



Part-time work and health in late careers: Evidence from a longitudinal and cross-national study

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ABSTRACT

In this exploratory study, we examine how older workers' part-time employment and health are associated in four countries promoting this type of employment in late careers but with a different welfare regime: the United States, Germany, Sweden, and Italy. Using data from two large representative panel surveys and conducting multichannel sequence analysis, we identified the most typical interlocked employment and health trajectories for each welfare regime and for three different age groups of women and men. We found that there is more heterogeneity in these trajectories in countries with a liberal welfare regime and among older age groups. Overall, women are more strongly represented in the part-time employment trajectories associated with lower health levels. In countries with a social-democratic or corporatist welfare regime, part-time employment in late careers tends to be associated with good health. Our findings suggest that the combination of a statutory right to work part-time in late careers with a more generous welfare regimes, may simultaneously maintain workers' health and motivate them to remain active in the labor force.

1. Background

The demographic trends of the past decades (including declining fertility and mortality rates, as well as shifting migration trends) foster the debate about the balance between the length of working life and retirement (Alcover et al., 2014; Kohli & Rein, 1991). The debate has gained momentum in the context of the financial crisis of 2008, which enhanced the financial pressure on the old-age pension systems of several countries of the Organisation for Economic Co-operation and Development (OECD, 2019). Several approaches have been brought forward to improve the sustainability of retirement provisions. One approach is to prolong working lives, including terminating pre-retirement schemes, lifting the earliest eligibility age, or introducing options for flexible retirement (Guillemard, 2013; Hinrichs, 2021). Flexible retirement increases individuals' choice of the timing of retirement and provides them with more options for partial retirement

or part-time employment (Eurofound, 2016; Kohli, 2007). We focus on the latter of these policy instruments: part-time employment.

From a social policy perspective, part-time employment is considered a tool for retaining older workers in the labor market (Hess et al., 2018). By allowing older workers to work part-time, they are encouraged to work longer and retire later. Moreover, part-time employment is viewed as having the potential to maintain older workers' health and simultaneously prolong working lives (Eurofound, 2016). From this perspective, part-time employment is ideally used by younger cohorts of older workers with health problems as a way to avoid labor force exit before the statutory eligibility age (SEA) and by older cohorts of older workers to remain in the labor force beyond the SEA. However, little is known from previous research about whether this goal is achieved.

However, part-time employment may also be used by younger cohorts of older workers with good health, while older cohorts of older workers with good health may not use it and retire at the SEA. Moreover,

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there may exist differences between countries due to the welfare regime (Esping-Andersen, 1990, 1999) to which they belong. Earlier research indeed suggests that the welfare regime substantially affects the relationship between employment and health in late life (e.g., Flynn et al., 2014). Furthermore, implementing part-time employment as a way to maintain older workers' health and prolong working lives may represent predominantly male perspectives, considering retirement as a transition from a full-time breadwinner career job and neglecting female experiences of more fragmented careers (Earl & Taylor, 2017). Women are often found in part-time employment at younger ages due to complementary activities such as care work or volunteering or as a result of underemployment.

1.1. Part-time employment and health in late careers

Given that there is little literature specifically on part-time employment in late careers, we draw on literature of different forms of gradual retirement, such as phased retirement, partial retirement, or bridge employment (for an overview, see Alcover et al., 2014, p. 6). The association between part-time employment, on the one hand, and health, on the other hand, is complex. The literature suggests that it is a relationship of mutual influence: part-time employment affecting workers' health status and health status affecting the decision to work part-time (de Vaus et al., 2007; McDonough et al., 2017). Furthermore, unobservable characteristics such as lifestyle may influence both, health and part-time employment (Lindeboom & Kerkhofs, 2009). As a consequence, individuals who work part-time in late life are likely to be on average fundamentally different from those who work full-time or retire. This fundamental difference may explain differentials in health status between those who work part-time and those who work full-time or retire and confounds the potential effect of part-time work itself (Blau & Gilleskie, 2001).

Only a few studies have examined the link between health status and the decision to work part-time in late careers. One study based on a sample of employees of the University of California (Kim & Feldman, 2000) and three longitudinal studies based on data from the Health and Retirement Study (HRS) (Cahill et al., 2006, 2015; Wang et al., 2008) found that workers in better health conditions were more likely to move from career jobs to bridge jobs than those in poorer health. In the context of these studies, career jobs represent full-time jobs in which workers were employed for at least 10 years, while bridge jobs represent new jobs of shorter duration, including self-employment, accepted in the transition to retirement involving fewer, the same, or even more hours than the full-time career job (Cahill et al., 2006). One of the studies showed that workers in poorer health were more likely to move from career jobs to full retirement (i.e., not working for pay) than those in good health (Cahill et al., 2006). Nevertheless, some of the workers in poor health remained in their full-time career job, although less often than workers in good health. Another of these studies found that the association between good health and part-time employment was consistent for different periods and cohorts of workers (Cahill et al., 2015). One of the studies showed differences between age groups; workers younger than 62 years were more likely to move to a bridge job than those who were above 62 years (Cahill et al., 2006). This study kept health constant in the differential analysis by age group and thus did not provide insights into whether the association between part-time employment and health varied by age group.

A much larger body of literature examines the question of how part-time employment transitions in late careers affect workers' health status into and after retirement. Except one Australian study (de Vaus et al., 2007), all studies are based on the HRS (Calvo et al., 2009; Dave et al., 2008; McDonough et al., 2017; Zhan et al., 2009). While one study found no health differences between those who had fully and partially retired (Calvo et al., 2009), all other studies found that part-time employment in late careers was associated with better health outcomes than full retirement. For instance, Dave et al. (2008) studied the

causal effects of entering retirement on health outcomes. They compared workers shifting from employment to partial and full retirement – partial retirement including those who were retired but continued to work part-time and full retirement including those who were retired and not working. Although Dave et al. (2008) found that entering retirement had a negative effect on health for both groups, the effect was less negative for those who shifted to partial retirement than for those who shifted to full retirement. The authors argued that these protective effects of partial retirement on health may stem from social support experienced in the workplace.

