Assessing the impact of partial early retirement on self-perceived health, depression level and quality of life in Belgium. A longitudinal perspective using SHARE

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Abstract: For about twenty years, Belgium has successfully implemented working time reduction policies for the older workforce. However, the impact of such policies on health has not been explored yet. Using longitudinal data from waves 5 and 6 of SHARE (N=1,498), the paper assesses whether working time reduction in late career is associated with a change in self-perceived health, depression (EURO-D) and quality of life (CASP-12). For that purpose, ordered logit and OLS regressions are performed, using four different models for defining working time reductions. Results show that people reducing working time with or without additional social benefits tend to have a poorer self-perceived health at follow-up compared with people keeping the same or increasing working time. By comparison, people moving to retirement are more likely to present a better self-perceived health, depression level and quality of life compared to people increasing or keeping the same working time level. Although, introducing an interaction effect, the paper shows that the change in quality of life for respondents reducing working hours in addition to social benefits tends to be less negative for those who wished to early retire at baseline than for those who did not.

Key-words: Working time, Self-perceived health, CASP-12, EURO-D, SHARE, Longitudinal

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Introduction

The impact of labour market transitions on the health of the older workers is subject to a considerable amount of research using longitudinal methods, particularly suitable for assessing the change in health conditions over a selected type of transition. Among the different possible transitions, many articles have focused on the impact of the transition from work to retirement, unemployment and inactivity on health (Burton-Jeangros *et al.* 2015; Calvo 2006; Graetz 1993; Rice *et al.* 2011; Waddell and Burton 2006). For instance, comparing Denmark, France, Italy and England, Di Gessa and Grundy (2014) have demonstrated that engagement in paid work contributes to maintain health in later life compared to people leaving the labour market. More recently, taking into consideration labour market histories (using retrospective data covering the full professional career), Di Gessa et al. (2016) have shown that health benefits of working beyond the state pension age are no longer significant. However, even though there is a sparse literature about these arrangements at the policy level (Andor 2012; Berg *et al.* 2015; Bluestone and Rose 1998; Dubois *et al.* 2016) or at workplace level (Lewis *et al.* 2017; Wheatley 2017), little attention was given to part-time arrangements allowing older workers to reduce working time in a move towards retirement.

This article assumes that the growing use of working time arrangements in late career – supported by public policies in most European countries – should be taken into consideration in the study of retirement pathways and their association with health. On the one hand, an extensive literature shows that working hours and flexible working time affect health. This is particularly the case of overtime which tends to have negative effects on stress, sleep, and social and mental health (Costa *et al.* 2004) but this is also the case of part time work, particularly for male workers (Verbakel and Diprete 2007). On the other hand, it has been shown that workers who are "not free to lower their usual working hours, workers who [are] hours-constrained, or over-employed, [are] more likely to retire than workers who were free to adjust their work hours'. (Charles and DeCicca 2007; Fisher *et al.* 2016). As job satisfaction may be pointed out as a factor affecting health – as the "highest levels of health risk are found amongst dissatisfied workers and the lowest levels amongst satisfied workers" (Graetz 1993) –, working time reduction in late career should be taken into consideration. This article aims at providing some evidence using Belgium as a particularly good example of how working time policies have shaped transitions to retirement.

For that purpose, there is a need to look at policy level and understanding the ongoing transformation of the labour market, particularly affecting the older workers. The article aims at describing working time arrangements in late career in Belgium, providing descriptive data about their recent evolutions and assessing whether these arrangements have an impact on the self-perceived health, the level of depression and the quality of life of the older workers, compared to those reducing their working time with no additional social benefits, those keeping or increasing working time and those leaving the labour market. Panel data from waves 5 and 6 of the Survey of Health, Ageing and Retirement in Europe (SHARE) are used. The article is made up of four sections. The first section takes a policy oriented point of view by looking at the evolution of early retirement arrangements in Belgium with particular emphasis on the recent development of the so-called 'Time Credit Scheme' allowing older workers to reduce working time in addition to unemployment benefits partly compensating the income loss. Access criteria and rules associated with the 'time-credit' are shortly mentioned and descriptive data showing the evolution over the last decade are presented. The second section presents the methodological background of the article and provides an overview of the panel data used for assessing the impact of the time-credit on health. The third section presents descriptive results

and the results of the different models that are tested in this research. The fourth section sets out the main limitations of the paper. Finally, the discussion section summarizes the main results presented in the paper and suggests some ways to look in-depth at this matter in further research.

Contextual background: From early retirement to time-credit

Forty years of public policy reforms have shaped end of professional careers in Belgium. Historically, the Belgian labour market has long been characterized by low participation rates in late career, explained in large part by the implementation of the 'conventional early retirement' scheme in 1973 (Claes 2012). This scheme was initially implemented for two reasons. First, it aimed at regulating the labour market by allowing companies to use older workers as an adjustment variable. Early retirement was a costless way to reduce the labour supply in an economic context adversely affected by the first oil shock without relaxing labour market regulations. Second, the scheme aimed, by reducing the older workers' employment participation, at integrating young people – affected by mass unemployment – into employment (Wels, 2014). While the first aspect of the 'conventional early retirement scheme' worked well with a strong decrease in older workers' employment participation in the 1970s, the second aspect was later considered as a lump of labour fallacy (Jousten *et al.* 2010). Initially, the scheme was planned to be temporary, as a direct response to the economic slump but, from 1976 to 1995, early exit arrangements were developed further. The implementation of the 'legal early-retirement' scheme between 1976 and 1982, and of the 'early-retirement pension' between 1982 and 1991 reinforced a trend that began in the 1970s but while the conventional early retirement scheme required the dismissal of the worker, these two mechanisms opened the right to an early exit, independent of dismissal. From that time, workers can freely choose their retirement age without incurring a penalty (Jousten *et al.* 2010: 50).

Despite partial reforms in the 1990s, the conventional early retirement scheme continued until 2012, when its name was changed and access criteria were significantly revised. The conventional early retirement scheme then became a so-called 'unemployment benefit with income supplement paid by the company' ("stelsel van werkloosheid met bedrijfstoeslag" – "chômage avec complement d'entreprise") and the pre-pensioners of 60 years and more, previously exempt from job search, were encouraged to make themselves available on the labour market (Sorée 2015). The new name given to the conventional early retirement scheme has both symbolic and practical impact. Symbolically, the reform focuses on the institution paying for early retirement benefits. Indeed, the term *early retirement* could suggest that benefits were paid by the National Office for Pensions (ONP) while this was never the case: early retirement benefits are paid partially by the unemployment institution (ONEm) and, in a lesser extent, by the dismissing company. The contribution paid by the company gradually increased, with few exceptions, between 1973 and 2012. From a practical point of view, the rules for accessing conventional early retirement were tightened. The minimum age for access to unemployment with supplement paid by the company increased from 58 to 60 years of age with at least forty years of seniority (a longer transitional period for women was planned as the length of their career was – and still is – on average shorter). Moreover, under certain conditions, this seniority can be lowered to 35 years in the case of a heavy work. At the same time, older workers' unemployment regulations were changed. Before 2014, unemployed people aged 60 and over were exempted from job search with no other conditions. From 2014, the job search exemption remains for this age category but the unemployed needs to be registered as a job seeker and being involved in the follow-up organized the job-center.

