



Mobilising the Potential of  
Active Ageing in Europe

## **EXTENDING WORKING LIVES**

### **WORK PACKAGE 3 | TASK 4**

#### **DELIVERABLE D3.4.2**

#### **REPORT ON SECONDARY ANALYSES**

##### **CONTENTS**

**2 „RETIREMENT POLICIES AND LEARNING IN OLD AGE IN EUROPEAN COUNTRIES: COMPARATIVE ANALYSIS“ (KIRSTI NURMELA)**

**29 „LABOUR DEMAND AND LONGER WORKING LIVES IN EUROPE: DRIVERS AND BARRIERS IN COMPANIES“ (ANDREA PRINCIPI, JÜRGEN BAUKNECHT, MARCO SOCCI, MIRKO DI ROSA)**

**57 „WORKING CONDITIONS AND RETIREMENT: HOW IMPORTANT ARE HR POLICIES IN PROLONGING WORKING LIFE?“ (MIKKEL BARSLUND, JÜRGEN BAUKNECHT, ANDREAS CEBULLA)**

**DECEMBER 2016**



Research for this paper was conducted as part of MoPAct, a four year project funded by the European Commission under the 7<sup>th</sup> Framework Programme to provide the research and practical evidence upon which Europe can begin to make longevity an asset for social and economic development. The paper is also published on the MoPAct website ([www.mopact.group.shef.ac.uk](http://www.mopact.group.shef.ac.uk)) as Deliverable 3.4. See the website and the penultimate page of this paper for more information of the project.

# „RETIREMENT POLICIES AND LEARNING IN OLD AGE IN EUROPEAN COUNTRIES: COMPARATIVE ANALYSIS“

KIRSTI NURMELA

PRAXIS CENTRE FOR POLICY STUDIES (TALLINN)

## Abstract

The paper explores interaction between individual and institutional factors on participation in non-formal learning in 50-64 age group in 19 European countries. The analysis is based on Adult Education Survey 2011 data for individual level variables and Eurostat and MISSOC (Mutual Information System on Social Protection) database for macro level variables. The analysis is based on logistic regression models in each country to explore the patterns of interaction between retirement age and participation in non-formal education in late careers. In order to analyse the role of institutional variables in explaining cross-country differences in learning participation among older age groups, multilevel logistic regression models are used. Multilevel models confirm that, based on the pooled sample of all 19 countries, higher statutory retirement age is related to higher participation in non-formal learning in the 50-64 age group. However, I do not find a significant effect in generosity of old-age pensions on learning. Nevertheless, analysing the individual country models shows that interaction between retirement age and learning participation is not always so straightforward. There are many countries that deviate from this general trend. This confirms that while increasing retirement age may have some positive effects on learning, this does not apply in all countries. Further, the results show that positive interaction between retirement age and participation in non-formal learning occurs among both men and women. However, highly educated men benefit the most from increasing retirement age.

## Summary

One of the central questions of MoPAct WP3 research is how to foster extending working lives aided by lifelong learning and how to identify effective strategies that help to reach this aim<sup>1</sup>. From the lifelong learning perspective, this brings into forefront two questions: (1) what is the interaction between lifelong learning and longer working lives and (2) what kind of strategies/ practices can foster lifelong learning and longer learning careers at individual level?

---

<sup>1</sup> Naegele, G., Bauknecht, J. 2013 WP3: Conceptual framework. <http://mopact.group.shef.ac.uk/wp-content/uploads/2013/10/Extending-working-lives-conceptual-framework.pdf>

European institutions stress the role of continuing vocational education and training in allowing men and women of all ages (re-)entry into and to fully participate in the labour market in quality jobs<sup>2</sup>. The underlying view is that inadequate education is an important cause for early retirement because it increases the risk of becoming unemployed and decreases an individual's chances of receiving job offers<sup>3</sup>. Also, participation in education and training can assist older workers in keeping up with dynamic labour market requirements<sup>4</sup>.

European countries fare differently when it comes to participation in lifelong learning among older age groups. In 2011, share of participants in non-formal learning in the 50-64 age group reaches from 72% in Sweden to 35% in Latvia. What differentiates the 'successful' countries from those 'catching up', i.e. what kind of strategies lead to longer learning careers?

Based on the interaction between longer learning careers and extended working life, it could be argued that one factor defining success in achieving high lifelong learning participation among older age groups is retirement policy. It is expected that as retirement policies affect the expected length of individuals' working lives, it also has an effect on incentives of workers to participate in training as well as incentives for employers to offer such training or cover part of the associated costs<sup>5</sup>. The paper focuses on analysing the role of retirement policies in longer learning careers – do retirement policies to prolong the employment careers of individuals also induce more investments in learning in late careers and does this interaction hold for all European welfare systems? Analysis is conducted using logistic regression models by countries and multilevel models including the pooled dataset of 19 European countries<sup>6</sup> based on Adult Education Survey 2011 dataset. For macro-level variables on national retirement policies, MISSOC database and Eurostat aggregate data are used.

The results suggest that retirement age (both statutory retirement and aggregate actual retirement age based on Eurostat SILC data) and participation in non-formal learning in 50-64 age group has a statistically significant and positive interaction among both men and women. Thus, higher retirement age also means higher participation in learning in older age groups. In my analysis, I did not find a significant effect of generosity of pension schemes to suggest that high replacement rates of pensions reduce incentives to invest in learning. This leads to a conclusion that high retirement age is a good measure to induce learning investments in late careers. However, we also need to keep in mind that most countries with high statutory retirement age (Denmark, Sweden, Switzerland) have high participation rates in learning in general. Also, we see (particularly in case of men) that even in case of equal statutory retirement age (in many countries, men's retirement age stands at 65 as at 2011), variation in participation can be high.

---

<sup>2</sup> Council of the European Union. 2012. "Council Declaration on the European Year for Active Ageing and Solidarity between Generations (2012): The Way Forward." Brussels. <http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2017468%202012%20INIT>

<sup>3</sup> Stenberg, Anders, Xavier de Luna, and Olle Westerlund. 2010. "Can Adult Education Delay Retirement from the Labour Market?" *Journal of Population Economics* 25 (2): 677–96

<sup>4</sup> Kristensen, Nicolai. 2012. "Training and Retirement." 6301. IZA Discussion Paper. Bonn: Institute for the Study of Labor (IZA). <http://ftp.iza.org/dp6301.pdf>

<sup>5</sup> Paccagnella, Marco. 2016. "Age, Ageing and Skills: Results from the Survey of Adult Skills." Education Working Paper 132. Paris: OECD Publishing

<sup>6</sup> Countries included in the analysis: Germany, Sweden, Austria, Belgium, Switzerland, Cyprus, Denmark, Spain, Finland, Italy, Portugal, Bulgaria, Estonia, Hungary, Slovenia, Czech Republic, Latvia, Slovakia, France.

Thus, while retirement age does have a significant effect on average (taking all countries together), there are a number of countries deviating from this general patterns. Thus, we can say that **high retirement age is a condition supporting longer learning careers, but it is not a sufficient measure to raise participation in learning on its own**. Retirement age and training policies at national, regional and company level can be mutually reinforcing (e.g. high retirement age in combination with training policies accessible in pre-retirement age) or hindering (e.g. when training policies are not supported by longer horizons in working lives). Thus, when analysing the success of individual learning policy measures at company level, as those described in the MoPAct WP3 case studies, the general context of retirement age and, hence, length of working life is an important factor to take into consideration.

Results suggest that the positive interaction between retirement age and training participation is found among both men and women. However, individual country models show that gender differences in retirement age do not result in gender differences in learning participation. Probability to participate in non-formal learning differs significantly among men and women in 6 countries of which only two coincide with the countries with gender difference in statutory retirement age. **As women's participation probability is higher compared to that of men's, women seem to be more prone to learning in older age groups, compensating for the lower retirement age found in some countries.**

Finally, the analysis explored interaction between participation in learning and education across age groups and whether the effect of retirement age differs by educational attainment. Results suggest while probability to participate in learning remains unchanged across age groups among those with higher education, it decreases among those with lower educational attainment. As a result, in several countries, differences in participation probability between people with different educational attainment increase in old age groups. Further, based on a pooled sample of 19 countries, we find that the effect of retirement age does differ by educational level among men while we find no differences among women. **It is particularly the highly educated men who are more impacted by differences in retirement age as their increase in participation probability is steeper as country's retirement age goes up compared to men with lower educational attainment.**

## Table of Contents

<b>Introduction.....</b>	<b>6</b>
<b>1. Theoretical framework.....</b>	<b>7</b>
1.1. Participation in learning in old age.....	7
1.2. Institutional influences.....	8
<b>2. Data and method used.....</b>	<b>10</b>
<b>3. Analysis.....</b>	<b>12</b>
3.1. Descriptive data.....	12
3.2. Comparative analysis of country-specific regression models.....	14
3.2.1. Gender and retirement age.....	14
3.2.2. Education and retirement age.....	17
3.3. Multilevel analysis.....	19
<b>4. Discussion and conclusions.....</b>	<b>25</b>
<b>References.....</b>	<b>27</b>

## Introduction

This report is part of the MoPAct project – Mobilising the Potential of Active Ageing in Europe<sup>7</sup>. The report is prepared in the research field Extending Working Lives, Task 4: identifying and assessing structural drivers of and barriers to innovation. The aim of this particular paper is to examine drivers and barriers to lifelong learning in later working life. The paper explores the incentives of disincentives created by retirement policies on learning in late careers.

Governments across Europe make considerable efforts to prolong active participation in working life to tackle population ageing and increasing pressures on social systems this entails. European Commission (2010) and OECD (2006) call for a greater involvement of older workers in labour market to support labour force growth. One measure to support this aim is the education and training of adults. “Adult learning can enhance significantly an older worker’s employability, not to mention wages and firm profits” (OECD 2006, 73). European institutions further stress the role of continuing vocational education and training in allowing men and women of all ages (re-)entry into and to fully participate in the labour market in quality jobs (Council of the European Union 2012). The underlying view is that inadequate education is an important cause for early retirement because it increases the risk of becoming unemployed and decreases an individual’s chances of receiving job offers (Stenberg, Luna, and Westerlund 2010). Also, participation in education and training can assist older workers in keeping up with dynamic labour market requirements (Kristensen 2012).

It could be argued that one important factor in learning longer is retirement policy. This assumption lies in the human capital theory (Becker 1962) suggesting that an individual’s decision to participate in learning depends on the horizon during which one can balance out the investment – the shorter the horizon (in this case expected remaining period in the labour market), the costlier it becomes to take up learning and the less incentives to invest in learning. It is expected that as retirement policies affect the expected length of individuals’ working lives, it also has an effect on incentives of workers to participate in training as well as incentives for employers to offer such training or cover part of the associated costs (Paccagnella 2016).

Empirical evidence so far suggests that generous retirement schemes discourage older workers from taking part in training (Fouarge and Schils 2009; Bassanini et al. 2005) whereas flexible early retirement options encourage this (Fouarge and Schils 2009). Several authors suggest positive relationship between higher retirement age and higher participation in learning in old age (Montizaan, Cörvers, and De Grip 2010 in Netherlands; Battistin et al. 2013 in Italy; OECD 2006). At the same time, there are considerable arguments towards variation of this interaction within countries (between different societal groups) as well as across countries.

With the continuous drive towards providing incentives to work longer, most European countries have introduced reforms to equalise retirement age between men and women and raise minimum retirement age (MISSOC database). As a result, countries move towards less variation in statutory retirement age. At the same time, lifelong learning systems vary considerably between countries (Green 2006; Saar, Ure, and Desjardins 2013). The current paper, relying on 2011 data, raises the question: does the interaction

---

<sup>7</sup> More detailed information on the project available at: <http://mopact.group.shef.ac.uk/>

between retirement age and generosity of old-age pensions still hold based on more recent data, after several countries have undergone changes in retirement policies? Also, does the interaction apply across the various welfare systems of Europe, including the Eastern European countries, which are in many cases underrepresented in previous research.

Second, I also expect some variations at individual level in the interaction between retirement age and participation in learning in late careers. In particular, statutory retirement age still differs for men and women in many European countries (even though most of them have foreseen gradual equalisation). Also, some authors find gender differences in learning patterns (for a longer discussion see Wozny and Schneider 2014). In the current paper, I will explore whether and how these gender differences translate into differences in participation in learning in old age across European countries. In particular, following the main hypothesis of the interaction between retirement age and gender, I raise the question: do gender differences in retirement age also translate into gender differences in learning among older age groups?

Third, impact of educational attainment on learning patterns in old age is explored. Some authors suggest higher education is no longer an advantage in older age groups compared to average educational attainment when it comes to participation in learning (Fouarge and Schils 2009). This suggests the third research question: does the effect of retirement age on learning differ by educational level?

Analysis relies on individual country regression models and multilevel models. The first approach enables exploration of patterns across individual countries. With multilevel models, it is possible to specify a hierarchical dataset to estimate the effects of national level policies and their role in explaining cross-country variation in participation in learning. The analysis is based on Adult Education Survey 2011 by Eurostat including data on 19 countries. For macro-level variables on national retirement policies, MISSOC database and Eurostat aggregate data are used.

The paper is structured as follows: a brief overview of the theoretical framework for this paper is outlined in the next chapter. This is followed by a discussion of the data and analysis methods. Chapter 3 outlines the analysis followed by a discussion of the results.

## **1. Theoretical framework**

### **1.1. Participation in learning in old age**

It has widely been recognised that participation in learning declines with age (for instance Cedefop 2015; Desjardins, Rubenson, and Milana 2006). Theoretical foundations of explaining this pattern lie in human capital theory (Becker 1964). According to this, participation in education and training is seen as an investment to increase human capital. An individual's decision to invest in training is based upon a comparison of the net present value of costs (i.e. direct training costs and lower wages while in training) and the net present value of benefits (i.e. higher marginal product and higher wages) of such an investment. Human capital theory predicts that in older age, participation in training declines as the associated costs outweigh the benefits. There are several reasons put forth to explain this.

First, because of the approaching retirement and expected exit from the labour market, the payback period to balance out the investments shortens (Fouarge and Schils 2009). Second, it is often assumed that older workers are less trainable than younger workers because their learning ability and their flexibility to adapt to new situations are considered to be lower (Andries De Grip and Jasper Van Loo 2002). As some skills surveys have shown, the cognitive skills levels are lower for older workers, which might limit their participation in learning (Desjardins and Warnke 2012). Thus, the gain from training for older workers is presumably lower.

A third set of reasons is related to supply and availability of learning opportunities that meet the demand and needs of older individuals (Desjardins, Rubenson, and Milana 2006). Some assert that they are geared toward the needs of younger adults and that the supply of opportunities is limited for older adults (Desjardins, Rubenson, and Milana 2006).

## **1.2. Institutional influences**

There is a remarkable cross-country variability in the difference in participation rates between older and younger age groups (for instance Cedefop 2015). This suggests that participation in learning is not merely an individual decision, but a process that takes place within a particular institutional context which shapes the potential choices and actions of individuals. Individual agency is affected by and interacts with the prevailing structural conditions that are binding for a given individual and therefore should not be treated in isolation (Desjardins and Rubenson 2013).

Institutional and public policy frameworks have the power to condition the provision and take-up of adult education and thus either mitigate or exacerbate various constraints (Desjardins and Rubenson 2013). Thus, it is clear that in order to understand participation patterns and constraints to participation in European countries, we need to take the institutional context into consideration. An interaction often discussed when talking about participation in learning in old age is that between retirement policies and learning participation.

Retirement policies have an important role in shaping training participation among older age groups. In particular, retirement policies determine the timing of labour market exit which sets the horizon for the payback period of training investments as stipulated in human capital theory. Fouarge and Schils (2009) differentiate between generosity and flexibility of the retirement scheme, focusing on early retirement. Generosity refers to financial attractiveness of retirement (i.e. high replacement rates) while flexibility refers to the 'freedom of choice' the individual has in deciding upon the timing of retirement, or how easy or difficult it is to meet the entitlement conditions of the early retirement schemes (Fouarge and Schils 2009). They find that generous early retirement schemes discourage older workers from taking part in training, whereas flexible early retirement schemes encourage this (Fouarge and Schils 2009).

The negative effect of generous retirement schemes has further been supported by other authors. Bassanini et al (2005) show that the interaction of age and the implicit tax on continued work is negative. The decline in training is higher in countries with a more generous pension system, because the higher implicit tax on continuing work at age 60 to 64 reduces the expected time horizon required to recoup the costs of the investment (Bassanini et al. 2005). Using a natural experiment approach, Montizaan, Cörvers,

and De Grip (2010) come to a similar conclusion. They find that the pension reform diminishing pension rights postpones expected retirement and increases participation in training courses among older employees in the Dutch public sector. They suggest that postponing retirement by one year can lead to 1.3% higher training participation (Montizaan, Cörvers, and De Grip 2010, 244).

Another mechanism that regulates the investment horizon in old age is the minimum statutory retirement age. Battistin et al. (2013) find that the increase in minimum retirement age that occurred in Italy in the second part of the 1990s has contributed to reduce retirement and to increase training among older workers. They compare the relative effects of changes in minimum retirement age and in training subsidies on their measure of training and find that, to compensate for the negative effects induced on training by a one-year reduction in minimum retirement age, training subsidies would have to increase by 7 to 13 real euro per head (Battistin et al. 2013). This suggests that increases in minimum retirement age, that are typically motivated by the need to accommodate an increasing ageing society, maybe a much more effective tool to promote the training of older workers than “proper” traditional training policies, which consist in subsidizing workers and firms (Battistin et al. 2013). Using a different approach to retirement age, OECD (2006) has found a positive and statistically significant correlation across countries between the (adjusted) incidence of training for older workers relative to younger workers and the average effective age of retirement. This refers to the age older workers withdraw from the labour market, despite statutory requirements. Thus, using indicators of actual retirement, the relative incidence of training for older workers still tends to be higher in those countries where workers withdraw from the labour market at an older age (OECD 2006, 73).

In the current paper, the interaction between retirement age (testing for both statutory as well as actual age of withdrawal from labour force) and learning in age 50+ and generosity of pensions and learning in age 50+ is explored based on a sample of 19 European countries. This includes a number of Eastern European countries, which have often been excluded in previous research. Based on previous literature, the following hypotheses are raised:

- Higher retirement age is related to higher training participation in age 50+.
- Generous pensions schemes are related to lower training participation in age 50+.

In many countries, retirement patterns differ for men and women. This is particularly true for Eastern European region, where statutory retirement age differs for men and women in most countries (MISSOC database). According to the ‘investment horizon’ hypothesis, gender differences in retirement age should also reveal in different learning patterns, leading to the following hypothesis:

- Gender differences in retirement age translate into gender differences in participation in learning in age 50+.

Previous research has widely recognised the Matthew effect in education and training, i.e. those with higher educational attainment tend to participate more in learning. However, some research suggests this effect is not so straightforward in older age groups. For instance, Fouarge and Schils (2009) find that the accumulation effect holds particularly in young age, whereas for workers over 45 having higher educational level does not give an advantage in participating in learning compared to those with average educational level. Even more, in older age groups difference in training probability is more in favour of

the low educated (Fouarge and Schils 2009). Montizaan et al (2010) find, based on an analysis of Dutch public sector, that more highly educated workers have a high training propensity due to their stronger motivation to invest in their human capital, irrespective of the duration of their remaining work life. At the same time, their analysis showed that lower educated individuals are more impacted by changes in retirement age as workers who were initially less inclined to train are now forced to participate in training courses to keep up their productivity during their extended work life (Montizaan, Cörvers, and De Grip 2010). Based on these results, the following hypothesis is raised:

- Country differences in participation in learning among highly educated workers aged 50+ is not related to differences in statutory retirement age.
- Country differences in participation in learning among low or average educated workers aged 50+ is related to differences in statutory retirement age.

## **2. Data and method used**

The analysis makes use of Adult Education Survey 2011 by Eurostat for individual level variables. Data of 19 countries are included in the analysis. Eleven countries were excluded from the initial dataset due to data quality issues and missing data across the variables included in the analysis<sup>8</sup>.

As the dependent variable, I include in the analysis participation in non-formal learning among employed 50-64 age group. The outcome variable takes the binary values of 1 when a person has participated in non-formal training during the 12 months prior to survey and 0 when there have been no participation episodes during the past year.

The following control variables are included in the models: gender, age, age squared, educational attainment, household income, occupational position, field of activity of the main job and size of company.

Educational attainment is included in the analysis with three categories: low educational attainment (below upper secondary education, ISCED 1-2), average educational attainment (upper secondary and post secondary, ISCED 3-4) and higher educational attainment (tertiary education, ISCED 5-6). Household income in the dataset is divided into 10 deciles, which is aggregated to four categories for the current analysis: 1) low income (up to 2<sup>nd</sup> decile); 2) below average income (2-5 decile); 3) above average income (5-8 decile); and 4) high income (above 8<sup>th</sup> decile).