Zhan et al. (2009) reported that shifting from a career job to a part-time job rather than shifting to full retirement was associated with fewer major diseases, fewer functional limitations, and better mental health than shifting to full retirement. In a study focusing on the association between gender and part-time work, McDonough et al. (2017) found that women and men downshifting from full- to part-time work in their early or mid-60s had better health outcomes up to 10 years later than those who continued to work full-time or fully retired. Part-time employment was positively associated with health among women but not among men. Finally, an analysis of employment and health trajectories of older workers in the US (Azar et al., 2019) found that those with trajectories characterized by partial retirement (i.e., people who started the observed trajectory with a full-time job, shifted to a part-time job, and retired at age 66) or late retirement (i.e., delayed retirement to keep working in a full-time job until age 66) experienced better baseline functional ability – measured in terms of a score summarizing limitations to perform activities of daily living, such as getting dressed – and a slower decline in functional ability than those with trajectories characterized by early retirement. The finding that those in partial or late retirement trajectories have a better baseline functional ability than those in early retirement trajectories points to some degree of self-selection into retirement trajectories based on health status. At the same time, the finding that the decline of functional ability among those in partial or late retirement trajectories is slower as compared to those in early retirement trajectories may either indicate that partial and late retirement trajectories have a protective effect in terms of health or that those who expect their health to be good in the long-term, continue working (part-time) while those who expect their health to be poor in the long-term, retire.

Of the studies discussed above, only the study by (Dave et al., 2008) has considered the endogeneity of health in part-time employment by studying the causal effects of entering retirement on health outcomes. To account for biases from unobserved selection and endogeneity the authors used longitudinal data and counterfactual checks. More precisely, as identifying strategy they rely on individuals who were healthy prior to retirement and use the change in health status among those who retire later as a counterfactual for those who choose to retire earlier. Most of the mentioned studies, however, do not apply a study design that allows for causal inferences. Previous findings therefore mainly reveal associations but not causal relationships.

This body of research suggests that part-time employment transitions are associated with better health than other types of retirement transitions. However, most studies stem from the US. Little is known about differences between countries, despite substantial previous research on cross-country differences in retirement policies and their association with older workers' health (Börsch-Supan et al., 2018; Chung & Muntaner, 2007). We, therefore, explored whether the association between part-time employment and health in late careers varies by country, drawing on the welfare regime theory presented by Esping-Andersen (1990, 1999).

1.2. Welfare regime and part-time employment policies of the countries examined

The typology of welfare regimes introduced by (Esping-Andersen, 1990, 1999) and further developed by other authors (e.g., Bonoli &

Kato, 2004; Ferrera, 1996) is based on three characteristics of a welfare state (Arts & Gelissen, 2010): first, the level of de commodification, which represents the degree to which individuals rely on paid work; second, the degree to which the welfare state, the market, and the family each contribute to social security; and third, the principle – either universal or conditional – based on which individuals can access welfare provisions. The specific combination of these three characteristics determines the type of welfare regime. In the present study, we include four countries, each representing one welfare regime: corporatist (Germany), social-democratic (Sweden), liberal (US), and Southern European (Italy). An overview is provided in Table 1.

Corporatist welfare regimes, such as Germany, are characterized by an intermediate level of de commodification. They provide generous welfare benefits to individuals who are engaged in breadwinner careers with full-time employment – typically men (Esping-Andersen, 1999). In 2005, the baseline year in our study, Germany had an SEA of 65 and a net wage replacement rate in retirement of an average earner of 72% (OECD, 2005). Germany has allowed workers aged 55 and older with at least 5 years of tenure to work part-time with partial wage replacement since 2004 (Eurofound, 2016, p. 12; Fagan et al., 2014, p. 71). The condition is that the employer hires an unemployed person for hours not worked by the part-time working person. About 45.7% of women and 8.4% of men in the age group 55–64 were in part-time employment in 2005 (OECD, 2005). The average healthy life expectancy at 60 – a common indicator of population health in old age and of the ability to continue working in older ages (see, e.g., Flynn et al., 2014; König et al., 2016) – was 17.7 years in 2016 (World Health Organization, 2015).

Social-democratic welfare regimes, such as Sweden, are characterized by a high level of de commodification. Access to welfare provisions is based on residency rather than on labor market participation, and the social security scheme is comparably generous (Esping-Andersen, 1999; Fritzell & Lundberg, 2007). Sweden had an SEA of 65 for basic pension in 2005 and a net wage replacement rate in retirement of an average earner of 68% (OECD, 2005). Sweden allows workers of all ages with at least six months of tenure to work part-time for educational purposes. Thus, the part-time policy is not specific for older workers and is conditioned on attending continuing training (Fagan et al., 2014, p. 75). About 21.2% of women and 11.4% of men in the age group 55–64 were in part-time employment in 2005 (OECD, 2005). The average healthy life expectancy at 60 was 18.5 years in 2016 (World Health Organization, 2015).

Liberal welfare regimes, such as the US, are characterized by a low level of de commodification (Esping-Andersen, 1999; Ferrera, 2000). Individuals who do not engage in paid work are provided with only low levels of welfare benefits. The SEA was between 65 and 66 (depending

on the birth cohort) in the US in 2005, and the country had a net wage replacement rate in retirement of an average earner of 51% (OECD, 2005). The US only introduced part-time work for workers of all ages with disabilities in 2014. The condition is that they work for employers with more than 15 employees (Fagan et al., 2014, p. 76). However, given the low level of regulation of the US labor market (Ebbinghaus & Hofäcker, 2013), part-time employment was already possible before 2014 if negotiated at the individual level. About 15.4% of women and 6.2% of men in the age group 55–64 were in part-time employment in 2005 (OECD, 2005). The average healthy life expectancy at 60 was 16.5 years in 2016 (World Health Organization, 2015).