Furthermore, they cannot refuse a job offer from the job-center and need to live permanently in Belgium.

In the mid-1990s, when access to full-time early retirement was restricted, new arrangements were gradually implemented to facilitate the adjustment of working time at the end of the career. Both early retirement and working time arrangements coexisted for a long time. For nearly 15 years, conventional early retirement continued to play an important role, while mechanisms such as part-time career break and half-time early-retirement were emerging. In January 1985 a new system, the 'part-time career break', was implemented for older workers in the public sector. This was a first step towards the current 'time-credit' as public policies shown the willingness to facilitate the reconciliation between family and professional life and to allow the replacement of individuals who reduce their working time. Facing an increasing unemployment rate among young people, the Government was re-affirming its objective of job sharing, which was already one of the reasons for why early retirement schemes were implemented. The collective labour agreement (CCT) N°55 of 1993 then introduced a "half-time pre-pension" scheme, which entitled the National Employment Office (ONEm) to provide social benefits compensating, under certain conditions, the reduction in working time. However – unlike the part-time career break –, the reduction in working hours is no longer necessarily compensated by hiring younger workers. The scheme was not very successful and did not affect the early retirement rate.

Following the 'part-time career break' and the 'half-time early retirement', the 'time-credit' appeared in Belgium at the beginning of the 2000s, in a context characterized by high rates of early exit from the labor market. The creation of time credit in 2001 must be seen in the context of the Lisbon Treaty and the European Employment Strategy (EES). Encouraged by the European Councils of Amsterdam, Lisbon, Stockholm and Barcelona, held between 1997 and 2002 (Salais 2004), European countries implemented arrangements aiming at increasing the employment rate of the older workers by smoothing the transition from work to retirement, through, for instance, the adjustment of the working time at the end of a professional career. In 2004, a national action plan for employment sets such targets at national level. In this context, the time-credit can be considered both as a career extension tool – as it largely replaced the use of early retirement schemes, which decreased in the 2000s, with the system being phased out in 2012 – and a tool for the organization of working time.

End-of-career time-credit establishes a right for workers aged 55 or over at the time of application to reduce working time with additional unemployment benefits from the National Employment Office (ONEm-RVA) aiming at compensating the loss of income. Several other criteria are also considered. First, the employee must have at least 24 months of seniority in the company (including assimilated periods) unless the employer and the employee agree to a derogation from this rule. Second, a career of at least 25 years (assimilated periods included) as an employee is required. Third, the 'time-credit' might be considered as a right only in companies of 11 workers or more. In 2012, an exception system was introduced for heavy work with a shortage of labour, and in companies undergoing restructuring. In these particular cases and under certain conditions (having had a heavy job for at least five years), the age for access to the end-of-career time credit might be reduced to 50 years of age. In practice, the time credit allows full-time workers working five days a week to reduce their weekly working hours by one-fifth, i.e. one day or two half-days a week. Some part-time workers are also entitled to time-credit. Workers employed at four-fifths have the possibility of reducing their working time by one-fifth and workers employed at three-quarter time can reduce it to half-time. There is no maximum duration for these reductions in working time but a minimum duration: the reduction

of the working hours of one fifth must apply for at least six months and the half-time for minimum three months.

End-of-career time-credit is also partly considered in the calculation of the employee's state pension. Before 2012, all periods of time-credit after the age of 50 were calculated based on a 'notional dummy pay' (the notional dummy pay is usually calculated based on the real incomes before the time-credit). The system was reformed in 2012 and, from 2013, the calculation of the amount of the pension changed (except for transitional measures for time credit recipients under the old scheme). The calculation is nowadays carried out as follows: (1) in the case of heavy work and a reduction in working time of one-fifth, or in the case of 312 equivalent days following the month in which the age of 60 is reached, the calculation is based on the same 'notional dummy pay'. In other cases, the calculation is now based on a "limited dummy pay", less advantageous than the previous one.

Nowadays, three main schemes shape end of professional careers in Belgium: the 'time-credit', the 'unemployment exempted from job search' and the 'unemployment benefits with income supplement' (the former early retirement scheme). Using data provided by the ONEm, the figure 1 shows the trends from January 2008 to August 2017 for three kinds of arrangements concerning people aged 50 and over:

< Please, insert figure 1 >

In August 2017, unemployment exempted from job search concerned 15,078 males and 14,220 females aged 50 and over; unemployment benefits with income supplement concerned 52,091 males and 23,005 females; and 15,232 males and 29,178 females were under a time-credit scheme. However, looking at the trends over the selected period, one observes a significant decrease in both unemployment exempted from job search and unemployment benefits with income supplement while the number of people benefiting from a time-credit scheme increased. These recent trends confirm that public policies aim at discouraging early retirement while encouraging working time reductions at the end of the career (Dejemeppe *et al.* 2015). However, one should remain cautious about this assertion as it has been shown that "participation in [time credit scheme] initially prolongs the time spent in employment (during the first two years for men and four years for women), but subsequently it accelerates the exit to early retirement" (Albanese *et al.* 2015: 41).

There are two additional remarks related to these figures. First, one can observe a difference between male and female, particularly when looking at the former early retirement scheme. This is particularly due to transitory measures that were made more gradual for female workers. Second, the linearity of the trends varies from one scheme to another. The 'time-credit' is indeed particularly affected by the economic activity as it depends on the employment participation of the older workers – which is less the case when looking at schemes allowing a total withdrawal from the labour market.

Data, variables and methods

Data

The paper uses data from the Survey of Health Ageing and Retirement in Europe (SHARE), waves 5 and 6 (Borsch-Supan 2017). Compared with panel surveys such as the Health and Retirement Study (in the US) or the English Longitudinal Survey of Ageing (in England), SHARE is not built using specific cohorts. Consequently, the sample contains respondents aged 50 and over followed over several waves and new respondents are included in the sample wave after wave. Therefore, it is relevant to use the last waves (in this case, waves 5 and 6) as they

reflect the current policy context. Wave 5 was completed in November 2013 and wave 6 in November 2015. People aged 50 and over and declaring being in paid work (self-employed, employed or civil servant) at baseline (wave 5) are selected and followed up to wave 6, whatever their labour status is in wave 6. Even though workers declaring being in paid work are selected at baseline, the sample is affected by a relatively high attrition rate. The original sample at baseline contains 1,498 respondents. At follow-up, the sample is 1,168 respondents. Put in another way, 330 individuals dropped out from the survey between wave 5 and 6; which can be estimated as a reduction of 22 percentage points. Looking at the characteristics of the population dropping out, it is observed that it contains 50 per cent of male and 50 per cent of female with an average age at baseline of 55 for female and 56 for men. Interestingly, the attrition sample is composed at 80 per cent of high-qualified workers (ISCED levels 5 to 6).

