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Abstract

Health literature shows that unemployment has a negative and 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 is linked 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 is the result of 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—i.e. across traditional and egalitarian gender regimes. We pursue a three-steps comparative perspective. The analysis relies on EU-SILC data for the period 2004-2015 for Italy and Sweden and SOEP data for Germany (1992-2016). We address the different selection mechanisms applying correlated dynamic random-effects probit models. Empirical results support our hypothesis of a larger gendered effect in traditional contexts with respect to egalitarian ones. We find weak support for the role of health selection in shaping the relations between unemployment, health and gender.

Keywords: health inequality; unemployment consequences; social selection; gender roles; dynamic panel models

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Introduction

A solid result in the literature dealing with the social determinants of health is that unemployed people are in worse health than their employed counterparts (Paul and Moser 2009; Wanberg 2012). The social and economic costs of unemployment, however, are not evenly distributed across the population. More specifically, the role of gender in the relationship between unemployment and well-being has been on the research agenda for 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), other find harsher consequences for men (e.g. see Norström et al. 2014; Paul and Moser 2009). Contrasting results might be due to the fact that gender differences in the relationship between unemployment and health vary across contexts with different institutional and cultural characteristics (Nörstrom et al. 2014). In order to further our understanding of the processes that lead to health inequalities, we analyse the relationship between unemployment, general self-rated health and gender in different contexts, exploring the mechanisms leading to this relation.

Labour research has extensively documented the different positions of men and women in Western labour markets, with the latter usually experiencing higher prevalence of unemployment and inactivity, and lower pay than their male counterpart (Mascherini, Bisello, and Rioboo Leston 2016). Moreover, health research has shown that women generally tend to be in poorer health than men (Van de Velde, Bracke, and Levecque 2010; Verbrugge 1985) and that there exist gender differences in the social determinants of health (Walters, McDonough, and Stroschein 2002; McDonough and Walters 2001). More specifically, the gender differentials in the association between unemployment and health has been extensively analysed by relying on social roles theories. Men and women react differently to risky life events—i.e. unemployment—because of gender-differences in family responsibilities (Artazcoz et al. 2004; Strandh et al. 2013; Leana and Feldman 1991; Leeftang, 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; Leeftang, Klein-Hesselink, and Spruit 1991), and social class (Artazcoz et al. 2004). Moreover,

the broader context also contributes explaining the variance in bad-health among unemployed men and women (Strandh et al. 2013). Rather, most of the existing research is somewhat tempered by some limitations: The majority of studies are rather out of date (Leana and Feldman 1991; Leeflang, Klein-Hesselink, and Spruit 1991; Ensminger and Celentano 1990) and provide only partial pictures of the relationship 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), who implemented a robust analytical strategy by employing longitudinal data and choosing two different contexts —i.e. Sweden and Ireland— to investigate whether the institutional and cultural context matters.

Our paper aims at contributing to existing literature by empirically testing two different mechanisms which 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). According to the latter mechanism, selection as a three-fold social process (i.e. unobserved heterogeneity, path dependence and reverse causality) could channel men and women differently into different social positions according to health and health determinants (West 1991; Arrow 1996; McDonough and Amick 2001). Finally, as far as the institutional context is concerned, our analysis tests gender roles and selection mechanisms for Sweden and Italy, which represent radically different gender regimes thus providing the necessary institutional and cultural variation (Lewis 1992; Sainsbury 1994; Gosta Esping-Andersen 2009). Furthermore, for the study of gender roles we side these two countries with further comparisons that allow exploiting additional sources of cultural variation while reducing heterogeneity in other respects, such as in institutional characteristics. To this aim, we focus on Germany that allows capturing within-country heterogeneity in gender roles via the comparison between East- and West-Germany as well as in the comparison between older and younger cohorts – for West-Germany. We overcome limitations of previous literature and test the proposed mechanisms using longitudinal data and employing advanced dynamic panel models in order to fully control for selection mechanisms. Understanding the heterogeneity of unemployment consequences has important policy implications: It allows identifying the most fragile groups of workers in order to efficiently address the social and economic costs of unemployment and at the same time reducing health inequalities.

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. 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. 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 behaviours (Falba et al. 2005).

While unemployment is expected to be bad for everyone’s health, health responses tend to differ according with several individual and contextual characteristics—e.g. social support, socio-economic status (SES), previous employment experience, welfare states, the general situation of the national economy. Among these, researchers have repeatedly shown that the association between unemployment and mental health is gendered (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 of 3 percentage points for men, whereas no effect is found for women, when selection is controlled for (Tattarini et al., 2018). However, while many studies report that unemployment is harsher for men than for women, results are neither consistent nor undisputed. In light of these considerations, this paper aims at filling previous literature gaps by addressing two mechanisms responsible of the gendered effect of unemployment on health: (1) gender roles; and (2) health selection.