Southern European welfare regimes, such as Italy, are characterized by a low level of de commodification (Esping-Andersen, 1999; Ferrera, 2000). Individuals who do not engage in paid work are provided with only low levels of welfare benefits and rely largely on family support. An exception to this principle is old-age pension benefits, which are comparably generous in Southern European welfare regimes. Italy had an SEA of 65 in 2005 and a net wage replacement rate in retirement of an average earner of 89% (OECD, 2005). Italy has allowed part-time work for workers of all ages since 2000 (Fagan et al., 2014, p. 72). About 32.4% of women and 9.3% of men in the age group 55–64 were in part-time employment in 2005 (OECD, 2005). The average healthy life expectancy at 60 was 18.6 years in 2016 (World Health Organization, 2015).

The overview of the four countries shows that while all countries have implemented policies to foster part-time employment, they substantially vary with respect to how they are embedded in the overall welfare regime context. In particular, the countries strongly differ with respect to their welfare benefit generosity (e.g., as measured in terms of the wage replacement rate in retirement). Research on how welfare regimes affect retirement transitions suggests that the welfare benefit generosity affects the degree of choice over retirement, especially for those with low income (Hofäcker et al., 2016).

However, welfare benefit generosity alone does not seem to explain the full picture. In fact, high employment rates among older workers exist not only in countries with a liberal welfare regime – where high employment rates among older workers result from countries' low investments in social protection and by their flexible, weakly regulated labor markets – but also in countries with a social-democratic regime, in particular Sweden (Ebbinghaus & Hofäcker, 2013). The latter countries focus on explicit retention policies, and retirement policies have largely remained stable in the last decade, which is a possible explanation of the permanently (high) employment rates of older workers.

There is, however, only little research on how welfare regimes affect health in the context of retirement transitions. One of the only two

Table 1
Overview of the countries analyzed.

Country	Welfare regime	Statutory eligibility age in 2004	Net replacement rate of an average earner ^a	Part-time employment policies	Part-time employment among women (men) 55–64 ^b	Average healthy life expectancy at 60 in 2015
Germany	Corporatist	65 ^c	72%	Workers aged 55 and older with 5 years of tenure can request part-time work with partial wage replacement.	45.7 (8.4)	17.7
Sweden	Social-democratic	65 ^d	68%	Workers of all ages with 6 months of tenure can work part-time for educational purposes.	21.2 (11.4)	18.5
United States	Liberal	Between 65 and 66 ^e	51%	Part-time work is possible at the national level.	15.4 (6.2)	16.5
Italy	Southern European	65	89%	Employees can request to work part-time.	32.4 (9.3)	18.6

Notes: The statutory eligibility age (SEA) is the age at which old-age pension benefits can be claimed and is specified for the eligibility of full pension benefits. We indicate the SEA for 2004 (Organisation for Economic Co-operation and Development [OECD], 2005). The average healthy life expectancy for all countries are based on data from the (World Health Organization, 2015). ^a We indicate the net replacement rate since it reflects individuals' disposable income in retirement in comparison to when working. Data for the baseline year of the analysis (2004) is provided (OECD, 2005, p. 51). ^b Share of employment in part-time employment (OECD, 2005). ^c Applies for individuals with five years of contributions; 63 for individuals with 35 years of contribution. ^d Applies for occupational plans; for these, an early pension age of 55 applies. The earnings-related public pension can be claimed from 61. ^e Early pension from age 62 with reduced benefits.

studies we are aware of, studied the association between health and late-life employment trajectories in four different countries with flexible retirement policies (Baumann & Madero-Cabib, 2021). In contrast to the present study, the study used only employment trajectories as an outcome variable, whereas welfare regimes and health were used as predictors. The study showed that trajectories including part-time work in old age were more frequent in liberal than in social-democratic welfare regimes. In an analysis of interaction effects between welfare regimes and health, the authors found that health was not differently associated with part-time employment trajectories in the welfare regimes examined. The second study investigated how the interaction between older people's employment trajectories and welfare regimes is associated with chronic conditions and self-rated health (Madero-Cabib et al., 2020). The authors found that people in part-time employment were more likely to experience large numbers of chronic conditions in liberal and liberal-corporatist welfare regimes as compared to social-democratic, corporatist, and Southern European welfare regimes. A comparison of these two studies indicates that when health is used as an outcome variable, the association between employment trajectories and health varies by welfare regime, but there is no significant relationship with health if employment trajectories are used as an outcome variable.

1.3. Aims and hypotheses

Besides Baumann and Madero-Cabib (2021) and Madero-Cabib et al. (2020), welfare regime theory has, to our knowledge, not been used to examine the relationship between employment and health trajectories in late careers. Moreover, while differences between genders have been examined, differences between age groups have hardly been studied, and we intend to explore these differences further. We, therefore, fill this gap by exploring how part-time employment and health in late careers are associated. Receiving a better understanding of this relationship may offer insights into whether providing older workers with the statutory right to work part-time may be a measure to maintain people's health while remaining active in the labor force. We examined how the association between part-time employment and health varies between and within welfare regimes and between age groups and genders. In contrast to previous studies, we included longitudinal measures of both employment and health and used both measures simultaneously as variables of main interest. Based on the literature, we hypothesize:

- H1.** first, that in the U.S., Italy and Germany we find a pattern of polarization where some workers with part-time employment trajectories are in good and some in poor health;
- H2.** second, that in Sweden we find an association between part-time employment and good health;
- H3.** third, that among younger age groups, part-time employment is used mainly by workers in poor health;
- H4.** fourth, that among older age groups, part-time employment is used mainly by workers in good health;
- H5.** fifth, that part-time employment trajectories in younger age groups and part-time employment trajectories associated with poor health are more frequent among women than among men.