Dependent variables and statistical models

Health and quality of life were measured using three variables: the self-perceived health, the depression level and the quality of life. These three variables are pointed out by the scientific literature as particularly affected by employment (Kober and Eggleton 2005) and retirement transitions (Coe and Zamarro 2011). But they are also particularly affected by working time. Gains in quality of life from reducing working hours have been shown (Verbakel and Diprete 2007) although it has to be assumed that the relationship between working hours and quality of life is non-linear (Drobnič *et al.* 2010), mainly because lower working time might not always be voluntary.

Self-assessment of health "clearly measures something more and something less than objective medical ratings" (Maddox and Douglass 1973). For instance, it has been shown that self-rated health in an important predicator in explaining mortality (Idler and Benyamini 1997). Furthermore, part of the problem when looking at 'objective' measurements of health is that they measure health as such rather than the "capacity for work" (Bound 1991) as the self-perceived health do. Self-perceived health was measured in terms of responses to the question: "*Would you say your health is...",* associated with five modalities: excellent, very good, good, fair or poor, respectively coded from 1 to 5. The variable used in this paper is calculated as the difference between the value of the self-perceived health in wave 5 and the value for the same variable in wave 6. Therefore, a positive value means that a positive change was observed between baseline and follow-up. Conversely, a negative value means that a worsening self-perceived health was reported at follow-up.

The second variable is the depression-scale using the EURO-D indicator measuring depression on a scale from 1 (not depressed) to 12 (very depressed) (Prince *et al.* 1999) covering 12 symptom domains: depressed mood, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment and tearfulness (Castro-Costa, Dewey, Stewart, Banerjee & Huppert, 2007). As the change in self-perceived health, the variable was calculated as the difference between what is observed in wave 5 and what is observed in wave 6. A positive change is associated with a value higher than zero while a negative change is associated with a value lower than zero.

Finally, the third variable is the quality of life (CASP-12) (Siegrist, Wahrendorf, Von Dem Knesebeck, Jürges, & Börsch-Supan, 2007; Borrat-Besson, Ryser, & Goncalves, 2015) which is a shorter version of CASP-19 (Platts *et al.* 2013). This is an index based on the answers to several questions about control, autonomy, pleasure and self-realization. Even though CASP-12 is based on twelve questions (against 19 for CASP-19), it contains information about these four aspects. The quality of life index is ranked from 12 (the lowest) to 48 (the highest). The

variable used in this article is calculated as the difference between the value of CASP-12 observed in wave 6 and the value of CASP-12 observed in wave 5. Hence, it can be interpreted as the two previous variables; a positive value being associated with a positive change in quality of life and a negative value being associated with a negative change.

As the models aim at assessing the association between health and change in working time, the models used in this paper assume a potential causal link between labour market transitions, on the one hand, and health and quality of life, on the other hand. As using a two-waves sequence does not allow to ensure that a causal relationship is observed, the levels of self-perceived health, EURO-D and CASP-12 are controlled at baseline. Furthermore, additional covariates (see below) are included in the models in order to control for the sector of activity (industry), the level of education or whether the person worked continuously or not over the period. It would have been better to use a three-waves sequence that would allow to look directly at the causality, but this would have led to a drastic reduction in the size of the sample (and particularly of the size of the population reducing working time).

One issue with these variables is that they are numerical indicators built on ordinal questions, particularly in the case of self-perceived health and EURO-D. Therefore, one can assume that the change calculated between wave 5 and 6 reflects an ordinal change. If so, two main methods can apply: the ordered logit regression or the ordered probit regression (Winship and Mare 1984). The benefits of using probit rather logit are not obvious but it can be assumed that the logit model tends to affect extreme values – due to the logarithmic scale that is used in the model – more than the probit model. However, the coefficients obtained through the ordered logistic regression (log odds) are easier to interpret as they can be transformed into odds ratios, which is, by definition, not possible with the probit model. That is the reason for why self-perceived health and EURO-D variables are analysed in this paper using an ordered logit regression. The case of CASP-12 is slightly different as it is calculated on 12 Likert-scale indexes. Therefore, the change in CASP-12 is analysed using an Ordinal Least Square (OLS) regression, as it is done other articles (see, for instance, Howel, 2012).

As the sample attrition is particularly high for the selected subsample, models are calculated in two different ways. First, ordered logit models and the OLS regression are calculated based on the disposable data, excluding missing values. Second, ordered logit models and the OLS regression are calculated using Random Forest (RF) imputations. One of the benefits of using Random Forest imputations method is that it applies both to numerical and categorical variables, keeping the imputations homogeneous from one variable to another as it is able to capture non-linear selection models (Hayes and Mcardle 2016). For a description of the algorithms used in Random Forest and the benefits of using such method, please read Tang & Ishwaran (2017).

Independent variables

People in paid-work are selected at baseline and what matters in this article is the job situation (variable ep_005) they hold at follow-up, and particularly whether respondents reduced working time from wave 5 to wave 6. Therefore, several types of statuses at follow-up are distinguished depending on whether the person is still working, retired, unemployed, in long-term sickness or disability, homeworker or under another status. In the case of people remaining in paid work, a subdivision is made distinguishing respondents reducing working time, keeping the same working time or increasing working time over the period. The change in total hours worked per week is calculated as the difference between the weekly working time at follow-up and the weekly working time at baseline (variable ep_013). This categorical variable,

distinguishing potential change in job situation and change in working time, is considered in this paper as our basic model (model 0).

However, as the case of Belgium involves social benefits in addition to the working time reduction (time credit), three other models (models 1, 2 and 3) are developed, aiming at capturing the potential impact of working time reduction with social benefits on the change in self-perceived health, depression level and quality of life. Although SHARE contains country-level information about social benefits, no information about time credit was collected in Belgium in the disposable waves. Therefore, – and while the process of merging SHARE data with Belgian administrative data is ongoing – there is a need to develop assumptions. One way to do it is to look at the change in social benefits from one period to another and assuming that a change in unemployment benefits associated with a decrease in working time would correspond to a case of time credit. Conversely, a decrease in working time which is not associated with a change is social benefits should be considered as a working time reduction which is not supported by social benefits. Hence, three aspects are taken into consideration for doing so: the change in job situation (ep_005), the change in weekly working time (ep_013) and the change in income sources (ep_071 in wave 5 and ep_671 in wave 6).

Based on these three aspects, three models using three different assumptions are made for distinguishing people in time credit from people who reduce working time without a time credit:

- In model 1, a broad definition of social benefits is chosen by taking into consideration people declaring benefiting from unemployment benefits, pension benefits or early-retirement benefits in wave 6.
- In model 2, a limited definition of social benefits is given as it looks at the evolution of unemployment benefits (only) from wave 5 to wave 6. Put in another way, model 2 selects people reducing working time in addition to social benefits if there is an increase in unemployment benefits over the period.
- Finally, the model 3 is an intermediary model mixing the longitudinal approach of the model 2 with the broad definition of social benefits including unemployment benefits, pension benefits and early retirement benefits used in model 1.