Size of company is included in the analysis in four categories: 0-10 employees (including self-employed without employees), 11-49 employees, 50-249 employees and 250 or more employees.

Occupational position in the analysis is divided into four categories as shown in Table 1.

---

<sup>8</sup> Countries excluded from the analysis include: Serbia, Ireland, UK, Greece, Luxembourg, Poland, Malta, Norway, Netherlands, Romania and Lithuania

TABLE 1. DEFINITION OF OCCUPATIONAL CATEGORIES USED IN ANALYSIS

Categories in analysis	Respective ISCO 08 categories
High-skilled white collar	ISCO 1-3: Managers, professionals, technicians and associate professionals; ISCO 01 and 02: armed forces officers
Low-skilled white collar	ISCO 4-5: Clerical support workers, service and sales workers
Skilled blue collar	ISCO 6-8: Skilled agricultural, forestry and fishery workers, craft and related trades workers, plant and machine operators, and assemblers; ISCO 03: armed forces occupations, other ranks
Unskilled blue collar	ISCO 9: Elementary occupations

With the individual data from AES 2011 dataset, I ran logistic regressions for each country in the analysis. Results are presented as marginal probabilities and average marginal effects (AMEs) in order to ensure comparability of estimation results across different models (Mood 2010). Comparing predicted probabilities and marginal effects across countries enables first consideration of country differences. In addition, this approach can reveal some important country variances in the effects analysed, which might not be visible in the pooled dataset.

Secondly, I ran a multilevel logistic regression in which data of all 20 countries in the analysis were pooled and institutional variables were included in the model. Data on institutional variables are based on Eurostat online database (aggregate data) and MISSOC database for legal threshold for retirement age:

- Statutory retirement age: legal retirement age by gender reported in the MISSOC database as at 1.1.2011.
- Actual retirement age: age at which a person first received retirement (average on country level) by gender, 2012 based on EU LFS ad-hoc module (Eurostat).
- Aggregate replacement ratio: ratio of income from pensions for persons aged between 65 and 74 years and income from work of persons aged between 50 and 59 years by gender, 2011 based on SILC data (Eurostat)

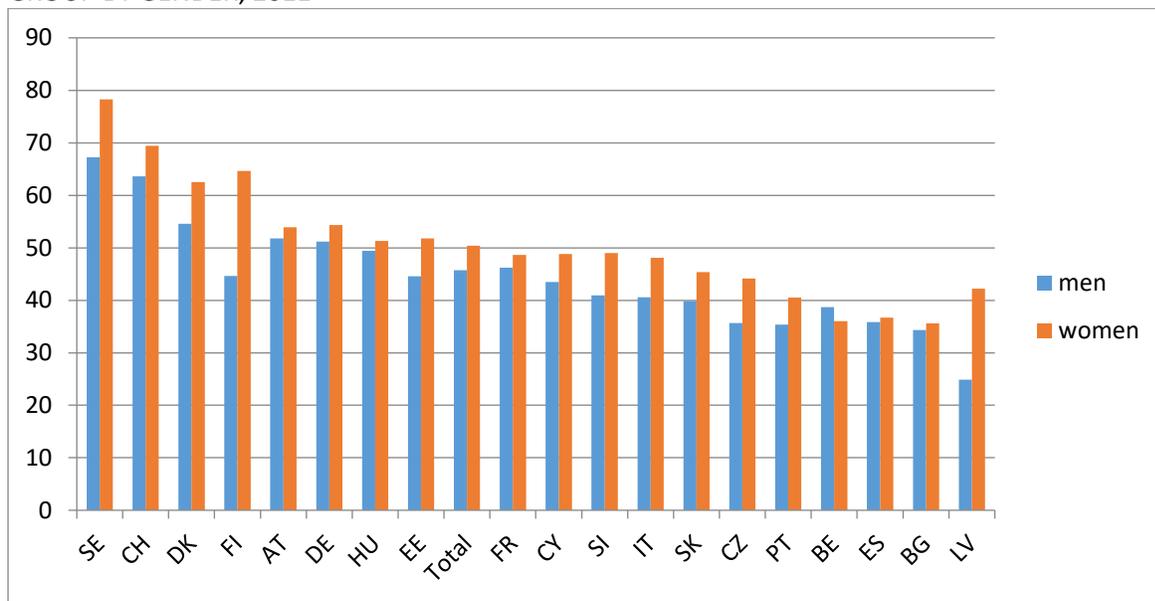
Since statutory retirement age as well as replacement ratio of pensions differ considerably for men and women in many countries, different models for men and women are estimated. Multilevel regression models avoid biased standard errors when hierarchical data structure is used, i.e. variables at different levels are included in one model (Kreft and Leeuw 2007). Further, multilevel models enable quantification of how much country-level variation in training probabilities is explained by institutional indicators in the analysis and how much on differences in individual characteristics between countries. Thus, multilevel models provide additional evidence on the impact of institutional indicators (in this case retirement policies) on training participation in old age.

### 3. Analysis

#### 3.1. Descriptive data

Figure 1 shows that participation in non-formal training in the 50-64 age group varies across European countries among both men and women. On average, share of participants in the 50-64 age group reaches from 72% in Sweden to 33% in Lithuania. Particularly among women, we see four best performing countries, while variation among rest of the countries is smaller. In case of men's participation rates, we also see a few best-performing countries, those at lowest end of participation rates and a large intermediate group. Countries with the highest participation rates in the older age group are indeed those with higher retirement age while relationship does not seem to be as straightforward in the rest of the group as participation differences remain modest. With multivariate models we can control whether these cross-differences hold when keeping background variables constant.

FIGURE 1. SHARE OF PARTICIPANTS IN NON-FORMAL TRAINING IN EUROPEAN COUNTRIES IN 50-64 AGE GROUP BY GENDER, 2011



Source: AES 2011, author's calculations

In the current paper I discuss the role of retirement policies in shaping learning participation patterns in late careers. Table 1 below shows statutory retirement age according to the MISSOC database as at 1 January 2011 compared to actual retirement (i.e. age at which first received old-age pension) according to 2012 data (Labour Force Survey ad-hoc module). There have been further changes in statutory retirement age after 2011, although the time period is chosen to enable comparison to the AES dataset, where data was collected in 2011-2012.

TABLE 2. STATUTORY RETIREMENT AGE, ACTUAL RETIREMENT AGE AND DIFFERENCE IN YEARS BY GENDER

country	Statutory retirement at 1.1.2011		Age at which first received retirement, 2012		Difference in years	
	men	women	men	women	men	women
DE	67.0	67.0	61.2	61	5.8	6.0
SE	67.0	67.0	63.6	63.6	3.4	3.4
AT	65.0	60.0	59.3	57.8	5.7	2.2
BE	65.0	65.0	60.9	60.6	4.1	4.4
CH	65.0	64.0	63.0	62.6	2.0	1.4
CY	65.0	65.0	61.2	61.9	3.8	3.1
DK	65.0	65.0	62.2	61.7	2.8	3.3
ES	65.0	65.0	61.7	61.9	3.3	3.1
FI	65.0	65.0	61.4	61.5	3.6	3.5
IT	65.0	60.0	57.8	58.4	7.2	1.6
PT	65.0	65.0	59.6	60.3	5.4	4.7
BG	63.0	60.0	58.1	57	4.9	3.0
EE	63.0	61.5	60.7	58.7	2.3	2.8
HU	63.0	63.0	59.8	57.5	3.2	5.5
SI	63.0	61.0	58.3	55.2	4.7	5.8
LT	62.5	60.0	60.6	58.9	1.9	1.1
CZ	62.3	58.7	60.8	57.7	1.5	1.0
LV	62.0	62.0	60.5	58.9	1.5	3.1
SK	62.0	62.0	59.8	56.1	2.2	5.9
FR	60.0	60.0	58.6	59.3	1.4	0.7

Source: MISSOC database, Eurostat Labour Force Survey, author's calculations

The table above shows that in 2011 retirement age varies between 60 and 67 among men and 59 and 67 among women. We find highest retirement age in Germany and Sweden at 67 years for both men and women. Gender differences in statutory retirement age occur in 8 countries out of 20, where women's retirement age is below that of men's. Nevertheless, most of these countries foresee equalisation of men's and women's retirement age for future generations. Many countries aim towards the retirement threshold at 65 for both men and women (AT, BG, EE, HU, LV, SI), others aim towards 67 (DE), 68 (DK) or even 69 (IT) (MISSOC database). Some countries directly link future changes in retirement age to life expectancy (CY, DK, PT, SK) (MISSOC database). Still, comparison of statutory retirement age to actual retirement shows that in some countries, there are considerable differences between the legal threshold and actual behaviour between men and women. In all countries, actual retirement on average occurs earlier than the statutory threshold as at 2011. Differences vary from as low as 1-2 years in France, Switzerland, Czech Republic, Lithuania, Latvia (for men) and Italy (for women) to as high as 5-7 years in Germany, Portugal (men), Italy (men), Hungary (women), Slovenia (women) and Slovakia (women). Thus, legal retirement age may not always be the perfect reflection of behavioural patterns and this can vary by

gender. An example is the case of Italy where statutory retirement age for men and women differ by 5 years while actual retirement patterns are more consistent (around 58 years for both sexes). For this reasons, I will keep both indicators of retirement age in mind when comparing countries by participation rates in learning among older age groups.

### 3.2. Comparative analysis of country-specific regression models

#### 3.2.1. Gender and retirement age

Figure 2a and 2b below show interaction between statutory retirement age and predicted probability to participate in non-formal learning. The figure for men does seem to suggest a moderate positive relationship between the two variables. A cluster of countries with low statutory retirement age and low participation probability in learning emerges (LT, LV, BG, CZ, SK). A number of countries have equalised the retirement age of men at 65 years by 2011, although this has not resulted in equalisation of participation probabilities in 50+ age group. To compare, three countries with retirement age threshold for men at 63 (SI, EE and HU) have participation rates higher than that of many countries with higher retirement age. Thus, interaction is not so straightforward in all countries.

Similarly among women, participation probability varies considerably at low retirement age – from 34 to 60% at retirement threshold of 60. Similar variation is found in case retirement threshold is raised to 65 – from 38 to 65%.

FIGURE 2A. ADJUSTED PARTICIPATION PROBABILITY IN STATUTORY RETIREMENT AGE IN 50-64 AGE GROUP, MEN

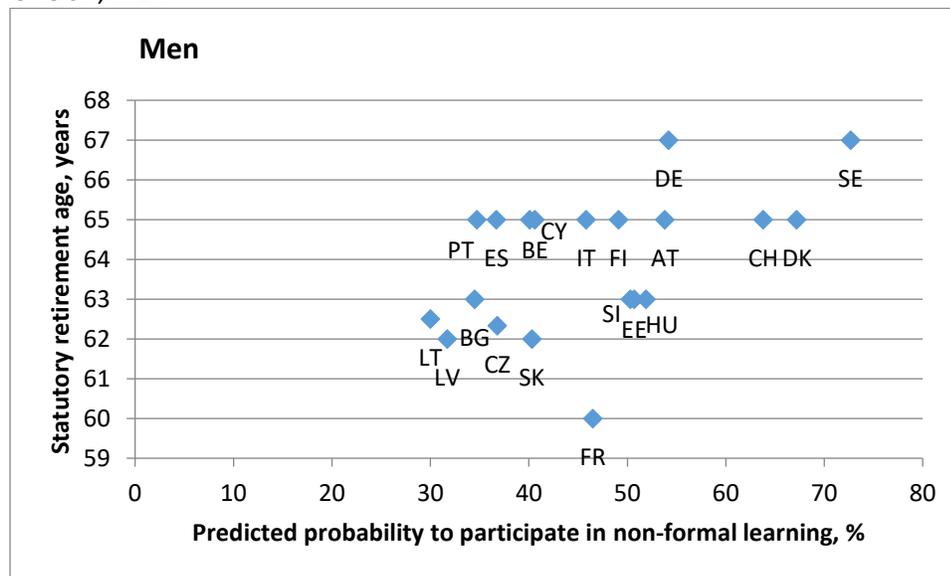
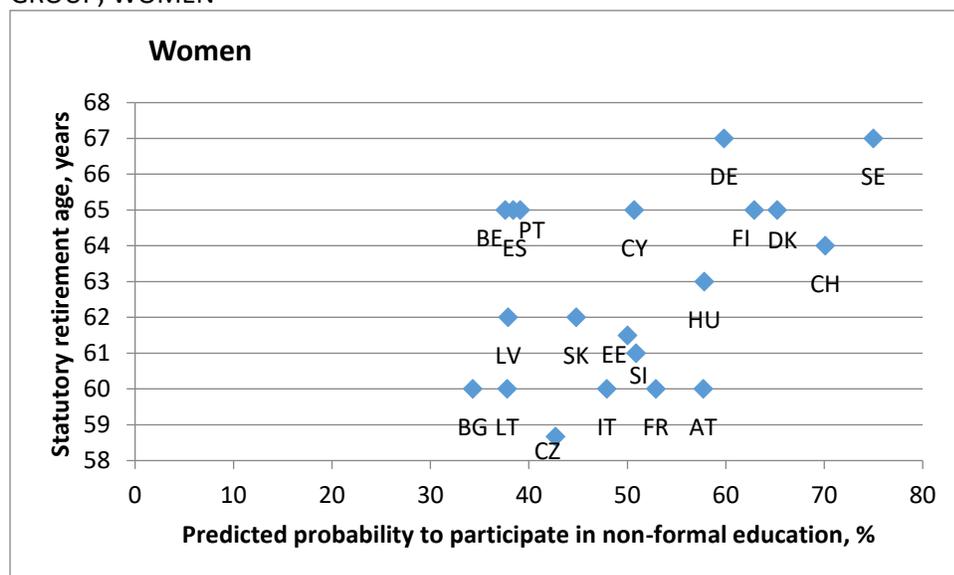


FIGURE 3B. ADJUSTED PARTICIPATION PROBABILITY IN STATUTORY RETIREMENT AGE IN 50-64 AGE

GROUP, WOMEN



Note: Predicted probabilities calculated based on individual country logistic regression models; predicted probabilities calculated by gender, other variables controlled for include: age, age squared, educational attainment, household income, occupational position, field of activity of the main job and size of company.  
 Source: MISSOC database, AES 2011, author's calculations

As discussed above, statutory retirement age may not always be the best reflection of the average age when people withdraw from the labour market, particularly in some countries. For this reason, figures 4a and 4b show interaction between actual retirement age and predicted probability to participate in non-formal education. There does not seem to be a considerable change in the strength of interaction between the two variables. Although, countries with high participation probabilities and high retirement age clearly emerge. In case of women, though, a straightforward positive relationship is drawn out, with some countries deviating from this general pattern. In particular, we see a number of countries, where retirement age varies between 59 to 62 while participation probability remains relatively moderate.

Another possibility to explore interaction between retirement age and participation probability to learning is to compare whether countries with gender difference in retirement age also reveal in gender difference in predicted probability to participate in learning. Comparing average marginal effects by gender shows that we can find statistically significant gender differences in 6 countries out of 19 (FI, CH, FR, CY, CZ, LV). However, only two of these coincide with the countries with gender difference in statutory retirement age (and only one with countries with gender difference above 2 years in actual retirement age). Furthermore, while statutory retirement age is higher for men in all cases (also true in case of actual retirement age), predicted probabilities are in the 'advantage' of women, i.e. women's participation probability in all cases is higher compared to that of men's. This suggests that women are more prone to learning, compensating for the lower retirement age.

FIGURE 4A. ADJUSTED PARTICIPATION PROBABILITY AND ACTUAL RETIREMENT AGE IN 50-64 AGE GROUP, MEN

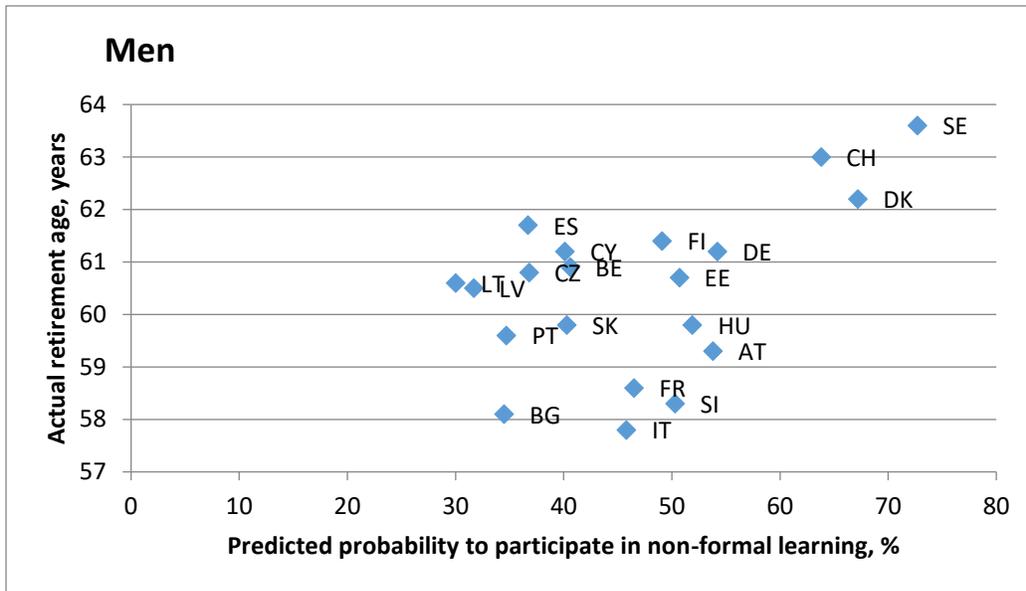
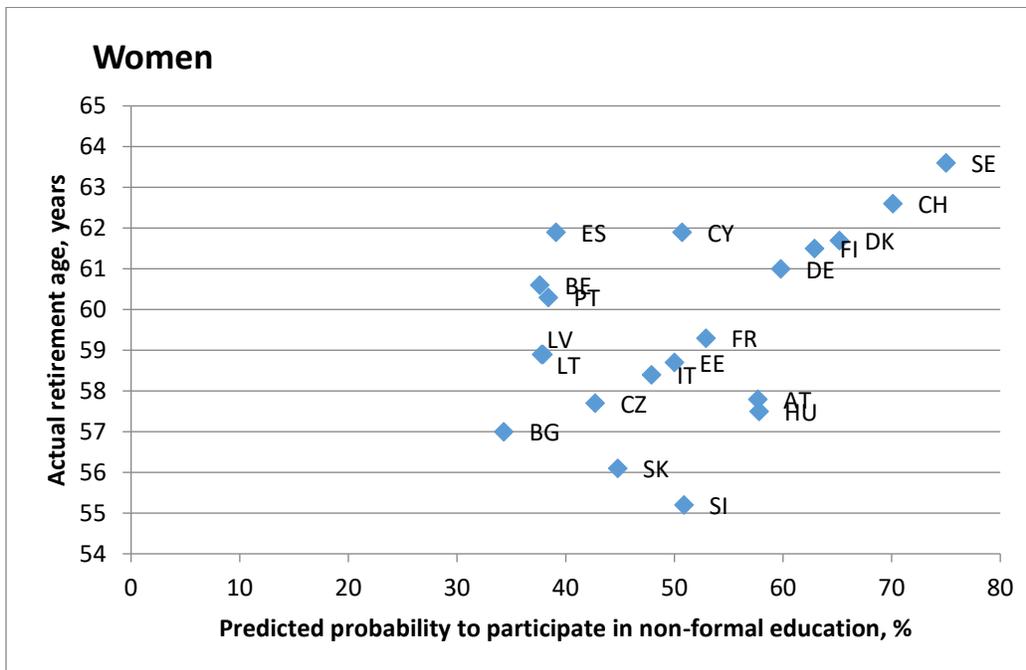


FIGURE 5B. ADJUSTED PARTICIPATION PROBABILITY AND ACTUAL RETIREMENT AGE IN 50-64 AGE GROUP, WOMEN



Note: Predicted probabilities calculated based on individual country logistic regression models; predicted probabilities calculated by gender, other variables controlled for include: age, age squared, educational attainment, household income, occupational position, field of activity of the main job and size of company.

Source: Eurostat database (SILC 2011), AES 2011, author's calculations

### 3.2.2. Education and retirement age

Previous research suggests that accumulation of learning (i.e. higher initial educational attainment leads to higher participation in training) occurs particularly in younger age groups while in older age, having higher educational level does not give an advantage in learning participation. In the current dataset, this conclusion holds only for two countries where a significant difference in training participation probability between those with tertiary education and with average educational attainment in younger age group turns insignificant in older age (EE and HU) (see Table 3). Figure 6 below shows that this is because probability to participate in non-formal education drops between the two age groups among highly educated more than among those with average educational attainment.