We address our aim and hypotheses by exploring the employment and health trajectories of three age groups of older workers in four countries: Germany, Sweden, the US, and Italy. We used individual-level longitudinal data and sequence analysis to create clusters of individuals with similar sequences (Macindoe & Abbott, 2004). Furthermore, with *multichannel* sequence analysis (MCSA; Gauthier et al., 2010; Madero-Cabib et al., 2021), we explored older workers' simultaneous sequences of both employment and health. We relied on a harmonized pooled-country dataset from large representative panel surveys, HRS, and the Survey of Health, Ageing and Retirement in Europe (SHARE)

and provide novel empirical analyses.

2. Study design and methods

2.1. Countries and panel data

In this study, we explored four countries with a statutory right to work part-time or the statutory right to claim partial retirement benefits but with different welfare regimes: Germany (corporatist), Sweden (social-democratic), the US (liberal), and Italy (Southern European). We used data from two representative biannual panel surveys, which were then harmonized and pooled into a single dataset. Specifically, to examine the case of Germany, Sweden, and Italy, we utilized SHARE, while for the US, we used HRS.

We analyzed simultaneous employment and health trajectories in these countries during the same chronological years and across all the available waves in SHARE and HRS in that period. Concretely, we covered a 12-year period (2004–2016) across seven waves in HRS (2004, 2006, 2008, 2010, 2012, 2014, and 2016) and six waves in SHARE (2004, 2006, 2010, 2012, 2014, and 2016). We did not employ the 2008 wave in SHARE, as it is retrospective.

We examined three age groups within each country: people aged 50–54, 55–59, and 60–64 at baseline (2004). Therefore, in the first age group, we analyzed employment and health trajectories from age 50–54 to 62–66, in the second from 55 to 59 to 67–71, and in the third from 60 to 64 to 72–76.

To be part of the study sample, individuals had to meet two criteria. First, they had to be aged within the corresponding age group in the baseline observation, and second, they had to have at most one missing value in the employment and health statuses across the survey waves examined. Missing values were imputed using 50 iterative multivariate imputations by chained equation models (MICE), applying predictive mean matching and considering as predictors employment and health status before and after the missing observation, as well as gender, education, and survey wave (van Buuren & Groothuis-Oudshoorn, 2010). Our final sample consisted of 489 individuals for Germany (age group 50–54: 156; 55–59: 150; 60–64: 183), 772 for Sweden (age group 50–54: 208; 55–59: 280; 60–64: 284), 6671 for the US (age group 50–54: 2021; 55–59: 1996; 60–64: 2654), and 766 for Italy (age group 50–54: 176; 55–59: 298; 60–64: 292). Although the sample sizes of some subgroup studies are rather small, we used the best data available.

2.2. Measures

First, to construct employment trajectories, we used a variable called employment status – indicating (in each wave) the labor-force position of individuals, which could be 'i. full-time job' (i.e., having a job of 36 or more hours a week), 'ii. part-time job' (indicating both not retired people working in a job 35 h or less a week and individuals receiving pension benefits but continue working in a job 35 h or less a week), 'iii. out of the labor force' (for inactive people both looking and not looking for a new job), 'iv. fully retired' (i.e., retired individuals not employed in the labor market), and finally, 'v. deceased' (indicating people who passed away during the observation period).

Second, to construct health trajectories, we used the variable number of chronic conditions, which measures, in each wave, the presence of the following six chronic conditions: 'high blood pressure or hypertension', 'diabetes or high blood sugar', 'cancer or malignant tumor except skin cancer', 'chronic lung disease except asthma', 'stroke or transient ischemic attack', and 'arthritis or rheumatism'. These six conditions are based on a self-reported question for which individuals answered whether a medical doctor had ever told them that they had, or currently have, that condition. The variable number of chronic conditions not only ranges from zero to six conditions but also includes the value 'deceased' for those individuals who died during the observation period. An overview over the employment and health status variables is provided in

Supplementary Table 1.

Finally, we examined the descriptive statistics for the part-time employment trajectories by two sociodemographic variables, gender and household income (measured in quintiles within each country).

2.3. Statistical methods

We used MCSA to estimate simultaneous employment and health trajectories separately for each age group in Germany, Sweden, the US, and Italy. MCSA, an extension of sequence analysis (Gauthier et al., 2010; Madero-Cabib et al., 2021), is a longitudinal statistical method that examines how similar or different every pair of individual sequences is in two or more domains (in our case employment and health domains), the sequential order in which individuals experience status changes, and the timing of these status changes. A pairwise distance matrix summarizes the ‘distance’ between the individual sequences – that is, the number of modifications needed to make one sequence be exactly like another. As Ritschard and Studer (2018) explain, sequence analysis is a useful method to study trajectories in an exploratory way and to visualize both intra- and inter-individual patterns over time. To illustrate the intra-individual patterns, we use sequence index plots which show the *individual* transitions between employment and health statuses in each trajectory type. To illustrate the inter-individual patterns, we use chronogram plots which show the *share* of individuals (measured on a scale from 0 to 1) in different employment and health statuses across time. The scores on the criteria applied based on which we identified the most representative types of employment and health trajectories are presented in Supplementary Fig. 1. The types are given a name that best summarizes their characteristics.

Despite the generally high response rates in HRS and in the countries analyzed from SHARE, we also ran our trajectory analyses weighted by the individual-level weights from the baseline wave (2004) (results available upon request). The results did not substantially differ from those with nonweighted data; therefore, we present the latter ones.

The analyses were performed by the statistical software R (R Core Team, 2020), specifically using the packages TraMineR (Gabadinho et al., 2011) and WeightedCluster (Studer, 2013) for weighted MCSA, and MICE (van Buuren & Groothuis-Oudshoorn, 2010) for multivariate imputation by chained equations.

3. Results

Fig. 1a–c shows the types of interlocked employment and health trajectories for the four countries and the three age groups. The results are presented as chronogram plots; the complementary sequence index plots are presented in Supplementary Figs. 2a–c. In the left column, the name of the trajectory type and its proportion in each country is indicated. The names summarize the main employment and health pattern observed in each trajectory type. In the X-axis of columns, the individuals’ ages are shown, while the Y-axis displays the proportion (from 0 to 1) of individuals classified in different employment and health statuses across time (each status is identified with a different color; see the bottom right of Fig. 1). In the following, we describe the trajectory types involving large shares of part-time employment.