Gender Roles

The first theoretical argument we propose for explaining gender differences in the relationship between unemployment and health builds on *social role theories*. In particular, we build on the idea that the availability and centrality of roles alternative to employment may fill the “void” that unemployment leaves in individual’s life. Social roles theories generally predict that having more than one principal role— i.e. being a worker, a husband/wife or a parent— improves health, or at least has no negative effects on it (Verbrugge 1982; 1986; Sorensen and Verbrugge 1987; Nordenmark 2002). Being involved in multiple roles, indeed, 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; Nordenmark and Strandh 1999). 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 life (Sorensen and Verbrugge 1987; Nordenmark 2004). Thus, in case of job loss, other roles such as being a husband/wife and being a father/mother may offer support and buffer the negative health consequences of unemployment.

However, the availability of alternative options depends on the different position that men and women have in the society. Traditionally, in many western societies, being a wife and a mother is assumed to be women’s traditional and primary roles, whereas the primary breadwinner role is still reserved to men (Hochschild and Machung 1989; Sjöberg 2004). Moreover women, if employed, tend to be disadvantaged in the labour market (e.g. low participation, 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 fulfils in men's and women's lives (Nordermark and Strandth 1999). Accordingly, we argue that work-related roles are more central in men's lives while family-related roles are more central in women's life (Hakim 1991).

From this it follows that men should perceive unemployment as more problematic and adverse because it implies losing the main source of individual identity and self-realization as well as the main source of household financial resources. Conversely, women should perceive unemployment as less harmful because they benefit from alternative roles and because of the minor contribution to the household budget represented by their employment.

Gender roles in context

The position of women in the society has quickly changed in many respects over the last few decades and heterogeneously across European countries. 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 to the labour 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. Yet, this strongly varies across contexts—i.e. gender regimes (Lewis 1992; Sainsbury 1994; Esping-Andersen 2009). Different gender regimes structure the different position that women (and men) occupy in the family and the labour market via both institutional (e.g. family policies, taxation system, labour market policies) and cultural factors (e.g. gender norms, attitudes) (Pfau-Effinger 1998; 2004; 2005). Thus, it is possible that in more egalitarian gender regimes employment represents nowadays a principal role also for women. On the contrary, in more traditional gender regimes it is likely that employment is still less central for women. Therefore, with our first hypothesis we expect job loss to have a similar effect on health for men and women in egalitarian contexts; while a gendered effect in traditional contexts, with women suffering less than men (Strandh et al. 2013).

In order to provide robust support to this expectation, we test it comparing three pairs of (more or less) egalitarian and traditional contexts.

Comparison 1: Sweden vs Italy

Our first comparison includes Sweden and Italy, two different institutional and cultural contexts identifying two gender regimes. Sweden can be considered as a prototype of an egalitarian gender regime whereas Italy a traditional one with respect to female employment and gender norms (Lewis 1992; Lewis and Ostner 1994; 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 high availability of child care services; on the other hand, in Italy female labour force participation has historically been substantially lower and the division of labour within households strongly gendered. According with 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 to be far lower (51% of women against 71% of men) (Eurostat 2020). 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. In light of these considerations, we hypothesize that: *Hp1a. Unemployment has a stronger negative effect on health among men than among women in Italy, but there will be no (less) difference between men and women in Sweden.*

Although the use of national contexts as proxies for gender regimes is both theoretically and empirically supported by the literature (Esping-Andersen 1990; 1999; Pfau-Effinger 1998b; Lewis and Ostner 1994), these two countries greatly vary in many institutional and cultural respects. This has the risk that country-specific gender differences in the effect of unemployment on health might be due to country differences which go beyond gender norms. In order to reduce part of the cross-context heterogeneity that the Sweden-Italy comparison entails, our second comparison exploits within-country variation.

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.

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). However, many differences persist between Eastern and Western Germany. Particularly, Eastern states can be regarded as more egalitarian thanks to the long-lasting gender cultural model of the socialist GDR (Birgit Pfau-Effinger and Geissler 2005). Accordingly, we hypothesize that: *Hp1b. Unemployment has a stronger negative effect on health among men than among women in West Germany, but there will be no (less) difference between men and women in East Germany.*

Comparison 3: Young vs old cohorts in West-Germany

In our third comparison we focus only on West Germany to further reduce cross-context heterogeneity and exploit another source of variation to capture gender norms: cross-cohort variation. Over the last decades, social norms have changed. Women's orientation towards work has strengthened, and attitudes towards gender roles and women employment have become more liberal also in more traditional gender regimes (Knight and Brinton 2017). Furthermore, many European countries have progressively introduced family and social policies that point toward more equal redistribution of social roles between men and women. Even though these processes in Germany have started relatively late (see Trappe, Pollmann-Schult, and Schmitt 2015), nowadays employment is likely to be more central in women's life than in the past. 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). 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). We thus hypothesize that: *Hplc: Unemployment has a stronger negative effect on health among men than among women in older cohort, but there will be no (less) difference between men and women in more egalitarian younger cohort in (Western) Germany.*