In some countries (7) the opposite is true - difference between tertiary education and average educational attainment becomes significant in older age groups. Figure 6 below shows that this is mostly because probability to participate in non-formal education remains unchanged for highly educated employees while it decreases for those with lower educational attainment (CY, LV, BG, SE). Similar pattern occurs in DE, although in this case difference between average and high educational attainment remains significant also in younger age groups. Gap only increases with those at the lowest educational levels. In two countries (SI and AT), probability to participate in learning increases with age for highly educated employees, increasing the difference between educational groups in the older age cohort. PT, though, is an example where participation probability decreases in all educational levels, although decrease is steeper in lower educational groups.

These results suggest that in many countries, tertiary education becomes even more significant in old age compared to younger age groups as it is particularly the high-educated older workers who participate in non-formal learning.

In 7 countries, difference between the two educational groups remains largely unchanged, but significant. This covers, however, three different patterns. There are countries, where participation probability across educational levels remain largely unchanged (CH, IT, SK) and countries where probabilities decrease in parallel in all educational groups (BE, FR, CZ, ES). In two countries (DK and FI) differences between educational levels are insignificant in the older age group.

TABLE 3. MARGINAL EFFECTS OF EDUCATIONAL ATTAINMENT (REFERENCE GROUP AVERAGE EDUCATION) BY AGE GROUPS

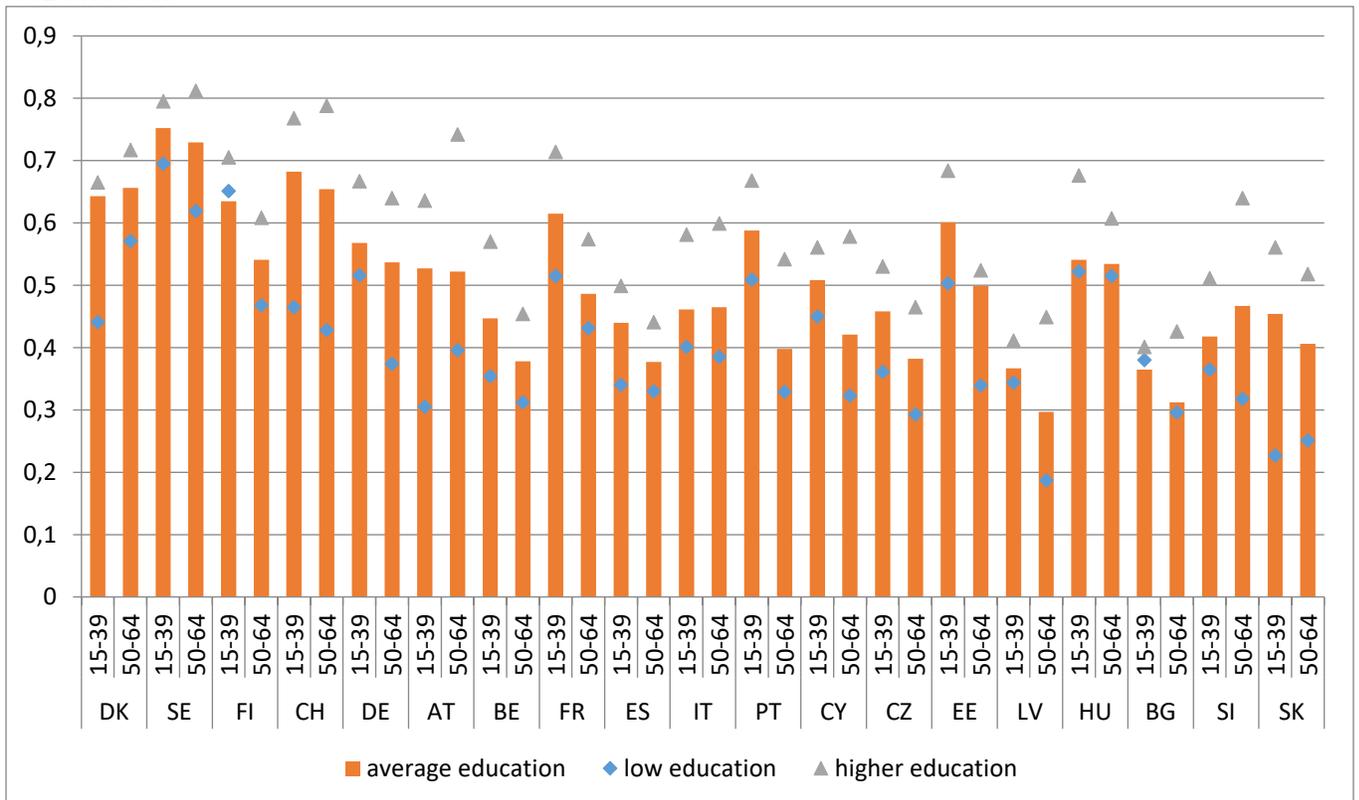
		25-39	50-64		25-39	50-64		25-39	50-64
low education	DK	-0.202**	-0.084	BE	-0.093	-0.066	CZ	-0.097	-0.089
		(0.06)	(0.06)		(0.05)	(0.04)		(0.07)	(0.05)
tertiary education		0.021	0.061		0.123**	0.076*		0.072*	0.083*
		(0.04)	(0.05)		(0.04)	(0.04)		(0.03)	(0.04)
low education	SE	-0.057	-0.111*	FR	-0.100**	-0.055*	EE	-0.098	-0.16
		(0.05)	(0.05)		(0.03)	(0.03)		(0.06)	(0.09)
tertiary education		0.043	0.083*		0.099***	0.088**		0.083*	0.024
		(0.04)	(0.04)		(0.02)	(0.03)		(0.04)	(0.04)

low education	FI	0.016	-0.073	ES	-0.099***	-0.047	LV	-0.024	-0.110*
		(0.07)	(0.05)		(0.03)	(0.03)		(0.05)	(0.06)
tertiary education		0.07	0.067		0.060*	0.064*		0.044	0.152***
		(0.04)	(0.04)		(0.03)	(0.03)		(0.03)	(0.04)
low education	CH	-0.217***	-0.226***	IT	-0.06	-0.080**	HU	-0.019	-0.019
		(0.05)	(0.04)		(0.03)	(0.03)		(0.05)	(0.05)
tertiary education		0.086***	0.134***		0.120***	0.134***		0.135***	0.073
		(0.02)	(0.03)		(0.03)	(0.04)		(0.03)	(0.04)
low education	DE	-0.052	-0.163**	PT	-0.078**	-0.069*	BG	0.015	-0.016
		(0.05)	(0.06)		(0.03)	(0.03)		(0.06)	(0.05)
tertiary education		0.099**	0.103**		0.080*	0.144**		0.036	0.114*
		(0.04)	(0.03)		(0.03)	(0.05)		(0.04)	(0.05)
low education	AT	-0.223***	-0.126*	CY	-0.058	-0.097	SI	-0.053	-0.149
		(0.06)	(0.06)		(0.06)	(0.06)		(0.08)	(0.08)
tertiary education		0.108**	0.220***		0.053	0.157**		0.093*	0.173**
		(0.04)	(0.04)		(0.04)	(0.06)		(0.04)	(0.06)
low education							SK	-0.227	-0.154
								(0.18)	(0.09)
tertiary education								0.107**	0.113*
								(0.04)	(0.05)

Source: AES 2011, author's calculations

FIGURE 6. PREDICTED PROBABILITY TO PARTICIPATE IN LEARNING BY EDUCATIONAL ATTAINMENT AND

## AGE GROUPS.



Source: AES 2011, author's calculations

Previous research (Montizaan, Cörvers, and De Grip 2010) suggests based on the Dutch example that lower educated employees might be more impacted by changes in retirement age. Based on the AES 2011 dataset, I estimated country models with interaction effect between gender and education. Results do not seem to suggest a particularly clear relationship between educational attainment and statutory retirement age for men or women (data not presented here). Nevertheless, we will be able to explore the strength of this interaction in multilevel models below.

### 3.3. Multilevel analysis

Multilevel analysis starts from an 'empty model', i.e. a model with no covariates. This serves as a benchmark to test the explanatory power of covariates when included in the model. This is followed by adding individual and institutional factors consecutively in the model, assessing how these affect the between-country variation in lifelong learning participation in pre-retirement age (i.e. 50+ age group). Strength of the effect of covariates in the model is shown with regression coefficients. For each model, estimated between-country variance and ICC (intra-class correlation) coefficient are presented. The estimated variance indicates the extent to which differences between countries in non-formal learning participation in old age are explained by the covariates in the model. The more the estimated between-country variance is reduced between models, the higher explanatory power the institutional variable has.

The ICC coefficient gives us an idea of how the variance for the country-level error term compares with the individual level variance. In general, adding the macro variables that explain country differences, the ICC coefficient goes down.

Table 4 below shows the results from the multilevel logistic regression of men’s participation in non-formal learning in 19 European countries. The intraclass correlation measures the share of variation in the dependent variable attributable to unobserved country-level characteristics. In the null-model with no covariates, the ICC amounts to 0.05. Thus, only about 5% of the cross-country variance in non-formal learning participation can be attributed to unobserved country characteristics. The estimated residual between-country variance is 0.17 and goes down to 0.16 once we add individual level variables to the model. The ICC stands at 0.05, i.e. the change is marginal and thus the individual level variables that are included in the model do not explain much of the between-country differences.

Models 2-4 show the effects of retirement policy indicators on participation in non-formal education in 50-64 age group. Model 2 shows the effect of statutory retirement age on participation probability in age 50+, which is statistically significant. The coefficient is positive, confirming the results of previous research – based on the pooled sample of the 19 countries in the analysis higher statutory retirement age is related to higher participation probability to participate in learning, after having controlled for the differences in individual level variables. Differences in legal retirement threshold explain about 25% of the between country variance compared to Model 1 with only individual level variables. In order to control for whether aggregate actual retirement age according to SILC data has a stronger interaction with participation patterns in non-formal learning, Model 3 looks into the effect of actual retirement age. The coefficient is also significant and positive, with country variance explained standing at 19%. Thus, the two indicators are relatively equal in explaining cross-country differences in learning participation among men in pre-retirement age.

Although analysing the role of replacement ratio in explaining country differences in non-formal learning participation has not been the main focus of this paper, the indicator is included in the analysis for reference. Based on the AES 2011 dataset, model 4 shows that aggregate replacement ratio has no statistically significant interaction with training participation when it comes to men’s learning participation. This is also shown by the small amount (4%) of country variance explained by Model 4 as compared to Model 1.

Finally, models 5 and 6 fit a model with all individual level variables as well as two institutional level indicators reflecting retirement age and replacement ratio of pensions. Model 5 uses statutory retirement age while model 6 actual retirement age. The results confirm once more that both indicators are relatively equal in explaining cross-country variance in participation in learning: both models explain about 32-33% of cross-country variance compared to model 1 with only individual level variables.

TABLE 4. MULTILEVEL LOGISTIC REGRESSION COEFFICIENTS, INSTITUTIONAL DETERMINANTS OF PARTICIPATION IN NON-FORMAL LEARNING OF MEN AGED 50-64

	M0	M1	M2	M3	M4	M5	M6
Statutory retirement age (men)			0.114*			0.122**	

				(0.05)		(0.05)	
Actual retirement age (men)				0.110*			0.146**
				(0.05)			(0.05)
Aggregate replacement ratio (men)					1.004	1.385	2.077
					(1.20)	(1.03)	(1.09)
Between-country variance	0.172	0.157	0.118	0.128	0.151	0.107	0.105
	(0.06)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)
Intraclass correlation	0.050	0.046	0.035	0.037	0.044	0.032	0.031
Explained country variance			0.247	0.186	0.037	0.318	0.328
Observations	14106	11991	11991	11991	11991	11991	11991
Countries	19	19	19	19	19	19	19

Note: M0: no explanatory variables in model; M1: individual level variables in the model (age, age squared, educational attainment, household income, occupational position, field of activity of the main job and size of company); M2-6: individual level variables + institutional variables included in the models.

Source: AES 2011, MISSOC database, Eurostat online database (SILC), author's calculations

The estimated multilevel model for women's participation in non-formal learning is outlined in table 5 below. The estimated effects are relatively similar to that of men. In the null-model with no covariates, the ICC amounts to 0.06. Thus, about 6% of the cross-country variance in non-formal learning participation in Europe can be attributed to unobserved country characteristics. The estimated residual between-country variance is 0.22 and goes down to 0.21 once we add individual level variables to the model. The ICC remains at 0.06, i.e. the individual level variables that are included in the model do not explain much of the between-country differences.

Similarly to the model among men, both statutory retirement age and actual retirement return significant positive coefficients, i.e. higher retirement age increases probability to participate in learning in pre-retirement age among women. Adding statutory retirement age to the model explains about 22% of between-country variance while the indicator is 26% in case of actual retirement. Similarly to men, aggregate replacement ratio is not statistically significant. In total, adding both actual retirement age and aggregate replacement ratio to the model explains almost half of the between-country variance (Model 6).

TABLE 5. MULTILEVEL LOGISTIC REGRESSION COEFFICIENTS, INSTITUTIONAL DETERMINANTS OF PARTICIPATION IN NON-FORMAL LEARNING OF WOMEN AGED 50-64

	M0	M1	M2	M3	M4	M5	M6
Statutory retirement age (men)			0.124*			0.136**	
			(0.06)			(0.05)	
Actual retirement age (men)				0.153*			0.207***
				(0.06)			(0.05)
Aggregate replacement ratio (men)					1.583	2.004	3.108**

					(1.37)	(1.20)	(1.12)
Between-country variance	0.223	0.213	0.167	0.157	0.199	0.145	0.108
	(0.08)	(.07)	(.06)	(.05)	(.07)	(.05)	(.04)
Intraclass correlation	0.064	0.061	0.048	0.046	0.057	0.042	0.032
Explained country variance			0.216	0.263	0.068	0.323	0.492
Observations	12665	10565	10565	10565	10565	10565	10565
Countries	19	19	19	19	19	19	19

Note: M0: no explanatory variables in model; M1: individual level variables in the model (age, age squared, educational attainment, household income, occupational position, field of activity of the main job and size of company); M2-6: individual level variables + institutional variables included in the models.

Source: AES 2011, MISSOC database, Eurostat online database (SILC), author's calculations

To test the hypothesis that the impact of retirement age on learning differs across educational levels, we include a cross-level interaction in the multilevel model (Table 6). This means we will allow the effects of statutory pension age in a country depend on the person's education level. Coefficients for interaction effects show that in case of men, the slopes for the effect of statutory retirement age differ significantly for those with low and high educational attainment. However, there is no significant difference in the effect of retirement age between those with lower education and average educational attainment. For women, on the other hand, the effect of statutory retirement age does not differ by educational groups – none of the interaction coefficients are significant. In order to illustrate these differences, the slopes for the effect of retirement age by educational level (keeping other variables constant) are shown in figures 7 and 8. Figure 7 shows a stronger effect of increasing retirement age on highly educated men as increase in retirement age is related to a steeper increase in probability to participate in learning among the highly educated as compared to lower educational levels. The positive effect of higher statutory retirement age on women's participation probability is also visible in figure 8. However, the slopes for different education levels do not differ considerably.

TABLE 6. MULTILEVEL LOGISTIC REGRESSION COEFFICIENTS, INTERACTION EFFECTS BY GENDER

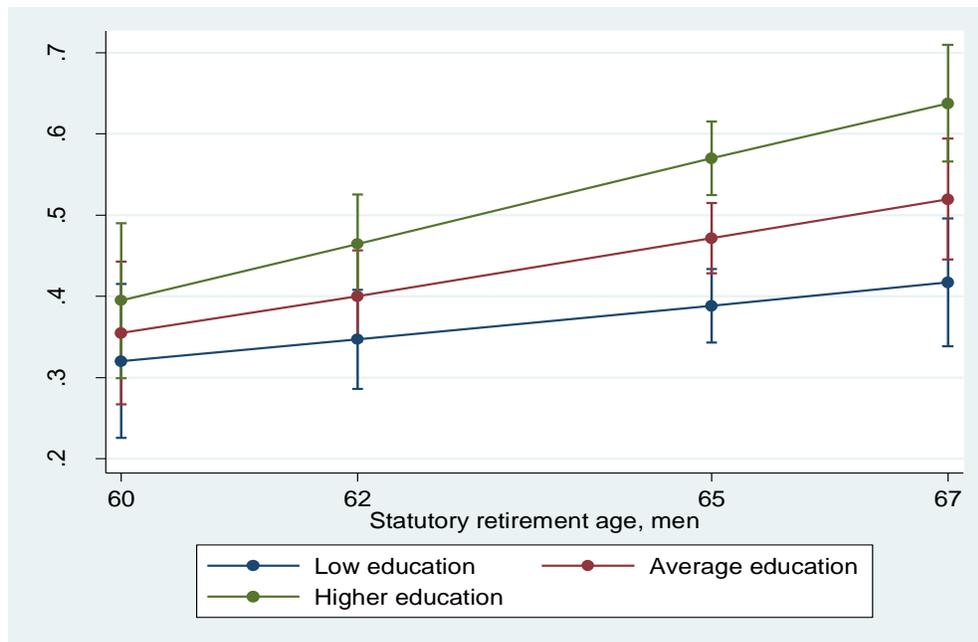
	Men	Women
Ref: low education		
Average education	-2.261 (1.97)	-1.347 (1.54)
Higher education	-5.020* (2.13)	-0.903 (1.69)
Statutory retirement age, men	0.064 (0.05)	
Ref: Low education#statutory retirement age, men		
Average education#statutory retirement age	0.040 (0.03)	
Higher education#statutory retirement age	0.090** (0.03)	
Statutory retirement age, women		0.052

Ref: Low education#statutory retirement age, women		(0.04)
Average education#statutory retirement age, women		0.028
		(0.02)
Higher education#statutory retirement age, women		0.029
		(0.03)
Between-country variance	0.118	0.175
	(.04)	(.06)
Intraclass correlation	0.034	0.051
Observations	11991	10565
Countries	19	19

Note: other variables controlled in the model include: age, age squared, household income, occupational position, field of activity of the main job and size of company.

Source: AES 2011, MISSOC database, Eurostat online database (SILC), author's calculations

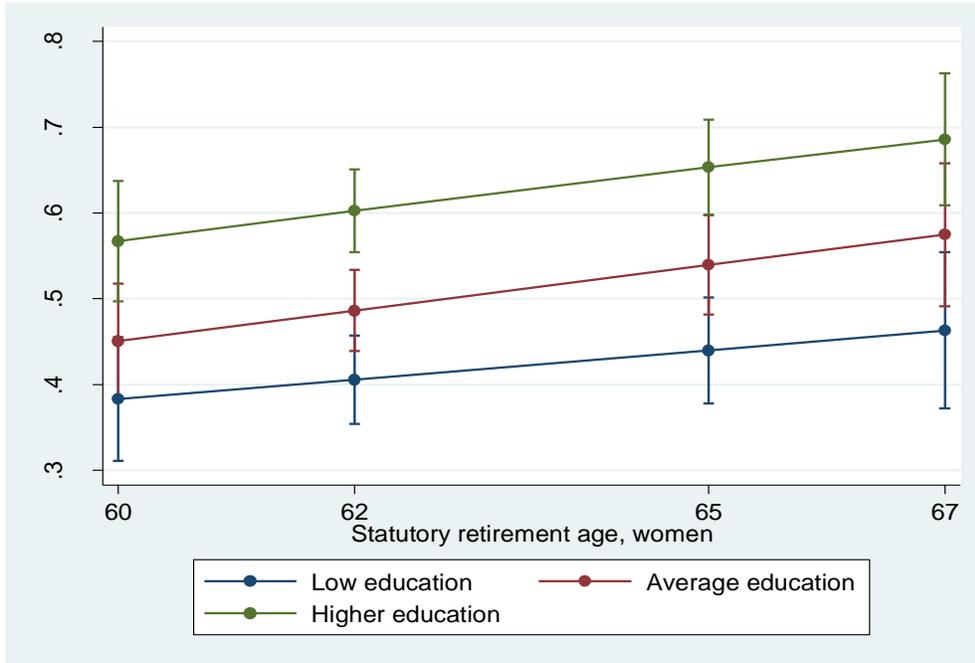
FIGURE 7. PREDICTIVE MARGINS FOR THE EFFECT OF RETIREMENT AGE BY EDUCATIONAL ATTAINMENT AMONG MEN AGED 50+



Source: AES 2011, MISSOC database, Eurostat online database (SILC), author's calculations

FIGURE 8. PREDICTIVE MARGINS FOR THE EFFECT OF RETIREMENT AGE BY EDUCATIONAL ATTAINMENT

AMONG WOMEN AGED 50+



Source: AES 2011, MISSOC database, Eurostat online database (SILC), author's calculations

## 4. Discussion and conclusions

The current paper aims at discussing interaction between retirement policies and participation in learning in 50+ age group based on a sample of 19 European countries. Results of the multilevel logistic regression model show that only a small proportion of the cross-country differences in participation in learning can be accounted to national level differences (about 5% among men and 6% among women). Nevertheless, results suggest that retirement age (both statutory retirement and aggregate actual retirement age based on Eurostat SILC data) and participation in non-formal learning in 50-64 age group has a statistically significant and positive interaction. In my analysis, I did not find a significant effect of generosity of pensions schemes (measures as replacement rate of pensions for women and men).

