Routes to retirement, working conditions and quality of life in comparative perspective

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A R T I C L E   I N F O

A B S T R A C T

An important response to the challenges of ageing populations has been reforms to decrease the economic incentives for early retirement. For individuals with poor working conditions, however, there is a risk that each additional working year may have negative consequences on their quality of life after retirement. Using data from 12 countries and 3000 individuals from the SHARE (Survey of Health, Ageing and Retirement in Europe), this study analyses exit routes from work to retirement in a comparative perspective. Using group-based trajectory modelling, results indicated that poor late-working life working conditions was associated with exit routes with high reliance upon income from different transfer schemes. Using multilevel models, analyses then indicated that the generosity of these transfer schemes has a positive impact on post-retirement quality of life. Limitations and policy implication of the study are discussed at the end.

1. Introduction

Many of us will live longer than our grandparents ever thought possible. Although increased longevity is something fundamentally positive, it also poses a number of challenges. More retirees mean higher pension costs and lower tax revenue (Martin, 2018). Increasing the labour market participation of older workers has the dual benefit of increasing tax revenue and decreasing pension expenditure. Measures to extend working life are therefore high on the policy agenda of most OECD countries. Reforms have largely focused on reducing economic incentives for early retirement by decreasing the generosity of early exit routes. Although there are social and individual benefits from later retirement, such reforms also raise questions about equity in health. Each additional year of employment for individuals with adverse working conditions may not only affect their health during working life but also have consequences for their health and wellbeing after retirement. Reducing the generosity of early exit routes will also reduce the economic resources available to individuals who leave the labour force prematurely, which may have negative consequences on their well-being.

With this as a background, the first aim of this study is to analyse the relationship between working conditions in late working life and exit routes from the labour force. A distinction can here be made between exit routes which involve a more or less direct transition from work to the receipt of old age pension benefits, and early exit routes, where

various income transfer schemes serve to bridge the gap between work and entry into old age pension schemes. We therefore set out to answer the question, "Are adverse working conditions associated with an increased likelihood of using such early exit routes"? Secondly, this study will analyse the association between the generosity of early exit routes and post-retirement quality of life. If individuals with poor working conditions are in fact using early exit routes, what is the association between the generosity of these routes and quality of life after retirement? These research questions will be empirically evaluated using longitudinal data from SHARE (Survey of Health, Ageing and Retirement in Europe) for 12 European countries.

2. Working conditions, exit routes from the labour force and quality of life after retirement

For the purposes of this study, it is useful to distinguish between two possible mechanisms whereby working conditions in late working life may affect quality of life after retirement. Firstly, the effect of adverse working conditions may be enduring so that even after individuals are no longer exposed to these conditions, an individual's quality of life is not fully restored. There is empirical evidence suggesting that working conditions in late working life have an impact on health and well-being after retirement (Wahrendorf et al., 2013a). Secondly, working conditions in late working life may affect the timing of retirement and exit routes from the labour force. Among the many factors that influence

retirement behaviour, such as e.g. physical and mental health and leisure preferences (Fisher et al., 2016), working conditions have been shown to have a significant effect on retirement decisions (Carr et al., 2016; Böckerman and Ilmakunnas, 2020). At the extreme, poor working conditions may be so harmful to health that continued work is no longer possible. But working conditions do not have to have such severe health effects to influence exit routes from the labour force. From a rational choice perspective, people will weigh the costs and benefits from continued work – including working conditions and their effects on health – against anticipated costs and benefits from retirement, and retire if the monetary and non-monetary benefits of retirement outweigh the benefits of continued work.

It is here useful to distinguish different dimensions of working conditions. According to the demand-control model (Karasek and Theorell, 1990), a 'high-strain' work situation is characterized by the combination of high job demands and low job control (employees' authority to make decisions concerning their own activities and using their skills at work). Studies suggest that control matter relatively more than demands for work-retirement transitions (Lahelma et al., 2012; Hintsa et al., 2015). According to the effort-reward imbalance model (Siegrist et al., 2004), lack of reciprocity between job efforts and rewards, such as financial compensation, esteem and promotion prospects, will involve a higher risk of adverse health outcomes as well as affect the timing of retirement. Some studies suggest that work-retirement transitions are primarily driven by the reward dimension (Juvani et al., 2014).

Economic resources available for retirement has also been shown to be important for retirement decisions and the timing of retirement (Fisher et al., 2016). For many individuals, economic resources provided through public income transfer systems constitute the primary, and in many cases the only, source of income that influences their retirement decision. Of relevance here are both regular old age pension benefits and income transfers that may bridge the gap between the exit from work and entry into regular old age pension schemes. Disincentives to work in late working life created by both regular old age pension and early retirement schemes, as well as transfer schemes that may function as de facto early retirement schemes (e.g. unemployment, sickness, and disability benefits), have been singled out as the most important factor in explaining the rise in early retirement observed in many countries up until the late 1990s (Gruber and Wise, 1999; Duval, 2003).