The role of selection

Over the last few years, the availability of high-quality longitudinal data has allowed researchers to unfold the crucial point of causality: Does unemployment impair health, or does poor health channel people out of employment? (Bartley 1994). While the former refers to a causation mechanism, the latter refers to health selection. Health selection is a social mechanism by which people are sorted into social positions on the basis of their health or health determinants (West 1991). Literature recognizes two sets of health selection mechanisms: indirect selection and direct selection (Stowasser, Heiss, and McFadden 2012). Indirect selection refers to *unobserved heterogeneity*. Namely, to the presence of a number of unobserved individual characteristics (e.g. genetics, cognitive ability, etc.) associated to both employment histories and health status. These unobserved factors, if not properly addressed, 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 be the result of the previous trend in health. 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 (Cullati et al. 2014; 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 fully participate in the labour market (Ross and Mirowsky 1995; Elkeles and Seifert 1993; Böckerman and Ilmakunnas 2009; 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; Schmitz 2011; Sarti and Zella 2016; Tøge and Blekesaune 2015). Yet, the role of selection mechanisms may vary by individual characteristics (Arrow 1996; McDonough and Amick 2001) and across contexts — i.e. time and space (Martikainen and Valkonen 1996; Heggebø 2015).

Health selection, regarded as a social process (West 1991), 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). Indeed, while this process comes into play for both men and women, previous studies have highlighted that health selection is associated with attributes of social inequalities such as gender (Arrow 1996). Some studies, for instance, have shown that women with poor health may become or remain unemployed to a greater extent than men (Arrow 1996; 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, whereas it disappears for women (Tattarini et al., 2018). Further, a recent study that investigates 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 relatively to men (Hoffmann, Kröger, and Geyer 2018).

Framing the relationship between unemployment, health and gender in the ‘alternative roles’ argument, health selection can be regarded as a form of *self-selection* (McDonough and Amick 2001). It is possible, indeed, that women who perceive their health as bad more easily *choose* to stop working. Unhealthy women could be more selected out of employment than men because exiting employment is not as normatively sanctioned as it is for men, and other roles are (normatively) more available for them than for their male counterpart. In other words, women have greater discretion over their labour 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: *HP2: Women suffer less than men because selection is stronger for them than for their male counterpart.*

Furthermore, we know that health selection mechanisms may vary across countries, because of different labour market structure or economic cycles (Martikainen and Valkonen 1996; Bartley 1996; Flint et al. 2013). However, theoretical arguments about how selection might vary across gender regimes is 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 the role of these mechanisms varies across different contexts. In traditional gender regimes, characterized by gendered social roles (female caregiver-male-breadwinner model), health selection should be stronger for women than for men; whereas in more egalitarian contexts, they should work similarly for both genders. *HP3: In more traditional gender regimes (i.e. Italy), women suffer less from unemployment than men because selection is stronger for them than for their male counterpart; whereas in more egalitarian contexts (i.e. Sweden), women suffer as much as men because selection is similar for the both of them.*

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 1992 to 2016 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 labour force aged between 25 and 55 years old. Missing on the relevant variables are dropped. 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.¹²

Dependent variable

Our outcome variable is self-perceived (bad) health (SPH). This measure of health has been frequently included in many population surveys and largely used for cross-national comparisons in Europe (OECD and European Union 2018). Its success is explained by its good validity (DeSalvo et al. 2006; Cullati et al. 2020) and reliability (Cox et al. 2009; Idler and Benyamini 1997) and to be a far-reaching measure for a broad range of health dimensions—physical, mental and functional health—and health behaviours (Yamada, Moriyama, and Takahashi 2012; Singh-Manoux et al. 2007). 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 measures provide 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.³ Although dichotomizing might reduce the variation in the data and requires identifying a cut-off point, we use this option in order to have a comparison with previous studies that use the same strategy.

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 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 in order to identify also those people 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 particularly important point because people do not randomly select in this group of hidden unemployed, rather women are more like to falling 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; 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.

¹ 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).

² Total samples sizes are reported in Table 1a of the Supplementary material.

³ Descriptive statistics for the outcome as well as for all the independent variables are reported in Table 2a of the Supplementary material.

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 four distinct random effect probit models, where the different mechanisms of health selection—direct and indirect—are stepwise controlled.

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

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

In Eq. (1), the latent outcome variable y_{it}^* expresses the chances of experiencing bad health for individual i ($i = 1, \dots, N$) 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 (Model 2) and third (Model 3) steps we control for indirect and direct selection, respectively. We do this using correlated random-effects (CRE) models building on the contribution of Rabe-Hesketh and Skrondal (2013) (for details on its implementation see Grotti and Cutuli, 2018). In Model 2, indirect selection is controlled by capturing individual unobserved heterogeneity. Specifically, the error component v_{it} is decomposed into an individual effect u_i and an idiosyncratic error term ϵ_{it} as in Eq. (2)

$$y_{it}^* = \beta une_{it} + \gamma Z_{it} + u_i + \epsilon_{it} \quad (2)$$

where u_i refers to individual unobserved heterogeneity and is modelled as

$$u_i = \alpha_0 + \alpha_1 y_{i0} + \alpha_2 \bar{Z}_i + \alpha_3 Z_{i0} + a_i \quad (3)$$

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.