Since the current analysis does not account for causal mechanisms, we are not able to draw conclusions on the specific mechanism. Also, most countries with high statutory retirement age (Denmark, Sweden, Switzerland) have high participation rates in learning in general. Nordic countries are characterised by comprehensive learning policies accessible to a wide part of the population, a strong learning culture and institutional mechanisms contributing to high participation rates (Rubenson 2006). Thus, we are not able to differentiate the effect of these policy frameworks from the effects of the old-age pension systems, particularly retirement age. As a result, we see (particularly in case of men) that even in case of equal statutory retirement age, variation in participation can be high. Thus, while retirement age does have a significant effect on average (taking all countries together), there are a number of countries deviating from this general patterns. Thus, in order to understand the mechanisms of learning participation in old age, it is important to take account of differences in training policies and programmes at national, regional and company level as well as variations in general old-age policy context (e.g. different retirement age). These policies can be mutually reinforcing (e.g. high retirement age in combination with training policies accessible in pre-retirement age) or hindering (e.g. when training policies are not supported by longer horizons in working lives).

Results suggest that the positive interaction between retirement age and training participation is found among both men and women. However, individual country models show that gender differences in retirement age do not result in gender differences in learning participation. Probability to participate in non-formal learning differs significantly among men and women in 6 countries of which only two coincide with the countries with gender difference in statutory retirement age. As women's participation probability is higher compared to that of men's, women seem to be more prone to learning in older age groups, compensating for the lower retirement age.

Finally, the analysis explored interaction between participation in learning and education across age groups and whether the effect of retirement age differs by educational attainment. Previous research (Fouarge and Schils 2009) suggests higher education may not be as strong of an advantage in old age compared to younger age groups. Based on the AES 2011 dataset we find this is the case in only a few countries. In many cases, the opposite is true – while probability to participate in learning remains unchanged across age groups among those with higher education, it decreases among those with lower educational attainment. As a result, differences in participation probability between people with different educational attainment increase. Further, Montizaan et al (2010) have suggested based on the case of Netherlands that lower educated individuals are more impacted by changes in retirement age. Based on

a pooled sample of 19 countries, we find that the effect of retirement age does differ by educational level among men while we find no differences among women. However, contrary to that suggested based on the Dutch example, we find that it is the highly educated men who are more impacted by differences in retirement age as their increase in participation probability is steeper compared to men with lower educational attainment.

Analysis in the current paper provides some new evidence on the factors behind cross-country differences in participation in non-formal learning in older age groups. This is an important contribution into discussions on raising participation in learning in old age. In particular, we see that differences in retirement age can only explain a small proportion of the cross-country differences in learning. At the same time, it is an important context to consider when discussing effectiveness of training policies targeted to older age groups. Furthermore, we see that countries respond differently to variations in retirement age when it comes to participation in learning in pre-retirement age. Thus, there is a need for further research into the policy settings in these countries, including their training programmes at national, regional and company levels and their accessibility for older age groups.

## References

- Andries De Grip, and Jasper Van Loo. 2002. "The Economics of Skills Obsolescence: A Review." In *The Economics of Skills Obsolescence*, 21:1–26. Research in Labor Economics 21. Emerald Group Publishing Limited. <http://www.emeraldinsight.com.ezproxy.tlu.ee/doi/abs/10.1016/S0147-9121%2802%2921003-1>.
- Bassanini, Abdrea, Alison Booth, Giorgio Brunello, Maria De Paola, and Edwin Leuven. 2005. "Workplace Training in Europe. IZA Discussion Paper No. 1640." IZA, Bonn. <http://ftp.iza.org/dp1640.pdf>.
- Battistin, Erich, Giorgio Brunello, Simona Comi, and Daniela Sonedda. 2013. "Work Longer, Train More? The Effects of Pension Reforms and Training Incentives on the Retirement and Training Decisions of Older Workers in Italy." Padova, Italy: Department of Economics and Management, University of Padova. [http://www.iza.org/conference\\_files/older\\_workers\\_2013/sonedda\\_d2966.pdf](http://www.iza.org/conference_files/older_workers_2013/sonedda_d2966.pdf).
- Becker, Gary S. 1962. "Investment in Human Capital: A Theoretical Analysis." *Journal of Political Economy* 70 (5, Part 2): 9–49. doi:10.1086/258724.
- . 1964. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. University of Chicago Press.
- Cedefop. 2015. "Unequal Access to Job-Related Learning: Evidence from the Adult Education Survey." Research Paper 52. Luxembourg: Publications Office of the European Union.
- Council of the European Union. 2012. "Council Declaration on the European Year for Active Ageing and Solidarity between Generations (2012): The Way Forward." Brussels. <http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2017468%202012%20INIT>.
- Desjardins, Richard, and Kjell Rubenson. 2013. "Participation Patterns in Adult Education: The Role of Institutions and Public Policy Frameworks in Resolving Coordination Problems." *European Journal of Education* 48 (2): 262–80. doi:10.1111/ejed.12029.
- Desjardins, Richard, Kjell Rubenson, and Marcella Milana. 2006. "Unequal Chances to Participate in Adult Learning: International Perspectives." Paris: UNESCO: International Institute for Educational Planning.
- Desjardins, Richard, and Arne Jonas Warnke. 2012. "Ageing and Skills: A Review and Analysis of Skill Gain and Skill Loss over the Lifespan and over Time." OECD Education Working Papers 72. Paris: Organisation for Economic Co-operation and Development. <http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP%282012%299&docLanguage=En>.
- European Commission. 2010. "Europe 2020. A Strategy for Smart, Sustainable and Inclusive Growth." Communication from the Commission. Brussels: European Commission. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF>.
- Fouarge, Didier, and Trudie Schils. 2009. "The Effect of Early Retirement Incentives on the Training Participation of Older Workers." *LABOUR* 23 (March): 85–109. doi:10.1111/j.1467-9914.2008.00441.x.
- Green, Andy. 2006. "Models of Lifelong Learning and the 'knowledge Society.'" *Compare: A Journal of Comparative and International Education* 36 (3): 307–25. doi:10.1080/03057920600872449.
- Kreft, I., and J. D. Leeuw. 2007. *Introducing Multilevel Modeling*. London: SAGE Publications.
- Kristensen, Nicolai. 2012. "Training and Retirement." 6301. IZA Discussion Paper. Bonn: Institute for the Study of Labor (IZA). <http://ftp.iza.org/dp6301.pdf>.
- Montizaan, Raymond, Frank Cörvers, and Andries De Grip. 2010. "The Effects of Pension Rights and Retirement Age on Training Participation: Evidence from a Natural Experiment." *Labour Economics* 17 (1): 240–47. doi:10.1016/j.labeco.2009.10.004.

- Mood, Carina. 2010. "Logistic Regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It." *European Sociological Review* 26 (1): 67–82. doi:10.1093/esr/jcp006.
- OECD. 2006. *Live Longer, Work Longer*. Ageing and Employment Policies. OECD Publishing. [http://www.oecd-ilibrary.org/employment/live-longer-work-longer\\_9789264035881-en](http://www.oecd-ilibrary.org/employment/live-longer-work-longer_9789264035881-en).
- Paccagnella, Marco. 2016. "Age, Ageing and Skills: Results from the Survey of Adult Skills." Education Working Paper 132. Paris: OECD Publishing.
- Rubenson, Kjell. 2006. "The Nordic Model of Lifelong Learning." *Compare: A Journal of Comparative and International Education* 36 (3): 327–41. doi:10.1080/03057920600872472.
- Saar, Ellu, Odd Bjørn Ure, and Richard Desjardins. 2013. "The Role of Diverse Institutions in Framing Adult Learning Systems." *European Journal of Education* 48 (2): 213–32.
- Stenberg, Anders, Xavier de Luna, and Olle Westerlund. 2010. "Can Adult Education Delay Retirement from the Labour Market?" *Journal of Population Economics* 25 (2): 677–96. doi:10.1007/s00148-010-0350-8.
- Wozny, C., and M. R. Schneider. 2014. "A Matter of Degree: The Continuing Training Gap for Women in Europe." *Socio-Economic Review* 12 (2): 353–79. doi:10.1093/ser/mwu008.

## „LABOUR DEMAND AND LONGER WORKING LIVES IN EUROPE: DRIVERS AND BARRIERS IN COMPANIES“

ANDREA PRINCIPI<sup>^</sup>, JÜRGEN BAUKNECHT<sup>\*</sup>, MARCO SOCCI<sup>^</sup>, MIRKO DI ROSA<sup>^</sup>

<sup>^</sup>ISTITUTO NAZIONALE RICOVERA E CURA ANZIANI / NATIONAL INSTITUTE OF HEALTH & SCIENCE ON AGEING (ANCONA)

<sup>\*</sup>INSTITUT FÜR GERONTOLOGIE AN DER TU DORTMUND / INSTITUTE OF GERONTOLOGY AT TU DORTMUND UNIVERSITY (DORTMUND)

### Summary

Most studies on employers' contributions to longer working lives are focused on what is termed 'supply side' measures in the project, that is, measures enabling workers to supply their labour longer to employers. Prime examples here are measures in the fields of health, training, motivation or the reconciliation of work and private life. Yet, for longer working lives also the demand side is crucial. This applies partly to working until statutory retirement age, since here employers' behaviour can motivate employees to work until they reach the statutory retirement age instead of choosing early retirement or other early exit pathways. Especially for work beyond the retirement age, either as a seamless continuation of the employment relationship when the statutory retirement age is reached, or as re-hired retired former employee, employers' encouragement of their (former) employees can be considered crucial. Anecdotal evidence is provided e.g. in the Best Practice report of MoPAct Work Package 3, Task 2, where working lives are prolonged especially by an employer asking the employees (elderly care professionals) to continue their working life.

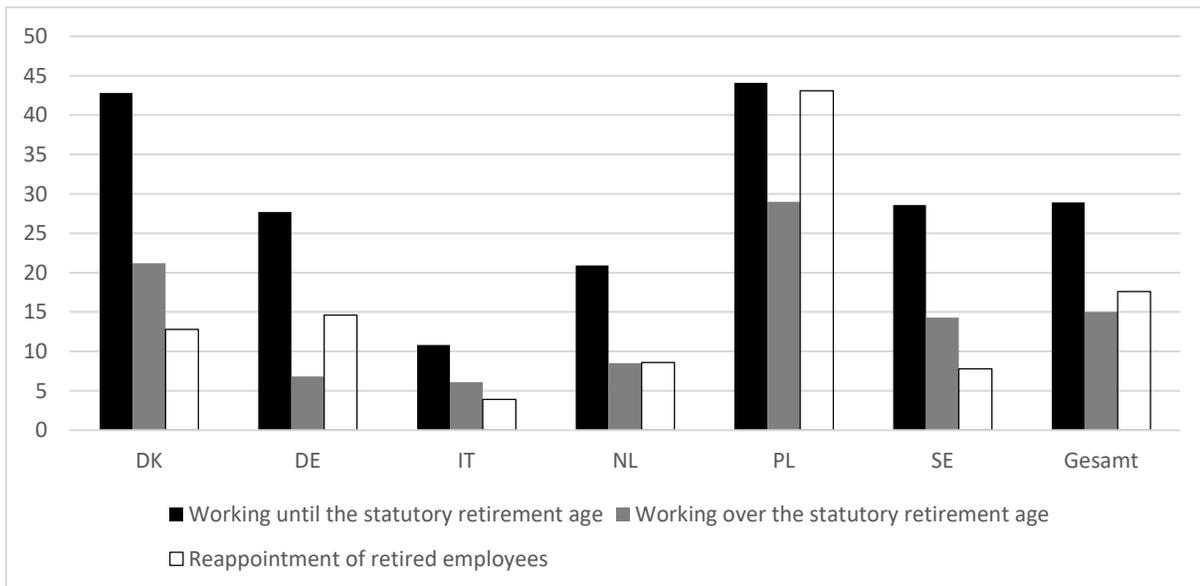
Focusing on the demand side of labour, Principi et al. (2016) analyse frequencies and determinants of three major demand side measures for longer working lives: Employers

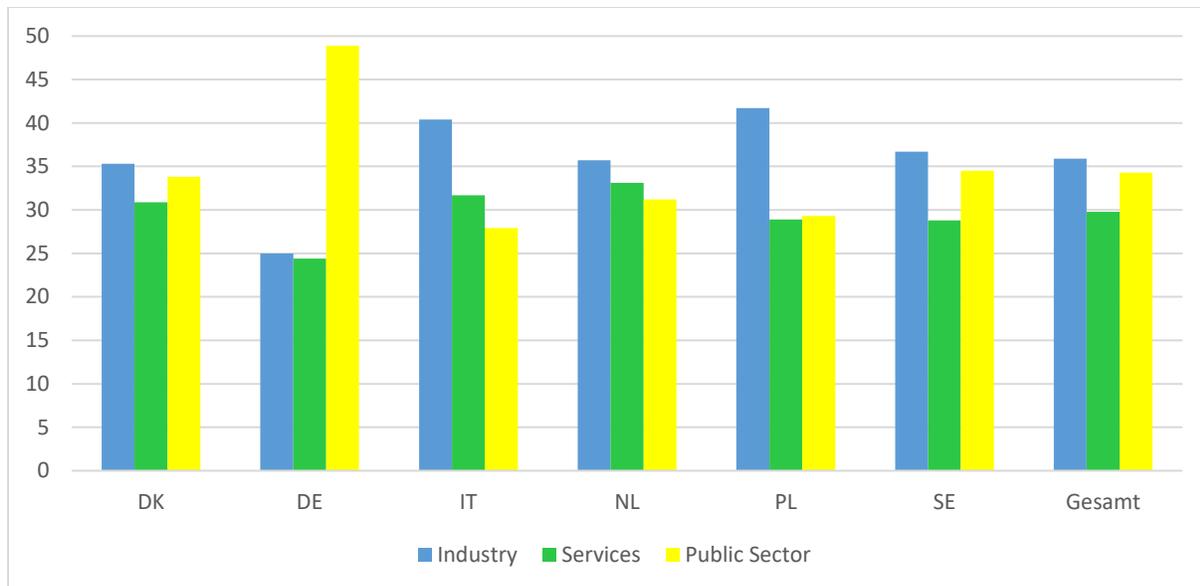
1. Encouraging their employees to work until the statutory retirement age
2. Encouraging their employees to work beyond the statutory retirement age
3. Recruiting employees who already retired

Therefore, the paper is focused on the retention and re-employment of current and former employees and *not* on one classical aspect of labour demand, that is, the hiring of workers from non-employment below retirement age (primarily the unemployed).

Analyses are based on data from the project 'Activating Senior Potential in an Ageing Europe' (ASPA). For this project, in 2009 interviews were conducted with directors/CEO owners, heads of departments, general managers, human resources managers and administrators. Six countries were analysed by Principi et al. (2016): Denmark (587 cases), Germany (666), Italy (770), the Netherlands (1046), Poland (1030) and Sweden (525). Descriptive results show that

- In the comparison between the three measures, as expected encouragement to work until legal retirement age (29%) is more widespread than encouragement to work beyond retirement age (15%) or the re-hiring of retired former employees (18%)
- In the comparison between countries, if one combines all three measures the total value is highest for Poland (116%) and Denmark (77%), and lower in Sweden (51%), Germany (49%), the Netherlands (38%), and lowest in Italy (21%)
- In the comparison between companies/organisations of different sizes, the higher prevalence of measures amongst larger companies/organisations found in other surveys for other measures for longer working lives (e.g. pro-workability measures) cannot be only partly be found here, with values of 52% for small companies (all three measures combined), 69% for medium-sized companies and 65% for large companies.
- Concerning sectors, differences are also small, with total values of 63% (industry and related areas), 58% (services) and 64% (public service).





Logistic regressions were conducted with each of the three measures as dependent variables. Explanatory variables can be categorised into four categories: HR policies (e.g. decreasing workload for older workers, training plans for older workers), companies' workforce characteristics (shares of high/low-skilled workers and older workers), companies' structural characteristics (size and sector) and economic and labour market climate (e.g. need to reduce staff, recruitment problems, labour union influence).

These multivariate analyses provide a multitude of results, only the most prominent is reported here:

- Across the three different measures, relevant factors or determinants are to be found in all groups of independent variables. Factors which are statistically significant for all three measures are part-time retirement and demotion (lower tasks and salary), the percentage of older workers, company size (large), and recruitment problems.

Other results (associations between the dependent variables and country dummies on the one side with each of the three measures on the other side) can be seen in the tables of the paper by Principi et al. (2016).

## Abstract

On the background of European population ageing and the related policy effort at the macro level to extend working lives (EWL), this paper identifies drivers and barriers of organisational practices designed to this aim. Three different types of EWL practices are investigated: (1) encouragement of employees to continue working until retirement age (i.e. prevention of early retirement), (2) encouragement of employees to continue working beyond retirement age (i.e. delay of retirement), (3) recruitment of employees who already retired (i.e. unretirement). A sample of 4,624 European organisations is analysed. Multiple logistic regressions are carried out. The results suggest that the main drivers for companies' EWL practices are the implementation of HR measures for older workers to improve their performance, their working conditions as

well as to reduce costs linked to their management. Other drivers are a high share of older workers in the company, (medium or large) company size and having experienced recruitment problems. In the industry the qualities and the skills of older workers could be more valued and desired than in other sectors, while in the public sector the adoption of EWL practices may be less affected by the external economic and labour market climate.

**Keywords:** older workers, age management, extending working life, employers, international study

## **Some “result-oriented” implications of the study**

In this section we offer some reflections about practical implications of the results of the study, policy implications, suggestions on how to support EWL on the basis of the findings emerged, and proposal for possible further research to carry out on the topic.

In Europe, at the macro level, there is a policy orientation aimed at extending working lives, mainly due to population ageing and the need to guarantee the sustainability of both pension and welfare system. First, it has to be taken in consideration that this study, focusing on the meso level (i.e. company/organization, where the extension - or not - of working life concretely materializes) adds to the scientific knowledge by providing insights about the rather unexplored topic of drivers and barriers to EWL practices in companies.

The results of the study suggest that among the main drivers for companies' practical (in terms of behavior) extension of working life by allowing older workers to work until retirement age, to prolong working life beyond retirement age and to be hired after retirement, there is the implementation of other HR measures for older workers to improve their performance, their working conditions as well as to reduce costs linked to their management. Other drivers are a high share of older workers in the company, medium or large company size and having experienced recruitment problems. In the light of the above - among other things - it seems to be crucial to support especially small companies in developing specific actions for promoting EWL, even by involving employers' organizations in this process. At the same time, it could be important to foster and strengthen the implementation of HR measures for older workers in companies regardless of their size. For example, there is the need to support a more wide implementation of age management policies to the benefit of older workers since it could contribute to improve managers' perception about the positive qualities and skills of these employees. Furthermore, promoting a change in work organization within companies according to specific needs and characteristics of older workers (i.e. taking into account their ability to work) could encourage more effectively employees to work until or beyond retirement age, as well as improving their working conditions. Moreover, to support a wide implementation of specific “silver workers” programs among companies could stimulate unretirement of employees.

The study also highlights that in the industry sector the qualities and the skills of older workers could be more valued and desired than in other sectors, together with a greater will in this sector, that older workers' knowledge could possibly be retained. This implies that there is the need to promote a wide set of measures (e.g. awareness campaigns, economic incentives, life-cycle approach in HR policies, flexible working time arrangements, career development programs, training and lifelong learning) for better valuing the competencies and qualities of older workers in order to be more valued in sectors other than the industry. The study has also underlined that the influence of labour unions is a barrier for EWL practices (in particular through

unretirement) especially in the industry. This suggests a need of involving trade unions in a process possibly shared with other stakeholders (e.g. companies and their representatives bodies, policymakers, etc.) for managing in a modern way workforce ageing, including promoting EWL practices in the various economic sectors.

Some indications from the study also suggest that age stereotypes may be present, especially in the service sector. In the light of this, it is crucial, in order to contribute to EWL, to develop awareness campaigns at various levels (e.g. production system, social partners), specific policies and organizational initiatives to combat negative stereotypes linked to older workers, especially concerning their supposed low productivity.

In general, the results of the study have some clear policy implications. Policy makers and stakeholders should be aware that to achieve the European policy aim of extending working lives, it is not sufficient to intervene through simply increasing the legal retirement age, but it is important to push companies through innovative tools, to promote more organisational practices to improve the employability and the working conditions of older workers. They should also be aware that through EWL practices, companies, besides exploiting older workers' qualities and knowledge, may try to save costs. This is not negative in itself, but it may be negative in the case older workers, this especially concerning unretirement, are underpaid in relation to the work done, and when this is detrimental to unemployed people who cannot access the labour market since retired and cheaper people are preferred. This is a risk that should be considered, at the policy level.

