard Errors
Numerosity reduced because Logistic regression excludes cases where the outcome does not vary.

Table 5A

Average Marginal Effect (Model 1b)

	Model 1b (Adjusted) AME	
	M	**W**
Job loss	0.057***	0.035**
Legend: *p<.05; ** p<.01; *** p<.001		

Table 5A

Average Marginal Effect (Model 1b)

Article 2 Gender roles and selection mechanisms across contexts: A comparative analysis of the relationship between unemployment, self-perceived health, and gender.

1. Abstract

Health literature shows that unemployment has a gendered effect on health. However, who is more affected between men and women and why is still unclear. We assume that women suffer less than men from unemployment because of two mechanisms. The first mechanism relates to social roles theories: the availability and centrality in individuals' lives of roles other than employment may reduce the detrimental effect of unemployment. The second mechanism is health selection: the gendered impact of unemployment on health results from the different way selection mechanisms operate across genders. Yet, the way these two mechanisms operate may vary according to the roles that men and women have in the society and/or the culture that sustains this gendered division of roles— i.e. across gender regimes. We investigate this by pursuing a three-step comparative perspective. The analysis relies on EU-SILC data for the period 2004-2015 for Italy and Sweden and SOEP data for Germany (1995-2017) and applies correlated dynamic random-effects probit models. Empirical results support our hypothesis of a larger gendered effect in traditional contexts with respect to egalitarian ones, suggesting that culture matters. Nevertheless, we find weak support for the role of health selection in shaping the relations between unemployment, health, and gender.

2. Introduction

The role of gender in the relationship between unemployment and health has been on the research agenda for a long time (Jahoda, Lazarsfeld, and Zeisel 1974), but with inconclusive results. While some studies find that unemployed women have worse health than men (e.g. see McKee-Ryan et al. 2005), others find harsher consequences for men (e.g. see Norström et al. 2014; Paul and Moser 2009). In this paper, we contribute to this debate further by analyzing the relationship between unemployment, general self-rated health, and gender in different contexts and exploring the mechanisms underlying this relation.

Studies focusing on the gender differentials in the association between unemployment and health have explained this variation by focusing on an array of factors: men and women

react differently to unemployment because of gender differences in family responsibilities (Artazcoz et al. 2004; Strandh et al. 2013; Leana and Feldman 1991; Leeflang, Klein-Hesselink, and Spruit 1992; Ensminger and Celentano 1990), coping strategies (Leana and Feldman 1991; Ensminger and Celentano 1990), economic situation (Strandh et al. 2013; Leeflang, Klein-Hesselink, and Spruit 1991), and social class (Artazcoz et al. 2004). Moreover, the broader institutional context also explains the variation in bad health among unemployed men and women (Strandh et al. 2013). However, notwithstanding the insights coming from previous research, our empirical knowledge on the topic is somewhat tempered by few limitations: the majority of studies are somewhat out of date (Leana and Feldman 1991; Leeflang, Klein-Hesselink, and Spruit 1991; Ensminger and Celentano 1990) and provide only partial pictures by selecting samples that often do not guarantee the representativeness of the whole working population (Leana and Feldman 1991; Leeflang, Klein-Hesselink, and Spruit 1991; Ensminger and Celentano 1990; Strandh et al. 2013); they rely on cross-sectional and single-country data, hence missing to address the causality/selection issue and neglecting important contextual explanatory factors for the gender differential (Artazcoz et al. 2004). An exception in this regard is the work by Strandh and colleagues (2013). They implemented a robust analytical strategy by employing longitudinal data and choosing Sweden and Ireland to investigate whether contextual variation matters. However, their theoretical and methodological framework only builds on differences in the institutional characteristics of the two countries. Yet, other country-differences, such as differences in gender cultures—values and norms about the 'correct' gender division of labor (Pfau-Pfeffer 1998)—may be responsible for the country-specific gender differential in the effect of unemployment on health.

Our paper aims at contributing to the existing literature by empirically testing two mechanisms that may be responsible for the gender differential in the relationship between unemployment and health. We do this by merging for the first time two different strands of research and two theoretical arguments: *social role theories* and *health selection*. According to the former, the health consequences after job loss may be gendered because of the different importance that men and women confer to each different role and, most importantly, to the occupational role (Hakim 1991) as an instrument for meeting their psychological and material needs (Nordenmark and Strandh 1999). When alternative roles—i.e. partnership, parenthood—are not normatively sanctioned and are conceived as valuable by the unemployed person for her self-realization and identity, they may compensate for the losses coming with unemployment. Yet, this depends on the structurally different positions that men and women occupy in the family and the labor market—i.e. the configuration of roles. According to the latter mechanism, selection as a three-fold social process (i.e. unobserved heterogeneity, path dependence, and reverse

causality) could channel people into different social roles and positions according to their health and health determinants (West 1991). Health selection is contingent on gender (Arrow 1996; McDonough and Amick 2001) to the extent this individual structured social position signifies different demands and access to social roles (other than employment) for men and women.

Thus, social roles and health selection can be considered not mutually exclusive mechanisms, which jointly shape the gender differential in the relationship between unemployment and health. Individuals' (*self-*)*selection* out of employment can be made possible or even favored by the availability of alternative roles. In the event of illness, those who have access to alternative roles can separate from their work more easily than those whose availability of roles is limited or even absent. Moreover, differences in the configuration of (alternative) roles are intimately connected to differences in institutional and cultural contexts—i.e. gender regimes (Sainsbury 1994; Lewis, 1992; Pfau-Effinger, 1998). Consequently, social roles and selection mechanisms and their interplay are expected to vary accordingly.

Going beyond previous research, we also try to separate the cultural from the institutional dimension of the gender regime(s) by implementing a multiple-step comparative approach. Firstly, our analysis tests gender roles and selection mechanisms for Sweden and Italy, which represent radically different gender regimes, thus providing both institutional and cultural variation (Lewis 1992; Sainsbury 1994; Gosta Esping-Andersen 2009). Then, we limit institutional heterogeneity by focusing on Germany on the comparisons between East- and West-Germany and between older and younger cohorts—for West-Germany. This three-step comparison sheds light on whether gender differential in the relationship between unemployment and health reflects structural differences in institutions and economic circumstances (structural effects) or whether individuals' gender ideologies play a major role, irrespective of structural characteristics (cultural effects).

We overcome the limitations of previous literature and test the proposed mechanisms using longitudinal data and advanced dynamic panel models to control selection mechanisms fully. Understanding the heterogeneity of unemployment consequences has important policy implications: it allows identifying the most fragile groups of workers to efficiently address the health costs of unemployment and reduce health inequalities.

3. Theoretical background and Hypotheses

The relationship between unemployment and health has been generally understood as a combined function of the "psychosocial" role (Jahoda 1982; Warr 1987) and the "material" role (Fryer 1986; 1992) of paid work for individuals. Thus, people perceive unemployment as problematic and adverse because of both the psychosocial (e.g. time structure, status, social relationships) and economic (e.g. income, social security) losses that it entails. Moreover, because of such losses, unemployment has been shown to negatively affect a set of health outcomes, including physical well-being (Korpi 2001), general self-rated health (Tøge and Blekesaune 2015), mental health, and depression (Bubonya, Cobb-Clark, and Ribar 2017), and health behaviors (Falba et al. 2005).

While unemployment is expected to be bad for everyone's health, health responses tend to differ according to gender (see Paul and Moser 2009 for a review). A recent study on unemployment in Europe, for instance, found that becoming unemployed increases the risk of bad self-perceived health by three percentage points for men. In contrast, no effect is found for women when selection is controlled for (Tattarini, Grotti, and Scherer, 2018). However, while many studies report that unemployment is harsher for men than for women, evidence is neither consistent nor undisputed (see McKee-Ryan et al. 2005). Some scholars point to the role of the context as the ground for this inconsistency (Nörstrom et al. 2014; Strandh et al., 2013). In light of these considerations, this paper aims to contribute to the literature by addressing two mechanisms responsible for unemployment's gendered effect on health: social roles and health selection. In order to do that, we compare different contexts characterized by different gender regimes.

3.1. Social role theories

A long tradition in research on the gender differential in the relationship between unemployment and health is rooted in *social role theories*. The main idea is that the availability and centrality of roles alternative to employment may fill the "void" that unemployment leaves in an individual's life—namely, the fulfillment of their socially constructed needs (Nordenmark and Strandh, 1999). According to this argument, having more than one principal role— i.e. being a worker, a husband/wife, or a parent—may improve health, or at least has no adverse effects on it (Verbrugge 1982; 1986; Sorensen and Verbrugge 1987; Nordenmark 2002). Indeed, being involved in multiple roles may expand an individual's stock of resources, support, and rewards, providing alternate sources of satisfaction, self-realization and self-esteem, and structure for individual identity (Sieber 1974)). In turn, these benefits may improve psychological and physical well-being by reducing stress and the sense of not being in control of one's own life

(Sorensen and Verbrugge 1987; Nordenmark 2004). Thus, in case of job loss, other roles may offer support and buffer the negative health consequences of unemployment.

However, the availability of alternative roles is contingent on the different positions that men and women have in society—such as the configuration of gender roles. For example, in many western societies, being a caregiver is assumed to be women's traditional primary role, whereas the primary bread-winner role is still reserved for men (Hochschild and Machung 1989; Sjöberg 2004). Moreover, if employed, women tend to occupy disadvantaged positions in the labor market (e.g. low attachment, low pay, low quality work, etc.) (Mascherini, Bisello, and Rioboo Leston 2016) and usually are the secondary earner in the family. These different social positions may lead to differences in the (psychological and financial) centrality that work fulfills in men's and women's lives (Nordernmark and Strandth 1999). Accordingly, our argument builds on the idea that work-related roles are more central in men's lives while family-related roles are more central in women's life (Hakim 1991). Therefore, we expect that unemployment has more negative consequences for men than for women's health.

3.2. Self-selection and alternative roles

The availability of alternative roles could be a good parachute when leaving employment is motivated by sickness and illness. Indeed, it is possible that people with health problems may choose easily to separate from their work role if they have other options at their disposal, offering compensatory resources for the fulfillment of their individual needs. The mechanism by which poor health channels people out of employment is well-known as health selection—a social process by which people are sorted into social positions based on their health or health determinants (West 1991; Bartley 1994). The literature recognizes two health selection mechanisms: indirect selection and direct selection (West, 1991 Stowasser, Heiss, and McFadden 2012). Indirect selection refers to unobserved heterogeneity, namely, to the presence of several unobserved individual characteristics (e.g. genetics, cognitive ability, etc.) associated with both employment histories and health status. If not properly addressed, these unobserved factors may confound the relationship between job loss and health (Tøge and Blekesaune 2015; Krug and Eberl 2018). Direct selection includes path dependence and reverse causality. The first, also known as state dependence, refers to the fact that the current health status might result from the previous health trend. Research has shown that health statuses tend to be strongly associated over time (Blackwell, Hayward, and Crimmins 2001), and this relationship may get stronger when adverse life events such as job loss are experienced (Sarti and Zella 2016). The

second mechanism—reverse causality—refers to the possibility that while on one hand unemployment may cause negative consequences on individual health (Flint et al. 2013; Steele, French, and Bartley 2013), on the other hand, poor health may work as a condition that impairs people to be productive at work and to participate in the labor market fully (Ross and Mirowsky 1995; Virtanen, Janlert, and Hammarström 2013).

So far, research has shown that health selection may be responsible for the negative correlation between job loss and health (Heggebø 2015; Sarti and Zella 2016; Tøge and Blekesaune 2015). Yet, health selection may be contingent on material and social rewards whose distribution is structured systematically in the distinctive experience of different social groups (McDonough and Amick 2001:136). Indeed, the role of selection mechanisms has been shown to vary by attributes of social inequalities, such as gender (Arrow 1996; McDonough and Amick 2001). Some studies, for instance, have shown that women with poor health may become or remain unemployed to a greater extent than men (Andreeva et al. 2015; Korpi 2001) and that, when both time-constant unobserved heterogeneity and path dependence are controlled for, the effect of job loss on health persists and is strong for men. In contrast, it disappears for women (Tattarini, Grotti, Scherer 2018). Further, a recent study investigating the relative importance of causation and selection in the relationship between health and SES, has highlighted the greater importance of previous health status in explaining the variation of current health for women relative to men (Hoffmann, Kröger, and Geyer 2018).

Thus, health selection out of employment depends on gender, interpreted in terms of structured individual social position. To the extent that individual location within this position signifies different access to social roles other than employment—such as family-related roles—gender structures the health selection process. In the frame of the 'alternative roles' argument, health selection can be interpreted as a form of *self-selection* (McDonough and Amick 2001) able to explain the gender differential in the relationship between unemployment and health. Unhealthy women could be selected out of employment more than men because exiting employment is not as normatively sanctioned as for men, and other roles are (normatively) more available for them than for their male counterparts. In other words, women have greater discretion over their labor supply, while men have no choice about whether to work or not, or at least not to the same extent. Following this argument, we assume that women suffer less than men because selection is stronger for them than for their male counterparts.

3.3. The role of the context

The position of women in society has quickly changed in many respects over the last few decades. Western societies have experienced a general trend towards more egalitarian gender-role attitudes (Knight and Brinton 2017), and women now participate to a greater extent in the labor market, many of them are primary earners, work in traditionally male-dominated jobs, and are strongly motivated and committed to their (paid) work. For these women, employment may be considered a principal role as it is for men. However, the modernization trend has not followed a unique pathway in Europe, resulting in different predominating gender cultures and different models of division of work across contexts—i.e., gender regimes (Lewis 1992; Sainsbury 1994; Esping-Andersen 2009; Pfau-Effinger 1998). While in some national contexts, an egalitarian dual breadwinner/dual-career model has completely replaced the traditional male breadwinner/female carer model, for other countries, this development has been only partially achieved. These two models reflect radically different notions of integrating men and women into work and family: symmetrical and equitable in egalitarian contexts; asymmetrical and unequal in traditional contexts. The way egalitarian and traditional gender regimes structure the different positions of women and men in the family, and the labor market may explain previous contrasting results on the gender differential between unemployment and health (Strandh et al., 2013). Indeed, it is possible that in more egalitarian gender regimes, employment is a principal role nowadays for women. On the contrary, in more traditional gender regimes, employment is likely less central for women's lives and other roles—i.e., motherhood—may be enough to fulfill their socially constructed needs. This discussion brings us to our first hypothesis.

Hp.1: Unemployment has a similar effect on health for men and women in an egalitarian context, while a gendered effect in traditional contexts, with women suffering less than men.

As far as social role options for women (and men) are different in different gender regimes, this should also be connected to the extent health selection operates according to gender across contexts. Previous research has shown that health selection mechanisms may vary across countries. A popular line of argument is that this variation depends on differences in labor market structures or economic cycles (Martikainen and Valkonen 1996; Heggebø, 2015): Health-based exit from employment is assumed to be stronger in prospering times and economies than during a recession when the unemployment experience is more widespread. However, theoretical arguments about how selection might vary across gender regimes are missing, and we do not know whether context and gender interact in

shaping health selection mechanisms. According to the idea that health selection may work in combination with the availability of 'alternative roles'—i.e., self-selection—we could expect that traditional gender regimes allow women to separate from their work in the event of illness more easily than men, whose alternatives regarding other roles is limited or even absent. On the contrary, in more egalitarian contexts, selection should work similarly for both men and women.

Hp2: In more traditional gender regimes, women suffer less from unemployment than men because selection is stronger for them than for their male counterparts; whereas, in more egalitarian contexts, women suffer as much as men because selection is similar for both of them.

As said, in order to provide support for these expectations, we implement a three-step gender regimes comparison.

Comparison 1: Sweden vs Italy

Our first comparison includes Sweden and Italy. Sweden can be considered a prototype of an egalitarian gender regime, whereas Italy is a traditional one regarding female employment and gender norms (Lewis 1992; Gosta Esping-Andersen 2009; Ferrera 1996). On the one hand, Sweden supports extended access to employment for women by promoting public (part-time) jobs, egalitarian gender policies in family and employment, and the high availability of child care services. On the other hand, in Italy, female labor force participation has historically been substantially lower, and the division of labor within households is strongly gendered. According to Eurostat statistics, for instance, in 2016 the 79% of working women (82% of men)—16-65 years old—were employed in Sweden; whereas in the same year in Italy, the female employment rate resulted in being far lower (51% of women against 71% of men) (Eurostat 2020). The two contexts also differ greatly in terms of gender cultures, with Swedish men and women showing on an average higher level of agreement with an egalitarian system of values than the Italian population. In particular, in 2017, the share of women who agree or strongly agree with the sentence 'a job is alright but what women want is a home and children' was 14% in Sweden against the 54% in Italy (EVS, 2017). While the first egalitarian regime enables women's decommodification and reduces gender stratification, the second channels men and women into different 'spheres of productions' – men into paid work and women into unpaid housework/family work.

Comparisons 2 and 3: Reducing heterogeneity

Although the use of national contexts as proxies for gender regimes is both theoretically and empirically supported by the literature (Esping-Andersen 2009; Pfau-Effinger 1998; Lewis 1992; Strandh et al., 2013) as well as by gender culture indicators (EVS, 2017), we recognize that this approach might not be ideal. Different countries greatly vary in many institutional and cultural respects. The possible country-specific pattern in the gendered effect of unemployment on health for Sweden and Italy could come from institutional or cultural (gender norms) factors. Strandh and colleagues (2013) framed the observed variation in the gender differential between Ireland and Sweden regarding institutional and welfare policy differences. In fact, culture or other factors may also play a role. In another study comparing three Scandinavian countries—Norway, Denmark, and Sweden— Heggebo (2015) found substantial differences in health selection out of employment across these contexts, which substantially vary in terms of employment regulations and economy in the period across the 2008 crisis. However, he does not find cross-country differences in how health selection interacts with genders, which is a non-significant interaction in all three cases. This is probably because the three contexts do not vary substantially in terms of gender culture—i.e., egalitarian values system. On the one side, this result supports our hypothesis of no gender differences in selection mechanisms in egalitarian contexts; on the other side, it signals the necessity to consider gender cultures for a better understanding of the process of social selection.

Furthermore, treating the institutional setting and gender culture as a unit might be problematic, as it neglects the existing contradictions and the tensions both within and between the levels (Pfau-Effinger 1998). Indeed, evidence suggests that, in some contexts, lower employment barriers for women can coexist with women's identification to domestic and care-giving roles (Charles and Grusky, 2005); while in other contexts, women might be oriented to autonomy and independence through work, but the institutional setting sets restrictions to their orientations (Lewis, 1992). Moreover, the assumption that women (and men) are homogeneous in terms of values and preferences might be questioned: different and competing values systems may coexist within the same context (Hakim, 1991).

All in all, this evidence highlights the necessity to isolate and differentiate gender cultures while keeping the institutional setting constant. Therefore, to better understand the relationship between unemployment, health, and gender, we try to reduce part of the cross-context heterogeneity that the Sweden-Italy comparison entails and maximize differences in gender cultures within the same institutional context.

Comparison 2: East- vs West-Germany

Our second comparison considers Germany, as it provides substantial variation in gender norms in the comparison between East Germany (more egalitarian region) and West Germany (more traditional region), while at the same time reducing the variation in other contextual characteristics.

West-Germany has been generally classified as a prototype of a conservative-traditional gender regime where social policies, the taxation system, and social security regulations strengthen the role of women as homemakers and caregivers (Esping-Andersen 1990; Pfau-Effinger 1998). Contrarily, the socialist German Democratic Republic (GDR) actively fostered female employment and systematically promoted egalitarian ideologies before reunification with West Germany and the resulting assimilation into a conservative welfare state and market economy (Rosenfeld, Trappe, and Gornick 2004). After 1990, the GDR territory adopted West German laws and institutions, including employment regulations, the educational system, and family policies. As a part of the process, converging trends in gender culture have also been found between East and West Germany, especially due to a re-traditionalization among young people in the East (Ebner, Kühhirt, and Lersch 2020). However, many differences persist even after reunification, and the Eastern German population remains more egalitarian than the Western German population (Pfau-Effinger and Geissler 2005; Ebner, Kühhirt, and Lersch 2020). Our focus here is on testing our hypotheses, looking at differences in gender norms, proxied by the place of socialization.

Comparison 3: Young vs old cohorts in West-Germany

While East and West Germany share both labor market and family policies, some differences at the institutional level, such as the provision of child-care services, still provide western and eastern women with different incentives to participate in gainful employment (Trappe, Pollmann-Schult, and Schmitt 2015). Therefore, in our third comparison we focus only on West Germany to further reduce cross-context institutional heterogeneity and exploit another source of variation to capture gender norms: cross-cohort variation. Previous research has shown that cohorts are particularly suitable for explaining changes in gender norms and ideologies (Lee, Alwin, and Tufis 2007; Ebner, Kühhirt, and Lersch 2020). Indeed, despite slowly and with some delay with respect to other European countries, social norms have changed over time also in West Germany (see Trappe, Pollmann-Schult, and Schmitt 2015). Women's orientation towards work has strengthened, and attitudes towards gender roles and women employment have become

more liberal. Moreover, Germany has progressively introduced family and social policies that point toward more equal redistribution of social roles between men and women. Therefore, it is reasonable to assume that nowadays more than in the past, work occupies a central role for West-German women. Accordingly, we exploit this source of variation and compare a cohort of younger individuals born after 1960 and assumed to embrace egalitarian gender norms, with a cohort of older individuals born up to 1960 which we assume embrace more traditional gender norms (Lee, Alwin and Tufis 2007).