Besides the effect on the incentive structure in which people make their retirement decisions, the generosity of early retirement and de facto early retirement schemes is likely to have important consequences for the quality of life of individuals who leave the labour market before the statutory retirement age. A large body of research shows that economic resources are an important determinant of health and well-being (Marmot et al., 2008). Economic resources can be converted into goods and services that are beneficial in improving and maintaining good health, and they may increase individuals' sense of autonomy and control over their lives. Such resources may also enable and facilitate participation in society. This effect may be particularly important for those who are leaving the labour market early. Research suggests that people prefer and are more likely to retire at the age they regard as the 'normal' retirement age (Van Erp et al., 2014). Retiring before this 'normal', socially accepted retirement age – the age at which most friends and colleagues from the same generation retires – may therefore be associated with a certain stigma and loss of social status (Wetzel and Mahne, 2016). By reducing economic inequalities between those inside and outside of the labour force, income transfer may therefore reduce the stress associated with a decrease in social status among those who exit the labour force early (Van Solinge and Henkens, 2008).

There is a lack of studies directly analysing the association between retirement transitions, the generosity of early exit routes, and health and wellbeing after retirement. One important reason for this is that in most countries, benefits associated with early exit routes are income-related. This means that within countries, differences in early retirement benefit generosity at the individual level largely reflect variations in earnings

capacity. An individual's earnings capacity is likely to depend on his or her health history, which in turn is associated with both the likelihood of retiring early and post-retirement health and wellbeing. This makes it difficult to estimate the independent effect of benefit generosity on post-retirement health and wellbeing.

The approach taken in this study is to use cross-national variation in benefits provided to individuals who retire early to analyse the impact of the generosity of such benefits on post-retirement quality of life. It could be argued that this variation is, at least to an important extent, exogenous in relation to individual exit routes and retirement trajectories, and that variation in policy measures between countries largely reflects genuine policy alternatives and institutional arrangements (Börsch-Supan et al., 2009).

3. Exit routes from the labour force: an institutional and comparative perspective

International comparisons of exit routes have revealed a complex configuration of overlapping institutional arrangements (Kohli et al., 1991; Ebbinghaus, 2006). Institutional equivalence appears to be a feature of welfare states in this area, and different income transfer schemes - primarily early retirement, disability, sickness and unemployment benefit schemes - have been used to varying extents in different countries to bridge the gap between early exit from the workforce and entry into the normal old age pension scheme. Many of these institutional arrangements were not initially tailored towards facilitating early exits from the workforce. Therefore, any comparison between nations regarding welfare state arrangements and their effect on the exit of older workers that is based on one or a few types of welfare state programs "is almost doomed to be misleading" given the multitude of interrelated work-retirement pathways (Palme et al., 2009: 67).

Table 1 provides an overview of important early exit routes as well as the statutory retirement ages in the 12 countries included in this study

Table 1

Statutory retirement age and important early exit routes, 2003/04.

Countries	Statutory retirement age, men (women)	Important early-exit routes
Austria	65 (60)	Disability- and early retirement benefits.
Belgium	65 (63)[a]	Unemployment-, sickness-, early retirement- and disability benefits.
Czech Rep.	61.5[b]	Sickness-, early retirement and disability benefits.
Denmark	65/67 [c]	Disability-, unemployment- and early retirement benefits.
France	60	Unemployment- and early retirement benefits.
Germany	65	Unemployment-, early retirement and disability benefits.
Greece	65 (60/65)[d]	Disability- and early retirement benefits.
Italy	65 (60)	Early retirement benefits, retirement after long service.
Netherlands	65	Disability-, unemployment- and early retirement benefits.
Spain	65	Sickness/disability- and unemployment benefits.
Sweden	65	Sickness-, disability-, unemployment- and early retirement benefits
Switzerland	65 (63)	Disability-, unemployment- and early retirement benefits.

[a] Retirement age increased progressively (2 months/quarter) after year 2000.

[b] In 2004, the retirement age for women was 63, rising to age 64 (2006) and age 65 (2009).

[c] Retirement age for women depended on number of children, 57 years and 8 months for women with 2 children.

[d] 65 years for social pension, 67 years for supplementary pension. Those turning 60 after 1/7 1999 could demand supplementary pension before age 65.
Sources: Maltby et al. (2004); OECD (2006); Leber and Wagner (2007); OECD (various years).

around 2003/2004, which is the year for the first SHARE survey. This table is not intended to be exhaustive but rather to provide an illustration of some of the most important institutional early exit routes in these countries.