Concerning suggestions about future research on the topic, even though it is not easy to plan a longitudinal survey in the scarce panorama of data dealing with the employers' perspective about the management of older workers, it could be very useful to carry out this kind of studies, since longitudinal studies could help to identify the effect (rather than just the association) of the independent variables (i.e. HR policies, companies' workforce characteristics, companies' structural characteristics, economic and labour market climate) on EWL practices (i.e. prevention of early retirement, delay of retirement, unretirement). Since this study focused mainly on differences across sectors, and recognizing that country differences relative to EWL organisational practices is an important topic, further studies are also needed for analyzing more in depth country differences.

## Introduction

Increased life expectancy, population ageing and the need to guarantee pension system sustainability, are key elements to explain the European policy aim of extending the working life (Whitehouse, 2007; Finch, 2014), an aim whose achievement depends on the interaction between various levels. At the macro level, this issue is mainly managed through policy changes in laws and regulations regarding the transition from work to retirement (Conen *et al.*, 2014). At the individual level, the decision to retire (or, conversely, to remain in employment), could be supposed to be managed based on a voluntary choice (Dorn and Sousa-Poza, 2005), and there is evidence that workers expect to retire at a higher age in the future (Velladics *et al.*, 2006). However, the place where the extension (or not) of working life materialises, is the meso (i.e. company/organisation) level, which has been recognised as the key level when it comes to decisions about this issue. Indeed, companies might not want to implement measures to pursue this policy aim (Schmitz, 2015), or may implement measures that strengthen, weaken or have no impact at all on this goal

promoted at the macro level (Hofäcker, 2010). On the other hand, companies could also influence the micro level, by leaving little choice to employees concerning their retirement (Vickerstaff *et al.*, 2003).

Having been largely acknowledged that the company/organisation level is crucial for longer working lives versus retirement (Vickerstaff *et al.*, 2003; OECD, 2006; Conen *et al.*, 2014), results of studies available on the management of older workers by companies suggest that employers act mainly through barriers rather than drivers, in the sense that they generally tend not to invest on them (Schmitz, 2015). However, the organisational level remains mainly unexplored (Smeaton and McKay, 2003; van Solinge and Henkens, 2014), especially concerning the specific issue of the provision of initiatives to prolong employees' working lives. This, since previous studies mainly have dealt with how companies manage older workers broadly (e.g. Conen *et al.*, 2012; Taylor *et al.*, 2013), for instance in terms of employability (van Dalen *et al.*, 2010), recruitment behaviour (Loretto and White, 2006), or broad retention strategies (Loretto and White, 2006). However, very seldom, to our knowledge, previous research concentrated specifically on the issue of the extension of the working life and, in more detail, on measures on the organisational level aimed at labour demand. Thus, a strength of this paper is that its main aim is to study European companies in order to identify main drivers and barriers to the extension of the working life, meant as: prevention of early retirement (i.e. encouraging employees to continue working until retirement age); delay of retirement (i.e. encouraging employees to continue working beyond retirement age); unretirement (i.e. recruiting employees who already retired), that is when "an individual fully retires and then returns to employment" (Lain, 2016, p. 77) .

Based on previous studies, in this study we adopt a conceptual framework, as described in the following, according to which at the company level, the extension of the working life depends on Human Resource (HR) policies, workforce characteristics, structural characteristics of the company, and the position of the company in the larger economic and labour market climate.

## **Human resource policies**

The extension of working life could be linked to HR policies which could create opportunities and conditions for this extension, e.g. via older workers' higher productivity caused by HR policies. Although age management initiatives are not very frequently implemented by employers (van Solinge and Henkens, 2014), it is plausible that the implementation of HR policies addressing older employees could be a meaningful indicator of the company propensity to extend employees' working lives (Schmitz, 2015). However, even though HR policies for older workers can prolong working lives, the relationship is not deterministic. For instance, in Norway, retention HR policies did not help to delay retirement among older workers (Hermansen and Midtsundstad, 2015). However, these policies could be positively associated with the extension of working lives since they are aimed to both maintain older workers' human capital in terms of preventing a decline in productivity, and/or to reduce costs (Conen *et al.*, 2012). Examples of organisational policies in this direction are: decrease of the workload for older workers, training programmes for older workers, career planning, ergonomic measures and workplace design, partial retirement, early retirement, health protection, reduction in tasks and salary - demotion (Conen *et al.*,

2012; Schmitz, 2015). Still, some retention measures could have negative traits for older workers. For instance, demotion is often seen as detrimental to work motivation (Josten and Schalk, 2010). Furthermore, partial retirement may indicate a wish to dismiss older workers, rather than to retain them (Tullius *et al.*, 2012). A still different question concerns organisational early retirement schemes, which cannot be considered as a policy aimed at longer working lives. However, the implementation of these schemes may have a positive connection with specific organisational ways of prolonging working life, for example the demand of work after retirement (Mulders *et al.*, 2015).

## **Workforce characteristics**

It is thought that research should pay particular attention to employers' attitudes and behaviour concerning different categories of personnel (van Dalen *et al.*, 2009). According to the human capital hypothesis (Harper *et al.*, 2006), companies relying to a large extent on highly skilled workers are more likely to retain older employees than organisations relying more on low skilled workers. The assumption is that highly skilled workers both hold company key-knowledge and experience, and continue to acquire new skills more easily, hence making the extension of their working life particularly desirable for employers. This does not exclude that, to save costs, employers may be also prone to rely on older low skilled workers with a low level of remuneration, and working for fewer working hours (Lain, 2012). This could concern especially unretirement, since most pensioners want to work part-time only (Hilsen and Salomon, 2012). Moreover, on the basis of the fact that having a large share of older employees next to retirement age implies that ways for retirement transitions without labour shortages have to be found, the age composition of the staff is supposed to be correlated with the company's will to prolong, in some cases, older workers' professional life. Thus, having a high percentage of older workers could be positively associated to the extension of working life in companies (van Dalen *et al.*, 2015).

## **Structural characteristics of the company**

Size and sector of the activity of the company have been found to be important elements in the interplay with age management HR policies. It is particularly worth looking into different sectors, since workload and age-productivity profiles differ between sectors and solutions would differ accordingly (Schmitz, 2015). For instance, to find skilled workers in the industry sector may be difficult, and companies could be more interested in extending workers' professional life in this sector (Hermansen and Midtsundstad, 2015). However, public sector organisations seem to be more conscious of age management issues than companies in other sectors (Hermansen and Midtsundstad, 2015). Furthermore, measures to extend working life are also supposed to differ across sectors according to the degree of heavy manual work tasks concerned (Midtsundstad and Bogen, 2011). Since there is a need to target age management efforts in accordance with the different needs, problems and challenges facing different sectors (Midtsundstad and Bogen, 2011), in this paper we intend to explore the phenomenon of the extension of working life within different sectors.

Company size also has a role on the management of older workers. Most studies agree that in larger companies older workers are more appreciated and that especially these companies implement age management initiatives, also in terms of alternative positions and duties (van Dalen *et al.*, 2010; Principi *et al.*, 2015; Schmitz, 2015). In light of this, large organisational size is sometimes considered as a prerequisite for efficient employment of older workers (Mulders *et al.*, 2015), despite Loretto and White (2006) found larger organisations behaving more negatively towards older workers in terms of retention and retirement.

## **Position of the company in the larger economic and labour market climate**

Companies' behaviour in terms of extension of working life may also be linked to specific circumstances, as business cycles, and/or features which are not structural, but rather depend on the products being made, the interplay with the economic climate, or with social partners, for instance unions. The business cycle of a company is influenced by the economic climate (Conen *et al.*, 2011): in times of economic crises, employers will be prone to adopt cost-saving policies, which were mainly found to be negatively correlated to the extension of working life (Conen *et al.*, 2014). For instance, in times of crisis employers could be inclined to dismiss older workers, and one of the most adopted practices to save costs in times of economic crises was the opposite of extending working life, that is, early retirement (Taylor and Earl, 2016). However, it was argued that while looking to possibilities to reduce the overall staff size in order to cut costs, during a period of downsizing it may also be important to retain some older core employees (Hermansen and Midtsundstad, 2015). Thus, in some specific cases downsizing may be positively correlated with the extension of working life. Along these lines, Conen and colleagues (2011) observed that during the recession, efforts to retain older workers are higher, while recruitment of older workers declines substantially. In times of economic growth, the expectation is straightforward towards employers being inclined to implement HR policies favouring the extension of working life. For instance, a firm could need to recruit personnel, and could find it difficult to find suitable candidates for specific positions. So, in case of labour shortages or recruitment problems, employers may try to extend older workers' professional life (van Dalen *et al.*, 2015).

Another important factor which may be linked to the extension of working life is represented by unions. Against the background of the European trend to increase retirement age, unions' representatives at the national level, in different countries, generally agree that these policies force older people to be active longer (Hagemann and Scherger, 2015). In line with this, there are some evidences (Hermansen and Midtsundstad, 2015) in the direction that highly unionised companies might find it difficult to extend workers' professional lives.

A further element is represented by the specificity of the company, relative to the workers' level of knowledge needed to deal with products being distributed or services being delivered in the market. If employers need to invest heavily in (especially) firm-specific training, they may be more likely to invest longer in their older employees (Bennet and Möhring, 2015), in order both to exploit longer the

knowledge embedded in these workers, and to save costs to train a higher number of younger inexperienced workers.

While previous studies have dealt with employers' behaviour in terms of broad age management practices, and little attention has been paid to the specific issue of the extension of working life, the main aim of this paper is to analyse drivers and barriers in relation to the extension of working lives via labour demand. Given that the degree of older workers' decline in productivity is supposed to depend on the sector of activity of the company, and that as a consequence of this, in certain sectors employers could be less inclined to prolong the working lives of their employees than in others, we study this issue within sectors.

## **Methods**

### **Study design**

Data are drawn from the European project 'Activating Senior Potential in an Ageing Europe' (ASPA) database, which provides data on employers' policies and behaviours towards older workers. This study includes 4,624 companies of 6 European countries: Denmark (587), Germany (666), Italy (770), the Netherlands (1,046), Poland (1,030) and Sweden (525). Data were collected between March and November 2009 by using the same questionnaire across countries. The survey addressed companies with at least ten employees, and in each country the sample was stratified by size and sector. Size classification was based on Eurostat's Structural Business Statistics, while the sector classification was based on the Nomenclature statistique des Activités économiques dans la Communauté Européenne (NACE, the statistical classification of economic activities in the European Union). Companies in the agricultural sector were excluded on the ground that they are mainly composed of self-employed people. The interview techniques differed across countries, depending on what was perceived to be the best way to address respondents in a particular country (van Dalen *et al.*, 2015): computer-assisted telephonic interviewing – CATI (Italy and Poland); computer-assisted web interviewing – CAWI (Denmark); paper and pencil interviewing – PAPI (Germany, The Netherlands, and Sweden). The response rates varied between 11% (Germany) and 53% (Sweden) and were generally in line with response rates of surveys carried out among employers (Brewster *et al.*, 1994; Kalleberg *et al.*, 1996). Respondents were directors/CEO/owners (29%); head of departments (10%), general managers (15%), human resource managers (31%), administrators/other positions (15%).

### **Measures**

Dependent variables. The extension of working live (EWL) was measured through three different variables testing the current implementation (Y/N) of the three following measures: (1) encouragement of employees to continue working until retirement age (i.e. prevention of early retirement), (2) encouragement of employees to continue working beyond retirement age (i.e. delay of retirement), (3) recruitment of employees who already retired (i.e. unretirement).

Independent variables. Concerning human resource policies, we asked whether the following measures concerning older workers were currently applied (Y/N) in the organisation: part-time retirement, early retirement schemes, decreased workload, demotion, training plans. We investigated the following company's workforce characteristics: percentage of high skilled workers, percentage of low-skilled workers and percentage of older workers. About size and sector, according to Eurostat's Structural Business Statistics, small companies were considered those with 10 to 49 employees, medium sized those with 50 to 249 employees and large companies those from 250 or more employees, while sector was categorised into industry, services and public sector (Principi *et al.*, 2015). To measure the impact of the economic and labour market climate we asked to what extent the establishment encounters the problem of the need to reduce staff levels. Answers categories were No/low extent/some extent/high extent and these categories were grouped into No/low extent vs some/high extent. Then we asked whether the company experienced recruitment problems in the last two years by distinguishing between "Yes, with some/relatively many vacancies" and "No, generally not". Knowledge intensity and labour union involvement were measured on a 5-point scale from 1 (completely disagree) to 5 (completely agree), by asking the extent to what the respondent agreed or disagreed to the following statements: "The knowledge intensity in our establishment is high"; "The influence of labour unions on personnel policies is clearly visible in the establishment".

Control. In multivariate analyses, we adjusted for country. Since to explore country differences was out of the scope of this paper, the country results are not discussed.

## Sample description

Table 1 presents the main characteristics of the sample (by country and for the total sample). Out of the three ways identified in this respect, the most widespread measure to extend working life is encouraging to work until statutory retirement age (28.9% of the total sample), this measure being particularly present in Danish and Polish companies. Concerning the recruitment of retired people, 17.6% of the companies adopt this strategy, this especially in Polish companies, a country where, despite the low employment rate of older workers in comparison to most of European countries (Eurostat, 2016) to hire pensioners is a profitable strategy for companies. In Italy, there is a scarce diffusion of measures to extend the working life. Globally, early retirement is still a widespread organisational policy for older workers (30% of the companies). This policy is particularly widespread in the Netherlands, where also part-time retirement and decreasing the workload for older workers are policies that employers frequently adopt. Demotion was more usual in Danish companies while training plans for older workers were more common in Polish and German ones. Low levels of diffusion of HR policies for older workers were found in Italy.

**Table 1. Sample characteristics, by country and total sample (% - mean/SD)**

	DK	DE	IT	NL	PL	SE	Total
--	----	----	----	----	----	----	-------

Numbers of cases	587	666	770	1046	1030	525	4624
<b>EWL in companies (yes)</b>							
Encouraging to work till statutory retirement age	42.8	27.7	10.8	20.9	44.1	28.6	28.9
Encouraging to work beyond retirement age	21.2	6.8	6.1	8.5	29.0	14.3	15.0
Recruiting employees who already retired	12.8	14.6	3.9	8.6	43.1	7.8	17.6
<b>HR Policies (yes)</b>							
Part-time retirement	19.7	16.4	4.5	49.9	28.3	24.6	25.7
Early retirement schemes	15.1	23.3	10.1	55.0	39.1	19.0	30.0
Decreasing the workload for older workers	36.0	8.4	7.4	37.0	9.9	13.5	18.8
Demotion	21.2	4.3	0.8	8.4	2.9	3.4	6.3
Training plans for older workers	11.5	24.9	2.2	14.9	39.5	11.0	19.1
<b>Company's workforce characteristics</b>							
% high-skilled workers	20.0 (24.8)	19.0 (23.5)	26.0 (29.8)	18.6 (27.0)	37.8 (31.8)	36.0 (33.9)	26.0 (29.6)
% low-skilled workers	23.0 (26.9)	15.9 (20.0)	36.0 (35.5)	18.2 (26.8)	17.4 (23.4)	37.3 (34.5)	23.1 (28.8)
% older workers	26.7 (15.1)	26.8 (15.2)	19.3 (18.5)	23.3 (15.6)	25.3 (19.7)	31.2 (18.9)	25.0 (17.6)
<b>Company's structural characteristics</b>							
<b>Size</b>							
<i>Small</i>	32.7	28.4	37.9	33.8	44.7	38.3	36.3
<i>Medium</i>	33.0	34.3	34.5	34.2	41.4	32.6	35.7
<i>Large</i>	34.3	34.6	27.5	32.0	13.8	29.1	28.0
<b>Sector</b>							
<i>Industry</i>	35.3	25.0	40.4	35.7	41.7	36.7	35.9

	<i>Services</i>	30.9	24.4	31.7	33.1	28.9	28.8	29.8
	<i>Public</i>	33.8	48.9	27.9	31.2	29.3	34.5	34.3
<b>Economic and labour market climate</b>								
Need to reduce staff to some/high extent		33.0	26.3	32.1	36.0	14.9	45.0	29.9
Recruitment problems (yes)		55.5	56.3	28.8	57.4	35.9	26.7	44.9
Knowledge intensity (1 = low, 5 = high)		3.8 (.89)	3.9 (.76)	2.1 (.84)	3.7 (.96)	4.1 (.80)	4.0 (.82)	3.6 (1.07)
Labour unions involvement (1 = low, 5 = high)		2.8 (1.23)	2.3 (1.21)	3.1 (1.26)	2.6 (1.18)	2.5 (1.40)	3.3 (1.11)	2.7 (1.28)

Polish and Swedish companies had the highest shares of high-skilled workers, on average (37.8% and 36%, respectively) and Swedish and Italian that of low-skilled ones (37.3% and 36%, respectively). On average, in the companies, 25% of the workforce was made of older workers, with the highest values in Sweden (31.2%) and the lowest ones in Italy (19.3%). Overall, 36.3% of the companies investigated were small, 35.7% were medium-sized and 28% were large ones. Small and medium sized companies were particularly present in the Polish sample while large ones in the Danish, German and Dutch samples. Looking at the total sample concerning the sector, 35.9% of the companies concerned the Industry, 29.8% services and 34.3% the public sector. Companies active in the industry were investigated especially in Poland and in Italy while those ones active in the public sector were more frequently investigated in Germany. About 30% of the studied companies encountered the need to reduce staff levels to some or high extent and this especially in Swedish companies (45%). Especially Dutch (57.4%), German (56.3%) and Danish (55.5%) companies had recruitment problems in the last two years while much less so in Italy. The knowledge intensity in the establishment was high in particular in the Polish and Swedish samples, while the involvement of labour unions was higher in the Swedish and Italian ones.

## Analyses

Analyses were carried out for the total sample and for the three sectors separately. In bivariate analyses, Pearson chi-square test and t-tests were used to test possible differences between the implementation (Y/N) of measures to extend working lives, and each independent variable. To test variables associated with the implementation of measures to extend the working life, controlling for other factors, multiple logistic regression models were used for the three activity sectors separately, and for the total sample. In the model on the total sample, sector was included among other regressors. To allow a comparison of probability values across sectors, in multivariate analyses within sectors, Average Marginal Effects (AMEs) were employed, which consider unobserved heterogeneity across groups (Mood, 2010). This makes it

possible to prevent problems linked to the variation, across sectors, of the unobserved heterogeneity (i.e., variation in the dependent variable, caused by the variables not included in the model), which is implied when the same model is applied to different groups by employing odd-ratios. A probability value of less than 0.05 was considered for statistical significance. Data were analysed using SPSS 23 and STATA 11.2.

## Results

The implementation of measures to extend working life (YES) is shown in Table 2. Concerning HR policies for older workers, the share of companies implementing EWL measures is always higher among companies implementing these policies. For example, 37.9% of companies implementing part-time retirement encourage their employees to work until retirement age, while only 25.7% of companies not implementing part-time retirement do so. The associations between the three EWL labour demand policies and HR policies for older workers always reach statistical significance but in the case of demotion for unretirement.

**Table 2. Companies extending working lives (YES) by selected characteristics**

	Encouraging to work till statutory retirement age		Encouraging to work beyond retirement age		Recruiting employees who already retired	
	% - mean* (SD)	p-value	% - mean (SD)	p-value	% - mean (SD)	p-value
<b>HR Policies</b>						
Part-time retirement		<b>.000</b>		<b>.000</b>		<b>.000</b>
<i>Yes</i>	37.9		20.8		25.7	
<i>No</i>	25.7		12.9		14.7	
Early retirement schemes		<b>.000</b>		<b>.000</b>		<b>.000</b>
<i>Yes</i>	35.1		18.9		26.8	
<i>No</i>	26.1		13.3		13.6	
Decreasing the workload for older workers		<b>.000</b>		<b>.000</b>		<b>.014</b>
<i>Yes</i>	41.9		22.1		24.4	
<i>No</i>	25.7		13.3		16.9	

Demotion		<b>.000</b>		<b>.000</b>		.098
	<i>Yes</i>	53.3		29.5		22.1
	<i>No</i>	27.0		14.0		17.4
Training plans for older workers		<b>.000</b>		<b>.000</b>		<b>.000</b>
	<i>Yes</i>	45.4		24.2		32.9
	<i>No</i>	24.9		12.8		13.9
<b>Company's workforce characteristics</b>						
% high-skilled workers		30.2		31.8		31.4
		(30.4)	<b>.000</b>	(30.1)	<b>.000</b>	(30.1)
						<b>.000</b>
% low-skilled workers		21.4		22.9		20.3
		(27.3)	<b>.000</b>	(27.5)	<b>.004</b>	(25.5)
						<b>.000</b>
% older workers		28.4		29.5		29.6
		(16.8)	<b>.000</b>	(17.9)	<b>.000</b>	(18.2)
						<b>.000</b>
<b>Company's structural characteristics</b>						
Size			<b>.000</b>		<b>.011</b>	<b>.000</b>
	<i>Small</i>	25.0		13.1		13.7
	<i>Medium</i>	29.8		16.9		22.2
	<i>Large</i>	32.8		15.3		17.1
Sector			<b>.045</b>		.744	.248
	<i>Industry</i>	28.9		15.6		18.5
	<i>Services</i>	26.8		14.6		16.2
	<i>Public</i>	31.1		14.9		18.0
<b>Economic and labour market climate</b>						
Need to reduce staff to some/high extent			<b>.000</b>		<b>.000</b>	<b>.000</b>

	<i>Yes (some/high extent)</i>	25.1		11.4		12.8
	<i>No (no/low extent)</i>	30.4		16.5		19.6
Recruitment problems (experienced shortages)			<b>.000</b>		<b>.008</b>	<b>.002</b>
	<i>Yes, some/many</i>	33.7		16.6		19.6
	<i>No</i>	25.1		13.8		16.1
Knowledge intensity (1 = low, 5 = high)		3.86 (.98)	<b>.000</b>	3.87 (.97)	<b>.000</b>	3.95 (.88)
Labour unions involvement (1 = low, 5 = high)		2.72 (1.32)	<b>.004</b>	2.78 (1.31)	.218	2.54 (1.33)

Bivariate analyses. Chi-square and T-tests for independent samples used to compare characteristics of companies extending working lives within each of the three EWL modalities. Statistically significant associations are shown in bold. Row percentages refer to having implemented EWL (yes).