Finally, Model 3 addresses direct selection. As discussed in the theoretical section, direct selection includes the mechanisms of reverse causality (not only unemployment causes bad health, but bad health causes unemployment) and state dependence (health status is associated over time). We control for direct selection augmenting our model with the lagged value of the response variable $y_{i,t-1}$ as in Eq. (4), where $t-1$ stands for the wave before the current wave.

$$y_{it}^* = \beta une_{it} + \gamma Z_{it} + \rho y_{i,t-1} + u_i + \epsilon_{it} \quad (4)$$

The associated coefficient ρ captures state dependence processes in bad health and at the same time indirectly control for reverse causality.

Based on the fully adjusted model (Model 3), we test our hypotheses on gender roles through the comparison of 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 to allow for directly testing whether gender differences in the effect of unemployment exist and are statistically significant.

As discussed in the theoretical section, we first compare Sweden and Italy, which represent two opposite cases of gender regimes. While this comparison has the advantage of assuring fully comparable data (we use EU-SILC data for both countries); it has the disadvantage of not allowing any disaggregation by subgroups given limited sample sizes. Therefore, we deepen our understanding about the role of gender norms using a third country, Germany, and SOEP data. We believe that Germany is an ideal case for two reasons: first, it provides great within-country variation thanks to its political history, i.e. reunification; second, SOEP data provide large samples allowing us to disaggregate the effect of unemployment also by East- and West-Germany, and by cohort.

Finally, we test the role of indirect selection and direct selection mechanisms in Sweden and Italy employing mediation analysis comparing Model 1 through Model 3. In this case, to allow selection mechanisms to operate differently between genders, we estimate separate models for men and women.⁴ This is done using the KHB method, a method that is suitable for comparing coefficients across nested nonlinear models (Breen, Karlson, and Holm 2013; Kohler, Karlson, and Holm 2011). In particular, we perform three tests. The first, tests the mediation role of total selection for the relationship between unemployment and health, and is based on the comparison of Model 1 and Model 3. The second, tests indirect selection comparing Model 1 and Model 2. The third, tests direct selection comparing Model 2 and Model 3.

Results

Gender norms and the unemployment health penalty

Our first hypotheses —*HPI1a-c*— explore whether gender differences in the effect of unemployment on health can be attributed to differences in gender roles across different contexts. These hypotheses are tested in Table 1, that reports average marginal effects (AME) of unemployment on bad health from our fully adjusted model—i.e. Model 3 (men and women pooled).⁵

We start with our first context-comparison: Sweden and Italy. Looking at 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 out 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

⁴ Average marginal effects from these models are in line with those from the pooled analysis.

⁵ AME and predicted probabilities are estimated fixing the values of other covariates at their observed value.

suffer less from unemployment than their male counterpart, confirming the existence of the gender differential observed in previous studies (Paul and Moser 2009; Norstrom et al. 2013).

However, if we compare the gender differential across different contexts, it seems that 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; and 13.5 and 15.8 for Italian men and women. This means that, in Sweden unemployment increases the risk of bad health of 30 percent for women (3.1 percent over 9.0 percent), and of about 50 percent for men (4.3 over 8.0). 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.

Table. 1 Average Marginal Effect (AME) of unemployment on the probability of Bad Health. Dynamic random-effects probit. Model 3 pooled by gender with interaction effect. EU-SILC 2004-2015 and SOEP 1992-2016

	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***	+

Adjusted for age groups, educational level, marital status, number of children in household, household income, previous health status, year dummies, initial condition of the outcome and initial condition and unit-averages of selected time-varying covariates.

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

In the next steps, we further deepen our argument with two more comparisons: Eastern vs Western German states; and younger vs older cohorts in West Germany.

Concerning the comparison between East and West Germany, we found a larger gender difference in the effect of unemployment on health in Western Germany than in Eastern Germany. In the former, unemployment increased bad health risk by 6.7 and 4.1 percentage points for men and women, respectively. The same figures for the latter, are 5.4 and 5.4 percentage points. Again, we find support to our hypothesis as in the traditional context women suffer significantly less than men while in the egalitarian context, we do not observe any difference. This is confirmed by tests of statistical significance.

Finally, concerning the comparison between younger and older cohort in West Germany, while women experience a smaller negative effect of unemployment on health in both cohorts, the gender gap varies between the two cohorts considered. Men and women in the older cohort present a negative effect of unemployment of respectively 8.4 and 5.2 percentage points, with a difference of 3.2 percentage points. In relative terms (see Tab 3a Supplementary material for predicted probabilities), unemployment increases the risk of bad health of 16 percent for men in older cohort and of 10 percent for women in the same cohort. Similarly, for men and women in the younger cohort the same figures are 5.8 (+ 16%) and 3.6 (+9%), with a difference of 2.2 percentage points. Therefore, although the difference is small, our third comparison also adds support to our hypothesis on gender roles.

The role of social selection

We move now to our second hypothesis regarding the role of health selection – *HP2: Women suffer less than men because selection is stronger for them than for their male counterpart* –, distinguishing between indirect and direct selection mechanisms. We measure health selection comparing the AME obtained from models separated by gender and across model specifications. As discussed in the method section, Model 1 controls for observable characteristics and is here our baseline model. Model 2 additionally control for indirect selection, while Model 3 further control for direct selection.