Within the age group 50–54 (Fig. 1a), we found part-time employment trajectories in Germany, Sweden, and Italy but not in the US. In Sweden, part-time employment trajectories go along with optimal health (14.9%); in Italy, with moderate health (24.4%); and in Germany, for some workers with optimal (17.3%) and some others with moderate health (12.2%). The sequence index plots (Supplementary Fig. 2a) provide additional insights. Most workers in part-time employment trajectories in this age group tend to switch from full-time employment to part-time employment and then to retirement, in particular in Germany and Italy. This kind of phased retirement goes along with stable health conditions at a high level, with a majority of workers having no chronic conditions.

Within the age group 55–59 (Fig. 1b), we found part-time employment trajectories in all countries. In Germany (16.7%) and Italy (4.7%), part-time employment trajectories go along with moderate health; in Sweden, for some workers with optimal (22.9%) and others with moderate health (14.3%); and in the US, for some workers with optimal (14.8%), some with moderate (9.8%), and some others with suboptimal health (5.9%). The sequence index plots (Supplementary Fig. 2b) show that also in this age group, many workers in part-time employment trajectories in all countries included switch from full-time employment to part-time employment and then to retirement. Nevertheless, we also observe some workers who return to the labor force after having retired. These trajectories are associated with generally good but varying levels of health.

Within the age group 60–64 (Fig. 1c), we found part-time employment trajectories in Germany, Sweden, and the US but not in Italy. In Germany, part-time employment trajectories go along with optimal health (9.8%); in Sweden, with moderate health (9.9%); and in the US, for some workers with optimal (12.2%), some with moderate (4.1%), some with suboptimal (7.0%), and some others with poor health (12.2%). The sequence index plots (Supplementary Fig. 2c) of the part-time employment trajectories show that these trajectories are characterized by switching in and out of the labor force. These changes in employment status are accompanied by changes in health status in both directions, decreases and increases in levels of health.

Regarding age patterns, we can maintain, first, that in the US, part-time employment trajectories are only prevalent among older age groups (50–54: 0%, 55–59: 30.5%, 60–64: 36.3%). In contrast, in Italy, part-time employment trajectories are prevalent in the first age group, slight in the second age group, and nonexistent among the oldest group (50–54: 24.4%, 55–59: 4.7%, 60–64: 0%). In Germany, part-time employment trajectories are more prevalent in the younger age group (50–54: 29.5%, 55–59: 16.7%, 60–64: 9.8%), and in Sweden, particularly in the intermediate age group (50–54: 14.9%, 55–59: 37.2%, 60–64: 9.9%). A second finding from comparing the age groups is that in Germany and Sweden, part-time employment trajectories go along with optimal or moderate health; in Italy, with moderate health; and in the US, with optimal, moderate, suboptimal, and poor health. Thus, we found the strongest pattern of heterogeneity of health statuses among workers in part-time employment trajectories in the US.

Further, we examined how women and men are represented in the different part-time employment trajectories (see Table 2). In the youngest age group (50–54), we found much larger shares of women than men in the part-time employment trajectories associated with optimal or moderate health in all countries (except in the US because there was no observation). In the intermediate age group (55–59), the shares of women and men are quite balanced in part-time employment trajectories associated with good health in Sweden and the US. In part-time employment trajectories associated with suboptimal health in the US, women are more prevalent. In the oldest age group (60–64), we found larger shares of men than women in part-time employment trajectories associated with optimal or moderate health in Germany and Sweden. In the US, part-time employment trajectories associated with optimal or moderate health are balanced between the genders while part-time employment trajectories associated with suboptimal or poor health are more frequent among women. Overall, we can maintain that women tend to be more strongly represented in those types with lower levels of health.

Finally, we investigated the household income distribution within each of the part-time employment trajectories across countries and age groups (see Supplementary Table 2). While there seem to be differences between countries and age groups, no clear pattern emerged.

4. Discussion

Our study examined late career employment and health trajectories in countries with part-time employment policies. We used pooled