\*For means, significance was tested against not having implemented, EWL, i.e. against the following mean values, respectively, for Encouraging to work till statutory retirement age, Encouraging to work beyond retirement age and Recruiting employees who already retired. % high-skilled workers: 24.7 (29.2), 25.4 (29.6), 25.4 (29.7); % low-skilled workers: 24.7 (30.0), 23.8 (29.5), 24.4 (29.9); % older workers: 23.4 (17.5), 24.1 (17.3), 23.8 (17.2); Knowledge intensity: 3.47 (1.11), 3.54 (1.10), 3.52 (1.11); Labour unions involvement: 2.73 (1.27), 2.72 (1.28), 2.76 (1.27).

Having higher shares of high-skilled workers on average, corresponds to higher values of implementation of EWL measures. For example, relative to encouraging to work till statutory retirement age, the mean of the share of high-skilled workers of companies which encourage to work until statutory retirement age is 30.2%, while the same mean of companies which do not encourage to work until statutory retirement age is 24.7% (see in the note at the bottom of Table 2). Exactly the same pattern concerns the companies' share of older workers. The reverse pattern is observed concerning the share of low-skilled workers: having lower shares of low-skilled workers is significantly associated to higher values of implementation of EWL measures. Concerning companies' structural characteristics, mainly large companies encourage to work until retirement age, whereas encouraging to work beyond retirement age and recruiting employees who already retired is more frequent among medium-sized companies. In bivariate analyses, differences in the association between activity sector and EWL were significant in the case of encouraging to work until retirement age, being this more frequent in the public sector. As for the economic and labour market climate, EWL practices were more frequent among companies without the need to reduce staff levels, which had recruitment problems and with higher values of knowledge intensity. Strong influence of labour unions is significantly associated with a higher value of encouraging (rather than not encouraging) to work until statutory retirement age, and with a lower value of recruiting employees who already retired.

In multivariate analyses, to control for other factors, the implementation of EWL practices was regressed on the independent variables, within sectors and for the total sample. Table 3 concerns EWL in terms of

encouragement to work until retirement age (i.e. prevention of early retirement). Despite sector being not significant in the model on the total sample, sector-specific models show some differences across sectors in terms of predictors.

**Table 3. Explanatory variables for encouraging to work till statutory retirement age, by sector and total sample**

	Industry			Services			Public			Total sample	
Number of cases	1,427			1,163			1,294			3,938	
	AME	SE	p-value	AME	SE	p-value	AME	SE	p-value	B	p-value
<b>HR Policies (yes)</b>											
Part-time retirement	0.06	0.03	<b>0.038</b>	0.03	0.03	0.395	0.03	0.03	0.271	.27	<b>.007</b>
Early retirement schemes	0.01	0.03	0.664	-0.06	0.03	0.060	0.00	0.03	0.921	-.07	.458
Decreasing the workload for older workers	0.12	0.03	<b>0.000</b>	0.12	0.04	<b>0.001</b>	0.11	0.03	<b>0.001</b>	.61	<b>.000</b>
Demotion	0.15	0.05	<b>0.005</b>	0.10	0.05	<b>0.042</b>	0.18	0.05	<b>0.001</b>	.74	<b>.000</b>
Training plans for older workers	0.08	0.03	<b>0.024</b>	0.12	0.04	<b>0.002</b>	0.06	0.03	0.064	.43	<b>.000</b>
<b>Company's workforce characteristics</b>											
% high-skilled workers	0.00	0.00	<b>0.009</b>	0.00	0.00	0.670	0.00	0.00	0.995	.00	.13
% low-skilled workers	0.00	0.00	0.444	0.00	0.00	0.650	0.00	0.00	0.097	.00	.143
% older workers	0.00	0.00	<b>0.039</b>	0.00	0.00	<b>0.000</b>	0.00	0.00	<b>0.002</b>	.01	<b>.000</b>
<b>Company's structural characteristics</b>											
Size (ref. Small)											
<i>Medium</i>	0.00	0.03	0.954	-0.01	0.03	0.663	0.05	0.03	0.079	.10	.324

	<i>Large</i>	-0.01	0.03	0.725	0.10	0.04	<b>0.006</b>	0.07	0.03	<b>0.033</b>	.29	<b>.006</b>
Sector (ref. Industry)												
	<i>Services</i>	-	-	-	-	-	-	-	-	-	.00	.994
	<i>Public</i>	-	-	-	-	-	-	-	-	-	-.10	.311
<b>Economic and labour market climate</b>												
Need to reduce staff to some/high extent												
		-0.05	0.02	<b>0.024</b>	-0.04	0.03	0.129	0.00	0.03	0.899	-.19	<b>.033</b>
Recruitment problems (yes)												
		0.08	0.02	<b>0.001</b>	0.04	0.03	0.108	0.09	0.03	<b>0.000</b>	.42	<b>.000</b>
Knowledge intensity												
		0.02	0.01	0.225	-0.01	0.01	0.516	0.03	0.02	0.055	.08	.119
Labour unions involvement												
		-0.01	0.01	0.547	-0.01	0.01	0.166	-0.01	0.01	0.316	-.06	.084
R-squared												
		0.12			0.13			0.12			0.18	

Note: Multiple logistic regression on encouraging to work till statutory retirement age (Y/N). Average Marginal Effects (AMEs) represent the probability discrete change from the base level. Statistically significant associations are shown in bold. Adjusted by country, findings available on request.

Apart from early retirement schemes (which is plausible), the implementation of HR policies for older workers shows a positive association with encouraging to work until retirement age. The analyses within sectors show that for part-time retirement this positive link is only in the industry, while training plans do not seem to have a role in the public sector. Concerning the characteristics of the workforce, having a high share of older workers was positively associated with encouraging to work until retirement age, while this positive association concerning a high percentage of high-skilled workers only concerned the industry sector. Large companies, rather than small ones, are more likely to implement this measure, but this does not seem to concern the industry. Consistent with results of bivariate analyses, this practice is negatively associated with the need to reduce staff levels but this only in the industry (and in the total sample), and positively associated with having had recruitment problems, even if the latter does not seem to concern the sector of services.

In Table 4 results are shown concerning EWL in terms of encouraging to work beyond retirement age. Again, sector was not significant in the model on the total sample, however, several differences concerning predictors between sectors were found in the comparison of models within sectors.

**Table 4. Explanatory variables for the encouraging to work beyond retirement age, by sector and total sample**

	Industry			Services			Public			Total sample	
Number of cases	1,427			1,157			1,296			3,933	
	AME	SE	p-value	AME	SE	p-value	AME	SE	p-value	B	p-value
<b>HR Policies (yes)</b>											
Part-time retirement	0.06	2.13	<b>0.033</b>	0.03	0.03	0.223	0.03	0.02	0.165	.32	<b>.008</b>
Early retirement schemes	0.00	0.02	0.987	-0.05	0.02	<b>0.047</b>	0.03	0.02	0.244	-.04	.770
Decreasing the workload for older workers	0.03	1.35	0.177	0.10	0.03	<b>0.002</b>	0.10	0.03	<b>0.001</b>	.58	<b>.000</b>
Demotion	0.11	2.42	<b>0.016</b>	0.03	0.04	0.389	0.11	0.04	<b>0.013</b>	.66	<b>.000</b>
Training plans for older workers	0.04	1.43	0.152	0.06	0.03	0.053	0.02	0.02	0.450	.29	<b>.017</b>
<b>Company's workforce characteristics</b>											
% high-skilled workers	0.00	0.42	0.671	0.00	0.00	0.793	0.00	0.00	0.870	.00	.450
% low-skilled workers	0.00	0.96	0.336	0.00	0.00	0.088	0.00	0.00	0.531	.01	<b>.007</b>
% older workers	0.00	1.33	0.185	0.00	0.00	<b>0.000</b>	0.00	0.00	<b>0.012</b>	.01	<b>.000</b>
<b>Company's structural characteristics</b>											
Size (ref. Small)											
<i>Medium</i>	0.03	1.45	0.147	0.03	0.02	0.220	-0.01	0.02	0.776	.17	.169
<i>Large</i>	0.00	0.07	0.943	0.02	0.03	0.384	0.01	0.03	0.723	.14	.328
Sector (ref. Industry)											

<i>Services</i>	-	-	-	-	-	-	-	-	-	.08	.499
<i>Public</i>	-	-	-	-	-	-	-	-	-	-.14	.272
<b>Economic and labour market climate</b>											
Need to reduce staff to some/high extent	-0.05	-2.76	<b>0.006</b>	-0.04	0.02	<b>0.039</b>	0.00	0.02	0.941	-.30	<b>.008</b>
Recruitment problems (yes)	0.06	3.08	<b>0.002</b>	0.02	0.02	0.351	0.02	0.02	0.279	.34	<b>.001</b>
Knowledge intensity	0.01	1.01	0.313	0.00	0.01	0.976	0.01	0.01	0.346	.09	.132
Labour unions involvement	0.00	-0.06	0.956	0.00	0.01	0.650	0.00	0.01	0.737	-.01	.847
R-squared		0.11			0.14			0.14			0.09

Note: Multiple logistic regression on encouraging to work till statutory retirement age (Y/N). Average Marginal Effects (AMEs) represent the probability discrete change from the base level. Statistically significant associations are shown in bold. Adjusted by country, findings available on request.

With different modalities and to different degrees, the HR policies considered in the analyses have positive associations with this way of extending working lives. An exception to this concerns early retirement schemes, which have a negative link with this measure in the sector services. This positive association concerned part-time retirement (industry and total sample), decreasing the workload (apart from the industry) and demotion (apart from the services). Concerning training plans, this positive association concerned the model on total sample but none of the ones within sectors. A high share of older workers in the company is also associated to this way of extending working lives, even if this does not seem to be the case in the industry. While having a high share of low-skilled workers is positively associated with encouragement to work beyond retirement age, this is not the case in the models within sectors. Size does not seem to have a role in this case of EWL. The need to reduce staff levels is negatively associated with the dependent variable apart from the case of the public sector, while having experienced recruitment problems explains encouraging to work beyond retirement age in the industry (and in the total sample).

Table 5 reports results about EWL in terms of unretirement, i.e. recruitment of employees who already retired. Even in this case, although sector was not significant in the model on the total sample, we found differences between sectors by comparing results of models carried out within sectors.

**Table 5 . Explanatory variables for recruiting employees who already retired, by sector and total sample**

	Industry			Services			Public			Total sample	
Number of cases	1,433			1,165			1,300			3,952	
	AME	SE	p-value	AME	SE	p-value	AME	SE	p-value	B	p-value
<b>HR Policies (yes)</b>											
Part-time retirement	0.05	0.02	<b>0.047</b>	0.06	0.03	<b>0.027</b>	0.00	0.02	0.976	.35	<b>.003</b>
Early retirement schemes	0.06	0.02	<b>0.009</b>	0.03	0.02	0.163	0.01	0.02	0.516	.35	<b>.003</b>
Decreasing the workload for older workers	0.03	0.02	0.193	0.06	0.03	<b>0.024</b>	0.09	0.03	<b>0.002</b>	.49	<b>.000</b>
Demotion	0.06	0.04	0.149	-0.03	0.03	0.229	0.04	0.04	0.297	.13	.483
Training plans for older workers	0.02	0.02	0.327	0.04	0.03	0.104	-0.01	0.02	0.710	.16	.183
<b>Company's workforce characteristics</b>											
% high-skilled workers	0.00	0.00	0.475	0.00	0.00	<b>0.017</b>	0.00	0.00	0.198	.00	.664
% low-skilled workers	0.00	0.00	<b>0.013</b>	0.00	0.00	0.834	0.00	0.00	0.278	.01	<b>.027</b>
% older workers	0.00	0.00	<b>0.011</b>	0.00	0.00	<b>0.000</b>	0.00	0.00	<b>0.000</b>	.02	<b>.000</b>
<b>Company's structural characteristics</b>											
Size (ref. Small)											
<i>Medium</i>	0.08	0.02	<b>0.000</b>	0.09	0.02	<b>0.000</b>	0.04	0.02	0.088	.71	<b>.000</b>
<i>Large</i>	0.04	0.02	0.113	0.05	0.02	<b>0.028</b>	0.07	0.03	<b>0.011</b>	.56	<b>.000</b>
Sector (ref. Industry)											
<i>Services</i>	-	-	-	-	-	-	-	-	-	.05	.666
<i>Public</i>	-	-	-	-	-	-	-	-	-	-.17	.183

**Economic and labour  
market climate**

Need to reduce staff to some/high extent	0.01	0.02	0.544	-0.03	0.02	0.084	-0.04	0.02	0.070	-0.13	.256
Recruitment problems (yes)	0.05	0.02	<b>0.004</b>	0.03	0.02	0.075	0.06	0.02	<b>0.004</b>	.45	<b>.000</b>
Knowledge intensity	0.02	0.01	<b>0.030</b>	0.02	0.01	0.073	0.01	0.01	0.438	.18	<b>.005</b>
Labour unions involvement	-0.02	0.01	<b>0.002</b>	-0.01	0.01	0.139	-0.01	0.01	0.123	-0.15	<b>.000</b>
R-squared	0.21		0.25		0.19		0.26				

Note: Multiple logistic regression on encouraging to work till statutory retirement age (Y/N). Average Marginal Effects (AMEs) represent the probability discrete change from the base level. Statistically significant associations are shown in bold. Adjusted by country, findings available on request.

In terms of HR policies positively associated with EWL in terms of unretirement, we found this concerning part-time retirement (this not in the public sector) and reduction of the workload (this not in the industry). Interestingly, the implementation of early retirement schemes was positively associated with recruiting retired people in the industry (and in the total sample). Concerning workforce characteristics, having a high percentage of older workers had a role even in this case, while high percentages of high and low skilled workforce have a role in the services and the industry, respectively. In general, this measure is more likely to be implemented in medium-sized and larger companies rather than in small ones, and by companies with recruitment problems (even if this does not seem to concern the service sector). For this specific modality of extending the working life, also (high) knowledge intensity has a role in the industry, while in this sector (and in the total sample) a strong influence of the unions is negatively associated to the recruitment of retired people.

**Discussion**

The scarce evidence available on companies' behaviour towards older workers (Vickerstaff *et al.*, 2003) concerns mostly how companies manage older workers in terms of broad age management practices (e.g. Loretto and White, 2006; Conen *et al.*, 2012) while the specific issue of companies' behaviour concerning the effective extension of working life of their employees is mostly unexplored. Due to this lack in knowledge, this paper investigated the company level concerning drivers and barriers to the extension of the working life, meant as: prevention of early retirement (i.e. encouraging employees to continue working until retirement age); delay of retirement (i.e. encouraging employees to continue working beyond retirement age); and unretirement (i.e. recruiting employees who already retired).

On the ground that the degree of older workers' decline in productivity is supposed to depend on the sector of activity of the company, since older workers' workload differs across sectors and solutions would differ accordingly (Schmitz, 2015), we also studied possible differences between sectors in terms of predictors of the extension of working life.

We adopted a conceptual framework driven by results of previous studies, according to which, if and how companies manage the possible extension of working lives of their employees, depends on the interaction of several dimensions, amongst which were the existence of organisational policies for older workers, workforce characteristics, structural characteristics of the company, and factors linked to the economic and labour market climate.

The discussion is structured as follows: first the main results obtained for the total sample of companies will be discussed, then we will deal with the main results concerning the three sectors, by concentrating essentially on differences (rather than similarities) from results concerning the total sample, and also on differences between sectors.

In general, the implementation of HR policies for older workers were positively associated with the three different modalities of extending working lives. Interestingly, the implementation of early retirement schemes is associated only with a specific typology of EWL practice out of the three ones considered in this study, that is unretirement. This suggests that in some cases early retirement schemes may serve for to re-hiring in the same company older workers with valuable skills, by saving costs (Mulders *et al.*, 2015). In terms of workforce composition, having a high share of older workers positively affects all the three kinds of EWL practices considered. This may mean that companies with these characteristics are interested, by continued employment of older workers, in finding ways to prevent possible labour shortages (Hermansen and Midtsundstad, 2015). Having a high share of low-skilled workers was linked to encouraging to work beyond and after retirement age rather than in younger age so it seems linked to try the way to reduce costs through low level of remuneration in the final part of the professional career (Lain, 2012). In line with what expected, results suggest that in large companies EWL practices are more likely to be implemented. However these companies may prefer to interrupt the work contract once employees reach retirement age and then re-hire them once they have retired (with a lower remuneration level and possibly only on project basis, or as fake self-employed). Indeed, this could allow them to save costs.

The negative association between the need to reduce staff and EWL practices is quite in line with the findings of Conen and colleagues (2011) who, longitudinally investigating Dutch companies, came to the highly plausible finding that companies which reduced staff levels had a lower probability of recruiting older workers. This suggests that the need to reduce staff was driven by the need to cut costs, and for the same reason it could not be attractive for companies to extend the working life of their employees. Interestingly, our results highlight that this is not an issue concerning unretirement, since indeed in this case it may be easier to hire pensioners by saving costs. In line with results of previous studies on employers' behaviour towards older workers (e.g. van Dalen *et al.*, 2015), our results suggest that in case of recruitment problems, employers try to deal with this by extending older workers' professional life. Factors as high knowledge intensity in the company (positive association) and strong influence of the

labour unions (negative association) seem to be decisive only on the specific EWL practice of recruiting employees who already retired. This indicates how important is for companies to exploit the knowledge of these key workers even after their retirement. As for the result concerning the influence of the unions, this could result from the fact that unions are prone to support mainly the inclusion in the labour market of unemployed rather than the hiring of retired people.

While we did not find differences between sectors of activity in explaining the implementation of EWL practices in companies, this suggesting that the level of EWL practices is the same in the different sectors, we found some interesting differences between sectors in terms of predictors of these practices. For example, part-time retirement seems to boost EWL particularly in the industry, a sector where work is usually physically harder than in other sectors. Even if, according to Tullius and colleagues (2012), a shift to part-time in the last part of the professional career might indicate a wish to dismiss older workers, rather than to retain them, in our case this policy seems to act as a facilitator to successfully manage EWL in the industry sector. This would be done through a reduction of working time by continuing doing the same tasks as before. This is also in line with the fact that in the industry a decrease of the workload (i.e. by changing task) seems to play a far less important role than in other sectors. Training plans for older workers have a role mainly to allow employees to work until retirement age while not to extend working life after retirement age, and this not in the public sector. This could mean that training plans may sometimes be experienced by companies as a quite undesired legal duty rather than as a tool to really invest on older workers. This even more in the public sector, where these plans do not play a role at all. After investigation within sectors, the above considerations about the positive role of early retirement on unretirement turned to be valid especially in the industry. It is likely that in this way (by re-hiring them with a lower cost), companies in the industry try to save costs. On the one hand, they may continue exploiting the qualities of older knowledge-keeper workers, as it is also suggested by the positive link, (only) in the industry of the company's high level of knowledge intensity, to predict unretirement. On the other hand, in this way they also could recruit low-cost unskilled workers, as it could be suggested by the positive link, (only) in the industry of the company's high share of unskilled workers, to predict unretirement. A high share of high skilled workers had a role in predicting some EWL practices in the industry and in the services, but not in the public sector. Perhaps in the public sector high skills are less valued than in the private one where knowledge loss could be experienced more as a problem. This is also in line with the fact that training plans for older workers do not predict EWL practices in the public sector. The negative association between the need to reduce staff and EWL practices was not found in the public sector, this is not surprising since in times of economic crises, and with legal restrictions to early retirement, the preferred option to reduce costs is hiring freeze, i.e. employees transitioning to retirement are not replaced through new recruitments (Socci and Principi, 2013). Having had recruitment problems does not predict EWL practices in the service sector, this suggesting a preference for younger workers to recruit, despite these problems. One explanation of this may be that age stereotypes may be particularly present in jobs requiring a direct interaction with a considerable number of users, as it is commonly the case in the service sector. For example, they may be moved to back-office activities or be less desirable since older people are thought to resist innovation and ICT tools (Eurofound, 2009; Principi *et al.*, 2012). The negative association of high unionisation on unretirement is confirmed in the industry, a sector in which unions are notoriously strong.