4. Data and methods

We study Sweden and Italy for the years 2004-2015 relying on the European Union Statistics on Income and Living Condition (EU-SILC). EU-SILC has a rotational design in which each year 25 % of the sample exits from the survey and is replaced by a new group of individuals. This implies that we observe individuals for a maximum of 4 years. Further, we study Germany from 1995 to 2017 using the German Socio-Economic Panel (SOEP), a representative panel study of German households (Wagner, Frick, and Schupp 2007). We restrict the samples to men and women in the labor force aged between 25 and 55 years old. To deal with missing values, which were always —with the exception of partner economic status in the German samples (see Table 1b, Supplementary material)— less than 5%, we used listwise deletion in the analyses presented below. To ensure that the missing data do not bias the results and jeopardize representativeness, we also re-ran models for Germany by including missing values as a separate category. The results of these analyses suggest that there is no systematic bias due to missing data (see Table 3b, Supplementary material). Our final analytical samples include 59,637 (33,087 men and 26,550 women) respondents in Italy; 8,932 (4,453 and 4,479) in Sweden; 29,235 (13,847 men and 15,388 women) in West Germany; 7,771 (3,731 and 4,040) in East Germany; 7,864 (3,853 and 4,011) in the old-cohort and 21,371 (9,994 and 11,377) in the young-cohort in West Germany.[18,19]A description of samples is reported in Table 2a in the Supplementary material.

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[18] Differences in the sampling design implemented in Italy and Sweden partially explain the large difference in sample size between the two countries. Both designs, however, provide representative samples of the population (see EU-SILC Guidelines 2016, p. 24).
[19] Total samples sizes are reported in Table 1a of the Supplementary material.

4.1. Dependent variable

Our outcome variable is self-perceived (bad) health (SPH). This health measure has been frequently included in many population surveys and is used mainly for cross-national comparisons in Europe. Its good validity explains its success (DeSalvo et al. 2006; Cullati et al. 2020) and reliability (Cox et al. 2009) and to be a far-reaching measure for a broad range of health dimensions—physical, mental and functional health and health behaviors (Yamada, Moriyama, and Takahashi 2012). EU-SILC surveys this information with the question "How is your health in general; would you say it is..." very good, good, fair, bad, very bad. Likewise, SOEP employs a five-point scale, ranging from "very good" to "good," "satisfactory," "bad, and "very bad." Such measure provides an ordinal ranking of individuals' self-perception of their health status. Following common practice in the literature (Ferrarini, Nelson, and Sjöberg 2014; Bambra and Eikemo 2009), the five-point scale is recoded as a binary variable, collapsing "very good" and "good" to 0, and "fair," "bad" and "very bad" to 1. Therefore, our outcome variable takes value 1 in the case of bad health and the value 0 otherwise.[20] Although dichotomizing might reduce the variation in the data and require identifying a cut-off point, we follow this strategy to compare with previous studies.

4.2. Independent variables

Our main independent variable is the person's self-defined economic status at present; it is coded 1 if the respondent is observed to be unemployed at the time of interview and coded 0 if he/she is employed. The target variable captures and differs from the more objective ILO definition. We prefer using self-defined economic status to identify those who consider themselves as 'unemployed' but do not meet the strict ILO criteria. These are the so-called 'hidden unemployed,' people who aspire to a job but gave up looking for it because discouraged, for example. This is, in our view, a crucial point because people do not randomly select in this group of hidden unemployed; rather, women are more like to fall into this group than men.

Our models also include a set of control variables, namely age and age square, level of education (ISCED 0/2; ISCED 3/4; ISCED 5/6), whether a partner is present and his/her economic status (distinguishing between no partner; partner employed; unemployed;

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[20] Descriptive statistics for the outcome as well as for all the independent variables are reported in Table 2a of the Supplementary material.

inactive), number of children (no children; 1; 2; 3 or more children), and disposable household income (log). All models that we estimate also include year dummies.

4.3. Analytical strategy

To assess the differential impact of unemployment for men and women, we compared the differences between (unemployed and employed) men with the differences between (unemployed and employed) women. In order to do so, we calculate predicted probabilities and average marginal effect from two distinct random-effects probit models.

Our first step is estimating a random-effects model (Model 1) that asses the association between unemployment and self-perceived health, controlling for observable characteristics. Model 1 takes the following form:

$$y_{it}^* = \beta une_{it} + \gamma Z_{it} + v_{it} \tag{1}$$

In Eq. (1), the latent outcome variable y_{it}^* expresses the chances of experiencing bad health for individual i ($i = 1, ..., N$) at time t as a function of a time-varying unemployment indicator une_{it}, a set of observable characteristics listed in the previous section Z_{it}, and an error component v_{it}.

In the second step, we control for both direct and indirect selection (Model 2). We do this using dynamic correlated random-effects (CRE) models building on the contribution of Rabe-Hesketh and Skrondal (2013) (see Anonymous for details on its implementation). Direct selection is captured by augmenting our model with the lagged value of the response variable $y_{i,t-1}$ as in Eq. (2), where t-1 stands for the wave before the current wave. The associated coefficient ρ captures state dependence processes in bad health and at the same time indirectly controls for reverse causality.

$$y_{it}^* = \beta une_{it} + \rho y_{i,t-1} + \gamma Z_{it} + u_i + \epsilon_{it} \tag{2}$$

Indirect selection is controlled by capturing individual unobserved heterogeneity. Specifically, the error component v_{it} in Eq. (1) is decomposed into an individual effect u_i and an idiosyncratic error term ϵ_{it} as in Eq. (2), where u_i refers to the individual time-constant unobserved heterogeneity and is modeled as

$$u_i = \alpha_0 + \alpha_1 y_{i0} + \alpha_2 \bar{Z}_i + \alpha_3 Z_{i0} + a_i \tag{3}.$$

y_{i0} and Z_{i0} stand for the initial value of the response variable and of the time-varying explanatory variables, respectively. Finally, $\bar{Z}_i$ represents the within-unit averages of the time-varying explanatory variables and a_i is a (residual) individual-specific time-constant

error term. In our application, time-varying variables include age, whether a partner is present, and his/her economic status, number of children, and household income.

Based on the fully adjusted model (Model 2) in Eq. 2, we test our hypotheses on gender roles (Hp.1) by comparing several contexts – models are estimated separately for each context. For this hypothesis, we pool men and women and include an interaction term between unemployment and gender. This has the advantage of directly testing whether gender differences in the effect of unemployment exist and are statistically significant.

Finally, we test the role of selection mechanisms (Hp.2). This is done using the KHB method, which allows to compare coefficients across nested nonlinear models (Breen, Karlson, and Holm 2013; Kohler, Karlson, and Holm 2011). Specifically, we test the role of selection for the relationship between unemployment and health based on the comparison between Model 1 and Model 2. In order to allow selection mechanisms to operate differently between genders, we estimate separate models for men and women.[21] Full models for all results are reported in the supplementary material.

5. Results

5.1. Social roles in context

Our first hypothesis regards whether gender differences in the effect of unemployment on health can be attributed to differences in gender roles across different contexts—HP1: *unemployment has a similar effect on health for men and women in an egalitarian context; while a gendered effect in traditional contexts, with women suffering less than men*. We test this hypothesis by looking at average marginal effects (AME) from our fully adjusted model—i.e., Model 2 (men and women pooled with interaction). Table 1 shows the results for the comparison between egalitarian contexts and traditional contexts, according to our three-step comparative approach.

Looking at the Comparison 1, in Sweden, unemployed men have a 4.3 percentage points higher risk of bad health with respect to employed men; the same figure for Swedish women is 3.1 percentage points. Turning our attention towards Italy, we observe an unemployment penalty of 4.3 and 2.3 percentage points for men and women respectively. These results show that in both Sweden and Italy women suffer less from unemployment than their male counterpart, suggesting the existence of a gender differential.

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[21] Average marginal effects from these models are in line with those from the pooled analysis.

Table. 1 Average Marginal Effect (AME) of unemployment on the probability of Bad Health. Dynamic random-effects probit. Model 2 pooled by gender with interaction effect. EU-SILC 2004-2015, SOEP 1995-2017.

	Egalitarian contexts			**Traditional contexts**		
	Sweden			**Italy**		
Context comparison 1	Men	Women	Diff. M-W	Men	Women	Diff. M-W
	4.28**	3.13*	NS	4.26***	2.32***	***
	East Germany			**West Germany**		
Context comparison 2	Men	Women	Diff. M-W	Men	Women	Diff. M-W
	5.43***	5.42***	NS	6.72***	4.10***	**
	Younger cohort			**Older cohort**		
Context comparison 3	Men	Women	Diff. M-W	Men	Women	Diff. M-W
	5.77***	3.60***	*	8.43***	5.22***	+

Note: column "Diff. M-W" tests statistical significance of gender differences via interaction. NS not significant, + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

However, if we compare the gender differential across these two countries, Italian women are less affected by unemployment than Swedish women relatively to their male counterpart. We test these differences via the interaction term between gender and unemployment status. Results reported in the column "Diff. M-W" in Table 1 confirm our hypothesis: Italian women are less affected by unemployment than Italian men while we do not observe any statistically significant difference between men and women in Sweden.

In order to give a meaning to the magnitude of the effect, consider that the predicted probabilities (Tab 3a Supplementary material) of bad health for employed people (the baseline level of bad health) are 8.0 and 9.0 percent for Swedish men and women respectively. This means that, in Sweden unemployment increases the risk of bad health by 30 percent for women, and of about 50 percent for men. Concerning Italy, unemployment increases the risk of bad health by less than one seventh for women while by almost one third for men. Looking at gender differences in relative terms, further strengthen our argument about a gender gap in the effect of unemployment, and its variation across egalitarian and traditional contexts.

These results are echoed in the analyses for Germany—Comparison 2 and 3. With unemployment, women's health is less at risk than men's health in West Germany and in the older cohort, namely in contexts characterized by a traditionalist gender regime. On the contrary, in egalitarian contexts—East Germany and younger cohort—the gender differential is neither substantial nor strongly significant. The picture, therefore, remains stable even when the heterogeneity due to the institutional setting is reduced. This indicates the importance of context-specific gender culture in shaping the observed gender differences in the relationship between unemployment and health.

5.2. Social roles and social selection across contexts

We move now to our second hypothesis regarding the interplay between health-selection mechanisms and social roles in shaping the gendered effect of unemployment on health – *HP2: In more traditional gender regimes, women suffer less from unemployment than men because selection is stronger for them than for their male counterpart; whereas in more egalitarian contexts, women suffer as much as men because selection is similar for both of them.*

We measure health selection comparing AME obtained from Model 1 and Model 2, separately by gender. Figure 1 reports this by egalitarian and traditional contexts. The figure shows that moving from Model 1 (controlling for observable characteristics only) to Model 2 (additionally controlling for selection) the effect of unemployment decreases substantially for all countries and genders, Swedish men being the exception.

We explicitly test the role of selection mechanisms in Table 2, which reports differences in the AME presented in Figure 1 together with a test of statistical significance obtained through the KHB method.

Our aim is to assess the impact of total selection—direct + indirect selection. By doing so, we aim to understand whether and to what extent health-selection mechanisms work differently for men and women thus explaining the gender differential. If the difference between the AME from Model 1 and Model 2 is statistically significant and larger for women than for men, we will conclude that health selection mechanisms are stronger for women.

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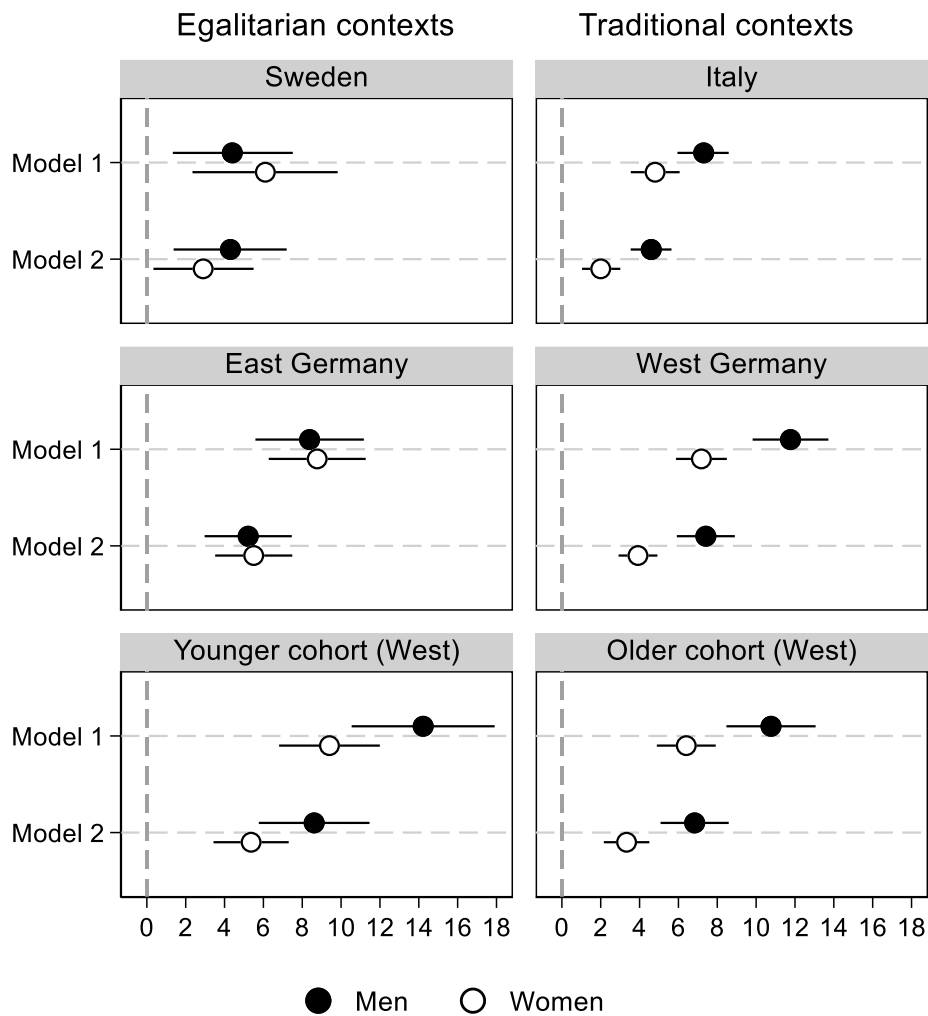
Figure 1. AME of unemployment on Bad Health. Separated models for men and women, EU-SILC 2004-2015, SOEP 1995-2017

Looking at the Comparison 1, results for Sweden indicate that health selection strongly counts for women (M1 - M2 = 6.09 - 2.92 = 3.17***) while it is negligible for men (M1 - M3 = 4.42 - 4.29 = 0.13***) in reducing the effect of unemployment on bad health. Substantially, total health selection halves the effect of unemployment for women's health. In Italy, the impact of (total) health selection is almost the same for men (M1 - M2 = 7.27 - 4.59 = 2.68**) and women (M1 - M2 = 4.80 - 2.02 = 2.78***). A very similar pattern is found in Germany for both comparisons 2 and 3.

Table 2. Bad Health. Differences between AME from dynamic random-effects probit models, by gender.

		Total selection M1 – M2	
		Men	**Women**
Comparison 1	**Sweden**	0.13***	3.17***
	Italy	2.68***	2.78***
Comparison 2	**East**	3.16	3.27
	West	4.36**	3.27
Comparison 3	**Young**	3.93	3.09
	Old	5.61	4.03

Note: Significance tests obtained from KHB models

*p<.05; ** p<.01; *** p<.001

All in all, these results do not support our hypothesis on the interplay between health-selection mechanisms and social roles in shaping the gendered effect of unemployment on health (Hp2): health selection seems to be stronger for women in egalitarian contexts but not in traditionalist ones.

6. Conclusions

Long established literature has shown that the impact of unemployment on self-perceived health in Western societies varies by gender. However, whether men are more penalized than women or the other way around (McKee-Ryan et al. 2005; Paul and Moser 2009; Norström et al. 2014) and especially the mechanisms that may lead to the gender differential are not sufficiently clear. The goal of the study reported herein was to contribute to the literature on unemployment by studying how it stratifies (self-perceived) health according to gender and the broader institutional and cultural contexts where men and women are embedded.

In order to understand why there exists a gender differential in the relationship between unemployment and health, we relied on two theoretical arguments: the availability of alternative roles and health selection. The first argument builds on the idea that men and women may compensate the detrimental health consequences of unemployment through the commitment to 'alternative roles', which can provide for the resources needed to fulfil

people's socially constructed needs (Nordenmark and Strandh 1999). Importantly, the availability of alternative options depends on the different positions that men and women have in society. Further, we merged the availability of 'alternative roles' argument to the health selection argument. Health selection plays a fundamental role in shaping the relationship between unemployment and health. Hence, we assumed that health selection can be contingent to people's social position as defined by gender (West 1991; McDonough and Amick 2001) and, thus, explain the gender differential in the relationship between unemployment and health. Ill people might be less reluctant to fall or remain (i.e., self-select) in unemployment if they have alternative roles. In Western societies, women have generally more alternative roles than men and thus more discretion in their labor market attachment. Therefore, health selection should be stronger for them, explaining why unemployment is less of a menace for women than for their male counterpart.

Further, relying on the idea of different gender regimes, we extended these arguments to a comparison across contexts. Notwithstanding the fact that over the last decades the breadwinner model has weakened in favour of more gender equality, there are still substantial differences across and within European countries—traditional gender regimes vs egalitarian gender regimes (Lewis 1992; Salisbury, 1999; Pfau-Effinger 1998; 2005). In contexts where being a wife and a mother is still assumed to be women's traditional and primary roles and the primary bread-winner role is still reserved to men, unemployment is less stigmatized and taking up alternative roles is more socially accepted for women than for men. Accordingly, social (self-)selection should be stronger for women than for men in traditional contexts, where in case of ill-health, the separation from work is eased by the availability of alternative roles. Building on these considerations, we hypothesized that in more traditional contexts, as opposed to egalitarian ones, women would suffer less from unemployment than their male counterpart (Hp.1) and that this could be partially attributed to the interplay between alternative social roles and health selection (Hp.2).

We applied a three-step—cross-country, cross-region and cross-cohort—comparison, by focusing on contexts that are representative of different gender regimes. Importantly, this approach served us to disentangle gender culture and institutional setting, thus going beyond previous research (Strandh et al., 2013). We used the longitudinal component of EU-SILC (2004-2015) for Sweden and Italy and SOEP data for Germany (1995-2017) to carry out our analysis. By applying correlated dynamic random-effects probit models, we tested our hypotheses on a sample of men and women between 25 and 55 years old. Given the cross-country differences between Sweden—i.e., egalitarian regime—and Italy—i.e., traditional regime—we expected gender to affect the relationship between unemployment and health differently in the two countries. Alike, we used the German context as a good

case of within-country heterogeneity. Here, we focused on differences between eastern (egalitarian) and western (traditional) states, and between older (traditional) and younger (egalitarian) cohorts in West Germany. In this way, we tried to disentangle the role of the institutional setting and gender culture—i.e., the two component of gender regime (Pfau-Effinger 1998).

We found support to our first hypotheses —the context where people are embedded structures the relationship between unemployment, health and gender. We found no gendered effect of unemployment on health in the egalitarian   context of Sweden. Conversely, in the traditional context of Italy we observed substantive and statistically significant gender differences in the effect of unemployment on bad health, with women suffering less than men. We found the same pattern for the comparisons between East and West Germany and younger and older cohorts in West Germany. In line with previous meta-analysis (Nörstrom et al. 2014) and empirical studies (Strandh et al. 2013), our analysis clearly support the hypothesis that the relationship between unemployment, self-perceived health and gender is structured by the context in which people are embedded (and socialized). Moreover, by focusing on within country and within region comparisons, we were able to capture the "cultural effect" of gender norms, irrespective of the "structural effect"—the effect that might stem from institutional and economic differences across-countries. This emerges quite convincingly form the cohort-comparison in West-Germany. In this context, the set of welfare policies (e.g., family-base taxes) and the scarce provision of child-care services (see Trappe, Pollmann-Schult, and Schmitt 2015), indeed, might still shape how norms are lived out, constraining the egalitarian orientations of women (and men). However, we believe that our results—especially those on cohorts—speak in favour of the existence of two opposing values systems within the same context and, then, the role of culture in shaping the gender differential in the relationship between unemployment and health, independently from the institutional setting. Thus, our findings extend previous research (Strandh et al., 2013) and make an important contribution to the literature on unemployment, health and gender. We believe that these results allow the reconciliation of the contrasting results that past research has found about the gendered effect of unemployment on health.