Austria provides an example of the interdependencies between different income transfer schemes in providing exit routes from work to regular retirement. Between 2000 and 2003, the early retirement scheme for reduced work capacity was phased out, and possibilities to enter into early retirement on account of unemployment were terminated. At the same time, however, the inflow into both the disability and old-age part-time scheme increased, effectively acting as a substitute for the restrictions in other early retirement routes. Belgium is an example of a country where unemployment benefits have functioned as an important exit route for older workers: in the early 2000s, older workers were exempt from job-search obligations, and many of these workers then switched from unemployment benefits to an early pension. Sector-level programs were an important exit route in the Czech Republic: in the early 2000s, the government introduced special benefits to workers in the steel and mining industry that encouraged early retirement. For the population as a whole, invalidity and early retirement schemes were the main early exit routes. In the early 2000s, there existed two main routes for early retirement in Denmark: disability and early retirement schemes. Although early retirement (VERP) was reformed in 1999 to encourage workers to delay retirement, in 2003, around 50 per cent of 60-66-year olds were receiving the benefit. In France, early retirement schemes, introduced to facilitate the entry of young workers into the labour market were phased out in the early 2000s. They were, however, replaced by specific schemes for workers who occupied demanding jobs. Moreover, an important early exit route has traditionally run through unemployment insurance. In Germany, extended eligibility periods for unemployment benefits was also an important early exit route in the early 2000s, together with early retirement benefits on account of unemployment or disability. In Greece, most of the early retirement in the early 2000s occurred under disability schemes or under special provisions for people in "arduous" jobs, which was defined rather broadly. In Italy, there were two main early exit routes in the early 2000s: various early retirement schemes and arrangements at the national level as well as the sectoral and firm level, and retirement after long service. In the Netherlands, the three major early exit routes in the early 2000s were the collective agreement based early retirement scheme (VUT), the occupational disability scheme (WAO), and the unemployment scheme (WW). In Spain, the main early exit routes in the early 2000s were flexible retirement arrangements (such as partial retirement), unemployment benefits, and invalidity/sickness benefits. In Sweden, qualification conditions for early retirement were increasingly tightened in the 1990s, and in 2003, the early retirement scheme was formally abolished. Older individuals could thereafter be granted sickness benefits. Lastly, in Switzerland, important early exit routes were disability, unemployment and early retirement benefits.

This overview indicates that countries have used different institutional arrangements to bridge the gap between early exits from work and entry into the regular old age pension scheme. Next, we will analyse the extent to which late-life working conditions affect the likelihood of individuals using these early-exit schemes, and whether the generosity of these institutional arrangements affects post-retirement quality of life.

4. Sample, measures, and analytical strategy

4.1. Sample

The empirical analyses use individual-level panel data from waves 1–2 and 4–6 from the Survey of Health, Ageing and Retirement in Europe (SHARE) for 12 European countries (Austria (AT), Belgium (BE), the Czech Republic (CZ), Denmark (DK), France (FR), Germany (DE), Greece (GR), Italy (IT), the Netherlands (NL), Spain (ES), Sweden (SE) and Switzerland (CH)) collected between 2004 and 2005 (wave 1) and

2015 (wave 6). The sample includes all countries that was available when the study was initiated and for which it was possible to construct individual benefit histories. Wave 3 was not used as it is a retrospective survey on participants in wave 1 and 2.

The SHARE data are based on nationally representative samples of the non-institutionalized population aged 50 years and older (Börsch-Supan et al., 2013). The sample for this study is restricted to respondents who (i) responded 'employed' to the question about their current job situation (and had responded to questions on working conditions) and were below the age of 65 in one of waves 1–5, and (ii) responded 'retired' to the question about their current job situation in one of waves 2–6 and were 65 years or older on that occasion (n = 3003). Thus, every respondent in the sample had participated in at least two waves. 68 percent of the sample had participated in at least four waves, and 26 percent of the sample had participated in three waves. For respondents who had participated in more than one wave before or after retirement, pre- and post-retirement measures refer to the first and last of these waves, respectively.

4.2. Exit routes

Information on individuals' exit routes from work to retirement is based on respondents' benefit and employment history. Respondents were asked if they had received income from any income maintenance scheme in the past year, how many months they received this benefit, and the first year they received it. SHARE waves 2, 4 and 5 also contains a detailed benefit history were respondents were asked the start and stop date of each episode they had received old age, early retirement, unemployment, sickness, and disability benefits since the last interview, as well as the start and stop dates of any periods of employment and unemployment.

As discussed, different transfer schemes may perform similar functions in bridging the gap between early exit from work and entry into the normal old age pension scheme. Based on individual benefit histories, different programs that may constitute early exit routes have therefore been grouped together into one broader category, consisting of early retirement, sickness, disability, unemployment and invalidity schemes (public as well as occupational schemes). Another important reason for the grouping of schemes is that the relatively small sample size makes it unfeasible to analyse individual programs. For each year, a measure named 'early exit incidence' was constructed that takes the value 1 (otherwise zero) if a respondent has received benefits from an early exit scheme during that year. Similarly, the 'work incidence' and 'old age retirement incidence' measures reflect, for each year, whether an individual has worked or received old age pension benefits, respectively.

4.3. Generosity of exit routes

In the SHARE surveys, respondents were asked how much they received in different social benefits in the past year, and the period (months) this payment referred to. However, the amount respondents received from different benefits was not asked in the questions covering the detailed benefit history. It is therefore not possible to construct any valid measure of benefits recipiency at the individual level. Therefore, an aggregated country-level measure of the generosity of early exit routes is used. This measure is based on the questions regarding the sum received in different social benefits last year. Each individual who stated that they received an early exit benefit was assigned a replacement level expressing the sum of benefits received during that year divided by the average annual wage for each country from Eurostat. An individual may have received different early exit benefits during a year. All respondents who had received these benefits for a whole year across all five SHARE waves were included in the calculation of this measure (n = 6163). The country score is then the country-level average of individual replacement levels across the SHARE waves. This measure varies from 24.6 per cent to 67.3 per cent, with a mean of 45.5 per cent. Scores for individual

countries are shown in Fig. 3.