## Conclusion

The results of this study suggest that the main drivers for companies' EWL practices are the implementation of HR measures for older workers to improve their performance, their working conditions as well as to reduce costs linked to their management. Other drivers are a high share of older workers in the company, medium or large company size and having experienced recruitment problems. There are clear indications that the possibility to reduce costs due to EWL practices is a key-element for companies. This is suggested by the diffusion of early retirement schemes and high shares of unskilled workers, especially in the industry, as associated with unretirement. In times of crisis, however, even these reduced costs could be "sacrificed" by companies as suggested by the general negative association between EWL practices and need to reduce staff levels. There are indications that in the industry sector the qualities and the skills of older workers could be more valued and desired than in other sectors, and greater will that their knowledge could be possibly retained. Indeed, the adoption of EWL practices in this sector is linked to the provision of an accommodating measure as part-time options for older workers, and, concerning unretirement, to high knowledge intensity in the company. The influence of labour unions is a barrier for EWL practices through unretirement especially in the industry. There are indications that, as the employer is partly the state, in the public sector there may be partially different models of EWL practices' mechanisms: there might be less motivation to retain older workers' qualities, and economic problems could have a milder effect of on these practices. Some indications suggested that age stereotypes may be present especially in the service sector.

These results have clear policy implications. Policy makers and stakeholders should be aware that to achieve the European policy aim of extending working lives, it is not sufficient to intervene through simply increasing the legal retirement age, but it is important to push companies through innovative tools, to promote more organisational practices to improve the employability and the working conditions of older workers. They should also be aware that through EWL practices, companies, beside exploiting older workers' qualities and knowledge, may try to save costs. This is not negative in itself, but it may be negative in the case of older workers, this especially concerning unretirement, are underpaid in relation to the work done, and when this is detrimental to unemployed people who cannot access the labour market since retired and cheaper people are preferred. This is a risk that should be considered, at the policy level.

This study has several limitations. One of the main ones is its cross-sectional design, since a longitudinal study would have clearly identified the effect of the independent variables on EWL practices. Unfortunately, as in the case of the project linked to this survey, it is not easy to plan a longitudinal survey in the already scarce panorama of data dealing with the employers' perspective about the management of older workers. To include a focus on country differences was out of the scope of this paper since it would have been a too ambitious aim for a single paper, given the primary focus that this study devoted to differences across sectors. However, we recognise that country differences relative to EWL organisational practices is an important topic and further studies are warrant to clarify this issue. This also in relation of interesting first insights revealed by our descriptives by country, for example the high share, among the Polish sample, of companies adopting EWL practices, which may suggest a will by employers

to encourage EWL against a national policy framework in favour of early retirement. Despite its limitations this paper adds to the knowledge by providing insights on the rather unexplored topic of drivers and barriers to labour demand EWL practices in companies. Since employers' practices towards older workers would be more efficient if targeted in accordance with the different needs, problems and challenges facing different industries (Midtsundstad and Bogen, 2011), a further strength of this study is that this issue also studied within companies' sector of activity, with the possibility to identify different patterns, and related solutions, across sectors.

## Acknowledgments

This project received funding from the European Union's Seventh Framework Programme for research, technological development, and demonstration under Grant Agreement No. 320333 (MOPACT). The data leading to these results were an output of a research which was funded by the EU Seventh Framework Programme (FP7/2007-2013) under grant FP7-216289 (ASPA).

## References

Bennet, J. and Möhring, J. (2015), 'Cumulative (dis)advantage? The impact of labour market policies on late career employment from a life course perspective', *Journal of Social Policy*, 44(2): 213-233.

Brewster, C., Hegewisch, A., Mayne, L. and Tregaskis, O. (1994), 'Methodology of the price waterhouse cranfield project', in Brewster C. and Hegewisch A. (eds.), *Policy and practice in European human resource management*, London: Routledge, pp. 230-245.

Conen, W. S., Henkens, K. and Schippers, J. J. (2011), 'Are employers changing their behavior toward older workers? An analysis of employers' surveys 2000-2009', *Journal of Aging and Social Policy*, 23(2): 141-158.

Conen, W. S., Henkens, K. and Schippers, J. (2012), 'Employers' attitudes and actions towards the extension of working lives in Europe', *International Journal of Manpower*, 33(6): 648-665.

Conen, W., Henkens, K. and Schippers, J. (2014), 'Ageing organisations and the extension of working lives: a case study approach', *Journal of Social Policy*, 43(4): 773-792.

Dorn, D. and Sousa-Poza, A. (2005), 'Early retirement: free choice or forced decision?', CESifo Working Paper No. 1542, CESifo Group.

Eurofound (2009), *Unicredit Produzioni Accentrate Spa, Italy: Redeployment, training and development. Eurwork, European Observatory of Working Life*. Accessed October 2016, from <http://www.eurofound.europa.eu/observatories/eurwork/case-studies/ageing-workforce/unicredit-produzioni-accentrate-spa-italy-redeployment-training-and-development>

Eurostat (2016), *Employment rate of older workers*. Accessed October 2016, from <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tsdde100>

Finch, N. (2014), 'Why are women more likely than men to extend paid work? The impact of work–family life history', *European Journal of Ageing*, 11(1): 31-39.

Hagemann, S. and Scherger, S. (2015), 'Concepts of retirement. Comparing unions, employers and age-related non-profit organizations in Germany and the UK', in Scherger S. (ed.), *Paid work beyond pension age: comparative perspectives*, Basingstoke: Palgrave Macmillan, pp. 237-255.

Harper, S., Khan, H. T. A., Saxena, A. and Leeson, G. W. (2006), 'Attitudes and practices of employers towards ageing workers: evidence from a global survey on the future of retirement', *Ageing Horizons*, 5: 31-41.

Hermansen, Å. and Midtsundstad, T. (2015), 'Retaining older workers – Analysis of company surveys from 2005 and 2010', *International Journal of Manpower*, 36(8): 1227-1247.

Hilsen, A. I. and Salomon, R. (2012) 'Retirement – Not necessarily a farewell to work life?', *Sociologia del Lavoro*, 125: 87-98.

Hofäcker, D. (2010), *Older workers in a globalizing world: an international comparison of retirement and late-career patterns in Western industrialized countries*, Cheltenham: Edward Elgar Publishing.

Kalleberg, A. L., Knoke, D., Marsden, P. and Spaeth, J. (1996), *Organizations in America: analyzing their structures and human resource practices*, London: Sage.

Josten, E. and Schalk, R. (2010), 'The effects of demotion on older and younger employees', *Personnel Review*, 39(2): 195-209.

Lain, D. (2012), 'Working past 65 in the UK and USA: segregation into Lopaq occupations?', *Work Employment and Society*, 26(1): 78-94.

Lain, D. (2016), *Reconstructing retirement*, Bristol: Policy Press.

Loretto, W. and White, P. (2006), 'Employers' attitudes, practices and policies towards older workers', *Human Resource Management Journal*, 16(3): 313-330.

Midtsundstad, T. and Bogen, H. (2011), 'Ulikt arbeid – ulike behov: seniorpolitisk praksis i norsk arbeidsliv', *Fafo Report n. 10*, Oslo: Fafo.

Mulders, J. O., Henkens, K. and Schippers, J. (2015), 'Organizations' ways of employing early retirees: the role of age-based HR policies', *Gerontologist*, 55(3): 374-383.

OECD (2006), *Live longer, work longer*, Paris: OECD Publishing.

Principi, A., Fabbietti, P. and Lamura, G. (2015), 'Perceived qualities of older workers and age management in companies: does the age of HR managers matter?', *Personnel Review*, 44(5): 801-820.

Principi, A., Lindley, R., Perek-Bialas, J. and Turek, K. (2012), 'Volunteering in older age: an organizational perspective', *International Journal of Manpower*, 33(6): 685-703.

Schmitz, J. (2015), 'Companies and older workers: obstacles and drivers of labour market participation in recruitment and at the workplace', in Scherger S. (ed.), *Paid work beyond pension age: comparative perspectives*, Basingstoke: Palgrave Macmillan, pp. 217-236.

Smeaton, D. and McKay, S. (2003), 'Working after state pension age: quantitative analysis', *DWP Research Report 182*, Leeds: CDS.

Socci, M. and Principi, A. (2013), 'National report for the conceptual framework on innovative, effective, sustainable and transferable strategies to enhance the extension of working life and lifelong learning in Italy', *MOPACT report WP3 Task 1*, Ancona: INRCA. Accessed October 2016, from <http://mopact.group.shef.ac.uk/wp-content/uploads/2013/10/Country-report-Italy.pdf>

Taylor, P. and Earl, C. (2016), 'The social construction of retirement and evolving policy discourse of working longer', *Journal of Social Policy*, 45(2): 251-268.

Taylor, P., McLoughlin, C., Brooke, E., Biase, T. D. and Steinberg, M. (2013), 'Managing older workers during a period of tight labour supply', *Ageing and Society*, 33(Special Issue 1): 16-43.

Tullius, K., Freidank, J., Grabbe, J., Kädtler, J. and Schroeder, W. (2012), 'Perspektiven alter(n)sgerechter Betriebs- und Tarifpolitik', *WSI-Mitteilungen*, 2: 113-123.

van Dalen, H. P., Henkens, K. and Schippers, J. (2009), 'Dealing with older workers in Europe: a comparative survey of employers' attitudes and actions', *Journal of European Social Policy*, 19(1): 47-60.

van Dalen, H. P., Henkens, K. and Schippers, J. (2010), 'How do employers cope with an ageing workforce? Views from employers and employees', *Demographic Research*, 22(art. 32): 1015-1036.

van Dalen, H. P., Henkens, K. and Wang, M. (2015), 'Recharging or retiring older workers? Uncovering the age-based strategies of European employers', *Gerontologist*, 55(5): 814-824.

van Solinge, H. and Henkens, K. (2014), 'Work-related factors as predictors in the retirement decision-making process of older workers in the Netherlands', *Ageing and Society*, 34(9): 1551-1574.

Velladics, K., Henkens, K. and Van Dalen, H. P. (2006), 'Do different histories produce different policy preferences? Opinions on pension reforms in Eastern and Western Europe', *Ageing and Society*, 26(3): 475-495.

Vickerstaff, S., Cox, J. and Keen, L. (2003), 'Employers and the management of retirement', *Social Policy and Administration*, 37(3): 271-287.

Whitehouse, E. R. (2007), 'Life-expectancy risk and pensions: who bears the burden?', *OECD Social, Employment and Migration Working Papers*, No. 60, OECD Publishing.

# „WORKING CONDITIONS AND RETIREMENT: HOW IMPORTANT ARE HR POLICIES IN PROLONGING WORKING LIFE?““

MIKKEL BARSLUND<sup>^</sup>, JÜRGEN BAUKNECHT<sup>\*</sup>, ANDREAS CEBULLA<sup>2</sup>

<sup>^</sup>CENTRE FOR EUROPEAN POLICY STUDIES (BRUSSELS)

<sup>\*</sup>INSTITUT FÜR GERONTOLOGIE AN DER TU DORTMUND / INSTITUTE OF GERONTOLOGY AT TU DORTMUND UNIVERSITY (DORTMUND)

<sup>2</sup>SA CENTRE FOR ECONOMIC STUDIES (ADELAIDE)

## Abstract:

Human resource (HR) management policies improving satisfaction with the way work is organized, how well work is rewarded, and with the workplace in general are often identified as key drivers in prolonging working life and avoiding early retirement among older workers. While best practice HR policies are an intrinsically good thing, there is little evidence as to how they impact on the length of working lives. In this study we provide a comprehensive literature review on the effect on working conditions on retirement decisions. This is followed by an analysis of the link between the remaining length of working life and a number of indicators of work satisfaction for 12 European countries using the longitudinal dimension of the Survey of Health, Ageing and Retirement in Europe (SHARE) data set. Finally, we use our statistical findings to construct synthetic individuals with maximum work satisfaction and simulate the best-case potential of HR policies in extending working lives. Our results suggest that the potential for HR policies to promote longer working lives is by itself limited. We find that, if all 50-54 year olds were very satisfied with their general working conditions this would result in an average increase of working life of around 4 months. We compare this finding with the effectiveness of other policies to extend working lives. Better HR policies and age management policies do work in terms of extending working lives, but can only be one tool in a multifaceted policy response.

## Acknowledgement

This paper uses data from SHARE Waves 1, 2 (SHARELIFE), 4 and 5 (DOIs: 10.6103/SHARE.w1.500, 10.6103/SHARE.w2.500, 10.6103/SHARE.w4.500, 10.6103/SHARE.w5.500). The SHARE data collection has been primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: N°227822, SHARE M4: N°261982). Additional funding from the German Ministry of Education and Research, the U.S. National Institute on Aging (U01\_AG09740-13S2, P01\_AG005842, P01\_AG08291, P30\_AG12815, R21\_AG025169, Y1-AG-4553-01, IAG\_BSR06-11, OGHA\_04-064) and from various national funding sources is gratefully acknowledged (see [www.share-project.org](http://www.share-project.org)).

## Summary

Human resource (HR) management policies improving satisfaction with various aspects of the job often identified as key drivers in prolonging working life and avoiding early retirement among older workers. While best practice HR policies are an intrinsically good thing, there is little evidence as to how they impact on the length of working lives. In this study we review the literature on the effect on working conditions on retirement decisions. This is focused on the aspects of job satisfaction which are used in our own analyses: physical demands, time pressure, job autonomy, the possibility to develop new skills, support in difficult situations, recognition by others at work, adequate salary, promotion prospects, and job security. Existing literature shows that these factors generally contribute to longer working lives or the intention to retire later, but effects and statistical significance for single factors partly depend on the inclusion of other factors or control variables.

This summary is followed by an analysis covering 12 European countries using the longitudinal dimension of the Survey of Health, Ageing and Retirement in Europe (SHARE) data set. Firstly, it can be shown that amongst employed person over 50 years of age, only a small share in the single-digit percentage area is dissatisfied or very dissatisfied with the job. Further, within the 50+ group, the share of those strongly agreeing with the statement that they are satisfied with their main job rises with age. Since this happens especially after the age of 64, this could result from the higher probability of retirement at 65 or before amongst those with lower job satisfaction, so that the sample after 64 mainly consists of satisfied survivors. This pattern applies to the high-skilled as well as the low-skilled, whereas differences between both groups are marginal.

Simple statistical analysis shows that, unsurprisingly, employees expressing satisfaction with their job are less likely to want to retire 'as soon as possible' than employees who are dissatisfied with their job. The desire to retire 'as soon as possible' is more prevalent among lower skilled workers than higher skilled workers, regardless of their job satisfaction. This finding may appear somewhat counterintuitive, since high-skilled workers would be expected to be in a more comfortable position to retire (savings, pension entitlement) than low-skilled workers. Yet it hints at other factors than simple job satisfaction shaping retirement intentions.

In a next step, we estimate the number of years that employees remained in employment until they retired, measured from the time they were first asked about their job satisfaction (in wav 1 of SHARE, in 2004). This reveals

Employees more satisfied with their job are indeed likely to continue working for longer than employees with employees with lower job satisfaction. The difference however declines with age. For instance, high-skilled workers aged 50-54 who are satisfied with their job spend an extra 1.5 years before retiring than workers in the same age group but dissatisfied with their job. This reduces to 0.8 years for those in the higher age group of 55-59 year olds. The pattern is similar to low-skilled workers, but the additional years spent in work before retirement is smaller for both age groups when compared to the more highly skilled workers.

These nominal statistics are likely to be affected by differences in the sex, education or country composition of the high and low skilled workers in the two age groups. These are controlled for in a regression analysis, which shows that job satisfaction increases working lives between 0.64 and 1.19 years, depending on age group

The final regression shows a total effect of 0.3 working years (or 4 months) of highest job satisfaction.

Finally, we use our statistical findings to construct synthetic individuals with maximum work satisfaction and simulate the best-case potential of HR policies in extending working lives. Our results suggest that the potential for HR policies to promote longer working lives is by itself limited. We find that, if all 50-54 year olds were very satisfied with their general working conditions this would result in an average increase of working life of around 4 months. We compare this finding with the effectiveness of other policies to extend working lives. Better HR policies and age management policies do work in terms of extending working lives, but can only be one tool in a multifaceted policy response.

## **Practical implications**

The result is mixed for two reasons:

- Firstly, the effect of maximum job satisfaction for those between 50 and 54 years of age is comparatively small, especially when compared to calculated or projected effects of reforms in the legal retirement age. In the latter, analysis of several countries are rather similar. Generally, an increase of the legal retirement age by two years yields longer working lives of ten to twelve months. In this sense, effects measures here are small. The first message is that, although too strong a reliance on welfare states reforms and financial incentives provided by (national) policies is one-sided and erroneous, too strong a focus on the company level is also misleading.
- Yet secondly, it is not only job satisfaction that can be affected by measures at the employer level. Although one should not overestimate the potential effects of the workplace on people's health, clearly the employer can contribute positively to employees' health, which in turn prolongs working lives. Further, the employer level is the most important sphere of influence for further training and the formal or informal acquisition of new skills. This in turn can also prolong working lives.

A crucial practical implication results from different effects on different age groups. Effects are higher for lower age groups.

This may result partly from the fact that potential maximum effects of very high job satisfaction are limited due to the relatively high level of stated job satisfaction in the sample. Although social desirable responsive behaviour may overestimate respondents' job satisfaction, this clearly limits the potential of increased job satisfaction. Since job satisfaction increases with age in the groups analysed (partly since those dissatisfied quit their job and are no longer part of the sample), for workers over 60 the potential is even smaller. In short, if a huge majority is either satisfied or strongly satisfied, room for improvements is small.

This may also partly result from the fact that people plan their lives, which includes timing retirement, retirement synchronisation with partners, planning for grandchildren care or elderly care etc. The older workers get, the less they let job satisfaction affect their retirement timing.

What results from all this, is:

- 1) *Measures at the employer level aimed at higher job satisfaction, or increasing job satisfaction as a by-product (e.g. health/further training measures can increase job satisfaction although that is not the prime goal) should begin at a very young age within the group of 'older workers', that is,*

*around 50 if one wants to use the chronological age (possibly this also depends on occupation/skill-specific age/career profiles). This also refers to measures aimed at mid-career workers and the improvement of their career planning and job satisfaction once they reach the 'plateau phase'. Similar to measures aimed at health and at lifelong learning, measures aimed at job satisfaction should begin relatively early. Also in this sphere, measures aimed at 'older workers' should be aimed at these 'older workers' already when these workers are rather 'mid-career workers'.*

- 2) Job satisfaction has its effects on longer working lives, but this is not the ultimate solution. This becomes even more plausible if one reconsiders that for most people work is not their favourite pursuit, and some jobs clearly are far away from being this for their employees. Although measures aimed at higher job satisfaction come with the potential advantage of being 'win-win' situations (higher satisfaction for the employee, higher productivity, less employee turnover for the employer etc.), this cannot substitute for the win-lose measures at the level of (welfare state) policies. But: The higher employees' job satisfaction, the lower is their resistance against policies aimed at longer working lives via financial incentives, which is important in representative democracy. Here higher job satisfaction (and measures increasing job satisfaction) prolongs working via a meso-micro-macro-meso-micro link from employers' actions to employees' attitudes to national policies to employees' behaviour.*

# I. Introduction

It is well known fact that European societies are ageing and that this creates challenges for traditional welfare systems. In many countries, the financial crisis of 2008 and the subsequent slump exacerbated a political and financial crisis of pension systems at a time when large numbers of the post WWII baby boomer generation started to retire. A remedy promoted throughout Europe and by the European Commission is to extend working lives and promote work beyond the statutory retirement age.

Human resource (HR) – or age management – policies may present tools for discouraging older workers from retiring early and motivating those close to retirement to work longer (Andersen et al., 2007, Borella and Mascarola 2009, D’Addio et al. 2010, Thorsen 2013). While HR can offer direct incentives to encourage employee retention, other indirect measures to maintain the workforce seek to create positive working environments that add to employee satisfaction with their job and their employer.