On the contrary, our results did not support our theoretical argument on social selection. We found that in Sweden women are more selected out of employment than men, whereas in Italy, health selection does not seem to be the main mechanism behind the gender differential—Italian men and women seem to be selected out of employment to the same extent. Namely, we do not find any evidence that health selection is stronger for women in more traditional countries (Hp.2), despite the fact the institutional and the cultural

context would offer them a wider range of 'alternative roles' relative to men. Moreover, our second hypothesis is rejected also in the second and third comparisons, where the cross-country heterogeneity is reduced in order to maximize cultural differences within the same institutional context. As for the first comparison, results for Germany showed that men are generally more health-selected that women into unemployment. What is most striking about our findings is the extent to which they defy generalizations about how the context works in combination with social selection in shaping the gender differential. One potential explanation for this result could be found in the frame in which we address selection. Being the transition into unemployment our only focus, we de facto neglect those people who transit from employment into inactivity, because of ill-health. Theory and previous evidence suggest that these people are more frequently women (Korpi, 2001), especially in traditional gender regimes (Esping-Andersen, 2009). According to this, our analyses do not allow us to grasp a substantial part of the social selection mechanism— namely the one that channels women out of the labor force—and that could confirm our Hp.2. Therefore, further research that addresses selection into inactivity is needed in order to evaluate the interplay between selection and social roles across gender regimes.

Before concluding, some limitations and avenues for future research need to be mentioned. Due to data limitations, we tested our hypotheses by using general self-rated health as dependent variable. Because of its subjective nature, the reliability of SPH has been often questioned, especially regarding gender comparisons. It has been argued that SPH may be vulnerable to several biasing factors, such as gender-specific heterogeneity in the evaluative process—i.e., men and women may place different weights on particular inputs when making health judgment (Peersman et al. 2012)—and gender-related reporting behaviours heterogeneity—i.e., women are thought to have over-reporting behaviours than men (Crimmins, Kim, and Solé-Auró 2011). These differences could be problematic if they were to occur systematically among men and women because they could bias our understanding of health inequalities across those groups. Rather, the literature is not consistent in this matter. Other studies have challenged and contradicted the aforementioned results (see for instance Oksuzyan et al. 2019), leaving the debate about the degree of gender-bias of SPH still open. We tried to limit the potential bias, by doing sensitive analysis with separated models for men and women without revealing problematic differences. Nevertheless, we acknowledge that an objective health measure would be preferable in order to limit this and other potential biases. Psychological justification, for instance, may mediate whether individuals who are unemployed project health as a reason for their job loss (McDonough and Amick 2001). If that is the case, we might face the risk of overestimating the effect of unemployment on health, especially for

those groups who would be more exposed to self and social stigmatization in case of unemployment, namely Italian men.

We also must recognize that our context-comparisons are only a proxy for gender norms, and leave gender norms as a 'black box'. We believe that this issue would not be solved via the use of contextual (macro-level) measures of gender norms. In fact, as our data cover only short time spans, exploiting changes over time would not be a viable solution given that values and norms change very slowly. Also, changes across a large number of countries which could provide enough variation in cultural aspects, would also introduce large heterogeneity in institutional characteristics – which we want instead to minimize. A more promising venue for further research would instead be addressing gender roles from a micro level perspective for example studying how roles specialization within couples may shape the health consequences of unemployment for men and women. Notwithstanding these limitations, we still believe that our paper provides a substantial contribution to the existent literature and to our understanding of the complex relationship between unemployment, gender and general health.

To conclude, results from this study could also be read from a gender equality perspective. Undoubtedly, gender equality in opportunities and roles is a desirable aspect for contemporary societies and a political goal that cannot be postponed further. However, the broader question that stems from this study might be: What kind of equality should be pursued in order to provide men and women with both good life quality and equal chances in the public and private spheres? In this sense, we believe that social and labor policies aiming at improving women's integration into the labor market should be sided by policies targeting men and fathers, and facilitating their involvement in the family life. A more equal redistribution of social roles could then activate a crucial transformation both of gender roles and of the cultural models that sustain them

7. References

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8. Appendix

Table. 1a Number of observations and respondents. Italy and Sweden, EUSILC 2004-2015 and Germany, SOEP 1995-2017

	Italy			Sweden		
	Men	**Women**	**Total**	**Men**	**Women**	**Total**
N observations	67,451	51,824	119,275	9,610	9,601	19,211
N respondents	33,087	26,550	59,637	4,453	4,479	8,932
	West Germany			**East Germany**		
N observations	75,580	85,691	161,271	23,410	25,879	49,289
N respondents	13,847	15,388	29,235	3,731	4,040	7,771
	Old Cohort (West)			**Young Cohort (West)**		
N observations	23,273	24,909	48,182	52,307	60,782	113,089
N respondents	3,853	4,011	7,864	9,994	11,377	21,371

Table.1b Description of missing as percentage (%) of sample

	IT		SW		DE_West		DE_Est		DE_Old cohort		DE_Young cohort	
	M	W	M	W	M	W	M	W	M	W	M	W
Unemployed*	7.10	31.65	5.93	10.94	2.32	7,92	2.22	7.51	0.51	1.30	3.04	10.32
Age	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	0.10	0.09	0.12	0.17	2.14	2.22	1.74	1.30	1.22	1.67	2.51	2.42
Log Income	0.00	0.00	0.00	0.00	1.54	0.95	1.22	0.73	0.03	0.02	2.15	1.28
Nr. of kids	0.00	0.00	0.00	0.00	0.15	0.13	0.13	0.12	0.03	0.02	0.20	0.17
Partner economic status	0.12	0.08	0.85	0.93	11.34	8.11	8.79	6.02	5.10	4.79	13.84	9.31
N	110.503	115.348	15.143	15.862	111.755	128.049	32.656	36.529	31.951	34.040	79.804	94.009

*Missings on Unemployed are Inactive, other Non-working (e.g., in maternity leave) or working people (e.g., Ausbildung) who do not enter our definition of Employed/Unemployed. Then, they are not non-response missings.

Table. 2a Descriptive statistics

	Italy				Sweden			
	Men		**Women**		**Men**		**Women**	
	Employed (60.993)	Unemployed (6.458)	Employed (45.053)	Unemployed (6.771)	Employed (9.250)	Unemployed (360)	Employed (9.185)	Unemployed (416)
N observations								
Bad Health (mean (Std.Dev))	0.17 (0.38)	0.24 (0.43)	0.19 (0.39)	0.24 (0.42)	0.11 (0.32)	0.26 (0.44)	0.13 (0.34)	0.34 (0.47)
No partner (%)	32.53	60.67	34.91	47.73	26.40	51.67	23.29	38.22
Employed partner	39.60	16.38	57.83	41.44	64.50	35.00	72.17	52.88
Unemployed partner	4.50	6.40	2.67	6.84	2.10	2.78	1.99	6.02
Inactive partner	23.37	16.55	4.60	3.99	7.01	10.56	2.55	2.88
No kids (%)	53.81	73.52	55.59	59.13	45.55	67.22	43.26	50.96
1 kid	24.48	13.81	25.65	24.19	21.03	16.11	23.32	25.00
2 kids	18.36	9.99	16.33	14.41	24.95	10.00	25.13	14.42
3 or more kids	3.35	2.68	2.43	2.26	8.48	6.67	8.30	9.62
Household income (log) (Mean (Std.dev))	10.40 (0.76)	9.50 (2.10)	10.45 (0.72)	9.79 (1.62)	10.59 (0.85)	9.96 (1.37)	10.67 (0.71)	10.24 (0.90)
Age (mean, (Std. Dev))	41.84 (8.00)	38.81 (8.82)	41.49 (7.97)	38.41 (8.27)	40.94 (8.18)	41.56 (8.85)	41.63 (8.20)	40.66 (8.88)
Primary Education (%)	36.79	50.79	25.60	38.38	4.92	15.14	4.92	15.14
Secondary Education	48.03	38.88	50.83	44.09	47.22	54.09	47.22	54.09
Tertiary Education	15.18	10.33	23.57	17.53	47.86	30.77	47.86	30.77

Table. 2a Continue

	West-Germany				East Germany			
	Men		Women		Men		Women	
	Employed	Unemployed	Employed	Unemployed	Employed	Unemployed	Employed	Unemployed
N observations	(68.659)	(6.921)	(65.571)	(20.120)	(19.795)	(3.615)	(20.462)	(5.417)
Bad Health (mean (Std.Dev))	0.40 (0.50)	0.61 (0.49)	0.43 (0.49)	0.53 (0.50)	0.41 (0.49)	0.60 (0.49)	0.42 (0.49)	0.61 (0.49)
No partner (%)	19.61	36.11	26.01	18.90	20.57	37.90	22.69	30.90
Employed partner	60.40	36.08	67.67	67.85	66.16	35.21	68.29	48.35
Unemployed partner	19.22	27.15	5.59	12.41	12.60	26.22	8.45	19.77
Inactive partner	0.77	0.66	0.73	0.84	0.68	0.66	0.57	0.98
No kids (%)	55.18	65.06	58.65	40.80	62.84	73.11	61.48	55.33
1 kid	20.28	14.97	21.96	23.28	21.85	15.49	24.33	23.52
2 kids	18.33	12.61	15.47	23.20	12.41	8.13	11.91	14.88
3 or more kids	6.22	7.35	3.92	12.72	2.89	3.26	2.28	6.28
Household income (log) (Mean (Std.dev))	10.57 (0.52)	9.94 (0.88)	10.54 (0.56)	10.28 (0.66)	10.38 (0.51)	9.80 (0.74)	10.38 (0.50)	9.95 (0.63)
Age (mean, (Std. Dev))	41.82 (7.93)	41.94 (9.00)	41.66 (7.91)	41.41 (8.15)	41.89 (8.03)	42.64 (8.72)	41.87 (7.92)	42.01 (8.52)
Primary Education (%)	39.21	60.90	20.03	50.48	12.32	37.26	6.95	28.24
Secondary Education	34.89	27.70	48.66	38.30	62.16	54.22	57.07	58.13
Tertiary Education	25.90	11.40	22.32	11.22	25.52	8.52	35.98	13.62

Table. 2a Continue

	West Germany Old cohort				West Germany Young cohort			
	Men		Women		Men		Women	
N observations	Employed (20.962)	Unemployed (2.311)	Employed (18.195)	Unemployed (6.714)	Employed (47.697)	Unemployed (4.610)	Employed (47.376)	Unemployed (13.406)
Bad Health (mean (Std.Dev))	0.49 (0.50)	0.74 (0.44)	0.51 (0.50)	0.63 (0.48)	0.36 (0.48)	0.55 (0.50)	0.39 (0.49)	0.48 (0.50)
No partner (%)	13.75	24.32	20.41	14.18	22.19	42.02	28.16	21.26
Employed partner	63.51	46.73	68.50	67.68	59.03	30.74	67.36	67.94
Unemployed partner	22.16	28.43	9.86	16.68	17.93	26.51	3.95	19.27
Inactive partner	0.58	0.52	1.23	1.46	0.86	0.74	0.53	0.53
No kids (%)	69.91	77.24	82.51	71.64	48.70	58.96	49.49	25.35
1 kid	17.97	13.85	12.62	16.59	21.30	15.53	25.54	26.63
2 kids	9.18	6.97	4.22	7.82	22.35	15.44	19.79	30.90
3 or more kids	2.95	1.95	0.66	3.95	7.66	10.07	5.18	17.12
Household income (log) (Mean (Std.dev))	10.60 (0.50)	10.01 (0.78)	10.60 (0.55)	10.30 (0.69)	10.56 (0.53)	9.91 (0.93)	10.52 (0.56)	10.27 (0.64)
Age (mean, (Std. Dev))	48.44 (4.90)	49.91 (4.68)	48.54 (4.76)	48.52 (5.12)	38.92 (7.23)	37.95 (7.93)	39.02 (7.25)	37.85 (6.96)
Primary Education (%)	46.07	68.41	42.21	60.83	36.19	57.14	23.96	45.30
Secondary Education	27.99	21.07	37.92	30.25	37.93	31.02	52.78	42.32
Tertiary Education	25.94	10.51	19.86	8.92	25.88	11.84	23.26	12.38

Table. 3a Predicted Probabilities of Bad Health for employed individuals. Dynamic random-effects probit. Model 2 pooled by gender with interaction effect. EU-SILC 2004-2015 and SOEP 1995-2017

	Egalitarian contexts		**Traditional contexts**	
	Sweden		**Italy**	
Context comparison 1	Men	Women	Men	Women
	0.080***	0.090***	0.135***	0.158***
	East Germany		**West Germany**	
Context comparison 2	Men	Women	Men	Women
	0.419***	0.439***	0.406***	0.424***
	Young cohort		**Old cohort**	
Context comparison 3	Men	Women	Men	Women
	0.357***	0.383***	0.524***	0.520***

Adjusted for age groups, educational level, marital status, number of children in hh, hh income, previous health status, dummy year, and initial conditions for all covariates.

[+] $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table. 4a Bad health. Dynamic random-effects probit. Model 3 pooled by gender with interaction effect (probit coefficients). EUSILC 2004-2015.

	Sweden	Italy
Unemployed	0.426***	0.267***
Woman	0.117**	0.150***
Unemployed # Woman	-0.128	-0.130***
Year of survey (ref. 2005)		
2006	0.021	0.083***
2007	-0.004	-0.293***
2008	-0.034	-0.247***
2009	-0.137	-0.234***
2010	-0.043	-0.370***
2011	-0.037	-0.193***
2012	-0.004	-0.512***
2013	-0.033	-0.350***
2014	0.093	-0.486***
2015	0.087	-0.269***
Age	0.053	0.040**
Age square	-0.001*	-0.000
Level of education (ref. ISCED 3/4)		
ISCED 0/2	0.118	0.184***
ISCED 5/6	-0.258***	-0.172***
Household income (log)	-0.027	-0.011
Partner economic status (ref. not present)	-0.100	0.024
Employed	-0.112	0.062
Unemployed	0.010	-0.003
Inactive		
N. of children (ref. no children)	0.015	-0.009
1	-0.136	-0.059
2	-0.333	-0.196
3 or more	-0.100	0.024
Initial condition (time 0)		
Health	1.932***	1.316***
Age	0.054	0.039*
Household income	-0.035	-0.002
Partner economic status (ref. not present)		
Employed	0.096	0.068
Unemployed	0.027	-0.070
Inactive	0.095	0.001
N. of children (ref. no children)		
1	0.006	-0.022
2	0.287	-0.050
3 or more	0.260	-0.161
Within-unit average		
Partner economic status (ref. not present)		
Employed	-0.112	-0.139
Unemployed	0.379	0.225
Inactive	0.010	-0.029

Table. 4a continue

N. of children (ref. no children)		
1	-0.033	0.003
2	-0.161	0.067
3 or more	0.036	0.366
Age	-0.025	-0.043*
Household income	-0.079	-0.063**
Health at t-1	0.300***	0.413***
Constant	-2.445***	-2.143***
Var(u_i)	0.985***	0.682***
Observations	19.211	119.275

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table. 5a Bad health. Dynamic random-effects probit. Model 3 pooled by gender with interaction effect (probit coefficients). SOEP 1995-2017.

	West Germany	East Germany	Old cohort	Young cohort
Unemployed	0.231***	0.184***	0.288***	0.201***
Woman	0.064***	0.068*	-0.015	0.092***
Unemployed # Woman	-0.090**	-0.002	-0.110+	-0.077*
Year of survey (ref. 1995)				
1996	0.038	-0.022	0.046	0.014
1997	-0.035	-0.081	-0.003	-0.104
1998	-0.060+	-0.129*	-0.031	-0.123*
1999	-0.030	-0.018	-0.042	-0.046
2000	0.027	-0.041	0.061	-0.035
2001	-0.070*	-0.111*	-0.052	-0.109*
2002	0.050	-0.124*	0.071	0.008
2003	-0.046	-0.153**	-0.066	-0.052
2004	-0.054	-0.175**	-0.043	-0.088
2005	0.034	-0.160**	0.060	-0.008
2006	0.060	-0.225***	0.090	0.019
2007	0.000	-0.193**	0.005	-0.025
2008	-0.014	-0.252***	-0.053	-0.019
2009	0.046	-0.218***	0.026	0.035
2010	0.027	-0.271***	-0.069	0.044
2011	0.040	-0.208***	0.119	0.016
2012	0.003	-0.303***	-0.075	0.007
2013	0.024	-0.175**	-0.005	0.026
2014	0.046	-0.296***	-0.099	0.059
2015	0.047	-0.251***	-0.010	0.059
2016	0.047	-0.276***		0.062
2017	-0.017	-0.343***		0.003
Age	0.039***	0.056***	0.051	0.047***
Age square	0.000	0.000	0.000	-0.000
Level of education (ref. ISCED 3/4)				
ISCED 0/2	0.097***	0.062	0.104***	0.090***
ISCED 5/6	-0.171***	-0.076*	-0.103**	-0.195***
Household income (log)	-0.047**	-0.071*	-0.048	-0.045*
Partner economic status (ref. not present)				
Employed	0.051*	0.150**	0.086	0.043
Unemployed	0.054+	0.203***	0.091	0.042
Inactive	0.101	0.318*	0.142	0.081
N. of children (ref. no children)				
1	0.0160	-0.003	0.058	0.004
2	0.024	-0.021	0.023	0.022
3 or more	-0.006	-0.087	0.076	-0.021
Initial condition (time 0)				
Health	1.181***	1.150***	1.162***	1.186***
Age	-0.023***	-0.022***	-0.038***	-0.020***
Household income	0.058**	0.086*	0.137**	0.032
Partner economic status (ref. not present)				
Employed	0.041	0.013	0.030	0.036
Unemployed	0.024	-0.012	-0.084	0.075
Inactive	0.127	0.066	0.153	0.111

Table. 5a continue

N. of children (ref. no children)				
1	0.008	0.090*	0.039	-0.031
2	0.016	0.130*	-0.068	0.008
3 or more	0.030	0.206*	-0.078	0.031
Within-unit average				
Partner economic status (ref. not present)				
Employed	0.015	-0.084	0.112	-0.014
Unemployed	0.045	-0.063	0.174	-0.009
Inactive	-0.122	-0.122	-0.093	-0.083
N. of children (ref. no children)				
1	-0.017	-0.040	-0.103	0.030
2	-0.072	-0-111	0.068	-0.070
3 or more	-0.105	0.023	-0.224	-0.088
Age	0.003	-0.007	0.009	0.002
Household income	-0.211***	-0.195*	-0.401***	-0.151***
Health at t-1	0.507***	0.566***	0.543***	0.489***
Constant	0.060	-0.178	0.981	-0.454
Var(u_i)	0.590***	0.685***	0.721***	0.535***
Observations	161271	49289	48182	113089

[+]$p<0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table. **6a** *Sweden:* Bad health. Dynamic random-effects probit. Models separated by gender (probit coefficients). EUSILC 2004-2015.

	Men		Women	
	Model 1	**Model 2**	**Model 1**	**Model 2**
Unemployed	0.589***	0.425***	0.623***	0.281*
Year of survey (ref. 2005)				
2006	0.020	-0.010	0.022	0.048
2007	0.015	-0.050	0.032	0.046
2008	-0.040	-0.106	-0.005	0.039
2009	-0.285*	-0.258*	-0.164	-0.023
2010	-0.263*	-0.180	-0.042	0.087
2011	-0.158	-0.106	-0.124	0.028
2012	-0.084	-0.052	-0.113	0.049
2013	-0.179	-0.128	-0.063	0.055
2014	0.017	0.066	-0.003	0.125
2015	-0.003	-0.014	0.103	0.189
Age	0.086	0.020	0.156**	0.085
Age square	-0.001	-0.000	-0.002*	-0.001*
Level of education (ref. ISCED 3/4)				
ISCED 0/2	0.231	0.054	0.425**	0.202
ISCED 5/6	-0.451***	-0.205**	-0.515***	-0.306***
Household income (log)	-0.177***	-0.057	-0.121**	0.016
Partner economic status (ref. not present)				
Employed	-0.263**	-0.110	-0.324***	-0.151
Unemployed	-0.006	-0.270	0.044	0.028
Inactive	-0.021	-0.087	0.196	0.148
N. of children (ref. no children)				
1	0.032	0.138	-0.091	-0.015
2	-0.028	0.036	-0.153	-0.321
3 or more	-0.299	-0.424	-0.001	-0.130
Initial condition (time 0)				
Health		1.833***		2.017***
Age		0.024		0.071
Household income		-0.029		-0.043
Partner economic status (ref. not present)				
Employed		0.141	0.066	0.172
Unemployed		-0.078	0.199	-0.069
Inactive		0.067	0.329	0.084
N. of children (ref. no children)				
1		-0.144	0.150	-0.168
2		0.310	0.273	0.339
3 or more		0.388	0.096	0.437
Within-unit average				
Partner economic status (ref. not present)				
Employed		-0.279	0.026	-0.350
Unemployed		0.700	0.087	0.703
Inactive		0.034	-0.270	0.024
N. of children (ref. no children)				

Table. 6a continue

1		0.213	-0.272	0.269
2		-0.312	-0.009	-0.325
3 or more		-0.037	0.083	-0.065
Age		-0.003		-0.030
Household income		-0.063		-0.100
Health at t-1		0.304**		0.302**
Constant	-2.423*	-1.537	-3.937***	-3.355***
Var(u_i)	2.344***	0.975***	2.592***	0.987***
Observations	9610	9610	9601	9601

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table. 7a *Italy:* Bad health. Dynamic random-effects probit. Models separated by gender (probit coefficients). EUSILC 2004-2015.