The model 2 is the one that fits the best with the definition of what is the time credit in Belgium as it takes into consideration the change in unemployment benefits associated with the change in working time only. By comparison, the model 3 includes pension benefits and early retirement benefits. The main reason for why these three models are taken into consideration is the potential lack of understanding and the potential bias in replying to the questionnaire as no information is asked about this specific aspect.

Covariates

Both the ordered logit models and the OLS regression include several covariates that are selected based on what is usually pointed out by the scientific literature about this topic (for an extensive justification, please read: Wels, 2016). The gender of respondents is included in the models as a dichotomous variable for which the answer modality ‘male’ is selected as the reference category. The age is also controlled by the model as a numerical variable. The level of education based on the International Standard Classification of Education (ISCED) is taken into consideration. The variable is decomposed in three modalities: ISCED0-1 corresponds to no education or the lowest level of education. ISCED2-4 is the intermediary level of education and ISCED5-6, selected as the reference category, corresponds to the highest levels of education. The marital status distinguishing single people, widowed respondents and married and living together (reference category) is included. So are a categorical variable distinguishing

respondents working in the private sector (reference category), self-employees and public sector workers, a dichotomous variables distinguishing respondents who declared at baseline wishing to early retire or not (reference category), and another dichotomous variable distinguishing respondents who worked continuously from wave 5 to wave 6 from people who did not (reference category). The model also controls for two wealth-related numerical variables: the yearly net incomes of the household, including earnings and social benefits (on a natural logarithmic scale) and the total household wealth (on a natural logarithmic scale). Finally, the models control for the type of industry in which respondents are working ('financial intermediation' is selected as the reference category). For reducing the amount of data, all covariates are not shown in the following tables.

Results

The results section is divided in five subsections. The first subsection provide some descriptive data related to the different used in the paper. The second subsection presents results of the ordered logit models and OLS regression for the change in self-perceived health, depression level and quality of life for some of the covariates included in the models. The third section present results for the model 0, i.e. looking at the change of working time without taking into consideration the change in social benefits. The fourth section looks at the results of the regressive models for the change in working time and social benefits (models 1, 2 and 3). Finally, the fifth section presents the results when an interaction effect is introduced in the model, looking at the interaction between wishing to early retire and reducing working time.

Descriptive statistics

Figure 2 shows the distribution (looking at the total sample without taking into consideration attrition) for the change in self-perceived health (SPH), depression level (EUROD) and quality of life (CASP). It shows particularly the change is SPH contains just a few modalities and that both the distribution of the change in SPH and the change in EUROD look more like a Poisson distribution than a normal distribution which justifies the use of an ordered model (in this case, the paper uses an ordered logit model). The change in CASP is composed of many modalities and the distribution has the characteristics of a normal distribution, justifying the use of an OLS regression.

< Please, insert figure 2 >

Table 1 provides information about the dependent variable the paper looks at. The table shows both the number of respondent of each category and the percentage they represent among all respondents (in parenthesis). Model 0 is the original model, looking at the change in working time only. Models 1, 2 and 3 combine information about the change in working time and the change in social benefits. What can be observed when looking at the original model (model 0) is that the percentage of respondents retiring from wave 5 to wave 6 counts for 11 per cent of the original subsample. Transition to unemployment is quite rare (1.4 per cent) and the transition to permanent sickness or disability is higher (1.9 per cent). Most of the respondents remained in paid work from wave 5 to wave 6 (84.4 out of 100). 30.4 per cent of the original subsample kept the same working time over the period while 22 per cent declared an increase in working time and 32 per cent declared a decrease in working time from wave 5 to wave 6. When looking at the change in social benefits (models 1, 2 and 3), the percentage of people reducing working time in addition to social benefits is relatively low (respectively 4.3, 1.4 and 2.7 per cent of the original sample) – which indicates that taking into consideration social benefits would lead to underestimate the percentage of time-credit.

< Please, insert table 1 >

The variable distinguishing respondents who want to early retire at baseline from respondents who do not is also interesting. For the total sample, one observed that 33.4 per cent of the respondents declared wishing to early retire at baseline, 34.2 per cent when looking at male workers and 32.6 per cent when looking at female workers. Among the respondents declaring wishing to retire at baseline, 18.4 per cent was retired at follow-up, 27.5 per cent reduced working time, 27.3 per cent kept the same working time and, surprisingly, 19.7 increased working time.

Results for the covariates

Table 2 shows results for some of the covariates that are taken into consideration when using the original model (model 0) for the independent variable looking at job transitions from wave 5 to wave 6. It shows some interesting results. First, it can be clearly assumed that female workers at baseline are more likely than male workers at baseline to be affected by a negative change in depression level – in other words, the level of depression at follow-up tends to be worst for women. As the EUROD is calculated using an ordered logit models, coefficients (log odds) can be easily transformed in odds ratios (by calculating the exponentials of the log odds). Odds ratios are respectively 0.65 and 0.74 for the original model and for the model using Random Forest imputations which means that female are respectively 35 and 26 percentage points less likely to experience a positive change in depression level than men. The table also shows that those who worked in the public sector in wave 5 are more likely to experience a positive change in both depression level (only after imputations) and in quality of life (with or without imputations) compared to workers working in the private sector at baseline. Independently, but in the same vein, respondents who worked continuously between wave 5 and wave 6 are more likely to experience a positive change in self-perceived health and quality of life; that is also true for the change in depression scale but only after imputations. For CASP (OLS regression), workers who worked continuously from wave 5 to wave 6 show a change in CASP higher of 1.28 and 1.22 when looking at the marginal effect (slope). Not surprisingly, it can also be observed that incomes and household wealth have a positive effect on the change in self-perceived health, depression and quality of life, which is consistent with what can be observed in the literature (Benzeval *et al.* 2014; Yamada *et al.* 2015).

< Please, insert table 2 >

Model 0

Results observed for the change in job status from wave 5 to wave 6 (model 0) are presented in table 3.

< Please, insert table 3 >

When looking at the table, what can be observed is that, compared with people moving to retirement from wave 5 to wave 6, all other kinds of transitions are associated with a negative change in self-reported health, depression and quality of life and, overall, this change is significant. In other words, this means that nothing is better for health, depression level and quality of life than retiring. When looking at the details for the different variables, some nuances appear. First, – and this is consistent with what would have been expected – people moving from employment to permanent sickness or disability are highly likely to be affected by a negative change in SPH, EUROD and CASP. This negative association is significant with or without imputations. As the total number of people moving to unemployment is low, results are not significant for the transition from work to unemployment for the change in SPH and

EUROD but the imputations lead to a significant results when looking at the change in quality of life. The slope is -2.07 and significant at 95 per cent. It can therefore be assumed that moving to unemployment at the old age leads to a reduction of the change in quality of life which can be estimated between -3.01 and -1.13, compared to people experiencing a transition from work to retirement. When looking at people remaining in employment in wave 6, it is difficult to distinguish – when selecting the transition to retirement as the reference category – whether people reducing working time would be less likely than people keeping the same or increasing working time to experience a change in SPH, EUROD and CASP. In the three cases (same working time, higher working time or lower working time), coefficient are negatively and significantly associated with a negative change in SPH, EUROD and CASP but confidence intervals overlap, which makes the comparison difficult.