4.4. Quality of life

Quality of life is measured using the CASP-12 scale and composed of four sub-scales: control, autonomy, self-realization and pleasure, each measured by three questions that are assessed on a four-point Likert scale (Hyde et al., 2003). Quality of life as measured by the CASP-12 scale is an indicator of general functioning that has been shown to be related to different aspects of poor health, such as major illness and physical and cognitive functioning (Hyde et al., 2015). The analyses focus on the full 12-item scale, whereas results for the four subscales are commented upon in the text and shown in table A1. CASP-12 can range between 12 and 48, where a high score indicates high quality of life. The mean value is 39.3 (SD = 5.0) before retirement and 39.7 (SD = 5.5) after retirement.

4.5. Working conditions

In SHARE, working conditions are measured by a short battery of items derived from the Job Content Questionnaire, measuring the demand–control model (Karasek et al., 1998), and the effort–reward imbalance model questionnaire (Siegrist et al., 2004). The psychometric properties of both questionnaire scales have been previously tested (Wahrendorf et al., 2013b). The demand (and effort) dimension is captured by the questions (i) My job is physically demanding and (ii) I am under constant time pressure due to a heavy workload. The control dimension is captured by the items (iii) I have very little freedom to decide how I do my work, (iv) I have an opportunity to develop new skills, and (v) I receive adequate support in difficult situations. The reward dimension is captured by the items (vi) I receive the recognition I deserve for my work, (vii) Considering all my efforts and achievements, my earnings are adequate, and (viii) My job promotion prospects are poor. All questions are asked on a 4-point Likert scale ("fully agree'' to "fully disagree''). After scores on items (i), (ii), (iii) and (viii) were reversed, a summary index including all eight questions was constructed. This index can vary from 8 to 32, where higher values indicate worse working conditions. The sample mean is 18.6 (SD = 3.5). Analyses are performed using both this summary index and the demand, control and reward subscales.

4.6. Covariates

Individual-level covariates used in the analyses are education, gender, year of birth, having children, whether the respondent suffers from any chronic diseases, smoker vs. non-smoker, having been in hospital overnight during the last 12 months, and body mass index. Given the small number of countries, only GDP/capita is used as a covariate at the country level.

4.7. Analytical approach

For many individuals, retirement is a process that plays out over time rather than an event that occurs at a single point in time. To capture this process, group-based trajectory modelling (GBTM) is used. This approach assumes that the population under study consists of clusters of individuals following approximately the same trajectory over time (Nagin, 1999, 2005). Trajectories are defined by the three incidence measures ('early exit', 'work' and 'old age retirement' incidence) over age (50–70 years of age). The GBTM models are estimated on the same sample as the multivariate models (n = 3003). When fitting the GTBM models, models with three groups displayed the best goodness of fit (as measured by the AIC statistics, see Table A1). A model with four trajectory groups is also commented upon in the text. Statistical analyses were performed using Stata version 15 and the Stata plugin "traj" for the GBTM analyses (Jones and Nagin, 2003). .

5. Results

Fig. 1a and cfig display mean incidence measures (i.e. 'early exit', 'work' and 'old age retirement' incidence) over age of respondents for the three groups identified by the GBTM analyses.

The largest group (2343 individuals, or 78.0 per cent of the sample) display what can be called an 'extended work' transition pattern (Fig. 1a). Respondents in this group are, on average, distinguished by a high work incidence rate up until around age 59. From this age, there is an almost linear decrease in work incidence, which is matched by an increase in old age retirement incidence. Respondents in the second largest group (11.2 per cent of the sample) display what might be called an 'early old age retirement' transition pattern (Fig. 1b). In this group, on average around 85 per cent of all episodes consist of work episodes at age 50. From this age, and especially after age 55, there is a decrease in work incidence until age 66, when they constitute 1 per cent of all episodes, and a corresponding increase in old age retirement incidence. Finally, respondents in the 'early exit' transition group (10.8 per cent of the sample) are characterized by relatively high work incidence (around 90 per cent) up until age 52, after which it starts to decline (Fig. 1c). But individuals in this group do not transfer directly from work to old age retirement: at all ages the average retirement incidence is markedly lower in this group than in the 'early old age retirement' transition group, and similar to that in the 'extended work' transition group. Rather, this group is marked by an extensive use of early exit benefits (i. e. benefits from sickness, early retirement, invalidity and unemployment schemes) when transitioning from work to retirement. In a model with four trajectory groups, the 'early exit' transition group still constitutes a distinctive group, albeit somewhat smaller (9 per cent of the sample). The 'extended work' group from the 3-group solution is essentially divided into two groups: one group where working careers are extended even more and where the work incidence at age 65 is around 50 percent (22 per cent), and one group where work incidence decreases almost linearly from age 55 (when it is close to 100 percent) and reaches close to zero at age 65 (66 percent of the sample). The fourth group is very small (3 percent) and is characterized by a high old age retirement incidence already at age 57.