	Men		Women	
	Model 1	**Model 2**	**Model 1**	**Model 2**
Unemployed	0.447***	0.268***	0.300***	0.130***
Year of survey (ref. 2005)				
2006	0.065*	0.082**	0.055	0.085*
2007	-0.352***	-0.289***	-0.375***	-0.297***
2008	-0.399***	-0.239***	-0.426***	-0.256***
2009	-0.417***	-0.230***	-0.433***	-0.238***
2010	-0.585***	-0.361***	-0.613***	-0.382***
2011	-0.422***	-0.151***	-0.543***	-0.249***
2012	-0.812***	-0.514***	-0.837***	-0.509***
2013	-0.696***	-0.344***	-0.713***	-0.353***
2014	-0.809***	-0.465***	-0.870***	-0.511***
2015	-0.547***	-0.203***	-0.709***	-0.359***
Age	0.048**	0.021	0.113***	0.066**
Age square	0.000	0.000	-0.001**	-0.000
Level of education (ref. ISCED 3/4)				
ISCED 0/2	0.344***	0.171***	0.365***	0.205***
ISCED 5/6	-0.331***	-0.173***	-0.329***	-0.173***
Household income (log)	-0.069***	-0.014	-0.087***	-0.002
Partner economic status (ref. not present)				
Employed	-0.049	0.030	-0.121***	-0.103
Unemployed	0.172***	0.051	0.233***	0.073
Inactive	-0.021	-0.004	-0.053	-0.142
N. of children (ref. no children)				
1	-0.025	0.046	-0.066*	-0.095
2	-0.047	0.061	-0.212***	-0.265*
3 or more	-0.026	0.022	-0.279**	-0.542*
Initial condition (time 0)				
Health		1.154***		1.512***
Age		0.028		0.052*
Household income		-0.009		0.018
Partner economic status (ref. not present)				
Employed		0.096		0.027
Unemployed		-0.008		-0.176
Inactive		0.061		-0.161
N. of children (ref. no children)				
1		0.011		-0.077
2		-0.070		-0.017
3 or more		-0.171		-0.144
Within-unit average				
Partner economic status (ref. not present)				
Employed		-0.200		-0.032

Table. 7a continue

Unemployed		0.185		0.286
Inactive		-0.107		0.210
N. of children (ref. no children)				
1		-0.103		0.151
2		-0.009		0.184
3 or more		0.217		0.662
Age		-0.030		-0.059*
Household income		-0.048		-0.096*
Health at t-1		0.469***		0.356***
Constant	-2.860***	-1.818***	-3.705***	-2.458***
Var(u_i)	1.694***	0.574***	2.043***	0.815***
Observations	67451	67451	51824	51824

Table. 8a *East Germany:* Bad health. Dynamic random-effects probit. Models separated by gender (probit coefficients). SOEP:1995-2017.

	Men		Women	
	Model 1	**Model 2**	**Model 1**	**Model 2**
Unemployed	0.245***	0.181***	0.243***	0.182***
Year of survey (ref. 1995)				
1996	0.565	0.048	-0.062	-0.084
1997	-0.019	-0.053	-0.080	-0.106
1998	-0.028	-0.039	-0.184*	-0.210**
1999	0.076	0.045	-0.042	-0.071
2000	0.073	0.000	-0.013	-0.071
2001	-0.023	-0.122	-0.021	-0.095
2002	0.100	0.002	-0.146	-0.229***
2003	0.008	-0.108	-0.099	-0.183*
2004	0.006	-0.123	-0.113	-0.213**
2005	0.090	-0.048	-0.154*	-0.255***
2006	-0.076	-0.244*	-0.097	-0.197*
2007	0.039	-0.116	-0.121	-0.251***
2008	-0.050	0.230**	-0.132	-0.260***
2009	0.054	-0.121	-0.148	-0.291***
2010	-0.050	-0.256**	-0.130	-0.273***
2011	-0.009	-0.182*	-0.087	-0.219**
2012	-0.089	-0.275**	-0.164*	-0.317***
2013	0.028	-0.144	-0.031	-0.188*
2014	-0.085	-0.283**	-0.108	-0.295***
2015	-0.039	-0.240*	-0.055	-0.248**
2016	-0.114	-0.327***	-0.140	-0.225*
2017	-0.018	-0.360***	-0.072	-0.305***
Age	0.040*	0.048**	0.063***	0.060***
Age square	0.000	0.000	-0.000	-0.000
Level of education (ref. ISCED 3/4)				
ISCED 0/2	0.164*	0.067	0.299***	0.053
ISCED 5/6	-0.362***	-0.145**	-0.193***	-0.017
Household income (log)	-0.183***	-0.145***	-0.155***	-0.003
Partner economic status (ref. not present)				
Employed	0.133*	0.222 ***	0.061	0.081
Unemployed	0.181**	0.292***	0.138*	0.124
Inactive	0.372*	0.441**	0.127	0.195
N. of children (ref. no children)				
1	-0.018	0.005	-0.015	-0.014
2	-0.043	0.016	-0.066	-0.055
3 or more	-0.125	-0.147	-0.021	-0.046
Initial condition (time 0)				
Health		1.191***		1.116***
Age		-0.031***		-0.014*
Household income		0.077		0.100

Table. 8a continue

Partner economic status (ref. not present)				
Employed		0.088		-0.024
Unemployed		0.157		-0.210
Inactive		0.104		0.042
N. of children (ref. no children)				
1		0.049		0.110
2		0.057		0.173*
3 or more		0.221		0.178
Within-unit average				
Partner economic status (ref. not present)				
Employed		-0.229		0.051
Unemployed		-0.275		0.210
Inactive		-0.037		-0.014
N. of children (ref. no children)				
1		-0.025		-0.066
2		-0.162		-0.080
3 or more		-0.025		0.062
Age		-0.002		-0.011
Household income		-0.038		-0.354***
Health at t-1		0.618***		0.521***
Constant	-0.629	-0.855	-0.880	0.621
Var(u_i)	1.708	0.710	1.510	0.661
Observations	23410	23410	25879	25879

Table. 9a *West-Germany:* Bad health. Dynamic random-effects probit. Models separated by gender (probit coefficients). SOEP:1995-2017.

	Men		**Women**	
	Model 1	**Model 2**	**Model 1**	**Model 2**
Unemployed	0.340***	0.260***	0.201***	0.132***
Year of survey (ref. 1995)				
1996	0.038	0.029	0.033	0.044
1997	-0.072	-0.092*	0.013	0.014
1998	-0.084	-0.089	-0.033	-0.034
1999	-0.029	-0.028	-0.045	-0.034
2000	0.036	0.006	0.050	0.042
2001	-0.014	-0.053	-0.085*	-0.092*
2002	0.069	0.022	0.081	0.069
2003	-0.037	-0.094*	0.028	-0.009
2004	-0.051	-0.098*	0.003	-0.021
2005	0.078	0.021	0.071	0.041
2006	0.139**	0.052	0.105*	0.062
2007	0.028	-0.064	0.112*	0.053
2008	0.057	-0.029	0.056	-0.004
2009	0.110*	0.015	0.120**	0.068
2010	0.060	-0.044	0.150**	0.084
2011	0.090	-0.001	0.122**	0.070
2012	0.039	-0.046	0.087*	0.042
2013	0.070	-0.017	0.109*	0.057
2014	0.031	-0.053	0.181***	0.123**
2015	0.068	-0.036	0.191***	0.114*
2016	0.067	-0.038	0.198***	0.115*
2017	0.023	-0.088	0.142**	0.046
Age	0.048***	0.053***	0.033***	0.029**
Age square	0.000	0.000	0.000	0.000
Level of education (ref. ISCED 3/4)				
ISCED 0/2	0.179***	0.072***	0.263***	0.109***
ISCED 5/6	-0.399***	-0.212***	-0.320***	-0.146***
Household income (log)	-0.117***	-0.044	-0.195***	-0.050*
Partner economic status (ref. not present)				
Employed	0.029	0.004	0.043	0.074*
Unemployed	-0.022	-0.019	0.148***	0.120**
Inactive	-0.060	0.010	0.102	0.179*
N. of children (ref. no children)				
1	0.018	0.047	-0.019	-0.008
2	0.066**	0.104***	-0.089***	-0.044
3 or more	-0.014	0.060	-0.137***	-0.061
Initial condition (time 0)				
Health		1.238***		1.127***
Age		-0.024***		-0.022***
Household income		0.046		0.072**
Partner economic status (ref. not present)				

Table. 9a continue

Employed		0.042		0.039
Unemployed		0.024		0.0194
Inactive		0.079		0.176
N. of children (ref. no children)				
1		0.010		0.006
2		0.024		0.013
3 or more		0.027		0.041
Within-unit average				
Partner economic status (ref. not present)				
Employed		0.107		-0.007
Unemployed		0.097		0.100
Inactive		-0.096		-0.143
N. of children (ref. no children)				
1		-0.103		0.030
2		-0.156**		-0.014
3 or more		-0.149		-0.079
Age		-0.003		0.007
Household income		-0.135**		-0.286***
Health at t-1		0.536***		0.481***
Constant	-1.398***	-0.768**	0.0199	0.871**
Var(u_i)	1.546	0.599	1.377	0.580
Observations	75580	75580	85691	85691

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Table. 10a *Old-cohort:* Bad health. Dynamic random-effects probit. Models separated by gender (probit coefficients). West-Germany, SOEP:1995-2017.

	Men		Women	
	Model 1	**Model 2**	**Model 1**	**Model 2**
Unemployed	0.396***	0.295***	0.261***	0.182***
Year of survey (ref. 1995)				
1996	0.063	0.054	0.034	0.035
1997	-0.036	-0.060	0.067	0.046
1998	-0.025	-0.029	0.005	-0.038
1999	0.008	0.014	-0.082	-0.103
2000	0.118	0.086	0.068	0.026
2001	0.063	0.030	-0.100	-0.140*
2002	0.171	0.123	0.060	0.009
2003	-0.015	-0.070	-0.005	-0.079
2004	0.048	0.016	-0.042	-0.115
2005	0.254	0.197**	0.003	-0.080
2006	0.302	0.205**	0.065	-0.034
2007	0.200	0.103	0.015	-0.104
2008	0.224	0.136	-0.128	-0.245**
2009	0.262	0.163	-0.027	-0.129
2010	0.167	0.068	-0.109	-0.226*
2011	0.342	0.267**	0.093	-0.051
2012	0.123	0.042	-0.108	-0.220*
2013	0.203	0.132	-0.075	-0.170
2014	0.067	0.012	-0.158	-0.246*
2015	0.266	0.182	-0.138	-0.230
2016	-	-		
2017	-	-		
Age	0.031	0.039	0.023	0.047
Age square	0.000	0.000	0.000	0.000
Level of education (ref. ISCED 3/4)				
ISCED 0/2	0.176**	0.067	0.347***	0.118**
ISCED 5/6	-0.430***	-0.201***	-0.192**	-0.016
Household income (log)	-0.226***	-0.090*	-0.215***	-0.025
Partner economic status (ref. not present)				
Employed	0.026	-0.002	0.140*	0.142
Unemployed	0.021	-0.012	0.213***	0.161*
Inactive	-0.032	0.054	0.143	0.199
N. of children (ref. no children)				
1	0.072	0.117**	-0.027	0.006
2	0.081	0.142*	-0.178**	-0.101
3 or more	0.183	0.321**	-0.341**	-0.228
Initial condition (time 0)				
Health		1.21***		1.105***
Age		-0.039***		-0.040***
Household income		0.158*		0.138*
Partner economic status (ref. not present)				

Table. 10a continue

Employed		-0.020		0.038
Unemployed		-0.206		0.089
Inactive		0.134		0.143
N. of children (ref. no children)				
1		0.100		-0.007
2		-0.011		-0.114
3 or more		-0.058		-0.057
Within-unit average				
Partner economic status (ref. not present)				
Employed		0.209		0.082
Unemployed		0.356*		0.013
Inactive		-0.260		-0.091
N. of children (ref. no children)				0.244
1		-0235*		0.034
2		-0.105		0.244
3 or more		-0.265		-0.343
Age		0.009		0.011
Household income		-0.305**		-0.484***
Health at t-1		0.578***		0.510***
Constant	0.022	0.581	0.033	1.621
Var(*u_i*)	1.890	0.739	1.682	0.670
Observations	23241	23241	24866	24866

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Table. 11a *Young-cohort:* Bad health. Dynamic random-effects probit. Models separated by gender (probit coefficients). West-Germany, SOEP:1995-2017.

	Men		Women	
	Model 1	**Model 2**	**Model 1**	**Model 2**
Unemployed	0.317***	0.243***	0.181***	0.112***
Year of survey (ref. 1995)				
1996	-0.000	-0.016	0.019	0.043
1997	-0.125	-0.146	-0.086	-0.061
1998	-0.167*	-0.178*	-0.112	-0.071
1999	-0.071	-0.081	-0.052	-0.011
2000	-0.050	-0.079	-0.019	0.000
2001	-0.087	-0.130	-0.124	-0.095
2002	-0.018	-0.065	0.042	0.067
2003	-0.050	-0.107	-0.009	-0.011
2004	-0.120	-0.176*	-0.026	-0.009
2005	-0.035	-0.089	0.048	0.061
2006	0.040	-0.040	0.065	0.066
2007	-0.067	-0.155*	0.097	0.086
2008	-0.031	-0.115	0.078	0.063
2009	0.036	-0.055	0.121	0.112
2010	0.002	-0.100	0.183*	0.164
2011	0.009	-0.083	0.102	0.100
2012	-0.003	-0.0920	0.092	0.094
2013	0.024	-0.067	0.114	0.110
2014	-0.004	-0.0939	0.197**	0.187
2015	0.028	-0.081	0.205**	0.180
2016	0.031	-0.077	0.211**	0.183
2017	-0.003	-0.120	0.157*	0.119
Age	0.073***	0.075***	0.033*	0.027*
Age square	-0.000	-0.000	0.000	0.000
Level of education (ref. ISCED 3/4)				
ISCED 0/2	0.180***	0.071**	0.216***	0.097***
ISCED 5/6	-0.390***	-0.216***	-0.358***	-0.185***
Household income (log)	-0.081***	-0.022	-0.187***	-0.060*
Partner economic status (ref. not present)				
Employed	0.031	0.001	0.008	0.060
Unemployed	-0.042	-0.028	0.124**	0.120*
Inactive	-0.079	-0.012	0.099	0.196
N. of children (ref. no children)				
1	-0.005	0.019	-0.019	-0.006
2	0.050	0.084*	-0.068**	-0.028
3 or more	-0.060	-0.009	-0.105**	-0.032
Initial condition (time 0)				
Health		1.236***		1.122***
Age		-0.018***		-0.021***
Household income		0.021		0.047

Table. 11a continue

Partner economic status (ref. not present)				
Employed		0.024		0.049
Unemployed		0.092		0.022
Inactive		0.041		0.192
N. of children (ref. no children)				
1		-0.065		-0.012
2		-0.003		0.015
3 or more		0.007		0.050
Within-unit average				
Partner economic status (ref. not present)				
Employed		0.111		-0.058
Unemployed		0.024		0.110
Inactive		-0.041		-0.152
N. of children (ref. no children)				
1		-0.015		0.046
2		-0.127		-0.029
3 or more		-0.076		-0.095
Age		-0.009		0.011*
Household income		-0.101*		-0.212***
Health at t-1		0.517***		0.469***
Constant	-2.092***	-1.376	0.060	0.469
Var(u_i)	1.392	0.534	1.257	0.531
Observations	52163	52163	60658	60658

Table 12a AME of unemployment on Bad Health and Predicted Probabilities of Bad Health for employed individuals. Dynamic random-effects probit. Model 1-2 separated by gender. EU-SILC 2004-2015 Sweden and Italy.

	Model 1		Model 2	
Sweden				
	Men	**Women**	**Men**	**Women**
AME	4.42***	6.09**	4.29***	2.92*
Employed	2.09***	2.81***	7.25***	9.93***
Italy				
AME	7.27***	4.80***	4.59***	2.02***
Employed	8.02***	9.11***	13.8***	15.5***
East Germany				
AME	8.38***	8.77***	5.22***	5.50***
Employed	39.30***	43.10***	41.90***	44.00**
West Germany				
AME	11.80***	7.18***	7.41***	3.92***
Employed	36.20***	41.00***	39.50***	43.30***
Old-cohort				
AME	14.20***	9.40***	8.61***	5.37***
Employed	49.70***	52.60***	50.50***	53.70***
Young- cohort				
AME	10.80***	6.40***	6.84***	3.33***
Employed	30.70***	36.00***	34.90***	39.10***

Model 1: adjusted with observables
Model 2: adjusted with health selection
* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table. 13a Probit coefficients from KHB models. M2-M1 (total selection)

Sweden

	Men			Women		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.610	0.120	0.000	0.753	0.111	0.000
Full	0.425	0.120	0.000	0.281	0.112	0.012
Diff	0.185	0.048	0.000	0.473	0.058	0.000

Italy

	Men			Women		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.384	0.029	0.000	0.240	0.031	0.000
Full	0.268	0.029	0.000	0.130	0.031	0.000
Diff	0.116	0.009	0.000	0.109	0.012	0.000

East Germany

	Men			Women		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.394	0.039	0.000	0.406	0.033	0.000
Full	0.181	0.039	0.000	0.181	0.033	0.000
Diff	0.213	0.167	0.202	0.225	0.152	0.139

West Germany

	Men			Women		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.523	0.026	0.000	0.255	0.017	0.000
Full	0.260	0.026	0.000	0.132	0.017	0.000
Diff	0.264	0.102	0.010	0.123	0.093	0.184

Young cohort

	Men			Women		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.492	0.031	0.000	0.234	0.020	0.000
Full	0.243	0.031	0.000	0.112	0.020	0.000
Diff	0.249	0.146	0.089	0.122	0.141	0.389

Old cohort

	Men			Women		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.611	0.050	0.000	0.310	0.033	0.000
Full	0.295	0.050	0.000	0.181	0.033	0.000
Diff	0.316	0.180	0.079	0.129	0.163	0.431

Article 3 Bad job, bad health? A longitudinal analysis of the interaction between precariousness, gender, and self-perceived health in Germany.

1. Abstract

Over the last few decades in all European countries, more and more people have been experiencing precariousness during their working lives. Whether employment precariousness could affect working people's health and whether there is a gender differential in the relationship are crucial questions that have not been fully explored yet. Then, this paper aims twofold: Firstly, it investigates the relationship between precariousness and general health in Germany; secondly, it explores whether and in which direction the health consequences of precariousness vary by gender.

Data from the German Socio-economic Panel (SOEP, waves 2003 2007 2011 2015) are used for the analysis. By using multiple correspondence analysis, I develop a new multi-dimensional and continuous measure of precariousness, which summarizes seven different dimensions of insecurity. Further, I analyze the effect of precariousness on men's and women's self-perceived health by implementing ordered probit correlated random-effects models and controlling for observed and unobserved heterogeneity.

The findings suggest that employment precariousness could be detrimental to self-perceived health for both men and women, with men being more penalized. The social consequences of employment de-standardization need to be investigated considering the gender norms that characterize specific cultural and institutional contexts. Further research on this topic is required.

2. Introduction

Over the last few decades, in all European countries, more and more people have been experiencing a condition of precariousness during their working lives (Kalleberg 2000, 2009). The link between wage employment and strong social rights has eroded, making workers more powerless and more vulnerable to labor market risks than in the past (DiPrete et al. 2006; Breen 1992; ILO 2011). Because employment and the quality of work are fundamental determinants of health (Marmot and Wilkinson 2005), scholars from

different disciplines and international organizations have raised concerns about the potential consequences of employment precariousness on people's mental and physical well-being. However, whether precarious employment could harm individual health and which workers' groups might be more affected—i.e. men or women—are crucial questions that have not been fully explored yet. This paper aims to fill this gap.

Employment precariousness (further EP) can be conceptualized as the linking of the vulnerable worker to work that is characterized by uncertainty and insecurity concerning pay, the stability of the work arrangement, limited access to social benefits, and statutory protections (Kalleberg and Vallas, 2018; Olsthoorn 2014; Vosko, 2006). In this sense, precariousness is assumed to be a multidimensional and continuous phenomenon. Different dimensions of insecurity may overlap, leading to different 'degrees of precariousness' (Rodgers 1989). Several approaches have been developed to operationalize the EP concept (Scott-Marshall and Tompa 2011; Olsthoorn 2014; Vives et al. 2010; 2015; Van Aerden et al. 2014), and an increasing amount of evidence (Julià et al. 2017; Vives et al. 2013; Van Aerden et al. 2015, 2016; Gevaert et al. 2020) has confirmed its role as a social determinant of health (Benach et al. 2014). However, three main shortcomings emerge from the scrutiny of the empirical literature. The first one regards the cross-sectional nature of data that prevents the authors from ruling out unobserved heterogeneity as a mechanism for the association between EP and health. Indeed, several unmeasured individual characteristics—such as cognitive abilities—which play a decisive role for employment outcomes and may also have indirect consequences for general health, may confound the relationship between EP and health. Secondly, only a few studies have directly addressed the role of gender in shaping the relationship. Moreover, available results are mixed and inconsistent: some found EP more detrimental to women's health (Vives et al. 2013), while others found no gender differences or stronger negative association for men (Julià et al. 2017; Benach et al. 2015;). Finally, the attempts to an empirical translation of the EP concept have been not always coherent with their theoretical framework, partially grasping the complexity of the phenomenon (Vosko, MacDonald, and Campbell 2009; Laparra 2004; Benach, 2014) and its health consequences (Gash, Mertens, and Gordo 2007; Rodriguez 2002; Gebel and Voßemer 2014).