Models 1, 2 and 3

Up to now we do know that compared with those who retired at follow-up, respondents remaining in paid work are more likely to experience a negative change in SPH, EUROD and CASP and this is observed independently from the change in working time. There are two ways to look in-depth at this point. First, we can select another reference category for the change in status from wave 5 to wave 6. Second, we can use the assumptions (models 1, 2 and 3) and distinguishing those who reduce working time in addition to social benefits from those who reduce working time without social benefits – keeping in mind that the amount of people declaring reducing working time in addition to social benefits might be underestimated. That is what is done in table 4. More concretely, the table 4 shows the results for models 1, 2 and 3 (distinguishing working time reduction with and without social benefits based on three different assumptions – as mentioned above) and taking as a reference category a null or positive change in working time. For keeping the table tidy, only working time reduction and transition to retirement are shown. What can be observed in this table? First, looking at the change in depression level, it can be observed that, compared to respondents keeping the same working time or increasing it over the period, people reducing working time without social benefits are more likely to experience a positive change in EUROD, and this is true in the three models and with or without imputations. By contrast, respondents reducing working time in addition to social benefits are more likely to be affected by a negative change in EUROD. This is true when looking at models 1 and 2, after imputations, but results are not significant in model 3. This would lead to the preliminary conclusion that, in terms of change in depression level, working time reduction associated with social benefits tends to lead to a poorer health compared with respondents keeping the same working time or increasing it (and after controlling for depression at baseline and other covariates). A similar conclusion can be drawn when looking at the change in quality of life. Coefficients are not significant when looking at working time reduction without social benefits but when there are social benefits compensating the incomes loss, a negative association (and significant after imputations) can be observed for models 1 and 2. Finally, when looking at the change in self-perceived health, a negative association is observed for people reducing working time compared to people keeping the same or increasing working hours but the model does not allow to make a difference between people reducing working time in addition to social benefits and people reducing working time without social benefits.

< Please, insert table 4 >

In summary, three main findings are observed and they vary depending on the type of health indicator we are looking at. The change in SPH tends to be negative when decreasing working time, independently from social benefits. The change in EUROD tends to be negative for people reducing working time in addition to social benefits but positive for people reducing working

time without social benefits. The change in CASP tends to be negative for those reducing working time with social benefits but non-significant for those who reduce working time without social benefits. Among the different models used for calculating social benefits, models 1 and 2 provide information that tend to be significant while they tend to be non-significant for model 3. As mentioned previously, the model 2 is the one that fits the best with the definition of the time credit. One would conclude this subsection by assuming that the time credit – using the assumption stated above – tends to have a negative impact on self-perceived health, depression and quality of life compared to people keeping the same or increasing working time.

Interaction between wish to early retire and professional transition

As one of the purpose of the time credit was to replace early retirement schemes, it might be interesting to look at the interaction between working time reduction and whether the respondent wished to early retire at baseline. As shown in the first section of this paper, the time credit is a kind of substitute for early retirement schemes and it can be expected that older workers would choose a time credit when access to early retirement is made more difficult (Albanese *et al.* 2015; Cockx *et al.* 2010). The introduction of an interaction effect between two variables in a regressive model basically provides three coefficients: one coefficient for the first variable, one for the second and a third coefficients looking at the association between the first and the second variables. What is provided in table 5 is the sum of the coefficient for the variable 'early retirement' (respondents who want to retire at baseline) and the coefficient for the interaction variable 'early retirement * reduce working time' (respondents who want to retire at baseline and reduced working time from baseline to follow-up). This shows what is the specific impact on health of wishing to retire at baseline in relation with those who did not want to retire at baseline. In other words, coefficients can be interpreted as what wishing to early retire at baseline adds to the model[i].

< Please, insert table 5 >

As the number of respondents reducing working time and the number of respondents wishing to retire at baseline is relatively low, low significance can be expected – and that is the case when looking at figure 5. However, a few interesting observations can be drawn, particularly when looking at the change in quality of life.

Looking at model 0, we can observe that people who wished to early retired at baseline and for whom working hours have increased are affected by a negative change in self-perceived health. When taking into consideration the imputations related to missing data, it can be assumed that the odds of being affected by a positive change in SPH are from 38 to 78 percentage points lower for those who wanted early retirement at baseline. Other results are not significant. When looking at models 1-3, what appears, particularly in model 1 and 2, is that those who reduced working time in addition to social benefits and wanted to early retire at baseline are more likely to experience a positive change in quality of life, compared with those who kept the same working time or increased it and did not want to early retire (wishing to retire at baseline adds respectively 1.79 and 2.79 units to the slope, significant at 95 per cent). Put in another way, even though it can be observed that reducing working time with social benefits tends to lead to a negative change in CASP compared with those keeping the same working time or increasing it, those who wanted to early retire in wave 5 are less likely than those who did not want to early retire to be affected by a negative change in quality of life. However, even though wishing to retire at baseline reduces the odds of being affected by a negative change in quality of life for people reducing working time with social benefits (in models 1 and 2) compared with people keeping the same working hours or increasing working time, it is impossible to say – because

of the size of the confidence interval – whether reducing working time in addition to social benefits for people wishing to early retire at baseline would have a positive or negative impact on health[ii].

Finally, another interesting point is about those who reduced working time without social benefits. It can be observed in models 1, 2 and 3 that those who wished retiring earlier and reduced working time without social benefits are less likely to experience a positive change in self-perceived health – in comparison with those who increased or kept the same working time – compared with those who did not want to early retire.

Limitations

This research contains four main limitations.

1) It assesses the association between working time reduction and self-perceived health, quality of life and depression level at a certain point of time and does not look at the change in this association from one period to another. Waves 5 and 6 were completed respectively in November 2013 and November 2015 whilst the original time-credit scheme was already overhauled. The association captured in this paper corresponds to what was observed during a particular period, particularly characterized both by a restricted access to this arrangement and by a less positive impact on the calculation of the state pension.
2) It is based on a two-waves sequence and does not capture the long run changes in self-perceived health, depression level and quality of life. Even though extending the analysis to three waves would not be likely to affect significantly the sense of the association (Wels 2018a), it can be expected that the long-run impact of change in working time might differ from the short term impact (Coe and Zamarro 2011). Although, this would reduce drastically the size of the sample, particularly because of a relatively high attrition rate.
3) It controls for the sector of activity but does not look in-depth at what are the dynamics that might be observed at sector level, particularly in sectors of activity characterized by shift work, night work or short term contracts.
4) It uses different models for distinguishing those who reduced working time in addition to social benefits from those who did not. Although, the distinction is largely affected by the models and does not guarantee as much as a proper information about this matter that would be contained in the survey that time-credit beneficiaries are adequately distinguished. Furthermore, we were unable to distinguish the whole range of arrangements used for reducing working time in the led up to retirement (for a comparative overview of these schemes, please read Wels 2018b).