Figure 1 provides AME of unemployment by gender and country for the three model specifications. The figure shows that moving from Model 1 to Model 3 the effect of unemployment decreases substantially for all countries and genders, Swedish men being the exception. The observed pattern suggests that selection mechanisms, especially indirect selection captured by Model 2, explain part of the relationship between unemployment and health.

We explicitly test the role of selection mechanisms in Table 2, by using mediation analysis based on the Karlson-Holm-Breen method. Table 2 reports differences in the AME presented in Figure 1 together with a test of statistical significance obtained through the KHB method.

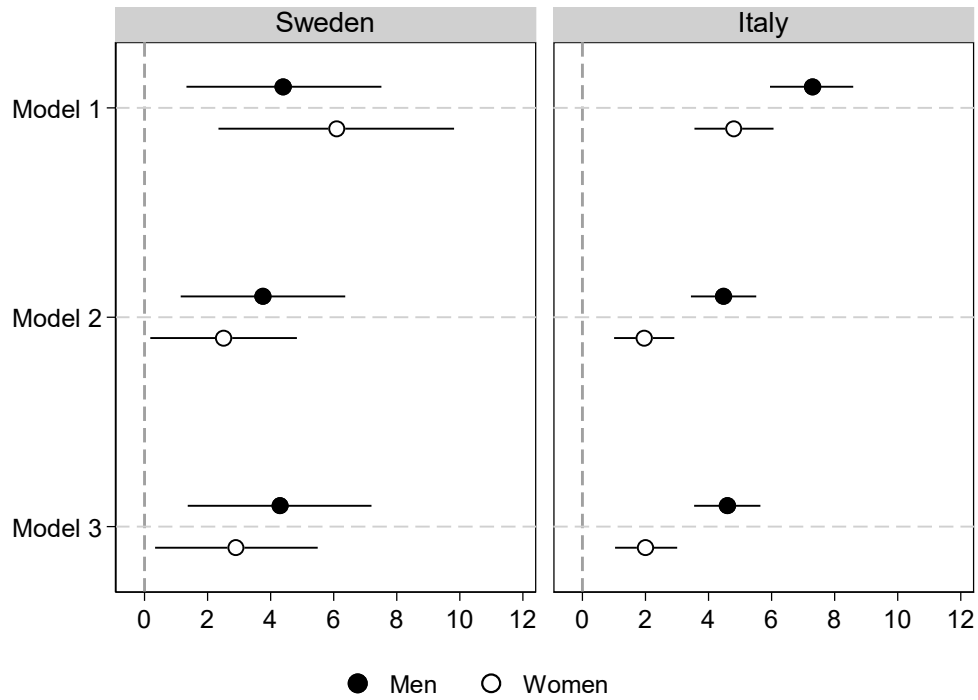


Figure 1. AME of unemployment on Bad Health. Separated models for men and women in Sweden and Italy, EU-SILC 2004-2015.

Our aim is to assess the impact of total selection—direct + indirect selection (M1-M3)—as well as the impact of single selection mechanisms—unobserved heterogeneity (M1-M2) and state dependence and reverse causation (M2-M3). By doing so, we aim to understand whether and to what extent each health-selection mechanism works differently for men and women thus explaining the gender differential. If the difference between the AME from Model 1 and Model 3 is statistically significant and larger for women than for men, we will conclude that health selection mechanisms are stronger for women.

Table 2. Bad Health. Differences between AME from dynamic random-effects probit models separated by gender. EU-SILC 2004-2015

	Total selection M1-M3		Indirect selection M1-M2		Direct selection M2-M3	
	Wome		Wome		Wome	
	Men	n	Men	n	Men	n
Sweden	0.13	3.17**	0.66	3.58**	-	-0.41
Italy	2.68**	2.78	2.79*	2.84	-	-0.06

Note: Significance tests obtained from KHB models

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

Results for Sweden indicate that overall health selection counts more for women ($M1 - M3 = 6.09 - 2.92 = 3.17^{**}$) than for men ($M1 - M3 = 4.42 - 4.29 = 0.13$) in reducing the effect of unemployment on bad health. The result is mirrored in the significance test, which shows a non-significant difference for men, and a significance difference for women. Substantially, total health selection halves the effect of unemployment for women's health. Moreover, the result for women seems to be entirely driven by indirect selection (3.58^{**}). In Italy, the impact of (total) health selection is almost the same for men ($M1 - M3 = 7.27 - 4.59 = 2.68^{**}$) and women ($M1 - M3 = 4.80 - 2.02 = 2.78$), but it is statistically significant only for men. As for Sweden, indirect selection plays the largest role both men (2.79^*) and women (2.84).

All in all, these results seem to provide only partial support to our hypothesis on the role of health selection (Hp2): health selection is stronger for women in Sweden but not in Italy. At the same time, our results do not support our last hypothesis (Hp.3) on the interplay between health-selection mechanisms and social roles in shaping the gendered effect of unemployment on health—*HP3 In more traditional gender regimes (i.e. Italy), women suffer less from unemployment than men because selection is stronger for them than for their male counterpart; whereas in more egalitarian contexts (i.e. Sweden), women suffer as much as men because selection is similar for the both of them.*

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 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 with gender and the broader institutional and cultural contexts where people live in.