Given these considerations, the first contribution of this paper is to start exploring the causal question about whether employment precariousness may affect individuals' health status in Germany. The lack of a clear understanding of the omitted-variable issue is a

significant omission considering that the causality between EP and health is vital for policy design to improve health and narrow health inequalities in societies. Therefore, disentangling the contribution of unobserved heterogeneity from employment-related effects among the working population will help gauge the potential health problems that precarious working conditions may deliver during the working life. Secondly, given the inconsistency of previous research, the paper investigates whether the health consequences of EP vary by gender and which group is more penalized. The German context offers a suitable opportunity to study the gender differential from two different theoretical angles. Finally, my paper also provides a methodological contribution. I develop a new indicator of EP that empirically translates a definition of EP as a multidimensional and continuous phenomenon (Rodgers 1989).

3. Background

3.1. Defining employment precariousness

Work has become more precarious in recent years (see Kalleberg and Vallas, 2017). Although this claim is more or less uncontested among social scientists, defining employment precariousness is still a difficult challenge (Laparra 2004). In this study, I draw on earlier literature on precariousness and health in order to develop a concept of EP that is both able to grasp the complexity of the phenomenon and to be used as a research instrument in the study of workers' health.

The first consideration is that the EP concept shifts the attention from the *quality of work* to the *quality of employment*. Differently from the approaches used in occupational health research that focus exclusively on the nature of work in itself, the workers' tasks and the socio-physical environment in which the work occurs—e.g., the effort-reward model by Siegrist (1996) or the demand-control model by Karasek (1979)—my EP approach poses the attention on the social organization of employment, namely, the mutual agreement between the employee and the employer (Kalleberg 2011). For much of the 20th and 21st centuries, this agreement was reflected in the standard employment relationship (SER)— permanent and full-time employment with a sufficient income to allow independent subsistence, full integration into a social security system, and strong collective protection (Kalleberg 2011; 2009; Bosch 2004). However, since the 80s, rapid technological innovation, globalization processes, economic recessions, and demographic changes have

activated a de-standardization of the employment relationship (Kalleberg, 2009), including fundamental transformations of employment arrangements and labor experiences. This process has raised concern among scholars, who have started challenging the narrow approaches commonly used in occupational health in favor of a broader theoretical perspective focused on the employment relationship and its transformations. Precarious employment is then defined as deviations from a standard, that is, the SER (Rodgers 1989; Kalleberg 2000; Dörre 2011).

Secondly, these deviations and, more in general, the phenomenon of employment de-standardization can be formulated positively—referring to employment quality—or negatively—focusing on employment precariousness characteristics. The latter approach points out that insecurity is the starting point for a description of precarious work relationships. The idea that the affluent societies of the West have entered an age of insecure employment has been popularized by many social theorists during the 1990s and further on: EP has been depicted as 'a virus that permeates everyday life' (Castel 2011 [2003], 21) and it may have 'corrosive' consequences for individuals' life chances (Sennett 1998), quality of life and well-being (Kalleberg 2018). According to this view, certain employment relationships that deviate from the SER are objectively 'negative'—namely, they represent a deficit of labor-related security—and, therefore, potentially threatening for precarious workers' health.

Third, a long tradition of scholarship pioneered by Rodgers (1989) has assumed that EP is a *multidimensional and continuous* phenomenon (Bourdieu 1998; Kalleberg and Vallas 2017; Vosko 2006). The main idea is that the 'deviations' from the SER are multiple, and they may occur alone or together, overlapping in the same particular employment relationship. Because of this, precariousness can be found in every employment relationship, though the form and the level of concentration may vary. Convincingly, many health scholars have received and empirically used this approach in order to provide interesting insights into the influence of precariousness on worker's health (Vives et al. 2013; Julià et al. 2017). For its ability to give a complete picture of the phenomenon, indeed, this approach is considered preferable to other more straightforward one-dimensional/binary approaches—e.g., temporary contract vs. permanent contract—which, so far, have not given clear results about the health consequences of precariousness (see in Benach et al. 2014; 2016).

Finally, alongside the characteristics of the employment relationship, the conceptualization of precariousness poses the accent also on the (precarious) conditions of

(precarious) workers. According to some authors (Vosko, 2006; Kalleberg, 2011; Olsthoorn, 2014), precarious employment is conceptualized as the linking of the *vulnerable worker* to insecure jobs and unsupportive legal and welfare entitlements. The central idea is that the threat posed by a degree of precariousness can only be assessed by examining the type of employee 'matched' to a potentially precarious job. Therefore, in addition to the job- (e.g., contract) and institutional-level (e.g., social protection), this view adds a further 'level' to the definition of precariousness, namely the employee-level, which is functional to the identification of the 'truly precarious' workers (Olsthoorn 2014).

3.2. Dimensions of EP

There is no consensus over the content of the list of EP dimensions, but there is often considerable overlap (see the works by Rodgers 1989; Standing 2011; Laparra 2004; Vosko, MacDonald, and Campbell 2009; Keller and Seifert 2013; Olsthoorn 2014). Drawing on previous theoretical conceptualizations, I propose seven dimensions that capture various objective features that employees experience in asymmetrical power relations with the employers.

1)   Income insecurity. An integral feature of the employment relationship is that workers exchange their labor power for money from the employers. The ideal-typical SER provided a sufficient income to live on and to cope with life risks through savings. If work does not assure such a level of monetary support, it is regarded as precarious (Rodgers 1989; Weinkopf 2009; Standing 2011).

2)   Social insecurity. This dimension concerns the access to social protection that workers can get in case of labor market risks (i.e., health accident and injuries, unemployment, retirement). Access to social security provided by the state defines the extent to which individuals (and families) can maintain an acceptable standard of living regardless of their market performance. In other words, the welfare state de-commodifies labor (Esping-Andersen 1990) via social transfers and services, thus reducing the employees' dependence on their employers. Being in an employment relationship that does not assure security and protection against such risks is an indication of EP because the ideal-typical SER is considered to provide full access to social security benefits.

3)   Legal insecurity. This dimension concerns the regulatory effectiveness, namely whether laws and policies are applicable and enforceable to workers in need of protection.

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Standard employment relations included statutory constraints on hiring and firing and regulations against arbitrary dismissal. In the context of precarious working arrangements, these individual rights are eroded. The threat of (arbitrary) dismissal translates into workers' powerlessness to exercise workplace rights and entitlements: Workers may find themselves defenseless to unacceptable workplace practices and treatments; more exposed to the unpredictability and arbitrariness of flexibility demands; more vulnerable toward management authority, intimidation, or discrimination. Another consequence of this vulnerability is the incapacity to exercise in practice formally granted workers' rights, such as the right to paid leave or compensation for overtime work.

4)   Employment insecurity. The 'temporary contract' has been regarded as the objective expression of employment insecurity and a central aspect of the precariat (Standing 2011). This category includes forms of employment conditions that are not permanent: fixed-term employment, sub-contracted work, on-call contracts, project-specific, and temporary agency work. According to Atkinson (1984:5), these forms of employment 'perform a similar function: Maximizing flexibility while minimizing the organization's commitment to the worker's job security and career development. Although such work arrangements can reflect workers' interests and preferences (Silla, Gracia, and Peiró 2005), there is also a large body of research emphasizing how these contracts undermine the capacity of employees to influence matters (Standing 2011; Kalleberg 2011).

5)   Working time insecurity. The unit of measure on which paid-work-related rewards are calculated is usually working time. Time is money, and control over working time is the key to power in the employment relationship. Time spent in paid work may be a voluntary decision—for instance, paid work can be more rewarding than home life (Kalleberg and Epstein 2001)—or a response to the demands of employers (Kalleberg and Epstein, 2001). Thus, the way working time is organized can be regarded as precarious when it does not match individual preferences and workers have no control over it.

6)   Representation insecurity. Over the last few years, unionization has declined precipitously in many European countries, including Germany (Kohaut 2018; Ellguth 2018; Fulton 2015). Without the power of a collective actor on their side, workers may lack the power to resist unfair treatment and the capability to influence the organization of their work. It is also plausible that lower union density has compromised organized labor's ability to affect healthcare provision, workplace conditions, and job security. In this sense,

organized labor power is likely to influence the health of workers (Reynolds and Brady 2012; Vives et al., 2010; Julia et al., 2017; Benach et al., 2015).

7)   Vulnerability.   The threat posed by EP to health can only be assessed by accounting for the worker's potential vulnerability to a precarious job (Vosko 2006). Individual vulnerability—here defined as defencelessness and powerlessness in the face of bad jobs—may come from the family situation. Previously, some authors have included the material situation of the family/household among the precariousness dimensions (Vosko, 2006; Kraemer 2008; Olsthoorn 2014; Stuth 2018). The use of this dimension is an attempt to focus on not only job aspects and the broader regulatory system but also on the characteristics of the worker. In this sense, the household's living conditions account for the situation of the worker occupying a potentially precarious job, and it is used for identifying the 'vulnerable worker' (Vosko, 2006; Olsthoorn 2014).

3.3. Measuring EP

Another challenging question is 'how to operationalize precariousness?'. Although several attempts have been made, social researchers have usually struggled in developing a measurement of precariousness consistent with its theoretical conceptualization (Vosko, MacDonald, and Campbell 2009; Laparra 2004). In this section, I review some of the previous approaches used to operationalize EP and their limitations. Eventually, I suggest a new approach that tries to overcome these limits.

One approach equates precariousness with either on employees' *subjective perception* of job insecurity (Sverke, Hellgren, and Näswall 2002) or the *objective* instability of the job due to (atypical) *contractual arrangements* (Virtanen et al. 2005). Both these operationalizations come with some shortcomings. In the former case, perceived job insecurity is an indicator that focuses on workers' subjectivity rather than on the objective characteristics of the employment relationship. As such, it may be driven by factors above and beyond the extent of precariousness (e.g., a decline of the sector, growing shares of temporary employment, and individual psychology), casting doubts on its validity. On the other hand, the use of (temporary) 'contract' as a proxy for EP might solve the problem related to the 'objectivity' of indicator and, therefore, the validity issue. Yet, the literature studying the relationship between atypical contracts and health has produced only inconclusive and mixed results so far (see Virtanen et al. 2005; Sverke, Hellgren, and

Näswall 2002), bringing health scholars to the conclusion that a more complex indicator of EP is needed (Benach et al. 2016).

A second approach used in the context of EP is the traditional variable-based approach. Although this framework accounts for multiple dimensions of precariousness, it shows a methodological limit by focusing on them separately. The traditional variable-based approach, indeed, identifies the independent associations of the multiple dimensions of EP with health while assuming other aspects to be constant. Studies that use this approach offer important insights on the key dimensions of the precarious work experience (Laparra 2004; Tangian 2009; Puig-Barrachina et al. 2014), in particular in relation to general and physical health (Scott-Marshall and Tompa 2011; Quinlan, Mayhew, and Bohle 2001). However, they miss to take into account the joint distribution and the simultaneous occurrence of the different aspects of EP, eventually not getting over the limit of the dualistic one-dimensional framework.

A complementary way of conceptualizing EP is the 'multifaceted approach' developed by Van Aerden and colleagues (2014). By using latent class cluster analysis (LCCA), the researchers develop from seven dimensions (and 15 indicators) a typology of five different types of jobs, which vary *qualitatively* in terms of employment quality. LCCA redistributes employees in a limited number of categories, based on the degree of similarity of their jobs regarding a set of proxy indicators for employment quality. Recent studies have validated the typology and used it in multivariate analyses that confirm the negative relationship with different dimensions of well-being, including self-perceived health (Van Aerden et al. 2015, 2016). Van Aerden and colleagues' typology satisfies the 'multidimensionality assumption' and represents a novelty in the categorization of changing employment arrangements. Moreover, it is a comprehensive, innovative measurement of EP that can be easily used with secondary data. Nevertheless, this typology departs from a different conceptualization that actually rejects both the 'continuity assumption' and the idea of EP as a gradational phenomenon. The five categories found by Van Aerden and colleagues, indeed, cannot be ordered from 'good' to 'bad' and represent *qualitatively* different 'deviations' from the SER.

Finally, an approach that operationalizes EP taking into account both the assumptions of multidimensionality and continuity, is the Employment Precariousness Scale, developed by the EMCONET research network. Respondents are positioned on a measurement scale of increasing EP, which is thought to be the synthesis of six dimensions (see Vives et al. 2010). The scale has been validated and used in survey research, and its empirical

applications have contributed greatly to our understanding of the relationship between precarious employment arrangements and health (Benach et al. 2014; Vives et al. 2013; Julià et al. 2017). First, it has been shown that EP is not necessarily a dichotomous matter, confirming that the binary opposition of good jobs vs. bad jobs needs more nuances, especially in relation to workers' health. Second, these studies report a negative and gradational association between EP and psychological health, confirming the nature of EP as a continuous phenomenon (Julià et al. 2017). The EPRES scale, however, has been developed for the Spanish context and it is not yet available in SOEP data as well as in other European questionnaires. Developing, validating, and testing new scales and subsequently collecting sufficient data to test the related hypotheses is very time-intensive and costly, and it is beyond the scope of this work.

An alternative strategy to the latter is using proxy indicators available in existing surveys and then combining them in a synthetic theory-coherent EP measure. Although using proxies has its methodological limitations, it permits the creation of large-scale evidence using existing data sources. This approach, indeed, aims at the construction of a summary scale in which all dimensions contribute jointly to the measured experience of precariousness and its health impact. In my paper, I follow this strategy and use available indicators in the SOEP dataset in order to operationalize the seven dimensions. Then, by using multiple correspondence analysis (MCA), I combine the different indicators and obtain a continuous measure of EP, which is the best representation of the seven dimensions in terms of variance. In this way, the obtained scale coherently operationalizes my EP theoretical concept by fulfilling the two assumptions on multidimensionality and continuity. To my knowledge, this paper is the first attempt of this kind, fostering our understanding of the relation between EP and health, especially in the German context.

3.4. The German context

Germany is a suitable context for studying the health consequences of EP and how these might diverge among men and women. Since the 1980s, the German government has implemented a series of reforms that aim to reduce the rigidity of its labor market and welfare institutions and increase competitiveness in the global market. First, with the 'Kohl era' (1982-98) and, then, with the 'Hartz reform' (2002-5), German governments have progressively pursued a shift towards a 'workfarist' system that has altered 'the institutional regulation of the labor market by re-commodifying labor' (Greer 2016). This

strategy has often been accused of contributing to the de-standardization of the employment relationship and creating a 'zone of vulnerability' occupied prevalently by precarious workers (Dörre 2014; 2015). Non-standard employment arrangements—i.e., part-time work, fixed-term contracts, mini-jobs, and work agencies—have increased over time and today count almost 30% of the working population (Hipp, Bernhardt, and Allmendinger 2015). A key characteristic of these forms of employment is their susceptibility to unpredictable fluctuations in income. Indeed, their growth has been attributed to the in-work poverty rate increases, which has risen from 7.1% in 2008 up to 9.7% in 2015 (7.7% in 2011) (Destatis 2016).

Moreover, a high incidence of low pay has been recently found among workers with standard work (Weinkopf 2009). According to the OECD data, among the full-time permanent employees, the share of German workers in relative poverty in 2011 was 18.90%, three percentage points above the OECD value (15.81%). The power of unions has also fallen over the last three decades. Collective agreement coverage has fallen from the 70% of the workforce at the end of 90s to the 52% in 2013 (Kohaut 2018); alike, codetermination is becoming less and less significant in German companies: Only a minority of employees work in companies with a works council (Ellguth 2018).

Although these multiple changes in the German labor market, the health consequences of precarious work have predominantly been investigated by focusing on single facets of the EP phenomenon—i.e., temporary contracts—rather than on the multidimensional aspect of it; moreover, this line of inquiry generally reveals an ambiguous picture, with some studies finding substantial adverse effects of temporary/marginal over permanent employment (e.g., Gash, Mertens, and Gordo 2007; Rodriguez 2002), while others report only minor differences (Gebel and Voßemer 2014). It may be argued that the focus of this simple approach is too narrowly put on the continuity of employment while omitting other typical features of the standard employment relationship (SER) that have been subjected to de-standardization. A more complex approach to EP is needed to grasp EP's health consequences in the German labor market context.

Further, the focus on Germany allows me to investigate my second research question on the gender differential. Germany is usually regarded as a traditionalist gender regime: a context characterized by a configuration of roles, where being a caregiver is assumed to be women's primary role, whereas the primary breadwinner role is reserved for men (Pfau-Effinger, 1998). This traditional model was dominant in the 50s and 60s: It was supported by the high prevalence of SER that allowed male workers to earn a family wage and strong

social norms that encouraged a gendered division of labor. Social policies favored this model, perpetuating women's dependence on the male breadwinner via taxation, health insurance, and social security regulations. Although over the last decades, many signs of progress have been made towards a greater equalization of gender opportunities (Trappe, Pollmann-Schult, and Schmitt 2015), and attitudes and beliefs over gender roles have become more liberal and egalitarian (Ebner, Kühhirt, and Lersch 2020), the results of this transition are only partial. The breadwinner model has been substituted only by a modified version of it, with women usually taking on the double role of workers (the so-called secondary earner) and caregivers and men still devoting most of their time to paid work activities (Trappe, Pollmann-Schult, and Schmitt 2015). Moreover, over the last decades, the overall upward trend towards more egalitarian gender ideologies has leveled off, moving notably towards more traditional gender ideologies in East Germany and with no substantial changes in West Germany (Ebner, Kühhirt, and Lersch 2020). Therefore, while on the one side, gender still channels women in a position of powerless with respect to men; on the other side, gendered norms strongly define the different meanings that social roles, such as work, may have for men and women in terms of gender identity and roles fulfillment.

Against this background, I can explore two alternative hypotheses in the relationship between EP, gender, and SPH. To the best of my knowledge, existing (few) studies that examine the gender issue generally assume that women's health might be more penalized than men's health when they experience a precarious employment relationship. The gender differential is thought to be the result of an interaction between employment-related power asymmetries and the structural condition of the powerlessness of women in many European societies (see Menéndez et al. 2007 for an extensive explanation). It is a fact that gender still structures access to different power sources both within and outside the work sphere. Compared to men, women tend to be employed less, are employed in lower-paid sectors, work longer per week than men in total (paid and unpaid) but have fewer paid hours, take more career breaks and face fewer and slower promotions. At the same time, women still carry the burden of an uneven distribution of care work and domestic workload (European Commission 2018). Nevertheless, gender reflects the structural position that men and women occupy in society and the cultural norms and beliefs against which people build their own identities (Eagly 1987; Eagly and Wood 2012). According to this view, the self-stigma arousing from an employment condition inferior to the socially accepted (masculine) standard—namely, the breadwinner man with a good job providing for the

family—could be detrimental to men's health, resulting in the latter a men's penalty when compared with women.

To the best of my knowledge, previous literature tends to report mixed and inconsistent results on the gender differential (Julià et al. 2017; Benach et al. 2015; Vives et al. 2013). Using the EPRES scale, Vives and colleagues (2013) tested the gender differential in the relationship between precariousness and mental health in a sample of 5679 employed men and women from the Psychosocial Factors Survey in Spain (2004-2005). They found significant interaction effects between quintiles of precariousness and gender, with the association being stronger for women than men. On the contrary, in a Spanish sample of 2941 men and 1939 women (Psychological Work Environmental Survey, 2010), Julia and colleagues (2017) found a higher prevalence rate ratio of poor mental health in men (3.55 for permanent; 2.57 for temporary) than in women (2.14 for permanent; 2.14 for temporary). However, the authors do not provide any indications about the statistical significance of the gender difference. Finally, Benach and colleagues (2015) studied the relationship between precariousness and both mental and self-perceived health in a Catalan sample of 2756 employed men and women (Encuesta Catalana de Condiciones de Trabajo, 2010). In the last quartile of the precariousness scale, they found a higher level of bad mental health in women (prevalence ratio=3.45) than men (3.21); whereas self-perceived health resulted in being worse for men (2.69) than women (2.14). Yet, also in this paper, it is not clear whether the gender differential is given by case. Thus, notwithstanding the insights from previous studies, it is still unclear whether there is a gender differential and which gender is more penalized in terms of health when EP is experienced.

4.   Hypotheses

4.1. Employment precariousness and health

The theoretical underpinning linking EP with health is the 'fundamental causes' of health (Benach et al. 2014; Tompa et al. 2007). The 'fundamental causes' perspective posits that an individual's social condition—all those factors that involve a person's relationships with other people (Link and Phelan 1995:81)—requires access to resources that enable individuals to accumulate health advantages over time. Hence, unequal access and distribution of these personal resources are fundamental causes of health inequalities (Link and Phelan 1995). As precariousness refers to the uneven distribution of power in the

employment relationship as defined by the new social organization of work (Benach et al. 2014), it can be regarded as a social condition and a fundamental cause of health. By affecting individuals' access to power and other resources, EP puts people at risk of experiencing health shocks and influences their ability to gain and accumulate health advantages (Benach et al. 2014).