Discussion

What do results presented in this paper mean in terms of public policy? First, they highlight the necessity of looking carefully at the heterogeneity of the different types of transitions to retirement, particularly taking into consideration working time reductions in late career. These different types of trajectories towards retirement do not have the same nature as they correspond to different types of arrangements. The case of working time reduction in late career is particularly significant as, in Belgium, the reduction might be associated with additional social benefits aiming at covering the income loss, but it might also not be covered by any kind of financial transfer coming from the state. What the paper clearly shows is that working time reductions in late career tend to be associated with a negative change in self-perceived health, depression level and quality of life. Second, one also needs to take into consideration institutional changes that occurred over the selected period to understand the type of arrangements workers use before retiring. Using such a policy-oriented perspective, one may

observe that the raise in time-credit in Belgium may be explained by a strong reduction in the use of early retirement schemes. The time-credit is, at least partly, explained by a restricted access to arrangements that were used in the past for retiring before the pension age. What is obvious in terms of public policies is that part-time arrangements in late career were implemented following previous early-retirement schemes (in countries where these schemes were implemented) and are, in their implementation, the extension of those schemes. These path dependencies (Palier 2002) in the way working time can be reduced in late career play a great role in explaining arrangements implemented at national level. This raises an issue about targeting a specific kind of arrangement within an international database which does not provide all the necessary information to do so. The paper investigates three different models and results seem to be consistent, i.e. no significant difference is observed when comparing the models. But they should be taken with caution as they are post-calculated models. Third, one may assume that the heterogeneity in working time reduction leads to different types of change in health once the working time is reduced. Results observed above suggest that – once controlled for external factors – the transition from work to retirement affects positively health, depression and quality of life while reducing working time with or without additional social benefits is associated with a deterioration in health, depression and quality of life within the sequence. The paper uses an interaction effect between wishing to retire at baseline and the type of working time transition over the period. What appears is that people wishing to retire and reducing working time in addition to social benefits tend to be less affected by a negative change in quality of life compared to those who did not want to retire early at baseline. However, these results correspond to what is observed over a relatively short time-sequence (two to three years in this case) and – as it is established that the benefits of retiring in terms of self-perceived health tend to vary depending on the length of the sequence (Coe and Zamarro 2011) – it would be relevant to look in further research at what would happen over a longer time period. Further research will be developed in the coming years. The process of merging SHARE data with administrative data is ongoing and this will lead to more accurate estimates in terms of how public policies affect health and quality of life in late career.

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Conflict of interest

None declared

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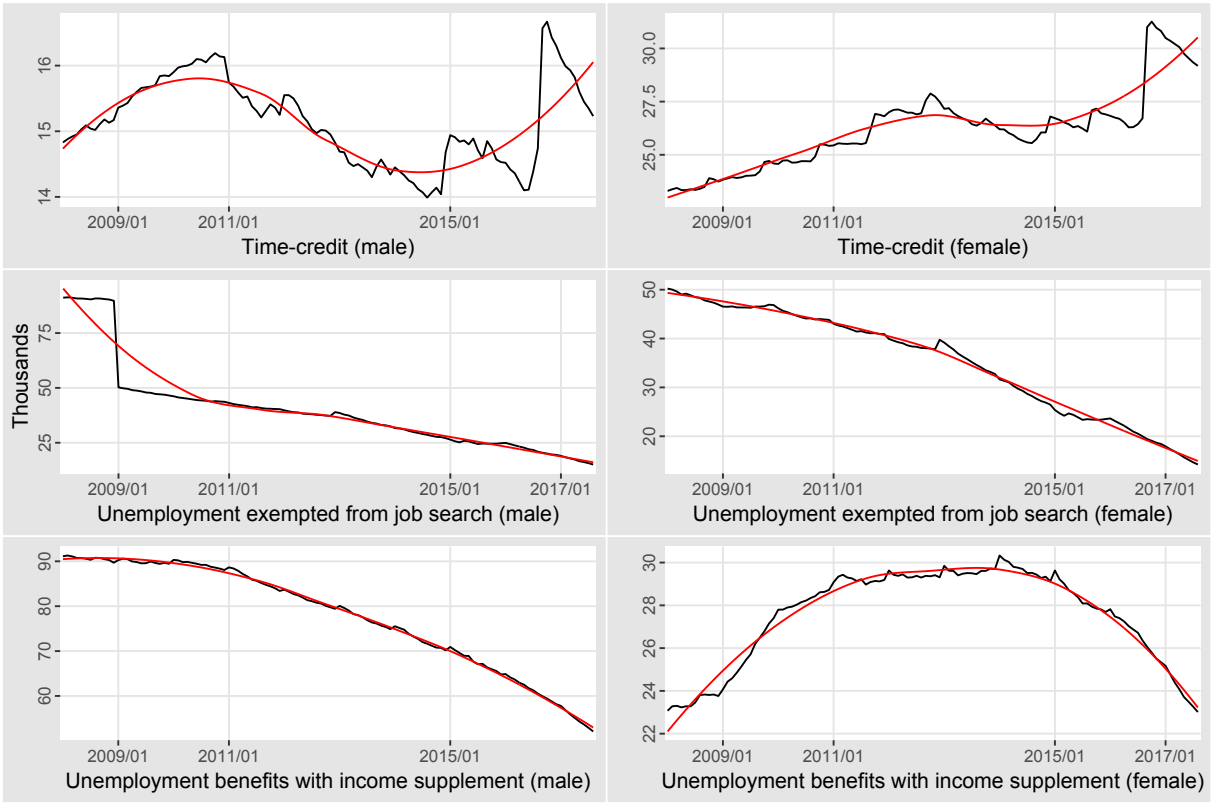
Figure 1. Time credit end of career, unemployment exempted from job search and unemployment benefits with income supplement from January 2008 to August 2017, monthly data and loess curve (in thousands).



Source: National Office for Employment (ONEm-RVA), author's calculation

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Figure 2. Distribution of the change in SPH, EUROD and CASP