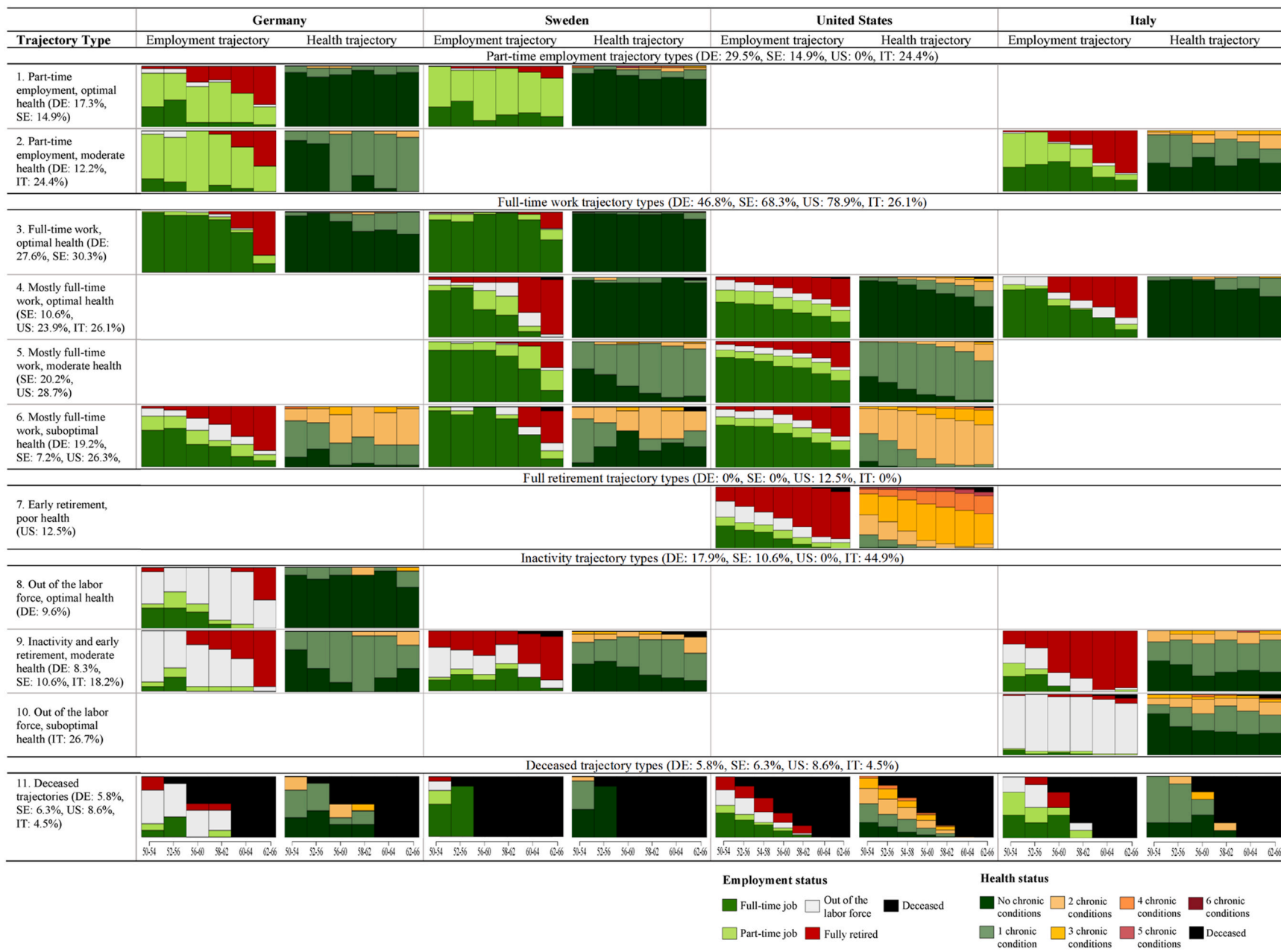


Fig. 1a. Interlocked employment and health trajectories of individuals aged 50-54.



Fig. 1b. Interlocked employment and health trajectories of individuals aged 55–59
 Note: DE = Germany; SE = Sweden; US = United States; IT = Italy.

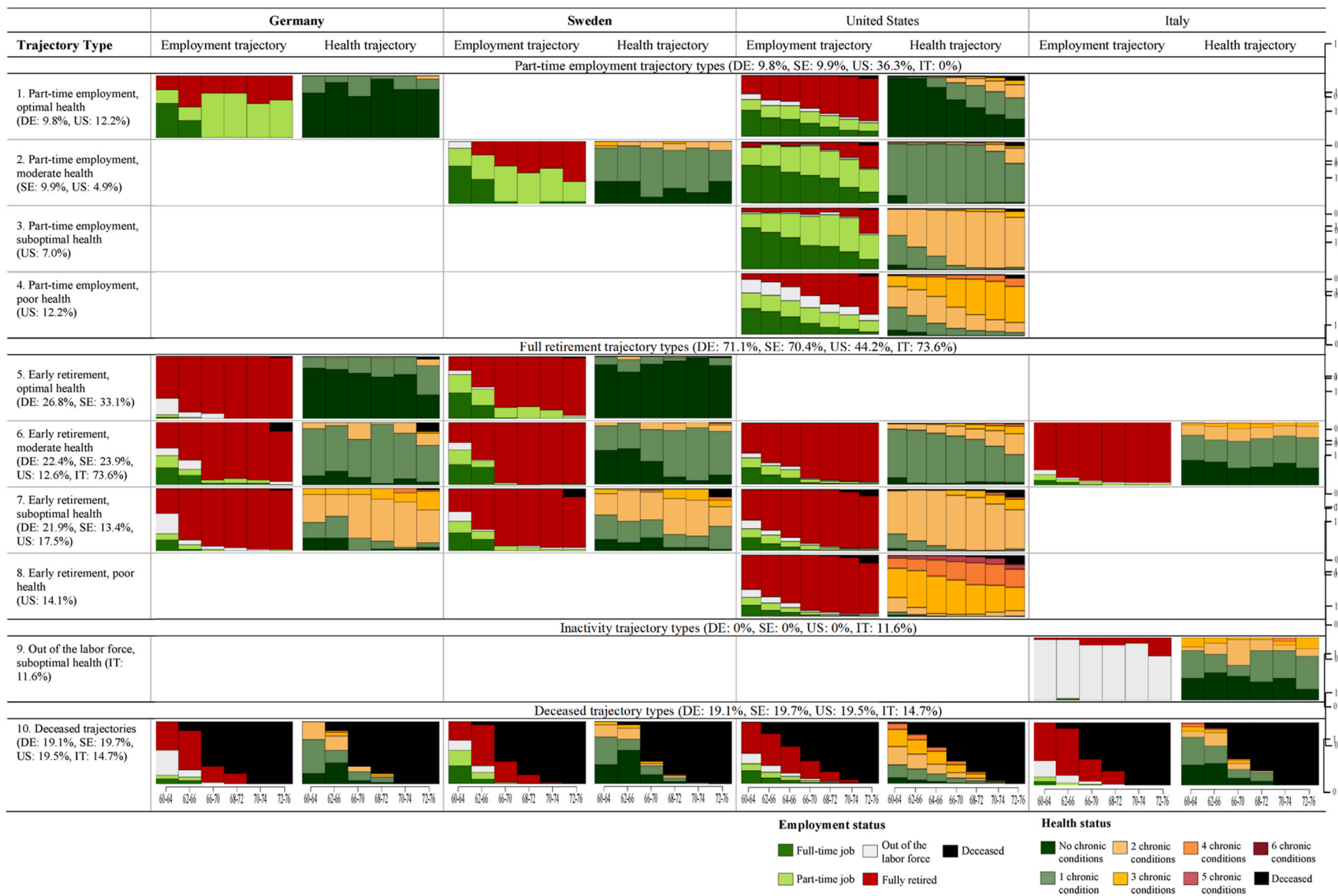


Fig. 1c. Interlocked employment and health trajectories of individuals aged 60–64
 Note: DE = Germany; SE = Sweden; US = United States; IT = Italy.