In combining different dimensions of insecurity, EP may affect health through different pathways. Lack of financial and material resources, for instance, may limit workers' ability to cover regular or unexpected expenses to prevent and cure health problems. In addition, anxiety, stress, and other mental disorders can arise from insecurity about employment prospects. Relatedly, precarious workers may need to expend additional effort in retaining their job, accepting unfair and authoritarian treatment by the employers, for instance, working extended hours without real compensation. Overtime work is associated with relatively high fatigue and low satisfaction, especially if it is not rewarded (Beckers et al. 2008), making precarious workers a burnout risk group. The lack of organized labor's power is also likely to influence workers' health (Reynolds and Brady 2012): Non-unionized workers' incapability to affect working conditions can expose them to job insecurity, lack of rewards and provisions, physical hazards, and several other risks factors—e.g., physical or chemical hazards and work-related injuries. Finally, health implications may also stem from a gradational accumulation of these different forms of insecurity (Benach et al., 2016). From this, I assume that:

HP1: Employment precariousness has negative consequences on individual self-perceived health for both men and women.

4.2. Precariousness, Health, and Gender

One way to understand the gender differential is to consider the configuration of gender roles that characterize the context where men and women are embedded. In a context like Germany—namely, a traditionalist gender regime—gender is still a strong factor structuring the different positions that men and women occupy in the family and the labor market (Esping-Andersen 2009; Lewis 1992). In this setting, women are systematically more disadvantaged than men both in the public and private spheres of life, having less access to formal and informal sources of power. These gender-related power asymmetries may interact with EP-related power asymmetries resulting in a stronger association of EP on women's health than on men's health (see Menéndez et al. 2007; Vives et al. 2013).

For instance, adapting to long working hours may be more problematic and stressful for women than for men if women also do (on average) disproportionately more hours of unpaid work, taking care of the household chores, children, and elderly family members. Women in precarious employment can also find harder than their male counterpart to planning and making far-reaching decisions about their lives, such as family formation and fertility. In a context characterized by a traditionalist gendered division of labor and strongly gendered family role expectations, discriminatory hiring practices penalize more women than men, especially if they have children (Hipp 2019). Women with children have fewer chances to be re-employed than men because potential employers see them as less committed to work, less stable, and less productive. In contrast, fathers are generally thought to increase their work effort. Women might be aware of this discrimination in hiring practices and, in the face of precariousness, this condition might reduce their ability to plan their future life and, in turn, their health more than their male counterparts. According to these arguments, I assume that

HP2: the negative relationship between EP and health is stronger for women than for men

An alternative way of looking at the gender differential is to consider the different interactions that precariousness might have with men's and women's gender identities. The role theory tells us that gender roles beliefs—that is, people's perceptions of men's and women's social roles in the society in which they live—guide and influence behaviors via different mechanisms, including self and social regulation (Eagly 1987; Eagly and Wood 2012). Indeed, people internalize gender roles as personal gender identities—individuals' sense of themselves as female and male—and, in turn, the gender identity becomes a self-standard against which people regulate their behaviors (Eagly and Wood 2012). Closer matches between self-standards and behaviors produce positive emotions and increase self-esteem, generally positive for health. On the contrary, engaging in behaviors that contradict stereotypical gender identity and self-standard decrease self-esteem and foster feelings of inferiority, helplessness, and jealousy (Carmona et al. 2006), which leads to poor health. In a society where the division of labor is gendered and masculine identities are so intricately linked to a stable and well-rewarded job—i.e., a job that confers the role of primary family provider (e.g., Lewis 1992)—those male individuals who have a precarious job might violate the traditional male gender role. Therefore, men in precarious jobs may perceive themselves (and be perceived by others) as possessing a socially

undesirable characteristic, which conflicts with the stereotypical idea of themselves as the male breadwinner. It follows that

HP2alt: the negative relationship between EP and health is weaker for women than for men.

5. Methods

5.1. Data and Sample

The German Socio-Economic Panel (SOEP; http://www.diw.de/soep) is a representative panel study of German households that started in the Federal Republic of Germany in 1984 (Wagner, Frick, and Schupp 2007). In 1990, before German reunification, the survey was expanded to include the territory of the former German Democratic Republic. This study makes use of information at four waves (2003, 2007, 2011, and 2015) since the full set of EP indicators were collected only during those years. The starting pooled sample of people with completed interviews who live in private households counts 100.155 observations. First, I select people on age and employment status, obtaining a sample of 46.391 men and women between 20 and 65 years old with formal employed contracts (both temporary and permanent). Second, I keep only the individuals with more than one observation over the four waves (remaining obs. 31.982). Finally, all missing values on the variables of interest are excluded from the analysis giving a final unweighted sample of 23.744 observations. To deal with missing values, I used listwise deletion in the analyses presented below. To ensure that the missing data do not bias the results and jeopardize representativeness, I also re-ran all models by setting missing values to zero (as I only use dummy). The results of these analyses suggest that there is no systematic bias due to missing data. Detailed descriptions of missings and samples are provided in the Appendix. By using SOEP weights[22], the final empirical sample contains 11.021 observations, among which 5522 are men and 5499 are women.

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[22] The weighting factor for my longitudinal sample are calculated as the product of the starting wave cross-sectional weighting factor (PHRF) and all the following staying factors to the end of the longitudinal sample (yearBLEIB), as in the following example: WLONG = 2003PHRF * 2004BLEIB * 2005BLEIB *...* 2015BLEIB.

5.2. Dependent variable

The health dependent variable used in my analysis is a single measure of perceived health status. In SOEP, self-perceived health (SPH) is a five-point scale, ranking from 'very good' to 'good,' 'satisfactory,' 'bad,' and 'very bad.' It basically provides an ordinal ranking of individuals' self-perception of their health status. As the distribution of SPH is generally skewed and the number of observations in the most negative category is quite low, I collapse together with the extreme categories—'very good/good,' 'satisfactory,' 'bad/very bad'—and obtain an ordinal three-points scale.

Because of its subjective nature, the comparability of SPH across groups has been put into question in a number of studies (Jylhä 2009; Shmueli 2003; Jürges 2007). The issue is generally known as 'reporting behaviors heterogeneity'—namely, the variation in the reported measures across population groups for a given level of 'true health' (Shmueli 2003). Because of socialization, different perceptions of their roles (including the sick role) or different ways of presenting themselves, men and women, for instance, may evaluate their health status in different ways: They may place different weights on particular dimensions—i.e., psychological vs. physical symptoms—when making their health judgment (Benyamini, Leventhal, and Leventhal 2000; Peersman et al. 2012) or engage in different reporting behaviors in the context of seeking medical advice and admitting health problems (Idler 2003). Moreover, different reference points or threshold levels may be used by men and women when classifying their 'true health' into a categorical measure such as SPH (Lindeboom and van Doorslaer 2004; Schneider et al. 2012).

In contrast, other studies have contested the existence of the heterogeneity bias in the self-evaluation of health between genders. According to them, men and women do not use different standards for assessing self-perceived health, and both groups use a broad frame of health-related information in forming their health judgment (Zajacova, Huzurbazar, and Todd 2017). Moreover, it seems difficult to detect a clear gender-specific pattern in reporting behaviors (Macintyre, Ford, and Hunt 1999), even when analyses are stratified by socioeconomic status (i.e., education) (Oksuzyan et al. 2019). Although the reporting heterogeneity issue has not been fully solved in the literature yet, neglecting the problem could be problematic for our understanding of gender inequalities in health. Therefore, I try to address the issue in my analytical strategy as well as with some additional analyses (see Appendix).

Notwithstanding this issue, SPH is generally considered a good and comprehensive measure of health, able to capture several dimensions of individual well-being, both physical and psychological (Singh-Manoux et al. 2007). The SPH question has good test-retest reliability (Cox et al. 2009), and it is proved to be a powerful predictor of a range of objective health measures such as functional ability in daily life (Idler and Kasl 1995) and mortality (Ferraro and Farmer 1999). Because of its easy administration and its ability to provide a concise way of summarizing the health status, the SRH question has been used extensively in many surveys and by International research organizations to monitor health and health inequalities within and across different populations.

5.3. EP variable

My main independent variable is *Employment Precariousness.* I assume that EP is a latent construct composed of seven dimensions chosen according to the theory and previous empirical research. The seven dimensions are proxied by eight indicators available in the dataset (see appendix for a full description of indicators). The EP composite indicator is obtained by performing a multiple correspondence analysis (MCA) on the eight indicators (see appendix).[23] The variable is then standardized and shifted in order to assume positive values. Table 1 shows the description of EP indicators, EP measurement, and the correlation between EP and perceived job security as a test of validity.

5.4. Covariates

Adjustments aim to control for the potential individual factors' impacts on health, such as social positions, family roles, and characteristics of the labor market, through pathways unrelated to precariousness. Model 1 controls for *Age*, Age squared, and *Highest Educational level Attained (Casmin),* coded in 3 categories: 'Primary' (in school, inadequately completed, general elementary school, basic vocational qualification), 'Intermediate' (intermediate general qualification, intermediate vocational, vocational maturity certificate) and 'Tertiary' (lower and higher tertiary education), *Nationality*

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[23] MCA is both a data reduction technique, which allows for the study of phenomena operationalized with qualitative (i.e. nominal) and categorical variables (Le Roux and Rouanet 2010; Benzécri 1973; Greenacre 1984) and a quantification technique—it allows me to generate quantitative scores from a set of qualitative/categorical variables (Di Franco 2016).

(German vs. Non-German) and *Area of residence (West/East).* I also add information on the household composition: *Having a Partner* (No=0 and Yes=1), *Number of children* (No kids=0, 1 kid=1, 2 kids=2, 3or more kids=3). Finally, I also include the *Economic Sector*, identifying 13 different sectors ('Agriculture', 'Forestry and Fishing', 'Mining and Quarrying', 'Manufacturing', 'Electricity', 'Construction', 'Wholesale and retail, motor and household services', 'Hotels and Restaurants', 'Transport, storage and communication', 'Financial Intermediation', 'Real estate, renting, business act.', 'Education', 'Health and social work') that characterize the German labor market plus a residual category[24]. In order to control for unobserved heterogeneity, I also include within-individual means of both EP and the other time-varying covariates (Wooldridge 2009) in Model 2. All models include also period dummies.

Tab. 1
Description of EP indicators and EP measurement (pooled sample).

	Description of indicators	Min	Max	Mean	S.D.	Correlation with job security
Income insecurity	Current net labor income below the 'relative poverty' threshold (less than 60% of the weighted sample median)	0	1	0.19	0.39	
Social insecurity	NOT entitled to unemployment benefits at t0—less than 12 months of contributions in the 2 previous years. =1	0	1	0.07	0.26	
Legal insecurity	NOT entitled to dismissal protection—6 months or less of job tenure	0	1	0.11	0.31	
Employment insecurity	duration of the contract: Temporary contract	0	1	0.08	0.27	
Working time insecurity	Underemployment: working less hours than desired.	0	1	0.15	0.35	
	Unpaid Overtime	0	1	0.26	0.44	
Representation insecurity	NOT being a member either of a union or works council	0	1	0.77	0.42	
Vulnerability	Material deprivation of 3 or more items=1	0	1	0.12	0.33	
Employment Precariousness	Scores variable obtained via MCA	0	6.08	0.98	1	-0.14***

Correlation with perceived job security (Worried About Job Security: 1 "Very Concerned" 2 "Somewhat Concerned 3 "Not Concerned at All")
***p<0.01

5.5. Strategy

The relationship between EP and 'general self-perceived health' is estimated by applying ordered probit random-effects estimators and calculating the average marginal effect (further AME). I apply ordered models in order to make use of the variability of my ordinal dependent variable. Although the ordered model requires the fulfillment of the strong assumption on odds proportionality (OP)—namely, estimated coefficients must be the same across categories of the outcome or, in other terms, all individuals have equal thresholds for the outcome's categories—it is preferable to unconstrained models such as multinomial models, which lose information about the ordinality and are less parsimonious and more difficult to interpret. Nevertheless, the OP assumption can be problematic in comparisons across groups, as different individuals may have different thresholds when rating their own health—i.e., reporting behaviors heterogeneity issue (Jylhä 2009). The individual variation in the set of thresholds is an indicator for heterogeneity that appears in the data, and that is not reflected in traditional ordered models (Boes and Winkelmann 2006; Schneider et al. 2012). In fact, the OP assumption is often violated if not by all the independent variables, at least by some of them, as in the case of my model (see Table3a in the appendix).

A 'strong' strategy to overcome this problem is using partial proportional odds (PPO) models (Agresti 2010; Fullerton 2009), which relax the OP assumption by allowing the thresholds to vary according to (only) those variables that violate the assumption. The PPO model is considered the best alternative to avoid ordered models that violate assumptions (e.g., proportional odds) and inefficient models with unnecessary parameters (e.g., multinomial logit) (Pfarr, Schmid, and Schneider 2010; Boes and Winkelmann 2006). However, although the choice of the model may have an important impact on the estimates, differences in probit coefficients across models may not translate into noticeable differences in the predicted probabilities (Fullerton 2009), which is also my case (see Table 4a in the appendix). As changes in predicted probabilities are negligible, I choose a 'simple' strategy to reduce the potential 'reporting behaviors heterogeneity' bias in my estimates: First, I conduct gender-specific analyses, and second, I test the significance of the gender differential in the sample pooled by gender.

My random-effect models belong to the panel models family, which have the advantage of taking into account the dependence of observations over time (i.e., autocorrelation) and the potential bias given by unobserved heterogeneity (Halaby 2004). Random-effect

models are generally more efficient than fixed-effects models (FE) but less consistent: They assume that unobserved heterogeneity will not bias the results because the unit-specific error is uncorrelated with the explanatory variables (Halaby 2004). In order to relax the 'random-effects assumption,' I use correlated random-effects models (Mundlak 1978). Correlated random-effects models (CRE) are more consistent than standard RE models, as they include the within-individual means of the time-varying independent variables in order to model unobserved heterogeneity (Wooldridge 2009). Thus, similarly to FE, CRE models rule out time-invariant unobserved heterogeneity. Moreover, for non-linear models, CRE is also preferable to FE because the number of observations is not reduced in case of scarce variability of the dependent variable, and the incidental parameter problem is avoided (Wooldridge 2009). Panel weights are used in order to assure the representativeness of the data. Analyses are carried out by using Stata 14.0.

6. Results

In order to test whether EP is detrimental for SPH (Hp1), two random-effects ordered probit models are implemented. Table 2 reports the AME of EP on SPH and predicted probabilities of SPH when EP is equal to zero. Full models are reported in the appendix. AMEs describe the increase (or decrease) in the probability of being in one of the three health categories when EP increases by one standard deviation and all the covariates are at their means.

Tab. 2. AME (%) of EP on self-perceived health and Predicted probabilities (%) of SPH at EP=0. SOEP 2003, 2007, 2011, 2015 (SOEP Weights)

		Very Good/Good		Satisfactory		Bad/Very bad	
		M	W	M	W	M	W
Model 1: RE	AME	-7.7**	0.7	6.6**	-0.5	1.1*	-0.2
	EP=0	61.4***	52.1***	36.9***	42.8***	1.7***	5.1**
Model 2: CRE	AME	-2.9	-1.6	2.5	1.2	0.4	0.4
	EP=0	57.7***	53.5***	40.3***	42.0***	2.0***	4.46**

Legend: *p<.05; **p<.01; *** p<.001
AME calculated at the mean of other variables.
Robust St. Errors

Looking at Model 1, we can observe that for men increasing EP by one standard deviation, the probability of reporting 'Very good/Good' health decreases by 7.7 percentage points, which means, in substantial terms, a 12.5 percent decrease. The probabilities of reporting 'Satisfactory' and 'Bad/Very bad' health increase respectively by 6.6 percentage points (almost 18%) and by 1.1 percentage points (more than 60%). For women, when PE increases by one standard deviation, the probability of reporting 'Very good/Good' health increases by 0.7 percentage points, namely 1.3 percent increase, while the probability of reporting 'Satisfactory' and 'Bad/Very bad' health decreases respectively by 0.5 percentage points (almost 1.2%) and by 0.2 percentage points (almost 4%). The relationship between EP and SPH seems to follow opposite directions for men and women, and AMEs are statistically significant only for men.

Model 2 controls for unobserved heterogeneity by including within-individual means of the time-varying independent variables. Importantly to note, with respect to Model 1, the AME for men is now strongly reduced and no longer statistically significant; moreover, the relationship follows the same direction for both genders. These first insights indicate that unobserved heterogeneity plays an important role in shaping the relationship between EP and SPH. Nevertheless, although reduced and not statistically significant, the 'effects' of EP on SPH are neither negligible in size nor trivial in practice. Looking at men, the risk of experiencing 'Very good/Good' health decreases by 2.9 percentage points when EP gets higher by one standard deviation, while the probability of reporting 'Satisfactory' and 'Bad/Very bad' health increases respectively by 2.5 and 0.4 percentage points. In substantial terms, it means that even cleaning the effect of EP out from potential selection biases, we can still observe for men a 6 percent increase in the probability of 'Satisfactory' health and a 20 percent increase in the probability of 'Bad/Very bad' health. Looking at women, when EP increases, the probability of 'Very good/good' health decreases by 1.6 percentage points, while it increases by 1.2 and by 0.4 percentage points for 'Satisfactory' and 'Bad/Very bad' health, respectively. Substantially, it means an increase of almost 9 percent in 'Bad/Very bad' health when women experience more precariousness. Although the no-significance of results warrants caution, it could be said that when EP increases, the probability of experiencing poor health also increases for both men and women (HP1).
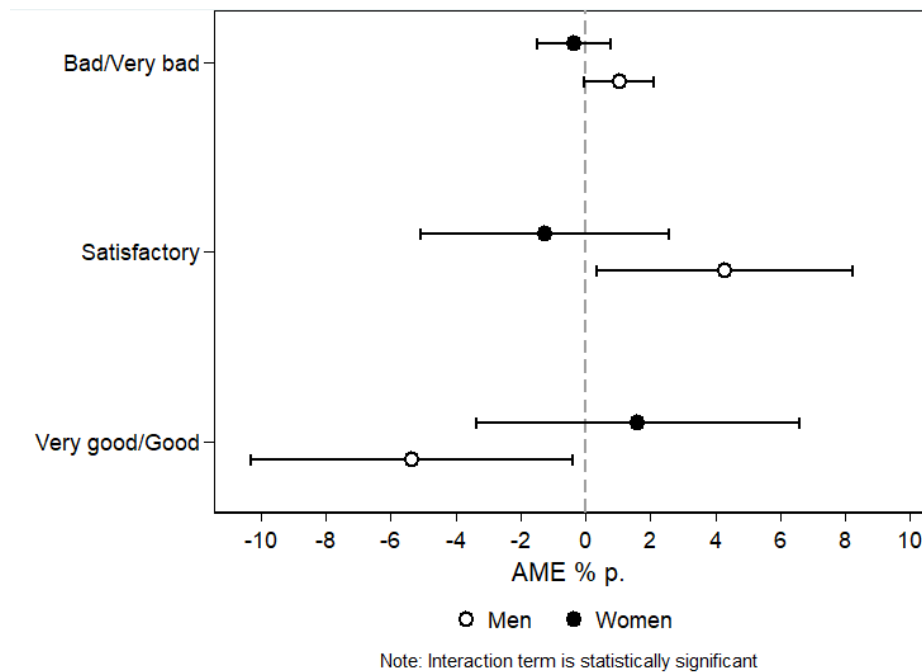
Figure 1. AME of EP on SPH. CRE model pooled by gender, with interaction. SOEP 2003, 2007, 2011, 2015

In order to test my hypotheses on the gender differential (Hp2 and Hp2alt), I implemented a CRE model pooled by gender with interaction term between EP and gender. Figure 1 shows the AME for men and women by each outcome's category. Increasing precariousness by one standard deviation, the risk of poor health is generally higher for men than for women. Curiously, when EP increases, the probability of experiencing poor health decreases for women, as in Model 1 (Table 2). AMEs for men are statistically significant, as well as the gender differential. All in all, these results seem to support my second alternative hypothesis of women's health being less (negatively) affected than men's health when EP increases.

7. Discussion

The aim of the study reported herein was to examine whether and to what extent employment precariousness may be detrimental for workers' general health in Germany. Particular attention was dedicated to the gender differential—men's and women's different ways of experiencing precariousness in terms of health. First, I investigated the relationship between EP and general self-perceived health by exploiting the longitudinal structure of SOEP data and accounting for selection (i.e., unobserved heterogeneity). By modeling unobserved heterogeneity (Wooldridge 2009), my correlated random-effects

models showed a negative and substantial 'effect' of EP on self-perceived health for both men and women. Although nonsignificant, the evidence seems in line with previous cross-sectional literature (Julià et al. 2017; Vives et al. 2013; Van Aerden et al. 2016), supporting the hypothesis that employment precariousness could be detrimental for workers' health also in Germany. Undoubtedly, my results showed the crucial role of (constant) unobserved heterogeneity in shaping the health consequences of precarious employment, and this is particularly important as evidence starts to accumulate, yet it is still mostly descriptive and based on cross-sectional data.

Further, my results revealed a substantial difference among men and women in the relationship between EP and health: when EP increases, the risk of experiencing poor health increases much more for men than for women. My results falsify previous theory according to whom the gender differential is contingent on the structurally disadvantaged position of women in western societies (Menéndez et al. 2007). This explanation focuses on the interaction between employment-related power asymmetries and gender-related power asymmetries in the private and public spheres of life, which is thought to create a disadvantage in terms of health for women with respect to men. Although this hypothesis is plausible also in a context like Germany, characterized by a traditional gender regime and high level of gender inequalities (EIGE 2018), I additionally suggested that the gender differential could take the opposite direction—that is, women being penalized less than men in terms of health consequences of EP. This alternative hypothesis took into account the role of gender norms. The main idea is that German men and women internalize their traditional gender roles (i.e., breadwinner/housekeeper) as personal gender identities. Then, they test their behaviors against these self-standards (Eagly and Wood 2012), facing potential gender role conflicts. This conflict was thought to be particularly pronounced for those men who experience EP, as their self-standard is supposed to be the stereotypical breadwinner man with a good and well-rewarded job. Taken together with test for gender difference, this result seems to confirm my second alternative hypothesis on the gender differential—women's health is less negatively affected by EP than men's health.