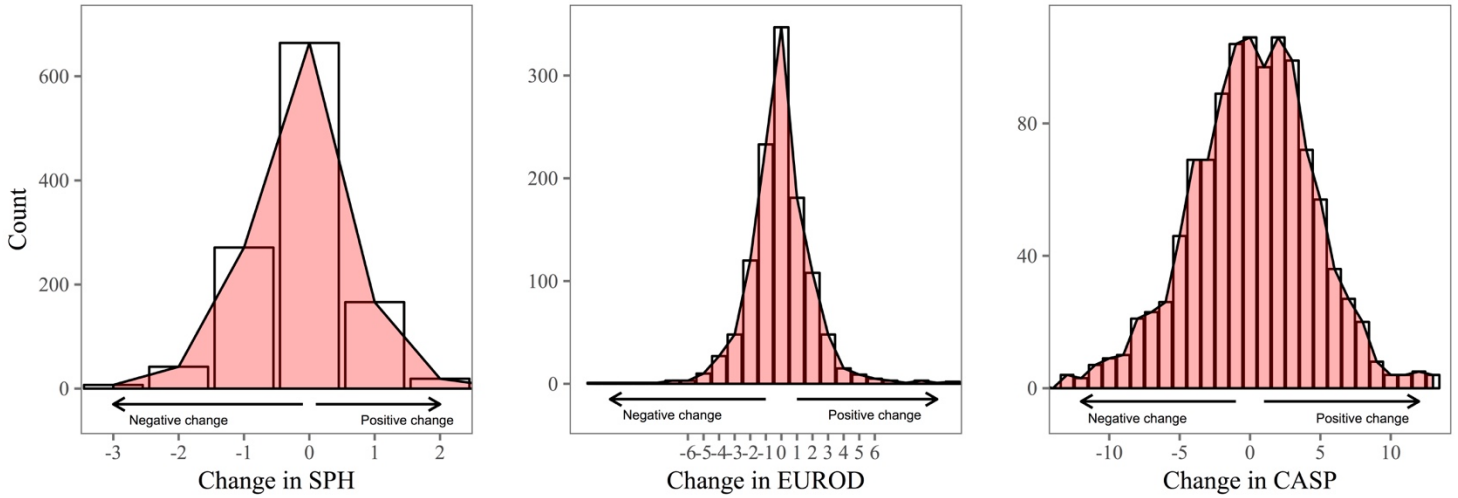

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Table 1. Models summary, total population and percentages

		Model 0		Model 1	Model 2	Model 3
Retired		128 (11)	Retired	———	———	———
Unemployed		16 (1.4)	Unemployed	———	———	———
Sick or disabled		22 (1.9)	Sick or disabled	———	———	———
Homemaker		5 (0.4)	Homemaker	———	———	———
Other		5 (0.4)	Other	———	———	———
No information		6 (0.5)	No information	———	———	———
Working time :	Same	355 (30.4)	Same or higher	611 (52.3)	611 (52.3)	611 (52.3)
	Increase	257 (22)	Decrease & benefits	50 (4.3)	16 (1.4)	31 (2.7)
	decrease	374 (32)	Decrease	325 (27.8)	359 (30.7)	344 (29.5)
Total		1,168 (100)	Total	1,168 (100)	1,168 (100)	1,168 (100)

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Table 2. Selected covariates in model 0

	SPH		EUROD		CASP	
	ordered logistic		*ordered logistic*		*OLS*	
		(rf)		(rf)		(rf)
Female	0.04	0.04	-0.43***	-0.30***	0.18	0.09
	(-0.22, 0.30)	(-0.07, 0.14)	(-0.66, -0.19)	(-0.40, -0.21)	(-0.35, 0.71)	(-0.11, 0.29)
Age	0.01	0.01	0.01	-0.01	0.10***	0.09***
	(-0.02, 0.04)	(-0.01, 0.02)	(-0.03, 0.03)	(-0.01, 0.01)	(0.03, 0.17)	(0.07, 0.12)
Civil servant	-0.14	-0.02	0.23	0.13**	0.72*	0.60***
	(-0.51, 0.24)	(-0.17, 0.119)	(-0.10, 0.56)	(0.01, 0.26)	(-0.04, 1.47)	(0.32, 0.88)
Self-employed	0.17	0.16**	-0.03	-0.01	0.41	0.26*
	(-0.22, 0.57)	(0.01, 0.32)	(-0.38, 0.31)	(-0.14, 0.13)	(-0.40, 1.22)	(-0.05, 0.57)
Wish Early	-0.65***	-0.55***	-0.23*	-0.19***	-0.15	-0.09
retirement	(-0.91, -0.38)	(-0.65, -0.45)	(-0.47, 0.012)	(-0.29, -0.10)	(-0.69, 0.39)	(-0.29, 0.11)
Continuous work	0.60**	0.57***	0.43	0.45***	1.28**	1.22***
	(0.02, 1.19)	(0.31, 0.82)	(-0.09, 0.95)	(0.22, 0.68)	(0.11, 2.45)	(0.72, 1.72)
Household incomes	0.17**	0.12***	0.09	0.05**	0.25	0.22***
	(0.01, 0.33)	(0.06, 0.19)	(-0.05, 0.23)	(0.01, 0.11)	(-0.07, 0.57)	(0.10, 0.34)
Earnings	0.04	0.03***	-0.01	0.02*	0.11*	0.07***
	(-0.01, 0.10)	(0.01, 0.05)	(-0.05, 0.05)	(-0.01, 0.04)	(-0.01, 0.22)	(0.03, 0.12)

Note : *p < 0.1,**p < 0.05,***p < 0.01.

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Table 3. Model 0

	SPH		EURO-D		CASP	
	ordered logistic		*ordered logistic*		*OLS*	
		(rf)		(rf)		(rf)
Unemployed	-0.04	-0.22	0.11	0.01	-1.90	-2.07***
	(-1.13, 1.05)	(-0.70, 0.27)	(-0.86, 1.08)	(-0.42, 0.43)	(-4.18, 0.39)	(-3.01, -1.13)
Sick or disabled	-2.56***	-2.32***	-1.74***	-1.63***	-1.95*	-1.91***
	(-3.51, -1.60)	(-2.74, -1.91)	(-2.65, -0.84)	(-2.03, -1.22)	(-3.92, 0.02)	(-2.73, -1.08)
Homemaker	-1.34	-1.48***	0.76	0.69*	1.32	0.75
	(-3.07, 0.39)	(-2.24, -0.72)	(-0.79, 2.32)	(-0.01, 1.39)	(-2.73, 5.37)	(-0.85, 2.36)
Other	-0.57	-0.74*	-0.59	-0.47	-1.65	-1.81**
	(-2.45, 1.31)	(-1.57, 0.10)	(-2.25, 1.07)	(-1.21, 0.27)	(-5.35, 2.05)	(-3.43, -0.20)
Decrease WT	-1.10***	-1.13***	-0.83***	-0.86***	-1.60**	-1.51***
	(-1.80, -0.40)	(-1.43, -0.82)	(-1.45, -0.21)	(-1.13, -0.58)	(-3.01, -0.19)	(-2.11, -0.91)
Reduce WT	-0.91**	-0.95***	-0.95***	-1.01***	-1.86**	-1.77***
	(-1.63, -0.19)	(-1.27, -0.63)	(-1.59, -0.31)	(-1.29, -0.73)	(-3.32, -0.39)	(-2.39, -1.15)
Same WT	-0.81**	-0.82***	-1.06***	-1.08***	-1.37*	-1.33***
	(-1.52, -0.10)	(-1.13, -0.51)	(-1.70, -0.43)	(-1.37, -0.80)	(-2.81, 0.06)	(-1.94, -0.73)

Note : *p < 0.1,**p < 0.05,***p < 0.01.