In order to study the understand why there exists a gender differential in the relationship between unemployment and health, we relied on two different 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 psychological and financial 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 the society. 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. 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 regime vs egalitarian gender regime (Lewis 1992; Salisbury, 1999; Pfau-Effinger 1998; 2005). Building

on these considerations, we applied a three-step —cross-countries, cross-region and cross-cohorts—comparison, by focusing on contexts that are representative of different gender regimes; we hypothesized that in more traditional contexts, as opposed to egalitarian ones, women would suffer less from unemployment than their male counterpart (Hp. 1a-c).

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 and some insights from previous studies suggested that selection mechanisms could work differently by gender (Arrow 1996; McDonough and Amick 2001; Hoffmann, Kröger, and Geyer 2018; Korpi 2001; Tattarini et al., 2018). Hence, we assumed that health selection can be contingent to people’s social position structurally defined by gender (West 1991; McDonough and Amick 2001) and, thus, explain the gender differential in the relationship between unemployment and health. People who are not able to work because of health problems might *choose* to not engage in paid work if they have the ‘alternative’ to do so—namely, they could self-select out of employment if they can. Given that in Western societies, women have generally more discretion in their labour supply and more alternative roles than men, health selection should be stronger for them, thus explaining why unemployment is less of a menace for women than for their male counterpart (HP2). Further, relying on the idea of different gender regimes, we extended this assumption to a comparison across countries and we hypothesized that in egalitarian contexts, health selection should work similarly for men and women, whereas it should be stronger for the latter in traditional contexts (HP3).

We used the longitudinal component of EU-SILC (2004-2015) for Sweden and Italy and SOEP data for Germany (1992-2016) 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.

Our empirical results confirmed the existence of the gender differential, with unemployed women suffering on average less than unemployed men in all contexts. This result was not consistent in previous research, where the direction of the gender differential has been shown to vary across different contexts (McKee-Ryan et al. 2005; Paul and Moser 2009; Nörstrom et al. 2014). By using the three-step comparative perspective, our study gives support to the conclusion that unemployment is generally less harsh for women’s than for men’s health (Nörstrom et al. 2014).

Overall, our empirical results only partially confirm our expectations. On the one side, 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 between in egalitarian national contexts, i.e. Sweden. Conversely, in traditional contexts (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 older and younger 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— thus, extending previous research and making an important contribution to the literature on unemployment, health and gender.

On the other side, we only partially found support for our theoretical argument on social selection. What is most striking about our findings is the extent to which they defy generalizations about how health selection works in combination with social roles defined by gender. 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. Also, we do not find any evidence that health selection is stronger for women in more traditional countries (Hp3), despite the fact the institutional and the cultural context would offer them a wider range of ‘alternative roles’ relative to men. Even if health selection seems to work differently for men and women in Sweden, this is not true for every context, especially those that can be regarded as being more traditional. This may be because Italian women may have fewer material resources in the form of labour income, disability or retirement pensions than Swedish women and Italian men (OECD 2015), which permit them to leave employment. Italian women may continue to participate in the work force under conditions of poor health simply because they cannot afford to withdraw or because early career’s interruptions for them might results in low (expected) old-age pensions. Hence, as suggested by McDonough and Amick (2001), gender matters in the context of employment and health, “but in ways that suggest that differential access to economic and social resources keeps those already disadvantaged in the labour market in their jobs, even in the context of poor health” (p. 143).

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 (Idler 2003; Peersman et al. 2012; Benyamini, Leventhal, and Leventhal 2000)—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 (Macintyre, Ford, and Hunt 1999; Oksuzyan et al. 2019; Case and Paxson 2005; Zajacova, Huzurbazar, and Todd 2017), 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 measures 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 comparing contexts for looking at how gender roles shape the effect of unemployment on health, leaves the role of gender norms as a 'black box'. A possible venue for further research is 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 steams 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 labour policies aiming at improving women's integration into the labour 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.

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Supplementary material

Table. 1a *Number of observations and respondents. Italy and Sweden, EUSILC 2004-2015 and Germany, SOEP 1992-2016*

	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 2a Descriptive statistics

	Italy				Sweden			
	Men		Women		Men		Women	
N observations	Employed (60.993)	Unemployed (6.458)	Employed (45.053)	Unemployed (6.771)	Employed (9.250)	Unemployed (360)	Employed (9.185)	Unemployed (416)
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 morekids	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	
N observations	Employed (68.659)	Unemployed (6.921)	Employed (65.571)	Unemployed (20.120)	Employed (19.795)	Unemployed (3.615)	Employed (20.462)	Unemployed (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	
	Employed (20.962)	Unemployed (2.311)	Employed (18.195)	Unemployed (6.714)	Employed (47.697)	Unemployed (4.610)	Employed (47.376)	Unemployed (13.406)
N observations								
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 3 pooled by gender with interaction effect. EU-SILC 2004-2015 and SOEP 1992-2016