My study also revealed a curious result: Women are not only less penalized than men, but their health seems to benefit when EP increases. A reason for this result may be linked to the ongoing transformation of gender roles and attitudes in German society, which since the 90s, have become more liberal, and opportunities for women have expanded. Probably, most of the women no longer perceive themselves as exclusively traditional homemakers: women's identities have come to incorporate other aspects considered important to a

woman's sense of self, as for instance, the work role. Participation in the labor market might be regarded as a means for personal emancipation and financial independence, and overall a more desirable aspect of female identity than in the past (Hakim 2002). However, these women do not give up on their care role, which is still very central in the development of their self-concept (Eagly and Wood 2012). These 'transitional' women (Hochschild and Machung 1989) blend the traditional and egalitarian ideologies: They fall in between the traditional woman, who wants to identify with her activities at home (e.g., as a wife or a mother) and the egalitarian women, who want to identify with the same spheres her husband does (e.g., work). Therefore, certain precarious employment relationships may result be beneficial for women's health because they are able to match with this new female self-concept. Working precariously may not produce in women that gender identity conflict that we expected in men, but a 'positive match' able to affect their health self-perception positively. Further research on this point is needed.

Finally, my paper contributed to the methodological debate on EP by developing an indicator that is both multi-dimensional *and* continuous. Coherently with the theory, it synthesizes multiple different dimensions of insecurity and powerlessness in the employment relationship (Rodgers 1989), and it is conceived in order to maintain the continuous nature of EP (Rodgers 1989; Vosko 2006; Vosko, MacDonald, and Campbell 2009). Results from the multiple correspondence analysis showed that there exists a latent variable of EP that can be expressed by seven different dimensions: social insecurity, legal insecurity, income insecurity, 'working time' insecurity, job insecurity, representation insecurity, and vulnerability. By maximizing the variance of a set of 8 observables indicators operationalizing the seven dimensions, the extracted score variable (Di Franco 2016) eventually describes the multidimensional and continuous nature of EP.

Before concluding this paper, some limitations and avenues for future research need to be mentioned. First, unobserved heterogeneity is not the only selection mechanism potentially at play here. Other mechanisms—e.g., reverse causation and path dependence—might play a role. A proper way to handle selection, could be the implementation of dynamic models—i.e., conditioning to a lagged dependent variable. However, this strategy is not optimal for this study: As the sample presents an average of 2 time observations per respondent, conditioning on lagged health would have greatly reduced the power of the analysis. Further studies should therefore investigate better the causal relationship between EP and self-perceived health by using a longer time span with more observations over time. Second, although I am confident that my indicators provide

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a good representation of the EP concept, the use of secondary data might influence the operationalization and the accuracy of my measure. Thus, an important step for future research could be the development of a psychometric scale of precariousness and its inclusion in nationally representative datasets such as the SOEP for Germany. This would greatly help researchers who are interested in studying employment quality and its consequences for people's lives. Third, this study mainly focused on the effect of EP on concurrent health, while many other aspects of the relationship could be investigated from a life course perspective. For instance, it is unknown whether and to what extent living a prolonged condition of precariousness may have repercussions on workers' health or whether EP can scar health even beyond the duration of an individual's working life. Finally, my paper considered workers as isolated individuals rather than interrelated family members; yet the health consequences of employment insecurity are likely to be moderated by the family structure and even may spill over on other family members. Future research, therefore, should incorporate a family perspective into the study of employment precariousness and health.

Notwithstanding these shortcomings, this paper makes an important three-fold contribution to the occupational health literature. The main implication of my findings is that a longitudinal approach to precariousness as a multidimensional and continuous phenomenon is crucial to grasp the complexity of employment de-standardization and the consequences for the quality of life of different workers' groups. In particular, the result on gender difference warns about a direct translation from objective features of employment precariousness into subjective self-perceived health. The health consequences of employment de-standardization need to be investigated in light of the gender arrangements and the transforming gender relationships that take place in specific cultural and institutional contexts. This interpretation suggests that women's health advantage may be a transitory phenomenon, contingent on the predominant gender norms and values against which people form their own gender identity. As the difference between men's and women's position in the society is eroded, and egalitarianism becomes the dominant normative status, so probably will be the gender difference in the consequences of poor-quality jobs and health. Institutions and organizations that want to monitor employment conditions in the country and want to improve the quality of life of workers should take into account the role of gender norms in the interrelated relationship between EP, health, and gender.

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9. Appendix

Table 1a

Sample characteristics by gender. SOEP, 2003, 2007, 2011, 2015. Weighted sample

	Men N=5601	Women N=5419
General Health %		
Very Good/Good	56.00	51.55
Satisfactory	34.42	34.71
Bad/Very bad	9.57	13.74
Employment Precariousness Mean (St.dev)	0.78 (0.88)	1.18 (1.08)
Age Mean (St.dev)	43.48 (10.41)	43.50 (9.95)
Educational Degree %		
Primary	35.72	27.16
Intermediate	42.50	47.79
Tertiary	21.78	20.70
Nationality %		
German	94.41	94.99
Non-German	5.59	5.01
Region %		
West	82.98	82.16
Est	17.02	17.84
Partner in household %		
Without partner	29.99	33.29
With partner	70.01	66.71
Kids in household %		
No kids	75.22	78.66
1	13.66	13.70
2	9.55	6.80
3 or more	1.57	0.85
Economic Sector %		
Agriculture, Forestry, and Fishing	3.22	0.42
Mining and Quarrying	0.16	0.09
Manufacturing	35.27	15.32
Electricity	2.17	0.50
Construction	6.96	1.28
Wholesale and retail, motor and household services	9.11	13.09
Hotels and Restaurants	1.58	3.13
Transport, storage and communication	8.16	3.30
Financial Intermediation	4.46	4.76
Real estate, renting, business act.	7.02	12.89
Public and Administrative	8.63	7.41
Education	3.62	10.25
Health and social work	6.65	10.25
Other	2.99	3.99

Table.2a

Description of missings (%)

Variable	Missing %
SPH	0.09
Age	0
Gender	0
Nationality	0
Education	0.95
Partner in hh.	0
Nr. of children	0
Region	0
Sector	5.54*
EP indicators	
Temporary contract	0
Low tenure	0.06
Unpaid overwork	2.89
Underemployment	7.80
Low Income	0
Social (in)security	5.17
Representation insecurity	10.35*
Material deprivation	10.52*
N=31.982 * The majority of these missing are NOT non-response missing, but 'non-applicable' missing	

Strategy: the proportionality assumption

In order to test whether the proportionality assumption holds, I use the user-written command REGOPRO2 with the AUTOFIT option (Pfarr, Schmid, and Schneider 2010). To the best of my knowledge, REGOPRO2 is the only available implementation in STATA for estimating ordinal variables by using generalized ordered model fitting panel data. By using the AUTOFIT option, REGOPRO2 can be used as a test for the proportionality assumption. The command triggers an iterative process used to identify the ordered probit random model that best fits the data. Basically, it runs different equations and eventually, it tells you if any of the variables violate the proportionality assumption and which would be the model that best reflects the observable heterogeneity in the data.

Given its properties, I use the REGOPRO2 command for two aims: 1) with the AUTOFIT option, in order to get whether the proportionality assumption for my independent variables holds and which variables potentially violate it; 2) by comparing predicted probabilities, to choose the best model among three different specifications —i.e., one standard ordered model (all the independent variables are expected to satisfy the PO assumption); one partial proportional odds model (only those variables that violate the assumption are set free to vary across equations); one generalized ordered model (all variable are set as unconstrained). More precisely, I seek to understand whether differences in the probit coefficients across the three models may or may not translate into noticeable differences in the predicted probabilities and, then, to assess whether the estimates obtained through my random models in the main analyses are subject to individual heterogeneity bias (Fullerton 2009).

Table 3a Variables that violate the OP assumption.

DO NOT VIOLATE	VIOLATE
Age	Age sq.
Employment Precariousness	Women
Nr of kids < 14 yrs old	Education
Having partner	Nationality
Economic sector	Region
	Year

Results from the REGOPRO2 model in the pooled sample show that only few variables drive the heterogeneity in the outcome (Table 3a, right column). In particular, while my main independent variable EP meets the OP assumption, the variable for 'gender', among others, does not. Results also suggest that, in contrast to both the fully constrained random effect model and the generalize random effect model—all variables set as unconstrained—the best choice is a partial proportional odds model, where the variable in the right column are let free to vary. This latter specification is preferable as it does not violate the proportionality assumption (Wald test for H0: No violation: Prob > chi2 = 0.4765) and reflects best the observable heterogeneity in the data.

However, running the three different models—fully constrained, partially constrained and unconstrained— results show important differences in the probit coefficients of the 5 'violating' variables, but negligible differences in the predicted probabilities (Table 4a).

Table 4a. Predicted probabilities from three specifications of REGOPRO2 for the first 20 observations in the data (N= 23744).

	Fully constrained model			Partially constrained model			Fully unconstrained model		
	Very good/Good	Satisfactory	Bad/Very bad	Very good/Good	Satisfactory	Bad/Very bad	Very good/Good	Satisfactory	Bad/Very bad
1	0.3272996	0.415557	0.2571434	0.30872	0.4623704	0.2289096	0.3111651	0.4558424	0.2329925
2	0.4999355	0.3642671	0.1357973	0.4813541	0.4025463	0.1160996	0.4788484	0.4079018	0.1132498
3	0.4515034	0.3843841	0.1641125	0.4287804	0.4314079	0.1398117	0.4261936	0.4373795	0.1364269
4	0.5230184	0.3534046	0.123577	0.5236419	0.3521569	0.1242012	0.5235425	0.3526177	0.1238398
5	0.4889485	0.3691586	0.1418929	0.4870935	0.3718067	0.1410998	0.4863254	0.373846	0.1398285
6	0.5408618	0.3444883	0.1146499	0.5256112	0.3718225	0.1025663	0.5319275	0.3587257	0.1093469
7	0.5117859	0.3587876	0.1294264	0.4912997	0.3939762	0.1147241	0.4916043	0.3930596	0.115336
8	0.457265	0.382193	0.160542	0.4314186	0.4273456	0.1412358	0.4369202	0.4142739	0.1488059
9	0.4606895	0.3808639	0.1584467	0.4488229	0.3955922	0.151585	0.4531727	0.3895699	0.1572574
10	0.4705953	0.3769084	0.1524963	0.4641198	0.3926294	0.1432509	0.464879	0.3910534	0.1440676
11	0.4214506	0.394855	0.1836944	0.4127167	0.4157521	0.1715313	0.4133857	0.4143316	0.1722828
12	0.3759585	0.4073591	0.2166824	0.3642713	0.4346069	0.2011218	0.3647501	0.4336023	0.2016477
13	0.7032922	0.2455208	0.051187	0.7052172	0.2394136	0.0553693	0.706023	0.2376894	0.0562876
14	0.6540887	0.278577	0.0673344	0.6569958	0.2711539	0.0718502	0.6568707	0.271156	0.0719733
15	0.5975977	0.3133628	0.0890395	0.6004663	0.3057927	0.0937411	0.6006295	0.302286	0.0940845
16	0.5496894	0.3399167	0.1103939	0.5514296	0.3338128	0.1147576	0.5514904	0.3333472	0.1149624
17	0.4928809	0.3674292	0.13969	0.498427	0.3542595	0.1473135	0.4999114	0.3514975	0.1485911
18	0.7470395	0.2141586	0.0388019	0.7557217	0.191213	0.0530653	0.7594382	0.184221	0.0563407
19	0.7488569	0.2128175	0.0383256	0.7581969	0.1918465	0.0499565	0.7575545	0.192834	0.0496115
20	0.7433576	0.2168663	0.039776	0.7548499	0.1936707	0.0514795	0.7528611	0.1970874	0.0500515

Description of EP indicators

Income Insecurity: The key variable for constructing my measure of income insecurity is an open question of the German Socio-Economic Panel about the net individual (current) income from labor. Following conventional practice in literature on poverty, I defined an individual as having insufficient income if her individual labor income is below the 60% of net labor income median, calculated on the weighted sample of the employed.

Social Insecurity is defined as 'NOT being entitled to unemployment benefit'. In order to receive the benefit, the German system establishes the regulatory requirement of 12 months of contributions accumulated in the previous two years (see Sozialgesetzbuch III). My indicator is then operationalized resorting to the calendar monthly variable on employment situation. Those who had not collected twelve months of employment at t-1 and t-2 are then categorized as exposed to social insecurity (= 1) at t0.

Legal insecurity is defined as 'NOT being covered by dismissal protection' and it is operationalized by the indicator '6 months or less of job tenure'. In Germany, the Employment Protection Act only applies to continuous employment relationships of more than six months in the same company. If these condition does not apply, employers generally have an unfettered right to terminate employment contracts within statutory notice periods.

Employment insecurity looks at the 'duration of the contract' and distinguishes between permanent (= 0) and temporary (= 1) contracts. Temporary contracts are all contracts concluded for a limited duration namely fixed term, temporary agency, seasonal, and casual.

'Working time' Insecurity is operationalized by means of two different indicators. People in SOEP are asked 'how many hours do you generally work, including any overtime' and 'If you could choose your own working hours, taking into account that your income would change according to the number of hours: How many hours would you want to work?'. The questions are used to obtain time mismatch—the difference between actual and desired working hours (Otterbach, Wooden, and Fok 2016; Wunder and Heineck 2012). From this, I further created the variable *Underemployment—* that is, working less hours than desired. For the second indicator, I used other two questions from the SOEP questionnaire: 'Do you work overtime?' and 'If you do work overtime, is the work paid, compensated with time off, or not compensated at all?'. Those people who actually work overtime and do not receive compensation of any kind are coded as 1 in my binary variable *Unpaid Overtime*.

Representation Insecurity is defined as NOT being a member either of a union or works council.

Vulnerability is proxied by material deprivation. This indicator is obtained from eleven indicators that were part of the household questionnaire of the SOEP. People were asked whether their household could afford a colour television, a telephone, a car, furniture, an adequate housing, a good neighbourhood, the affordability with regard to payments, savings for emergencies, a vacation for at least a week once a year, a dinner at least a month or a hot meal with meat, fish or poultry, and if not, whether financial or other reasons were responsible for this. I create an additive index that indicates the number of lacking living standard items for financial reasons. Based on the approach taken by Pfoertner and colleagues (2011), a person is denoted as 'poor' (=1), if at least three living standard items are lacking for financial reasons. The person is denoted as 'not poor' (= 0) either if she possesses these items or that they are lacking for other reasons. Finally, those who are not assignable to a group due to missing values will be excluded from the analysis (= missings).

Multiple Correspondence Analysis

In order to obtain my measure of employment precariousness (EP), I use multiple correspondence analyses (further MCA). MCA is a data reduction technique like principal component analysis and factor analysis (Le Roux and Rouanet 2010; Benzécri 1973; Greenacre 1984), with the advantage that MCA better allows the study of phenomena that are operationalized with qualitative (i.e., nominal) and categorical variables (or quantitative variables redefined in terms of both a finite number of categories and binary variables), as in the case of my study. Measuring the relations between variables as the distance from the condition of independence (Chi Squared), MCA can overlook both the scales and their distributions of the variables under study (Di Franco 2016)—it is a non-parametric approach to composite indicators.

Similarly, to principal component and factor analysis, MCA aims to find an 'optimal' sub-space where the original data are represented by a lower number of independent dimensions that maximize the variance. Moreover, the step-wise reduction process is also similar. I assume that employment precariousness is a multidimensional latent (unobserved) variable and I seek to estimate this latent variable based on a set of observed indicators that are more or less correlated. By exploring the internal structure of interdependence within the set of original categorical indicators, MCA uncovers association patterns across them, and then defines a new set of (latent) variables, named principal components. Principal components are obtained by linear combination of the original set of indicators. They are orthogonal, namely independent, and exhausting the whole variability of the original set of indicators. Equivalently to eigenvalues in factor analysis, the first principal component represents the unobserved latent variable that captures the highest variance of all observed variables used in the analysis and it is therefore the best candidate to represent all the variables considered.

Table 5a Multiple correspondence analysis: Principal Inertia

Dimensions	Principal Inertia [0,1]	Percent	Cumulative percent
Dim 1	.0175	80.06	80.06
Dim 2	.0005	2.14	82.20
Dim 3	.0000	0.22	82.41
Total Inertia	.0218	100.00	

In my paper, I apply MCA on the eight selected indicators in the pooled dataset in order to obtain the disaggregation of the total variance or principal inertia (Table 5a). In order to choose the principal component that maximize the variance, I look at the proportion of variance that is explained by each component. The rule of thumb is to select the dimensions beyond which the cumulative percentage grows more slowly. In my case, the first dimension explains the 80% of the total variance, while the second explains the 2.14%. Thus, specifying 1 component for the analysis may be sufficient. Accordingly, the dimension 1 seems to be the principal component that summarize best the data and express substantially my latent variable EP.

Figure 1a
Categories that contribute more to the principal component
on the bidimensional sub-space.

coordinates in standard normalization
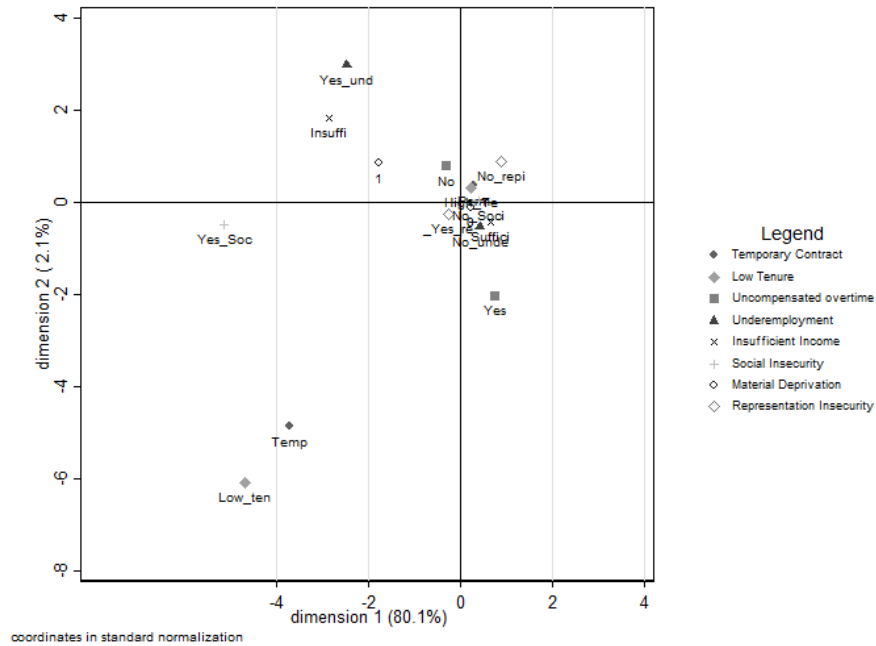
Moreover, MCA is also a quantification technique: from a set of qualitative variables, it allows me to generate quantitative scores. Once the principal components are identified, indeed, MCA gives the coordinates scores, namely the numerical values indicating the projection of original data on the geometrical low-dimension sub-space. Figure 1a shows the cloud of relevant categories/individuals in the bidimensional sub space. Most of my 'non-zero' categories are far from the origin, meaning that they strongly characterize the EP dimension[25], and on the left/negative side of the dimension 1, meaning that are directly associated among them. Conversely, the 'zero-categories' are concentrated at the origin of the plane, contributing less in term of variance to the dimension 1 (see Di Franco 2016). Eventually, the scores have been extracted and, for the sake of interpretability, I reverse the sign of EP (from worse condition to better).

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[25] In MCA, a category is weighted inversely to its frequency: the contribution of the low-frequency categories is reassessed and the contribution of the high-frequency categories reduced. Therefore, rare modalities/categories weight substantially on the determination of the principal components. In the case of precariousness indicators, this could be interpreted as giving more importance to minority population groups such as the relatively more precarious (see Asselin 2005).