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Table 2
Proportion of men and women in part-time employment trajectory types across different countries and age groups.

	Germany	Sweden	United States	Italy
Age group 50–54				
1. Part-time employment, optimal health	17.3% (Men: 14.8% Women: 85.2%)	14.9% (Men: 19.4% Women: 80.6%)		
2. Part-time employment, moderate health	12.2% (Men: 0% Women: 100%)			24.4% (Men: 44.2% Women: 55.8%)
Age group 55–59				
1. Part-time employment, optimal health		22.9% (Men: 54.7% Women: 45.3%)	14.8% (Men: 45.6% Women: 54.4%)	
2. Part-time employment, moderate health	16.7% (Men: 68.0% Women: 32.0%)	14.3% (Men: 52.5% Women: 47.5%)	9.8% (Men: 27.2% Women: 72.8%)	4.7% (Men: 64.3% Women: 35.7%)
3. Part-time employment, suboptimal health			5.9% (Men: 41.9% Women: 58.1%)	
Age group 60–64				
1. Part-time employment, optimal health	9.8% (Men: 83.3% Women: 16.7%)		12.2% (Men: 50.8% Women: 49.2%)	
2. Part-time employment, moderate health		9.9% (Men: 60.7% Women: 39.3%)	4.9% (Men: 48.9% Women: 51.1%)	
3. Part-time employment, suboptimal health			7.0% (Men: 45.9% Women: 54.1%)	
4. Part-time employment, poor health			12.2% (Men: 39.6% Women: 60.4%)	

country panel data spanning 12 years for four countries with different welfare regimes and for three age groups. Overall, we found that part-time employment is prevalent in all four countries, with differences between countries and between age groups.

First, we find partial support for **H1** which expected a pattern of health polarization among workers with part-time employment trajectories in the US, Italy and Germany. We found a pattern of health divergence among workers with part-time employment trajectories in the US, with the highest level of heterogeneity in the oldest age group 60–64. In contrast, we did not find such a pattern in the Southern European (Italy) and corporatist (Germany) welfare regimes. These findings are in line with a study based on data from Great Britain and Germany examining retirement trajectories (although without including information on health) that found that the retirement trajectories were more dissimilar in liberal Great Britain than in corporatist Germany (Fasang, 2012). Thus, liberal welfare states may foster heterogeneous life course patterns within a population. Another explanation may be that in the US, a larger share of older workers is active in the labor market than in European countries (Alcover et al., 2014). This explanation is supported by our findings presented in [Supplementary](#)

[Figs. 2a–2c](#), where we show that full-time work trajectories are more common in the US than in the other countries of our study.

With respect to health, previous research has shown that health inequalities among older workers are particularly pronounced in the US (McDonough et al., 2010). This may be due to social inequalities driven, for instance, by racial differences (Kunitz & Pesis-Katz, 2005). Our finding of a pattern of health polarization for the US may imply that some workers – those in poor health – are enforced to continue working part-time to receive a proper pension income, while for other workers – those in good health – part-time employment creates an opportunity to continue working. With respect to corporatist and Southern European welfare regimes, it has been argued that in countries with higher proportions of the older people living with their families, and with higher rates of unpaid labor carried out by women, health inequality among older workers seems to be lower. It has been shown that these proportions and rates are higher in Italy and Germany than in Sweden (Bartley, 2003).

Second, we find support for **H2** which expected that part-time employment trajectories are associated with good health in Sweden. Yet, such a pattern is also found in Germany. This finding may be explained by the generally high level of health status among older workers in these two countries. As shown earlier, people aged 60 have a higher average healthy life expectancy in Sweden (18.5 years) and Germany (17.7 years), as compared to the US (16.5 years). A further potential explanation for our finding may be that the Swedish and German older workers with poor health already left the labor force through generous early retirement schemes or disability pensions still enacted in the early 2000s (Hinrichs, 2021; Kadefors et al., 2019). This argument is supported, at least for Sweden, by the substantially higher level of public expenditure on disability and sickness benefits for the year 2005 in Sweden (3.5% of gross domestic product (GDP)) and Germany (1.3% of GDP) as compared to the US (1% of GDP) (OECD Statistics, n.d.).

We find no support for **H3** which expected that among younger age groups, part-time employment is used mainly by workers in poor health. In fact, all workers in part-time employment in the age groups 50–54 and 55–59 are in optimal or moderate health and that they are in particularly good health in Germany and Sweden. This suggests that part-time employment *early* in late careers is associated with better health compared to part-time employment *late* in late careers. Thus, we did not find support for the argument that among younger age groups, part-time employment is used mainly by workers in poor health. Overall, our finding is in line with the literature that has shown an association between part-time employment and good health (Cahill et al., 2006, 2015; Wang et al., 2008).

Fourth, we find support for **H4** which predicted that among older age groups, part-time employment is used mainly by workers in good health. Although in the US part-time employment is also used by workers in poor health, part-time employment trajectories in good health are much more prevalent. In Germany and Sweden, we observed part-time employment in the age groups 55–59 and 60–64 only in combination with good health. This finding thus further corroborates the evidence that part-time employment goes along with good health (Cahill et al., 2006, 2015; Wang et al., 2008). We now show that in most countries this is the case not only among the younger older workers (age groups 50–54 and 55–59) but also among the much older workers (age group 60–64).