	Egalitarian contexts		Traditional contexts	
	Sweden		Italy	
Context comparison 1	Men	Women	Men	Women
	0.080***	0.090***	0.135***	0.158***
Context comparison 2	East Germany		West Germany	
	Men	Women	Men	Women
	0.419***	0.439***	0.406***	0.424***
Context comparison 3	Younger cohort		Older cohort	
	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
<i>Initial condition (time 0)</i>		
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
<i>Within-unit average</i>		
Partner economic status (ref. not present)		
Employed	-0.112	-0.139
Unemployed	0.379	0.225
Inactive	0.010	-0.029
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***
<hr/> Var(u_i)	<hr/> 0.985***	<hr/> 0.682***
Observations	19.211	119.275
<hr/>		
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		

Table 5a *Bad health. Dynamic random-effects probit. Model 3 pooled by gender with interaction effect (probit coefficients). SOEP 1992-2016.*

	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
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 with interaction effect (probit coefficients). EUSILC 2004-2015.

	Men			Women		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Unemployed	0.589***	0.445***	0.425***	0.623***	0.285*	0.281*
Year of survey (ref. 2005)						
2006	0.020	-0.003	-0.010	0.022	0.051	0.048
2007	0.015	-0.043	-0.050	0.032	0.048	0.046
2008	-0.040	-0.097	-0.106	-0.005	0.036	0.039
2009	-0.285*	-0.270*	-0.258*	-0.164	-0.035	-0.023
2010	-0.263*	-0.198	-0.180	-0.042	0.094	0.087
2011	-0.158	-0.111	-0.106	-0.124	0.026	0.028
2012	-0.084	-0.044	-0.052	-0.113	0.047	0.049
2013	-0.179	-0.135	-0.128	-0.063	0.057	0.055
2014	0.017	0.063	0.066	-0.003	0.124	0.125
2015	-0.003	-0.003	-0.014	0.103	0.211	0.189
Age	0.086	0.030	0.020	0.156**	0.099	0.085
Age square	-0.001	-0.000	-0.000	-0.002*	-0.001*	-0.001*
Level of education (ref. ISCED 3/4)						
ISCED 0/2	0.231	0.064	0.054	0.425**	0.230	0.202
ISCED 5/6	-0.451***	-0.227**	-0.205**	-0.515***	-0.340***	-0.306***
Household income (log)	-0.177***	-0.063	-0.057	-0.121**	0.004	0.016
Partner economic status (ref. not present)						
Employed	-0.263**	-0.100	-0.110	-0.324***	-0.164	-0.151
Unemployed	-0.006	-0.256	-0.270	0.044	0.006	0.028
Inactive	-0.021	-0.081	-0.087	0.196	0.123	0.148
N. of children (ref. no children)						
1	0.032	0.116	0.138	-0.091	-0.012	-0.015
2	-0.028	0.021	0.036	-0.153	-0.325	-0.321
3 or more	-0.299	-0.469	-0.424	-0.001	-0.127	-0.130
<i>Initial condition (time 0)</i>						
Health		2.231***	1.833***		2.437***	2.017***
Age		0.016	0.024		0.071	0.071
Household income		-0.027	-0.029		-0.054	-0.043
Partner economic status (ref. not present)						
Employed		0.172	0.141	0.066	0.057	0.172
Unemployed		-0.069	-0.078	0.199	0.184	-0.069
Inactive		0.084	0.067	0.329	0.314	0.084
N. of children (ref. no children)						
1		-0.168	-0.144	0.150	0.132	-0.168
2		0.339	0.310	0.273	0.239	0.339
3 or more		0.437	0.388	0.096	0.067	0.437
<i>Within-unit average</i>						
Partner economic status (ref. not present)						
Employed		-0.350	-0.279	0.026	0.037	-0.350
Unemployed		0.703	0.700	0.087	0.043	0.703
Inactive		0.024	0.034	-0.270	-0.297	0.024

N. of children (ref. no children)						
1		0.269	0.213	-0.272	-0.242	0.269
2		-0.325	-0.312	-0.009	0.017	-0.325
3 or more		-0.065	-0.037	0.083	0.114	-0.065
Age		-0.000	-0.003		-0.030	-0.030
Household income		-0.074	-0.063		-0.091	-0.100
Health at t-1			0.304**			0.302**
Constant	-2.423*	-1.708	-1.537	-3.937***	-3.670***	-3.355***
Var(u_i)	2.344***	1.388***	0.975***	2.592***	1.401***	0.987***
Observations	9610	9610	9610	9601	9601	9601