What, then, is the importance of working conditions in late working life for the probability of displaying these different transition patterns? Fig. 2 depicts the probability that respondents are belonging to the 'early exit' transition group according to working conditions in late working life and pre-retirement quality of life. Probabilities are displayed for one standard deviation above and below the mean on the working conditions and quality of life measures, respectively (corresponding to values of 15.2 and 22.1 on the working conditions index, and to values of 34.2 and 44.3 on the CASP-12 scale). These probabilities are obtained from multinomial logistic regression models, with group membership identified by the GBTM analyses as the outcome variable and working conditions, pre-retirement quality of life, gender, birth year, and country-fixed effects as predictors.

Respondents with good working conditions and high pre-retirement quality of life have the lowest probability of belonging to the 'early exit' transition group. The probability of belonging to this group is
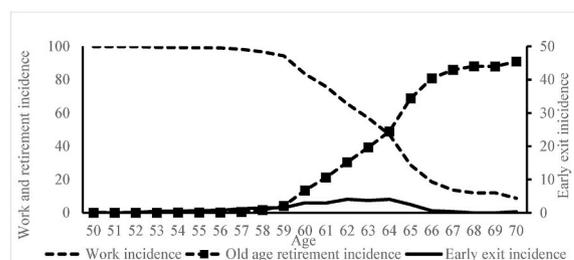

Fig. 1a. Extended work transition.
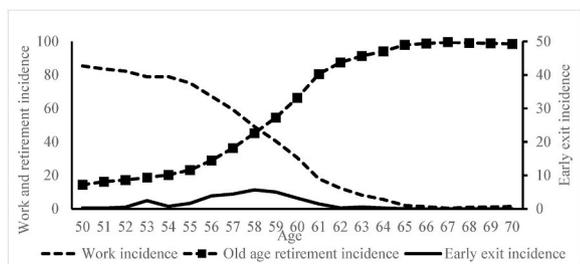
Fig. 1b. Early old age retirement transition.
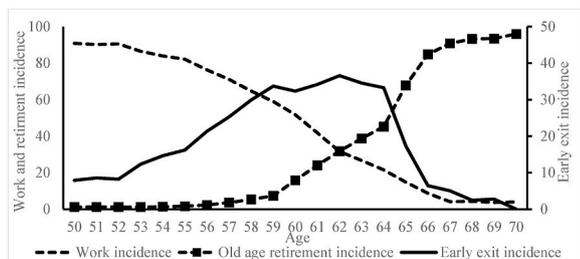
**Fig. 1c.** Early exit transition.
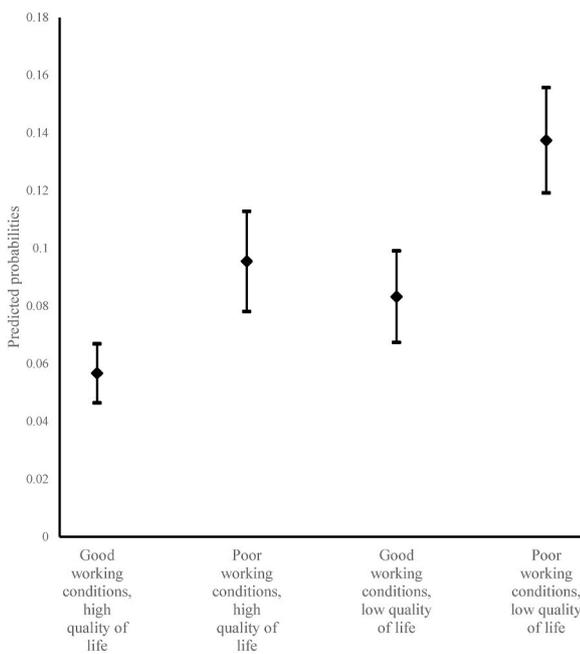
Fig. 2. Predicted probabilities (with 90-percent confidence intervals) of belonging to the 'early exit' transition group according to late life working conditions and pre-retirement quality of life (mean ± 1 SD).

significantly higher if respondents have experienced either poor working conditions or report low pre-retirement quality of life and is the highest for respondents who have experienced both of these circumstances in late working life. In contrast, the probability of belonging to the 'extended work' transition group is lowest for respondents who have experienced both poor working conditions and report poor pre-retirement quality of life (Table A2). There are no significant differences in the probability of belonging to the 'early old age retirement' transition group according to pre-retirement quality of life and working conditions. The model with four trajectory groups produces essentially the same results as those presented in Fig. 2, as do using the control and reward subscales instead of the overall working conditions index. Job
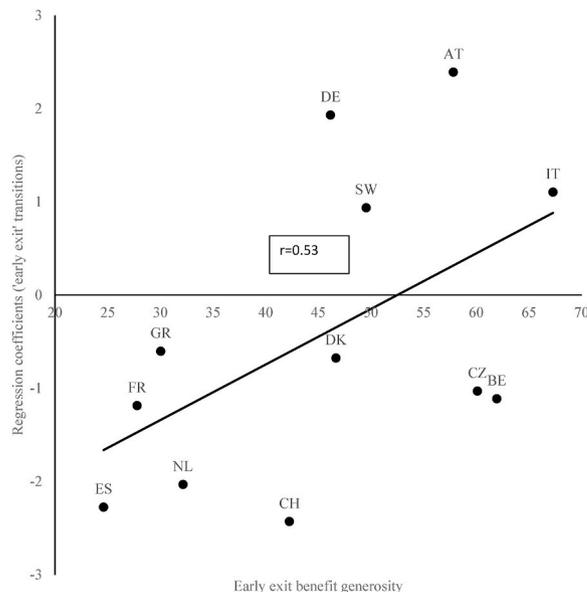

Fig. 3. Regression coefficients associated with 'early exit' transitions and early exit benefit generosity.

characteristics in terms of demands seems, however, to matter relatively less for the probability of belonging to the early exit transition group (Table A2). Results for the CASP-12 subscales are shown in Table A2.