Full models

Table 6a Random-effects ordered probit regression (Men)

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
EP	0.195	0.063	3.08	0.002	0.071	0.319	***
Age	0.114	0.037	3.09	0.002	0.042	0.187	***
Agesq	-0.001	0.000	-2.20	0.028	-0.002	0.000	**
Education (ref: Primary)							
2. Intermediate	-0.247	0.185	-1.33	0.182	-0.609	0.116	
3.Tertiary	-0.673	0.195	-3.45	0.001	-1.055	-0.290	***
Nationality (ref: German)							
1.Non-german	0.156	0.354	0.44	0.659	-0.538	0.851	
Region (ref. West)							
1.Ost	0.281	0.146	1.93	0.054	-0.005	0.568	*
Partner in hh (ref. No partner)	0.000	.	.	.	.	.	
1. Partner in hh	-0.201	0.138	-1.46	0.145	-0.471	0.069	
Nr. Of children <14 (ref. No children)							
1. 1 child	0.088	0.127	0.69	0.490	-0.161	0.337	
2. 2 children	-0.030	0.164	-0.19	0.853	-0.352	0.291	
3. 3 or more children	-0.429	0.261	-1.64	0.101	-0.941	0.083	
Sector (ref. Manufacturing)							
2. Agriculture, Forestry, and Fishing	-0.988	0.652	0.85	0.394	-0.722	1.832	
3. Mining and Quarrying	-0.433	0.550	1.80	0.073	-0.090	2.066	*
4. Electricity	-0.424	0.754	0.75	0.454	-0.913	2.041	
5. Construction	0.048	0.597	1.73	0.083	-0.135	2.207	*
6. Wholesale and retail, motor and households goods	-0.216	0.499	1.55	0.122	-0.206	1.750	
7. Hotels and Restaurants	0.813	0.734	2.45	0.014	0.362	3.240	**
8. Transport, storage and communication	-0.072	0.558	1.64	0.100	-0.177	2.009	
9.Financial Intermediation	-0.282	0.669	1.06	0.291	-0.605	2.017	
10. Real estate, renting, business act.	0.109	0.575	1.91	0.057	-0.031	2.225	*
11. Public administration, defence	-0.087	0.564	1.60	0.110	-0.203	2.006	
12. Education	0.099	0.600	1.81	0.070	-0.088	2.262	*
13. Health and social work	0.439	0.582	2.45	0.014	0.286	2.568	**
14. Other	-0.140	0.570	1.49	0.137	-0.268	1.964	
Year (ref: 2003)							
2007	-0.012	0.134	-0.09	0.927	-0.275	0.251	
2011	0.103	0.156	0.66	0.512	-0.204	0.409	
2015	0.254	0.160	1.58	0.113	-0.060	0.569	
Constant	4.272	1.179	3.63	0.000	1.962	6.582	***
Constant	6.100	1.194	5.11	0.000	3.760	8.439	***
Constant	1.223	0.164	.b	.b	0.941	1.590	

Mean dependent var		1.541	SD dependent var			0.670
Number of obs		5522.000	Chi-square			106.794
Prob > chi2		0.000	Akaike crit. (AIC)		76095255.979	

*** p<0.01, ** p<0.05, * p<0.1

Table 7a Correlated Random-effects ordered probit regression (Women)

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
EP	-0.018	0.052	-0.34	0.736	-0.120	0.085	
Age	0.036	0.044	0.82	0.413	-0.050	0.122	
Agesq	0.000	0.001	-0.08	0.936	-0.001	0.001	
Education (ref: Primary)							
2. Intermediate	-0.187	0.201	-0.93	0.352	-0.581	0.207	
3.Tertiary	-0.616	0.210	-2.93	0.003	-1.027	-0.204	***
Nationality (ref: German)							
1.Non-german	0.268	0.239	1.12	0.263	-0.202	0.737	
Region (ref. West)	0.000	.	.	.	.	.	
1.Ost	0.119	0.172	0.69	0.488	-0.218	0.456	
Partner in hh (ref. No partner)							
1. Partner in hh	-0.498	0.185	-2.69	0.007	-0.861	-0.135	***
Nr. Of children <14 (ref. No children)	0.000	.	.	.	.	.	
1. 1 child	0.031	0.127	0.24	0.810	-0.218	0.279	
2. 2 children	0.216	0.288	0.75	0.454	-0.349	0.780	
3. 3 or more children	-0.273	0.209	-1.31	0.191	-0.683	0.136	
Sector (ref. Manufacturing)							
2. Agriculture, Forestry, and Fishing	-0.183	0.781	-1.79	0.074	-2.925	0.136	*
3. Mining and Quarrying	-1.577	0.469	0.39	0.697	-0.737	1.103	
4. Electricity	-0.760	0.588	-0.98	0.326	-1.730	0.575	
5. Construction	0.268	0.656	0.69	0.492	-0.835	1.736	
6. Wholesale and retail, motor and households goods	-0.280	0.466	-0.21	0.835	-1.010	0.816	
7. Hotels and Restaurants	-0.268	0.542	-0.16	0.875	-1.147	0.977	
8. Transport, storage and communication	-0.107	0.542	0.14	0.890	-0.987	1.138	
9.Financial Intermediation	-0.525	0.485	-0.70	0.481	-1.294	0.609	
10. Real estate, renting, business act.	-0.383	0.497	-0.40	0.688	-1.174	0.775	
11. Public administration, defence	-0.394	0.478	-0.44	0.659	-1.149	0.727	
12. Education	-0.232	0.485	-0.10	0.918	-1.000	0.900	
13. Health and social work	-0.156	0.516	0.05	0.960	-0.985	1.037	
14. Other	-0.058	0.554	0.22	0.822	-0.962	1.211	
Year (ref. 2003)							
2007	-0.183	0.169	-1.08	0.279	-0.515	0.148	
2011	0.085	0.131	0.65	0.518	-0.172	0.342	
2015	-0.089	0.150	-0.59	0.555	-0.382	0.205	
Constant	0.957	1.036	0.92	0.356	-1.075	2.988	
Constant	2.539	1.045	2.43	0.015	0.490	4.588	**
Constant	1.049	0.177	.b	.b	0.753	1.461	

Mean dependent var		1.568	SD dependent var		0.693
Number of obs		5499.000	Chi-square		123.821
Prob > chi2		0.000	Akaike crit. (AIC)		81366059.971

*** p<0.01, ** p<0.05, * p<0.1*

Table 8a Correlated Random-effects ordered logistic regression (Men)

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
EP	0.074	0.065	1.13	0.257	-0.054	0.201	
Age	0.177	0.055	3.19	0.001	0.068	0.285	***
Agesq	-0.001	0.000	-2.54	0.011	-0.002	0.000	**
Education (ref: Primary)	0.000	.	.	.	.	.	
2. Intermediate	0.000	0.324	0.00	0.999	-0.634	0.635	
3.Tertiary	-0.525	0.272	-1.93	0.054	-1.058	0.009	*
Nationality (ref: German)	0.000	.	.	.	.	.	
1.Non-german	1.475	0.469	3.14	0.002	0.555	2.395	***
Region (ref. West)	0.000	.	.	.	.	.	
1.Ost	0.017	0.293	0.06	0.955	-0.558	0.591	
Partner in hh (ref. No partner)							
1. Partner in hh	-0.221	0.176	-1.26	0.209	-0.566	0.124	
Nr. Of children <14 (ref. No children)	0.000	.	.	.	.	.	
1. 1 child	0.072	0.121	0.60	0.549	-0.164	0.309	
2. 2 children	0.075	0.178	0.42	0.672	-0.273	0.424	
3. 3 or more children	-0.228	0.256	-0.89	0.373	-0.730	0.274	
Sector (ref. Manufacturing)							
2. Agriculture, Forestry, and Fishing	-0.278	0.493	-0.96	0.338	-1.439	0.495	
3. Mining and Quarrying	-0.751	0.316	0.88	0.379	-0.342	0.898	
4. Electricity	-0.204	0.553	0.14	0.893	-1.009	1.158	
5. Construction	-0.437	0.351	-0.45	0.652	-0.847	0.530	
6. Wholesale and retail, motor and households goods	-0.153	0.281	0.45	0.656	-0.426	0.676	
7. Hotels and Restaurants	0.164	0.403	1.10	0.272	-0.347	1.232	
8. Transport, storage and communication	-0.243	0.354	0.10	0.920	-0.659	0.730	
9.Financial Intermediation	0.010	0.448	0.64	0.520	-0.590	1.167	
10. Real estate, renting, business act.	0.262	0.375	1.44	0.150	-0.195	1.276	
11. Public administration, defence	-0.336	0.450	-0.13	0.899	-0.939	0.825	
12. Education	0.148	0.436	0.98	0.328	-0.428	1.282	
13. Health and social work	1.297	0.537	2.94	0.003	0.524	2.627	***
14. Other	-0.115	0.433	0.38	0.706	-0.685	1.012	
Year (ref. 2003)	0.000	.	.	.	.	.	
2007	-0.206	0.158	-1.30	0.192	-0.515	0.104	
2011	-0.282	0.265	-1.06	0.288	-0.802	0.238	
2015	-0.337	0.371	-0.91	0.363	-1.064	0.390	
Individual mean							
m_ep	0.394	0.104	3.77	0.000	0.189	0.599	***
m_age	-0.052	0.037	-1.38	0.167	-0.125	0.022	
m_partinhh	0.100	0.272	0.37	0.712	-0.433	0.634	
m_ost	0.176	0.329	0.54	0.593	-0.468	0.820	
m_nongerm	-1.656	0.632	-2.62	0.009	-2.896	-0.417	***
m_1 child	-0.017	0.320	-0.05	0.957	-0.645	0.610	
m_2 children	-0.405	0.412	-0.98	0.326	-1.214	0.403	
m_3 or more children	-0.409	0.566	-0.72	0.469	-1.518	0.699	
m_intermediary	-0.140	0.365	-0.38	0.701	-0.856	0.576	
m_tertiary	0.062	0.320	0.20	0.845	-0.566	0.691	
m_Agriculture, Forestry, and Fishing	-1.428	0.885	-1.61	0.107	-3.162	0.307	
m_Mining and Quarrying	1.105	0.928	1.19	0.234	-0.714	2.924	
m_Electricity	-0.486	0.883	-0.55	0.582	-2.216	1.244	
m_Construction	0.880	0.382	2.30	0.021	0.131	1.628	**
m_Wholesale and retail, motor and households goods	0.038	0.295	0.13	0.897	-0.540	0.617	
m_Hotels and Restaurants	0.948	0.580	1.64	0.102	-0.189	2.085	
m_Transport, storage and communication	0.384	0.299	1.28	0.199	-0.202	0.970	
m_Financial Intermediation	-0.328	0.564	-0.58	0.561	-1.435	0.778	

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Table. 8a continue

m_Real estate, renting, business act.	-0.466	0.351	-1.33	0.185	-1.154	0.223	
m_Public administration, defence	0.377	0.449	0.84	0.401	-0.504	1.258	
m_Education	-0.171	0.459	-0.37	0.709	-1.071	0.729	
13. Health and social work	-1.287	0.507	-2.54	0.011	-2.280	-0.294	**
m_Other	-0.073	0.462	-0.16	0.874	-0.979	0.832	
Constant	3.748	0.918	4.08	0.000	1.948	5.548	***
Constant	5.599	0.940	5.96	0.000	3.757	7.442	***
Constant	1.179	0.157	.b	.b	0.908	1.530	

Mean dependent var	1.541	SD dependent var	0.670
Number of obs	5522.000	Chi-square	333.431
Prob > chi2	0.000	Akaike crit. (AIC)	74849152.928

*** p<0.01, ** p<0.05, * p<0.1

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Table 9a Correlated Random-effects ordered logistic regression (Women)

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
EP	0.041	0.063	0.64	0.523	-0.084	0.165	
Age	0.202	0.052	3.92	0.000	0.101	0.303	***
Agesq	0.000	0.000	-0.80	0.425	-0.001	0.001	
Education (ref: Primary)							
2. Intermediate	0.389	0.131	2.96	0.003	0.131	0.647	***
3.Tertiary	-0.222	0.991	-0.22	0.823	-2.164	1.721	
Nationality (ref: German)							
1.Non-german	-0.067	0.191	-0.35	0.726	-0.442	0.308	
Region (ref. West)							
1.Ost	0.002	0.435	0.00	0.997	-0.852	0.855	
Partner in hh (ref. No partner)							
1. Partner in hh	-0.447	0.140	-3.19	0.001	-0.721	-0.173	***
Nr. Of children <14 (ref. No children)							
1. 1 child	0.039	0.131	0.30	0.766	-0.218	0.297	
2. 2 children	0.304	0.258	1.18	0.239	-0.202	0.810	
3. 3 or more children	-0.618	0.455	-1.36	0.174	-1.509	0.273	
Sector (ref. Manufacturing)							
2. Agriculture, Forestry, and Fishing	-0.499	0.717	-0.70	0.486	-1.904	0.905	
3. Mining and Quarrying	-0.945	0.745	-1.27	0.205	-2.406	0.515	
4. Electricity	-2.685	0.817	-3.29	0.001	-4.287	-1.083	
5. Construction	0.656	0.750	0.88	0.381	-0.813	2.125	
6. Wholesale and retail, motor and households goods	-0.410	0.400	-1.02	0.306	-1.194	0.375	*
7. Hotels and Restaurants	-1.078	0.589	-1.83	0.067	-2.233	0.077	
8. Transport, storage and communication	-0.344	0.363	-0.95	0.343	-1.055	0.367	*
9.Financial Intermediation	-0.998	0.572	-1.75	0.081	-2.119	0.122	
10. Real estate, renting, business act.	-0.477	0.461	-1.03	0.301	-1.381	0.426	**
11. Public administration, defence	-1.009	0.490	-2.06	0.039	-1.969	-0.049	
12. Education	-0.608	0.528	-1.15	0.250	-1.642	0.427	***
13. Health and social work	-1.295	0.492	-2.63	0.008	-2.259	-0.331	
14. Other	-0.526	0.542	-0.97	0.333	-1.589	0.538	
Year (ref. 2003)	0.000	.	.	.	.	.	***
2007	-0.601	0.203	-2.95	0.003	-1.000	-0.202	***
2011	-0.800	0.215	-3.72	0.000	-1.221	-0.379	***
2015	-1.466	0.326	-4.49	0.000	-2.106	-0.827	
Individual mean							
m_ep	-0.106	0.092	-1.15	0.251	-0.286	0.075	***
m_age	-0.150	0.027	-5.45	0.000	-0.204	-0.096	
m_partinhh	0.053	0.243	0.22	0.827	-0.423	0.530	
m_ost	0.111	0.480	0.23	0.818	-0.831	1.052	
m_nongerm	0.392	0.301	1.30	0.194	-0.199	0.983	
m_1 child	-0.164	0.295	-0.56	0.578	-0.743	0.414	
m_2 children	-0.690	0.464	-1.49	0.137	-1.599	0.220	
m_3 or more children	1.349	1.359	0.99	0.321	-1.314	4.012	**
m_intermediary	-0.551	0.248	-2.22	0.027	-1.037	-0.064	
m_tertiary	-0.307	1.007	-0.30	0.761	-2.281	1.667	
m_Agriculture, Forestry, and Fishing	0.601	0.984	0.61	0.541	-1.328	2.530	
m_Mining and Quarrying	-3.362	3.242	-1.04	0.300	-9.716	2.992	**
m_Electricity	2.459	1.010	2.44	0.015	0.480	4.439	
m_Construction	-1.117	0.803	-1.39	0.164	-2.690	0.457	

m_Wholesale and retail, motor and households goods	0.437	0.479	0.91	0.361	-0.501	1.376	*

Table. 9a continue

m_Hotels and Restaurants	1.277	0.746	1.71	0.087	-0.185	2.739	
m_Transport, storage and communication	0.499	0.576	0.87	0.386	-0.629	1.628	
m_Financial Intermediation	0.793	0.564	1.41	0.160	-0.312	1.898	
m_Real estate, renting, business act.	0.224	0.581	0.39	0.700	-0.915	1.362	
m_Public administration, defence	0.894	0.570	1.57	0.117	-0.223	2.010	
m_Education	0.545	0.617	0.88	0.377	-0.664	1.754	***
13. Health and social work	1.720	0.578	2.97	0.003	0.587	2.854	
m_Other	0.704	0.533	1.32	0.187	-0.342	1.749	
Constant	0.427	0.866	0.49	0.622	-1.271	2.125	**
Constant	2.038	0.878	2.32	0.020	0.317	3.759	
Constant	0.972	0.163	.b	.b	0.700	1.351	

Mean dependent var	1.568	SD dependent var		0.693
Number of obs	5499.000	Chi-square		319.959
Prob > chi2	0.000	Akaike crit. (AIC)		79360719.193

*** p<0.01, ** p<0.05, * p<0.1

Table 10a Correlated Random-effects ordered logistic regression (pooled with interaction term)

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
EP	0.135	0.064	2.12	0.034	0.010	0.259	**
Women	0.252	0.125	2.02	0.043	0.008	0.496	**
Women#EP	-0.175	0.079	-2.23	0.026	-0.329	-0.021	**
Age	0.179	0.038	4.66	0.000	0.104	0.254	***
Agesq	-0.001	0.000	-1.65	0.100	-0.001	0.000	
Education (ref: Primary)							
2. Intermediate	0.032	0.465	0.07	0.946	-0.880	0.944	
3.Tertiary	-0.607	0.253	-2.40	0.016	-1.102	-0.112	**
Nationality (ref: German)							
1.Non-german	0.569	0.266	2.14	0.032	0.048	1.089	**
Region (ref. West)							
1.Ost	0.074	0.279	0.27	0.791	-0.473	0.621	
Partner in hh (ref. No partner)	0.000	.	.	.	.	.	
1. Partner in hh	-0.299	0.109	-2.74	0.006	-0.512	-0.085	***
Nr. Of children <14 (ref. No children)							
1. 1 child	0.114	0.094	1.21	0.226	-0.071	0.299	
2. 2 children	0.222	0.186	1.20	0.232	-0.142	0.587	
3. 3 or more children	-0.302	0.279	-1.08	0.279	-0.848	0.245	
Sector (ref. Manufacturing)							
2. Agriculture, Forestry, and Fishing	-0.332	0.334	-0.99	0.320	-0.986	0.322	
3. Mining and Quarrying	-0.911	0.392	-2.33	0.020	-1.678	-0.143	**
4. Electricity	-0.739	0.488	-1.51	0.130	-1.695	0.218	
5. Construction	-0.415	0.286	-1.45	0.147	-0.976	0.145	
6. Wholesale and retail, motor and households goods	-0.309	0.235	-1.31	0.188	-0.769	0.151	
7. Hotels and Restaurants	-0.418	0.487	-0.86	0.391	-1.374	0.537	
8. Transport, storage and communication	-0.361	0.205	-1.76	0.078	-0.764	0.041	*
9.Financial Intermediation	-0.718	0.505	-1.42	0.155	-1.708	0.271	
10. Real estate, renting, business act.	-0.070	0.280	-0.25	0.802	-0.619	0.479	
11. Public administration, defence	-0.655	0.316	-2.07	0.038	-1.275	-0.035	**
12. Education	-0.204	0.427	-0.48	0.633	-1.041	0.633	
13. Health and social work	-0.514	0.491	-1.05	0.296	-1.477	0.449	
14. Other	-0.278	0.431	-0.64	0.519	-1.122	0.567	
Year (ref. 2003)							
2007	-0.446	0.138	-3.23	0.001	-0.717	-0.176	***
2011	-0.623	0.181	-3.43	0.001	-0.978	-0.267	***
2015	-0.979	0.264	-3.71	0.000	-1.496	-0.461	***
Individual mean							
m_ep	0.088	0.079	1.11	0.268	-0.068	0.243	
m_age	-0.107	0.024	-4.50	0.000	-0.154	-0.060	***
m_partinhh	-0.038	0.196	-0.19	0.847	-0.423	0.347	
m_ost	0.110	0.313	0.35	0.724	-0.503	0.724	
m_nongerm	-0.462	0.362	-1.28	0.202	-1.172	0.248	
m_1 child	-0.178	0.214	-0.83	0.406	-0.598	0.242	
m_2 children	-0.583	0.315	-1.85	0.064	-1.201	0.035	*
m_3 or more children	0.174	0.744	0.23	0.815	-1.285	1.633	
m_intermediary	-0.214	0.479	-0.45	0.655	-1.153	0.725	
m_tertiary	0.093	0.270	0.35	0.729	-0.436	0.623	
m_Agriculture, Forestry, and Fishing	-1.037	0.903	-1.15	0.251	-2.806	0.733	
m_Mining and Quarrying	0.327	1.096	0.30	0.766	-1.822	2.475	

m_Electricity	0.244	0.722	0.34	0.736	-1.172	1.659	
m_Construction	0.850	0.469	1.81	0.070	-0.069	1.769	*

Table. 10a continue

m_Wholesale and retail, motor and households goods	0.237	0.299	0.79	0.429	-0.350	0.823	
m_Hotels and Restaurants	1.008	0.610	1.65	0.098	-0.187	2.204	*
m_Transport, storage and communication	0.484	0.289	1.67	0.094	-0.083	1.051	*
m_Financial Intermediation	0.467	0.533	0.88	0.381	-0.577	1.511	
m_Real estate, renting, business act.	-0.193	0.388	-0.50	0.619	-0.953	0.568	
m_Public administration, defence	0.631	0.383	1.65	0.100	-0.120	1.381	
m_Education	0.165	0.485	0.34	0.733	-0.785	1.115	
13. Health and social work	0.851	0.557	1.53	0.127	-0.241	1.943	
m_Other	0.334	0.427	0.78	0.434	-0.504	1.172	
Constant	1.522	0.691	2.20	0.028	0.167	2.876	**
Constant	3.213	0.702	4.58	0.000	1.837	4.588	***
Constant	1.068	0.126	.b	.b	0.847	1.345	

Mean dependent var	**1.554**	SD dependent var		0.682
Number of obs	**11021.000**	Chi-square		226.819
Prob > chi2	**0.000**	Akaike crit. (AIC)		156896274.340

*** p<0.01, ** p<0.05, * p<0.1*