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

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

	Men			Women		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Unemployed	0.447***	0.307***	0.268***	0.300***	0.144***	0.130***
Year of survey (ref. 2005)						
2006	0.065*	0.089**	0.082**	0.055	0.094*	0.085*
2007	-0.352***	-0.312***	-0.289***	-0.375***	-0.313***	-0.297***
2008	-0.399***	-0.298***	-0.239***	-0.426***	-0.298***	-0.256***
2009	-0.417***	-0.275***	-0.230***	-0.433***	-0.272***	-0.238***
2010	-0.585***	-0.412***	-0.361***	-0.613***	-0.421***	-0.382***
2011	-0.422***	-0.204***	-0.151***	-0.543***	-0.300***	-0.249***
2012	-0.812***	-0.585***	-0.514***	-0.837***	-0.566***	-0.509***
2013	-0.696***	-0.429***	-0.344***	-0.713***	-0.415***	-0.353***
2014	-0.809***	-0.541***	-0.465***	-0.870***	-0.573***	-0.511***
2015	-0.547***	-0.257***	-0.203***	-0.709***	-0.417***	-0.359***
Age	0.048**	0.023	0.021	0.113**	0.077***	0.066**
Age square	0.000	0.000	0.000	-0.001**	-0.000	-0.000
Level of education (ref. ISCED 3/4)						
ISCED 0/2	0.344***	0.206***	0.171***	0.365***	0.233***	0.205***
ISCED 5/6	-0.331***	-0.208***	-0.173***	-0.329***	-0.198***	-0.173***
Household income (log)	-0.069***	-0.016	-0.014	-0.087***	-0.000	-0.002
Partner economic status (ref. not present)						
Employed	-0.049	0.061	0.030	-0.121***	-0.105	-0.103
Unemployed	0.172***	0.088	0.051	0.233***	0.071	0.073
Inactive	-0.021	0.027	-0.004	-0.053	-0.159	-0.142
N. of children (ref. no children)						
1	-0.025	0.051	0.046	-0.066*	-0.106	-0.095
2	-0.047	0.073	0.061	-0.212***	-0.287*	-0.265*
3 or more	-0.026	0.044	0.022	-0.279**	-0.598**	-0.542*
<i>Initial condition (time 0)</i>						
Health		1.682***	1.154***		1.938***	1.512***
Age		0.026	0.028		0.050	0.052*
Household income		-0.009	-0.009		0.021	0.018
Partner economic status (ref. not present)						
Employed		0.123	0.096		0.032	0.027
Unemployed		-0.000	-0.008		-0.207	-0.176
Inactive		0.087	0.061		-0.188	-0.161
N. of children (ref. no children)						
1		0.010	0.011		-0.085	-0.077
2		-0.090	-0.070		-0.021	-0.017
3 or more		-0.210	-0.171		-0.172	-0.144
<i>Within-unit average</i>						
Partner economic status (ref. not present)						
Employed		-0.267	-0.200		-0.046	-0.032

Unemployed	0.182	0.185		0.349	0.286
Inactive	-0.172	-0.107		0.248	0.210
N. of children (ref. no children)					
1	-0.112	-0.103		0.165	0.151
2	-0.004	-0.009		0.199	0.184
3 or more	0.237	0.217		0.741	0.662
Age	-0.026	-0.030		-0.059	-0.059*
Household income	-0.059*	-0.048		-0.111**	-0.096*
Health at t-1			0.469***		0.356***
Constant	-2.860***	-2.069***	-1.818***	-3.705***	-2.732***
Var(u_i)	1.694***	1.091***	0.574***	2.043***	1.248***
Observations	67451	67451	67451	51824	51824

Table 8a AME of unemployment on Bad Health and Predicted Probabilities of Bad Health for employed individuals. Dynamic random-effects probit. Model 1-3 separated by gender. EU-SILC 2004-2015 Sweden and Italy.

Sweden						
	Model 1		Model 2		Model 3	
	Men	Women	Men	Women	Men	Women
AME	4.42***	6.09**	3.76**	2.51*	4.29***	2.92*
Employed	2.09***	2.81***	6.71***	9.50***	7.25***	9.93***
Italy						
AME	7.27***	4.80***	4.48***	1.96***	4.59***	2.02***
Employed	8.02***	9.11***	12.37***	14.72***	13.8***	15.5***

Model 1: adjusted with observables

Model 2: adjusted with UH

Model 3: adjusted with GPD

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

Table 9a Probit coefficients from KHB models. EU-SILC 2004-2015
Sweden and Italy.

Sweden						
M3-M1	Men			Women		
	Indirect Selection			Indirect Selection		
	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	0.135	0.172	0.473	0.174	0.007
M2-M1	Indirect Selection			Indirect Selection		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.640	0.129	0.000	0.780	0.120	0.000
Full	0.445	0.129	0.001	0.285	0.121	0.019
Diff	0.195	0.145	0.181	0.495	0.189	0.009
M3-M2	Direct Selection			Direct Selection		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.431	0.120	0.000	0.300	0.112	0.007
Full	0.425	0.120	0.000	0.281	0.112	0.012
Diff	0.006	0.035	0.861	0.019	0.044	0.661
Italy						
M3-M1	Men			Women		
	Indirect Selection			Indirect Selection		
	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	0.043	0.007	0.109	0.061	0.071
M2-M1	Indirect Selection			Indirect Selection		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.424	0.033	0.000	0.258	0.034	0.000
Full	0.307	0.033	0.000	0.144	0.035	0.000
Diff	0.117	0.047	0.012	0.114	0.066	0.082
M3-M2	Direct Selection			Direct Selection		
	Coef.	Std.	P-value	Coef.	Std.	P-value
Reduced	0.280	0.029	0.000	0.134	0.031	0.000
Full	0.268	0.029	0.000	0.130	0.031	0.000
Diff	0.013	0.031	0.684	0.004	0.031	0.902