From the results presented thus far, we can conclude that adverse working conditions in late working life is associated with work-retirement transition involving relatively high dependence upon income transfers from sickness, invalidity, unemployment, and early retirement schemes. The last set of analyses examine the extent to which the generosity of these benefit schemes affects post-retirement quality of life. This is done in a multivariate framework with post-retirement quality of life as the outcome, and retirement transition group membership, pre-retirement quality of life, late-life working conditions, and other covariates (outlined in section 4.6) as predictors.

Given the small number of countries, these models are first estimated in each individual country (i.e. model 1, Table 2, estimated in each individual country). If the generosity of early exit schemes influences post-retirement quality of life, we would expect the regression coefficients associated with the 'early exit' transition group to show a positive relationship with early exit scheme generosity across countries.

Fig. 3 indicates that there is a fairly strong positive association between the regression coefficient associated with the 'early exit' transition group and early exit benefit generosity ($r = 0.53$, $p = 0.077$). This indicates that the more generous early exit benefits are in a country, the more tends 'early exit' routes to be positively associated with post-retirement quality of life. Corresponding association for the 'early exit' group from the 4-group GBTM solution is even stronger ($r = 0.65$, $p = 0.024$).

Table 2 display results from the same models but where countries are pooled together in a multilevel regression framework. This allows us to directly estimate the interaction effect between the different exit routes and early exit benefit generosity.

Models 1 and 2, with random effects at the country level and fixed effects at the individual level, indicate that 'early exit' transitions are negatively associated with post-retirement quality of life compared to the reference category, 'early old age retirement' transition. Model 1 also indicates that working conditions at the end of working life is negatively associated with post-retirement quality of life. Model 2 show that it is lack of control and rewards, rather than high demands, that are negatively associated with post-retirement quality of life. Since the effects of working conditions remain stable throughout models 3–5, the overall working conditions index are used in these models. Model 3

Table 2
Multi-level regression models on post-retirement quality of life (CASP-12).

		Model 1	Model 2	Model 3	Model 4	Model 5
Retirement transitions (reference: Early old age retirement transition)	Early exit	−0.847** (0.422)	−0.810** (0.412)	−2.882*** (0.946)	−2.904*** (1.067)	−3.214** (1.742)
	Extended work	−0.291 (0.282)	−0.266 (0.283)	−0.274 (0.638)	−0.301 (0.287)	−0.423* (0.224)
	Early retirement					0.394 (0.363)
	Early exit benefit generosity			0.019 (0.030)	0.019 (0.036)	0.016 (0.035)
Interactions retirement transitions * early exit benefit generosity	Early exit* benefit generosity			0.045** (0.021)	0.064** (0.027)	0.079** (0.038)
	Extended work * benefit generosity			−0.001 (0.016)		
	Working conditions index	−0.120*** (0.029)		−0.122*** (0.028)	−0.122*** (0.029)	−0.124*** (0.030)
retirement transitions *	Demands		0.026 (0.039)			
	Control		0.172*** (0.047)			
	Rewards		0.186*** (0.042)			
	Pre-retirement quality of life	0.389*** (0.047)	0.385*** (0.046)	0.389*** (0.046)	0.389*** (0.046)	0.387*** (0.047)
	GDP/capita (log)	7.381*** (2.827)	7.334*** (2.882)	7.401*** (2.563)	7.400*** (2.827)	7.314*** (2.430)
Random-effects parameters	Country	1.709 (0.730)	1.746 (0.763)	1.669 (0.660)	1.667 (0.657)	1.549 (0.612)
	Individual	18.083 (1.724)	18.025 (1.722)	18.052 (1.714)	18.052 (1.714)	18.024 (1.731)
2-*log likelihood		17253.4	17244.1	17247.9	17248.0	17242.5
Observations		3003	3003	3003	3003	3003
Number of countries		12	12	12	12	12