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Table 4. Models 1, 2 and 3

		SPH		EURO-D		CASP	
		ordered logit		*ordered logit*		*OLS*	
Model			(rf)		(rf)		(rf)
(1)	Retirement	0.90**	0.95***	0.94***	0.97***	1.39*	1.40***
		(0.19, 1.62)	(0.63, 1.26)	(0.31, 1.58)	(0.69, 1.25)	(-0.05, 2.83)	(0.78, 2.01)
	WT reduction	-0.42	-0.43***	-0.33	-0.25**	-0.87	-0.90***
	plus social benefits	(-1.03, 0.19)	(-0.70, -0.16)	(-0.85, 0.18)	(-0.48, -0.02)	(-2.11, 0.37)	(-1.43, -0.36)
	WT reduction	-0.22	-0.22***	0.27**	0.28***	0.11	0.18
	without social benefits	(-0.50, 0.05)	(-0.35, -0.10)	(0.02, 0.52)	(0.17, 0.39)	(-0.45, 0.68)	(-0.06, 0.43)
(2)	Retirement	0.92**	0.96***	0.98***	1.00***	1.46**	1.46***
		(0.21, 1.63)	(0.65, 1.27)	(0.35, 1.62)	(0.72, 1.28)	(0.03, 2.90)	(0.85, 2.07)
	WT reduction	-0.44	-0.40*	-0.49	-0.37*	-0.92	-0.92**
	plus social benefits	(-1.49, 0.60)	(-0.86, 0.06)	(-1.32, 0.34)	(-0.74, 0.01)	(-2.96, 1.11)	(-1.82, -0.02)
	WT reduction	-0.24*	-0.24***	0.23*	0.24***	0.03	0.09
	without social benefits	(-0.51, 0.03)	(-0.36, -0.12)	(-0.01, 0.47)	(0.13, 0.34)	(-0.51, 0.58)	(-0.15, 0.33)
(3)	Retirement	0.91**	0.95***	1.01***	1.01***	1.51**	1.52***
		(0.20, 1.63)	(0.64, 1.27)	(0.36, 1.64)	(0.73, 1.30)	(0.07, 2.97)	(0.91, 2.13)
	WT reduction	-0.63	-0.63***	-0.16	-0.08	-0.22	-0.28
	plus social benefits	(-1.40, 0.14)	(-0.96, -0.29)	(-0.78, 0.47)	(-0.35, 0.20)	(-1.77, 1.33)	(-0.95, 0.39)
	WT reduction	-0.22	-0.22***	0.22*	0.23***	-0.01	0.06
	without social benefits	(-0.49, 0.05)	(-0.344, -0.102)	(-0.02, 0.46)	(0.12, 0.34)	(-0.56, 0.54)	(-0.18, 0.30)

Note: reference category: same or higher working time. *p < 0.1,**p < 0.05,***p < 0.01.

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Table 5. Interaction effect for models 0, 1, 2 and 3

		SPH		EURO-D		CASP	
		ordered logit		*ordered logit*		*OLS*	
Model			(rf)		(rf)		(rf)
(0)	Inrease WT[i]	-1.05*	-0.67**	-0.92	0.06	-1.07	-1.01*
		(-2.26, 0.15)	(-1.54, -0.48)	(-1.17, 0.96)	(-0.43, 0.86)	(-3.51, 1.37)	(-1.95, 0.1)
	Reduce WT[i]	-0.47	-0.88	0.8	-0.06	0.5	0.65
		(-1.21, 1.56)	(-1.51, 0.75)	(-1.22, 0.89)	(-0.51, 0.68)	(-1.8, 2.81)	(-0.35, 1.65)
(1)	WT reduction	0.62	0.67*	0.37	0.43	1.64	1.79***
	plus social benefits[ii]	(-1.04, 2.28)	(-0.06, 1.41)	(-1.08, 1.81)	(-0.22, 1.07)	(-1.76, 5.04)	(0.41, 3.39)
	WT reduction	-0.67	-0.63**	-0.24	-0.13	0.38	0.51
	without social benefits[ii]	(-1.64, 0.30)	(-1.06, -0.20)	(-1.13, 0.65)	(-0.52, 0.27)	(-1.59, 2.34)	(-0.35, 1.37)
(2)	WT reduction	-0.31	-0.39	0.17	0.15	2.49	2.79***
	plus social benefits[ii]	(-2.79, 2.16)	(-1.47, 0.70)	(-1.87, 2.56)	(-0.77, 1.06)	(-0.48, 7.33)	(0.64, 4.93)
	WT reduction	-0.49	-0.45**	-0.17	-0.05	0.45	0.60
	without social benefits[ii]	(-1.45, 0.46)	(-0.87, -0.03)	(-1.04, 1.06)	(-0.44, 0.33)	(-1.35, 2.38)	(-0.24, 1.45)
(3)	WT reduction	1.38	1.29	0.53	0.56*	1.11	1.26
	plus social benefits[ii]	(-0.49, 3.25)	(0.47, 2.11)	(-1.05, 2.11)	(-0.14, 1.26)	(-2.73, 4.94)	(-0.42, 2.94)
	WT reduction	-0.67	-0.62**	-0.22	-0.10	0.52	0.67
	without social benefits[ii]	(-1.64, 0.30)	(-1.05, -0.19)	((-1.10, 0.67)	(-0.50, 0.29)	(-1.44, 2.48)	(-0.18, 1.96)

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Note: references [I]= same working time 5; [ii]= same or higher working time. Note : *p < 0.1,**p < 0.05,***p < 0.01.

Coefficients are calculated as the sum of the coefficients for the variable measuring whether the respondent wish to early retire at baseline and the interaction between wishing to retire and the variables shown in the table. Consequently, coefficients show what wishing to early retire at baseline adds in terms of coefficients (log odds for SPH and EUROD and slope for CASP).

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End notes

[i] Put in another way, the interaction effect in regressive model may be written as: $H = \beta_a * A + \beta_b * B + \beta_c(A * B)$; where H is the dependent variable, A and B are two independent variables (in this case, early retirement wish and the type of transition), β_a and β_b are the coefficients related to each variable (either the log odds in the ordered logit model or the slope in the OLS regression) and β_c is the coefficient measuring the interaction between variables A and B. In our model, we can assume that A is a binary variable distinguishing people who want to early retire at baseline from people who do not. It is therefore coded 0 or 1. B is the type of transition, including the type of change in working time. Therefore, the coefficient explaining H can be calculated as follow when the person do not want to early retire at baseline: $H = \beta_a * 0 + \beta_b * B + \beta_c(0 * B) = \beta_b * B = \beta_b$; and, similarly, the coefficient explaining H can be calculated as follow when the respondent wants to early retire: $H = \beta_a * 1 + \beta_b * B + \beta_c(1 * B) = \beta_a + (\beta_b * B) + (\beta_c * B) = \beta_a + \beta_b + \beta_c$. So, the difference between wishing to early retire or not is simply $\beta_a + \beta_c$, that is what is shown in table 5.

[ii] These results are not shown in the table but are calculated as follow: $\beta_a + \beta_b + \beta_c$. For the change in CASP, for model 1, the coefficient for people reducing working time in addition to social benefits is 0.02 (CI95%: -4.86, 4.91) and 0.06 (CI95%: -1.96, 2.3) after imputations. For model 2, the coefficient is -2.25 (CI95%: -4,97, 0.48) and -2.33 (CI95%: -3.54, 1.12) after imputations.

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