Fifth, we largely find support for **H5** which expected that women are more strongly represented in the part-time employment trajectories in the younger age groups and part-time employment trajectories associated with lower levels health. More precisely, we find, first, that women’s part-time employment seems to be associated with good health if observed in younger age groups. As part-time employment is substantially more prevalent among women in most Western countries, women in the younger age groups of our sample probably have been working part-time already in earlier years, for instance due to care responsibilities (Fagan et al., 2014). They may either be still in good health

due to their young age or because they benefit from working part-time. Support for the latter explanation is provided by a recent study on the health benefits of phased retirement that has found that older workers experience an improvement in vitality when entering phased retirement (van Solinge et al., 2022). Second, we find that in older age groups, women's part-time employment is associated often with poor health. This suggests that women in the older age groups of our sample are constrained to continue working for financial reasons. This interpretation is supported by evidence from a study that shows that among women who experience fragmented employment trajectories, lower activity levels negatively affect not only their financial situation but also their health (Earl & Taylor, 2017).

With regard to financial resources, supplementary analyses of the household income distribution in the part-time work trajectories suggest that there may be differences in opportunities to work part-time or to fully retire across welfare regimes and age groups. This topic warrants further investigation.

Our approach to distinguishing employment and health trajectories by age group highlights how older age groups may use part-time employment if they experience good health and wish to stay in the labor force until a late age. Overall, our results mainly point to a mechanism of part-time employment being particularly strongly related to good health if it is used *early* in late careers. Thus, if part-time employment is viewed as a means to maintain older workers' health and simultaneously prolong working lives (Eurofound, 2016), the first goal seems to be attained more successfully than the second, as has also been shown by previous research indicating that working hours flexibility or flexible retirement ages do not seem to motivate workers to remain in the workforce until later ages (Baumann & Madero-Cabib, 2021; Börsch-Supan et al., 2018; Hess et al., 2018). Nevertheless, as our findings show, in liberal welfare regimes, such as the US, workers seem to be constrained to continue working part-time or even full-time beyond the SEA, despite poor health. Finally, our findings raise the question of whether part-time work is indeed accessible to those workers who want to work part-time (Krekula & Vickerstaff, 2020). Our results indicate rather that not all older workers benefit from a statutory right to work part-time if some of them are in poor health or cannot afford it. In addition, a recent study from the Netherlands showed that substantially more workers would like to work part-time, while employers are more reluctant to offer such programs (Henkens et al., 2021).

The strengths and novelties of this study are threefold. First, we applied a comparative approach combining data from multiple countries and datasets. Second, we used a sophisticated methodological approach, examining the simultaneous unfolding of health and employment trajectories among older workers. This is one of the few methods that allows describing the interdependent relationship between employment and health in a longitudinal way. It offers an exploratory approach to our research question and may be complemented with other methods in a next step. Third, we have provided novel results on how employment and health trajectories in late careers vary by country, age group, and gender.

The limitations of our study are, first, that we examined only one country per welfare regime. More variation would be needed to make a more robust analysis of the relationship between welfare regimes and late career employment and health trajectories in countries with a statutory right to retire through part-time employment. Another approach would be to categorize countries according to typologies based on e.g., active aging or pension policies rather than the more comprehensive welfare typologies, thereby focusing on the relevant policies. Second, some countries introduced part-time employment policies at the national level only after 2004, the baseline year of our study. Nevertheless, all countries, except the US, had introduced some part-time employment policies (e.g., at the sectoral level) before 2004. Related to this, the cut-off of 35 h/week for part-time employment can be considered too high for some countries. The cut-off is, however, based on the recommendation from the International Labour Organization for

Sweden and the US (ILO, 2004), and for comparability we have used the same cut-off for all included countries. Third, while any comprehensive theory about part-time employment and health in late careers must take gender into account, the primary aim of our study was to explore factors that have received little attention in previous theory development. Although we provided descriptive statistics, we were not able to describe the precise mechanism of gender in this context; thus, it may be addressed in further research. Fourth, we did not examine the characteristics of older workers' employment type. As Taylor and Earl (2016) argued, the relative health benefits of employment in the transition to retirement depend on the quality of employment available for older workers. Investigating this question in more detail may be a direction for future research. Finally, we acknowledge that our data material is based on two datasets, SHARE and HRS, and although they are harmonized with high comparability, some differences may still exist.

5. Conclusion and implications

To conclude, our study examines how employment and health in late careers are linked in countries with a statutory right to work part-time. We show that there are substantial differences with respect to the welfare regime to which these countries belong and the age group examined. In particular, we found that there is more heterogeneity in part-time employment trajectories in countries with a liberal welfare regime and in older age groups. In countries with a social-democratic or corporatist welfare regime, part-time employment goes along with good health. However, our approach does not allow for causal inference.

Our findings may imply that both the statutory right to work part-time and the more generous welfare regimes provide older workers with more agency in maintaining good health while remaining active in the labor force. Thus, adopting policies that allow part-time employment in late careers may offer older workers in good health with incentive to stay longer in paid employment.

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Ethics approval

We use publicly available secondary data.

Author contributions

Isabel Baumann: Conceptualization, Funding acquisition, Project administration, Roles/Writing - original draft, Writing - review & editing. Ignacio Cabib: Conceptualization Data curation; Formal analysis, Funding acquisition, Methodology, Roles/Writing - original draft, Writing - review & editing. Harpa Sif Eyjólfsdóttir: Conceptualization, Funding acquisition, Roles/Writing - original draft, Writing - review & editing. Neda Agahi: Conceptualization, Funding acquisition, Writing - review & editing.

Submission declaration and verification

The work described has not been published previously, it is not under consideration for publication elsewhere, its publication is approved by all authors and tacitly by the responsible authorities where the work was carried out, and, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright holder.

Ethical statement

We, the authors of this manuscript, certify that we do not have any actual or potential conflict on ethical standards, financial and non-financial interests and compensations, ethical approvals, personal relationships with people or organizations, which could inappropriately influence, or be perceived to influence, our work.

Use of inclusive language

This work uses inclusive language. We use plural nouns whenever possible and avoid using “he, she,” or “he/she”. We use of descriptors that refer to age (e.g. older workers), gender (e.g. women, female) and health condition (e.g. chronic conditions) because they are relevant and valid in the context of our research.

Declaration of competing interest

Declarations of interest: None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2022.101091>.

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