All models control for birth year, education, family composition, having children, gender, presence of chronic disease, hospitalization in last 12 months, smoking, and body mass index. *p < 0.1. **p < 0.05. ***p < 0.01.
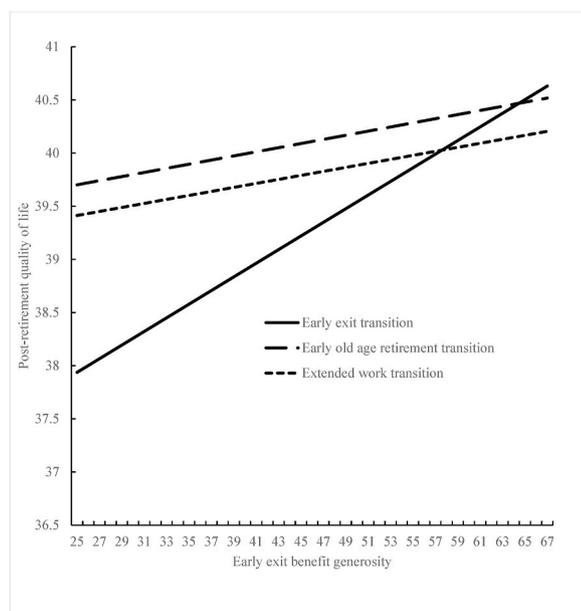
Fig. 4. Predicted post-retirement quality of life of different transition groups along values of early exit benefit generosity.

introduces the cross-level interaction term between the different transition groups and the generosity of early exit benefits. The interaction term between the 'early exit' transition group and early exit benefit generosity is positive and significant ($p < 0.05$), indicating that benefit generosity may have a moderating effect on post-retirement quality of life for this group. Model 4 contains only the interaction term between the 'early exit' transition group and early exit benefit generosity. This is a more parsimonious model that fits the data equally well as model 3, and the interaction effect between the 'early exit' transition group and benefit generosity in this model is even larger. A likelihood ratio test indicates that model 4 provides a significantly better fit to the data as compared to model 1 ($p = 0.066$). The interaction term between the 'early exit' transition group and benefit generosity is positive for all four CASP-12 subscales and significant for all subscales except the 'control' subscale, and is largest for the 'pleasure' subscale ($\beta = 0.025$, $p=<0.001$). Model 5, finally, includes the interaction between the 'early exit' transition group from the 4-group GBTM model and early exit benefit generosity. The interaction term between the 'early exit' transition group and early exit benefit generosity is positive and significant ($p < 0.05$) also in this model.

To check for possible outliers at the country level, model 4 was re-estimated using a procedure where countries were omitted one at the time (thus, $N = 11$ in each of these models). Throughout these models, the interaction effect between 'early exit' transitions and early exit benefit generosity remains positive and significant ($p < 0.05$), with coefficients varying from 0.038 to 0.086.

Fig. 4 graphically display predicted values of post-retirement quality of life according to early exit benefit generosity for the three different transition groups (from model 3, Table 2).

Post-retirement quality of life increases for all three transition groups as early exit benefit generosity increases, but the increase is clearly most pronounced in the 'early exit' transition group. These predicted values indicate that an individual belonging to the 'early exit' transition group has 7 per cent higher post-retirement quality of life if (s)he has undergone this form of work-retirement transition in a country with high early exit benefit generosity as compared to a country with low generosity (40.6 vs 37.9).

6. Discussion

Three main conclusions from the empirical analyses presented in this study are worth highlighting. Firstly, poor late-life working conditions are associated with an increased probability of experiencing work-retirement transitions involving relatively high dependence upon income transfers from sickness, invalidity, unemployment, and early retirement schemes. This applies particularly to working conditions in terms of lack of control and rewards, whereas high job demands appear to matter less for the probability of experiencing such transitions. Secondly, these forms of early exit routes are in themselves negatively associated with post-retirement quality of life. Thirdly, there is a moderating effect of early exit route generosity on post-retirement quality of life, meaning that the more generous benefits from these early exit routes are, the higher post-retirement quality of life is.

There are several caveats to these conclusions. The individual-level observations are a selected group, as individuals who do not work in late working life – possibly because of poor health caused by adverse working conditions – are not included in the analyses. There are also psychological mechanisms that might obscure the relationship between working conditions and health. For example, the so-called justification hypothesis implies people who enjoy their work will downplay their health problems and work longer, while those who dislike their work may exaggerate their health problems and retire sooner (Dwyer and Mitchell, 1999). Another important limitation is that it was only possible to include 12 countries in the analyses. Bearing these limitations in mind, this is the first study – to the author's knowledge – that has analyzed the role of early exit benefit generosity on post-retirement quality of life in a comparative setting. Another important merit of the study is the use of longitudinal panel data, which makes it possible to control for pre-retirement quality of life and health conditions.

Ageing populations pose a number of social and economic challenges to European societies. As the proportion of older persons increase, the costs of pensions and health care will put pressure on governments' budgets. Policy debates around ageing in Europe have therefore mainly focused on measures to prolong working life. Almost all OECD countries have enacted policies to increase retirement ages and decrease financial incentives for early retirement (Martin, 2018). There are important social and individual benefits from later retirement. Besides relieving pressure on public budgets, working until later ages may also increase personal retirement wealth. Work may also have important social and psychological benefits for individuals of all ages (Paul and Moser, 2009). But there are good jobs, and then there are not so good, or even bad, jobs. Jobs where there is little freedom to decide how to carry out tasks, where opportunities to use existing or develop new skills are small, and where rewards do not match the efforts put into work. For workers with such jobs, there is a risk that each additional working year may have negative consequences on well-being and quality of life not only during working life but also after retirement (Wahrendorf et al., 2013a).

At the policy level, this study therefore implies that policy-makers and others may be confronted with a more intricate trade-off problem than is oftentimes acknowledged. Although reducing the generosity of income transfer schemes may extend working lives, decrease pension expenditure, and increase tax revenue, it may do so at the expense of the quality of life of vulnerable individuals with poor late-life working conditions.

Declaration of competing interest

There are no potential conflicts of interest to report.

Table A1
AIC-values for different GBTM models.

	AIC
3-group solution (main model used in text)	−74123.8
4-group solution	−72706.4
5-group solution	−72611.0

Table A2
Probabilities of group membership (90 percent confidence interval within parenthesis).

Working conditions index	Pre-retirement quality of life	Early exit transition		Extended work transition		Early old age retirement transition	
Good	High	0.057	[0.046–0.067]	0.862	[0.847–0.878]	0.081	[0.068–0.093]
Poor	High	0.096	[0.078–0.113]	0.820	[0.797–0.842]	0.085	[0.069–0.100]
Good	Low	0.083	[0.067–0.099]	0.826	[0.804–0.848]	0.091	[0.074–0.107]
Poor	Low	0.137	[0.119–0.156]	0.769	[0.748–0.791]	0.093	[0.080–0.107]
Demands (mean = 4.96 ± 1 SD = 1.43)							
Low	High	0.069	[0.057–0.081]	0.848	[0.830–0.865]	0.083	[0.070–0.096]
High	High	0.078	[0.064–0.092]	0.829	[0.809–0.849]	0.093	[0.077–0.108]
Low	Low	0.113	[0.095–0.132]	0.796	[0.774–0.819]	0.090	[0.075–0.105]
High	Low	0.127	[0.109–0.145]	0.773	[0.751–0.794]	0.100	[0.085–0.115]
Control (mean = 8.72 ± 1 SD = 1.65)							
High	High	0.057	[0.047–0.067]	0.854	[0.838–0.870]	0.089	[0.076–0.102]
Low	High	0.101	[0.083–0.119]	0.815	[0.793–0.837]	0.084	[0.069–0.099]
High	Low	0.083	[0.068–0.099]	0.816	[0.794–0.838]	0.101	[0.083–0.118]
Low	Low	0.144	[0.125–0.163]	0.763	[0.741–0.785]	0.093	[0.079–0.107]
Rewards (mean = 7.59 ± 1 SD = 1.65)							
High	High	0.063	[0.052–0.074]	0.849	[0.832–0.865]	0.088	[0.075–0.101]
Low	High	0.088	[0.072–0.104]	0.826	[0.805–0.847]	0.086	[0.071–0.101]
High	Low	0.099	[0.082–0.116]	0.803	[0.780–0.826]	0.098	[0.082–0.115]
Low	Low	0.136	[0.118–0.154]	0.770	[0.749–0.792]	0.094	[0.080–0.108]
Working conditions index	CASP-dimension control (mean = 9.20 ± 1 SD = 1.95)						
Good	High	0.062	[0.051–0.073]	0.853	[0.837–0.870]	0.084	[0.071–0.097]
Poor	High	0.112	[0.093–0.131]	0.797	[0.774–0.820]	0.091	[0.075–0.106]
Good	Low	0.072	[0.058–0.086]	0.843	[0.824–0.863]	0.084	[0.070–0.099]
Poor	Low	0.128	[0.111–0.146]	0.781	[0.760–0.802]	0.090	[0.077–0.104]
	CASP-dimension autonomy (mean = 9.04 ± 1 SD = 1.79)						
Good	High	0.060	[0.049–0.071]	0.858	[0.841–0.874]	0.082	[0.070–0.095]
Poor	High	0.107	[0.089–0.125]	0.805	[0.782–0.828]	0.088	[0.072–0.103]
Good	Low	0.075	[0.061–0.089]	0.837	[0.817–0.858]	0.087	[0.072–0.103]
Poor	Low	0.132	[0.114–0.150]	0.776	[0.754–0.797]	0.092	[0.078–0.106]
	CASP-dimension self-realization (mean = 10.20 ± 1 SD = 1.72)						
Good	High	0.055	[0.045–0.064]	0.865	[0.849–0.880]	0.081	[0.068–0.093]
Poor	High	0.092	[0.076–0.108]	0.822	[0.801–0.844]	0.086	[0.070–0.101]
Good	Low	0.085	[0.070–0.101]	0.824	[0.803–0.846]	0.090	[0.074–0.106]
Poor	Low	0.141	[0.122–0.159]	0.766	[0.744–0.788]	0.093	[0.079–0.107]
	CASP-dimension pleasure (mean = 10.80 ± 1 SD = 1.52)						
Good	High	0.059	[0.048–0.070]	0.861	[0.845–0.878]	0.080	[0.067–0.092]
Poor	High	0.107	[0.089–0.124]	0.809	[0.788–0.831]	0.084	[0.070–0.099]
Good	Low	0.075	[0.062–0.089]	0.833	[0.813–0.854]	0.091	[0.076–0.107]
Poor	Low	0.134	[0.116–0.153]	0.771	[0.749–0.793]	0.095	[0.080–0.109]

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