The positive association between job satisfaction and delayed retirement has already been widely discussed, and has included studies using data from Finland (Bonsdorff et al. 2010, Krause et al. 1997), the USA (Wang 2008), Britain (Mein et al. 2000), to name but a few examples. A meta-analysis of available evidence by Topa et al (2009) included 99 studies using American, European, Australian, Canadian, Asian and Israeli samples

The evidence that HR can directly influence retirement decisions, including decisions to delay retirement, however, is less unequivocal. Furunes et al. (2015), for instance, found that HR policies were not amongst the main reasons cited by older workers to continue working. Yet, while a rich body of literature has studied the adoption of HR policies (e.g. Conen et al. 2012, *Perek-Białas/Turek 2012*, Jensen/Møberg 2012, van Dalen et al. 2014), few studies have attempted directly to measure the impact of the type or quality of HR policies on employee satisfaction and the subsequent propensity to extend working lives or postpone retirement. As a result, as Beehr and Bennett (2007) noted, we still lack a robust understanding of what exactly organisations may be able to do to prevent losing valued employees due to retirement.

The present paper contributes to this exploration of the scope for HR policy to affect employee retention through delayed retirement, utilizing longitudinal data for 12 European countries. In general, HR policies are outside the direct reach of government intervention (except for government employees). However, our research seeks to inform the evidence base of the likely effectiveness and impact of public campaigns and subsidy programmes intended to improve HR policies. This is important in a narrow cost-benefit framework, but also tells us what relative role HR policies can play in extending working lives.

The study is situated within a large body of literature examining factors affecting the effective retirement age. In contrast to individual specific factors located at the micro level (e.g. age, education, health, financial status), and environmental factors at the macro level (e.g. policies), this study’s work-related factors are located at the meso level, and explore aspects of workload, physical demands, and supervisory fairness (cp. Schreurs et al. 2011, Wang et al. 2010). As Schreurs et al. (2011) note, individual-level predictors of early retirement are typically outside the immediate influence of organisations, albeit, we would argue, to a varying degree. The effects and consequences of some individual-level indicators such as poor health or disability, may well be accommodated or alleviated within a workplace, at which point meso-level interventions gain their relevance.

Much of the retirement literature is also concerned with intentions to retire rather than actual retirement behaviour. These studies have shown that decisions as to whether to retire are often based on subjective (and projected) comparisons of seemingly dichotomous options (to retire – or not to retire) that also emphasise the voluntary nature of such decisions (e.g. Wang and Shultz 2010). In reality, decisions to retire are rarely taken entirely voluntarily. Instead, involuntary (push) factors, such as redundancy following layoffs or factory closures, or lifecycle turning points, such as grave health impairments that restrict employees' control over retirement decision, may come to play important roles in these decisions. Unsurprisingly, we thus see evidence of a remarkable discrepancy between stated retirement intentions and actual retirement behaviour (e.g. van Solinge/Henkens 2013), with these differences often explained by (detrimental changes in) health, but also (lower) educational or occupational status (e.g. Solem et al. 2014).

The present study is exclusively concerned with actual retirement. In examining the link from HR policy and job satisfaction to the act of retiring, our analyses, first, show a very high level of job satisfaction among older workers. While there are differences across countries, they are minor, as are variations between the different years for which data are analysed. Second, we also find that job satisfaction is closely associated with positive assessment of a range of workplace and working conditions typically within the purview of HR and business management, such as workload or pay.

In light of this evidence, we conclude that there may well be little scope for HR policy to further enhance job satisfaction among (older) workers, as it is already at a high level, in the expectation that this would induce greater workforce retention. In fact, econometric analysis reveals that increasing satisfaction with working conditions would yield little in terms of extended working lives. We estimate that raising job satisfaction among 50-54 year olds to a uniformly high level would delay retirement of employees with an average of only four months.

The rest of the article is organised as follows: section II discusses related literature, followed by a description of the data sources and research method (Section III). Section IV provides the main results while section V concludes and provides a discussion of the findings.

## II. Related literature

### Measuring work place satisfaction and the link to HR policies

An effective HR policy that motivates, trains and retains, in particular low-skilled and older workers, has many dimensions, which are not easily codified, nor measurable. Effective HR policies also have some degree of personalisation, further complicating the measurement of HR policies as an *entity*. In light of this challenge, the focus of our study, as that of previous related research that we will review briefly further below, is on examining *outcome indicators* of HR management policies, namely satisfaction with working conditions measured along several dimensions as well as overall work satisfaction. Their selection is naturally informed and to a large extent guided by the available data. The present study analyses the Survey of Health, Ageing and Retirement in Europe (SHARE), which contains data on a number of relevant indicators of workplace conditions, notably (next page)

- a physically demanding workload,
- the experience of time pressure at work,
- job autonomy,
- the availability of support in difficult situations,
- recognition,
- perceived adequacy of salary,
- promotion prospects and
- job security.

Before turning to the empirical analysis, the following section presents an overview of relevant literature that provide incremental evidence of the link between retirement decisions and some of the indicators of workplace conditions noted above.

*Job is physically demanding*

In a systematic review of eight longitudinal quantitative studies, van den Berg et al. (2010) found significant effects between physical workload and early labour market exit. Similarly, Krause et al. (1997) found heavy physical work to be positively associated with labour market exit via disability retirement. In above-mentioned Finnish study, von Bonsdorff et al. (2010) found that physically demanding work had weaker effects on early retirement intentions than mentally demanding work. Similar, in a study of Spanish nurses over 50, Burke et al. (2012) show a positive and statistically significant association between job demands (and emotional demands) and retirement intentions. Further, in a Belgian study, Schreur et al. (2011) describe a link between physically demanding work and labour market exit, and empirically support this using structural equation-modelling: job demands (measured in terms of workload and problems with change) positively affected recovery need, which in turn positively affected early retirement intention. Similarly, research on Polish blue-collar workers aged over 45, but under the statutory retirement age (for men 65 years; women 60) has shown heavy lifting at work to be associated with an increased probability of early retirement (Szubert and Sobala 2005). Finally, in a cohort study of employees of the city of Helsinki, Lahelma et al. (2012) found evidence of physical workload associated with musculoskeletal disease leading to labour market exit via the social security disability scheme.

Contrasting evidence is provided by Carr et al. for the UK (2016), who found no evidence of effects of physical job demands on work exit. Similarly, using Dutch data, Henkens and Leenders (2010) found no effect of jobs deemed by the worker to be physically demanding on early retirement intentions. Further, in a study of 21 European countries, Fleischmann et al. (2013) found no significant effects of physical demands on older workers' labour market participation.

Finally, Blekesaune and Solem (2003), analysing Norwegian data, found a positive association between hard physical work and early retirement only in the case of women but not for men. Labour market exit via disability insurance benefit was found to be linked to physical work for both, men and women.

### *Time pressure*

Wang et al. (2008) found strong negative effects of subjective work stress on the probability of bridge employment, whereby older workers leave their career job for alternative, typically part-time work, instead of full retirement. Similarly, in the study of Finnish men (Krause et al. 1997) frequent deadlines were positively related to probability of labour market exit via the disability scheme. This also applies to psychological strain, mental strain from strenuous work and time pressure. In both cases statistical significance on conventional levels was narrowly missed. Also the above-mentioned Spanish study by Burke et al. (2012) shows a positive (and statistically significant) association between work overload and early retirement intentions. In their large-n study, Fleischmann et al. (2013) show a positive and significant association of autonomy over work pace on labour market participation (i.e. being in work or unemployed rather than retired).

In contrast, Mein et al.'s (2000) job demand index (where two out of four variables cover time pressure) has shown no effects on early retirement for men or women. Similarly, in a Dutch Panel study van Solinge and Henkens (2013) found effects of job pressure merely on early retirement intentions, but not actual early retirement. Also Henkens and Leenders (2010) show effects of 'workload' and 'burnout' on early retirement intentions ('burnout' being defined as "a syndrome of exhaustion, cynicism, and a sense of ineffectiveness...", Henkens/Leenders 2010: 307, based on Maslach and Jackson 1981).

Lastly, Carr et al. (2016) found no evidence of effects from 'psychosocial demands' (two items covering fast work and time pressure) on labour market exit.

### *Job autonomy ('freedom to decide how I do my work')*

Elovainio et al. (2005) found that a lack of job control and high on the job demands, independently and in combination, increased intentions to retire early among Finnish workers. With similar effects, Schreier et al. (2011) find a link between job control and work enjoyment, and to lower early retirement intentions. Lunau et al. (2013) found that low job control increased the likelihood of depressive symptoms, on the background that depression fosters early retirement. Also Carr et al. (2016) found evidence of negative effects of 'decision authority' on work exit, and Lahelma et al. (2012) found effects of low job control on labour market exit via the disability scheme due to musculoskeletal diseases and mental disorders. For mental disorders, low job control was the most important determinant in the study. Also Fleischmann et al. (2013) found positive effects of autonomy over work on being in paid work or unemployed.

In contrast, Beehr et al. (2000) found no statistically significant association between low autonomy and expected retirement age, but small case numbers (N=197) might have adversely affected the robustness of their analysis. Similarly, in their Dutch study Henkens and Leenders (2010) found no effects of autonomy on later retirement intentions, not even in the model uncontrolled for various dimensions of burnout. Lastly, Shacklock and Brunetto (2008) found a positive yet insignificant relationship between perceptions of autonomy and intentions to continue working in Australia, but small case numbers adversely affected the statistical robustness of the results.

### *Support in difficult situations*

Krause et al. (1997) found a negative and statistically insignificant association between co-worker support and the probability of disability retirement, and effects of subjective supervisor support were statistically

significant. Van Solinge and Henkens (2013) note an effect of support systems on retirement intentions, but a weak effect on actual retirement. Also Lehalma et al. (2012) found evidence of low social support on the probability of labour market exit (via disability due to musculoskeletal diseases and mental disorders, yet not statistically significant in the latter case). Also Carr et al. (2016) could show that low social support fosters early labour market exit (one item was used: 'I receive adequate support in difficult situations', reversed), but these effects disappeared after the authors included additional control variables in their model (physical demands, psychosocial demands, decision authority, low recognition).

#### *Adequate salary*

Based on two panel surveys conducted in Finland, Kivimäki et al. (2007) show that adverse effort-reward imbalance and negative assessments of procedural and relational justice at the workplace negatively affected respondents' health (see also Fischer/Sousa-Poza 2007 for subjective and objective health). Lunau et al. (2013) found effects of effort-reward imbalance at the workplace on depressive symptoms, which fosters early retirement. Since health affects retirement behaviour (e.g. Wang et al. 2008, Behr et al. 2000, Szubert and Sobala 2005), negative effects on health can be expected to result in increased probability of labour market exit.

#### *Promotion prospects*

Kivimäki et al. (2007) argue that low salary and poor promotion prospects can be considered aspects of procedural justice. This implies that bleak (subjective) promotion prospects as well as (subjectively) inadequate salary can hamper various aspects of physical and mental health and therefore trigger early labour market exit (see preceding paragraph). Van Solinge and Henkens (2013) show that subjective promotion opportunities, opportunities for growth and the (absence of) the feeling that that the respondents has reached a dead end in his or her job, delay retirement. Henkens and Leenders (2010) found significant negative effects of 'opportunities for growth' on early retirement intentions, even controlled for various dimensions of burnout.

#### *Job security*

Evidence here is mixed. Winter-Ebmer et al. (2011) show that job insecurity is a main driver for early retirement. Contrastingly, Debrand and Sirven (2009) state that job satisfaction or the fear of losing one's job are factors that delay the retirement decision.

### **III. Research Methods**

#### **The data**

Our data source is the Survey of Health, Ageing and Retirement in Europe (SHARE). It is a multidisciplinary and cross-national panel database of micro data on health, socio-economic status and social and family networks of approximately 110,000 individuals (more than 220,000 interviews) from 20 European countries (and Israel)

aged 50 or older. We use data from wave 1 (2004), 2 (2006/7), 4 (2010/11) and 5 (2013).<sup>9</sup> Table 1 gives an overview of the questions asked on work satisfaction and working conditions in each of the four waves.

**Table 1. Questions on job satisfaction from the SHARE survey**

Question number	Wording
EP026	All things considered, I am satisfied with my job.
EP027	My job is physically demanding.
EP028	I am under constant time pressure due to a heavy workload.
EP029	I have very little freedom to decide how I do my work.
EP030	I have an opportunity to develop new skills.
EP031	I receive adequate support in difficult situations.
EP032	I receive the recognition I deserve for my work.
EP033	Considering all my efforts and achievements, my [salary is/earnings are] adequate.
EP034	My [job promotion prospects/prospects for job advancement] are poor.
EP035	My job security is poor.
Following the questions the respondent is asked: "Would you say you strongly agree, agree, disagree or strongly disagree?"	

Note: Exact questions are the same in SHARE wave 1 (2004), wave 2 (2006) and wave 4 (2011).

Each of these questions measures different aspects of HR policies. As an example, the response to "I am under constant time pressure due to a heavy workload" indicates if the job content is well-tailored to the individual's abilities and/or if the individual receives adequate support. Question EP026 measures overall job satisfaction and is our explanatory variable of interest in explaining length of working lives.

SHARE records responses to questions on the presence of these conditions on a 4-point Likert scale: strongly agree, agree, disagree, and strongly disagree.

The longitudinal dimension of SHARE is important for determining the link between working conditions and future retirement. In particular, our sample is constructed by linking working conditions in the wave when

<sup>9</sup> Wave 3 (SHARELIFE) has a different format than the other waves and our main questions of interest were not asked.

an individual is first observed to the retirement status of the same individual in the wave where the person is last observed. If the person is retired in the last wave of observation, we further observe the year of retirement.

For the individuals who are still working in the last wave in which they are observed, we cannot know the exact length of the remaining working life before retirement. For such individuals length of working life is top coded. Note that top coding occur at different values. An individual interviewed in 2004 and again in 2007 where he or she was still working but then subsequently is not interviewed again will have a top coded observation of length of working life of 3 years. Another individual first interviewed in 2004 and still working in 2013 will have a top coded value of 9 years.

This elaborate data procedure leaves us with a data set, which is derived from longitudinal data but has the structure of a cross sectional data set because each observation only figures once. For each observation we have overall work satisfaction, responses to questions on working conditions, number of years worked after first being observed, an indicator of whether the observation is top coded and a list of other time invariant characteristics such as gender, level of educational attainment, age at first observation, year of first observation etc.

### **Econometric approach**

The premise for our analysis is that good HR policies influence responses to the questions on working conditions (EP027 to EP035 in Table 1), which in turn affect overall job satisfaction (WP026). Confirming this link in the data, constitutes a first test of our results. Thus, we first estimate a simple ordered logistic regression model of the relationship between overall job satisfaction and individual HR policy domains (Cameron and Trivedi, 2005). We do this for the pooled sample of observations over the four waves and for both high and low-skilled older workers.

Apart from providing a test of the usefulness of the data, a close mapping of working conditions to overall job satisfaction also allows to reduce the dimensionality of the analysis of working conditions and length of working lives; instead of looking at the impact on length of working lives of each item of working conditions, we can look at the impact of overall work satisfaction alone.

### **Job satisfaction and length of working life**

Consider first the following econometric model where the number of years worked since year  $t_{start}$ , measured at year  $t$ ,  $years_{sw}(t, t_{start})$ , is related to job satisfaction (measured at  $t_{start}$ ),  $wsat(t_{start})$ , and other controls:

$$years_{sw}(t, t_{start})_i = wsat(t_{start})_i + \beta X_i + \varepsilon_i \quad (1)$$

Number of years worked has a maximum value of  $t - t_{start}$ . Estimating (1) with ordinary least squares regression is potentially subject to bias if the probability of observing a top coded outcome depends on the explanatory variables of interest. This is likely to be the case in our application because a priori we would expect people more satisfied with their working conditions to work longer and hence more likely to be observed as top coded in our data set. While we clearly acknowledge this we also argue – based on descriptive statistics – that this bias is not large in our sample.

In order to account for the top coded nature of the data set, one can employ a technique that controls for this ‘selection’ into top coding. We use a modified tobit approach for this (Wooldridge, 2009; Roodman, 2009). The modified tobit model in principle adjusts the estimates for the observations which are top coded. The standard critique of the tobit model relying on the same parameterisation for the selection part as well as for the part used for the point estimates apply in equal measure here. A maximum likelihood approach is used to estimate the model. Specifically, the log likelihood takes the following form:

$$(2) LnL = -\frac{1}{2} \sum_{i \in yearsw < (t - t_{start})} \left\{ \left( \frac{years_{sw} - wsat - \beta X}{\sigma} \right)^2 - \log(2\pi\sigma^2) \right\} + \sum_{i \in yearsw = (t - t_{start})} \log \left\{ 1 - \Phi \left( \frac{years_{sw} - wsat - \beta X}{\sigma} \right) \right\}$$

$$\varepsilon \sim N(0, \sigma^2 \cdot I)$$

The contribution to the likelihood function for observations where length of working life is observed (i.e. not top coded) is standard (first term) and for the top coded observations (second term) equal to drawing an error term in the (normalised) interval  $years_{sw} - wsat - \beta X$  where  $years_{sw}$  is the value for which top coding applies. Note that the top coding value is observation specific because it depends on the time between observations which will depend on which wave the individual was first interviewed and in which he or she was last interviewed.

The full sample available for the analysis contains around 20,000 observations of individuals aged 50 to 64 years who were in employment when first interviewed, and were interviewed in at least one successive wave.

The final step of our analysis is to construct an estimate of the maximum potential gain in employment from raising all workers’ job satisfaction to the maximum value. Given parameter estimates from equation (2) and individual level characteristics the number of potential years of employment is calculated and compared to the actual number of years observed.

## IV. Results

### Link between HR policies and work satisfactions

Our first step is to show that there is a close link between the individual HR policy domains and overall job satisfaction. This step is important to sustain our line of arguments. If overall job satisfaction is not strongly related to the individual HR policy domains, it is difficult to argue that we can capture better HR management as changes in overall job satisfaction.

To investigate the association between the between the individual domains of human resource policy and overall job satisfaction, we pool all four waves of SHARE data (wave 1, 2, 4 and 5) where these questions were asked to employees. To account for the ordinal nature of the job satisfaction question an ordered logistic model explaining overall job satisfaction is estimated. Each categorical explanatory variable enters as a factor variable in order to allow maximum flexibility in the specification. Note that explanatory variables and overall job satisfaction have been recoded so a higher value is consistent with being more satisfied.

Detailed results of several specifications are relegated to Table A1 in the Appendix. The main point to note is that all coefficients, except for those corresponding to promotion opportunity, have the right ordering: the more positive the respondent is on a specific HR outcome, the larger is general job satisfaction. The first column shows the base specification. The following three columns add dummies for, respectively, gender, country and age. Note that coefficients are virtually unchanged. Column 5 restrict the sample to 50 to 54 year olds with no qualitative effect on coefficients. Columns 6 and 7 divide the sample into one for low and one for high skilled workers. There are sizable differences among coefficients, with those for the low-skilled people being more in line with the full sample whereas coefficients from the regression on the high-skilled sample are far off. Furthermore, while the ordering of the coefficients is as expected, this is not the case for the high-skilled sample for a number of individual HR policy domain.

Column 8 and 9 show results from the sample of low-skilled split by gender (men are in column 8). Coefficients differ in size but are otherwise aligned with expectations except for the question of promotion opportunities for women.

The model performs well in terms of being able to generate a distribution of job satisfaction that is very close to the sample distribution (Table 2, next page).

**Table 2. Distribution of work satisfaction in sample and predicted (%)**

	Full sample		Low skilled (ISCED 0-3)		High skilled (ISCED 4-6)		Predicted all HR components "Very satisfied"
	Sample	Predicted	Sample	Predicted	Sample	Predicted	
Very satisfied	41.3	41.1	37.1	38.0	49.6	47.4	95.4
Satisfied	50.5	50.6	53.9	52.6	43.8	46.5	4.4
Dissatisfied	6.4	6.5	6.9	7.3	5.6	4.9	0.1
Very dissatisfied	1.8	1.8	2.1	2.0	1.1	1.2	0.0

Notes: Pooled sample of employed individuals SHARE waves 1, 2, 4 and 5. Predictions based on regression (4) in Table A1. Last column indicates predicted distribution of work satisfaction if every individual had maximum satisfaction on all HR policies.

Table 2 also shows a clear relationship between being very satisfied in all HR domains and being very satisfied with work conditions overall. This lends support to the idea that there is a tight link between the chosen HR domains (those available in the SHARE questionnaire) and overall job satisfaction. We also note that even for low-skilled individuals more than 90 per cent state that they are satisfied or very satisfied with their job. Furthermore, this also holds across waves of data.

### **Effect of general work satisfaction on age at retirement**

This section contains our core analysis of how overall work satisfaction affects length of working life. We focus on both low- and high-skilled individuals. Before turning to the regression results, it is instructive to consider some descriptive statistics.

Table 4 shows a stronger tendency to be very satisfied with the job the older the individual. This is most likely due to selection effects, in particular after the age of 64 when most people would be eligible for statutory pension.

**Table 4. Overall work satisfaction for different age groups, low and high skilled.**

Satisfied with main job?	High-skilled					Low-skilled				
	50-54	55-59	60-64	65-69	70-74	50-54	55-59	60-64	65-69	70-74
Strongly agree	47	47	59	76	78	35	37	46	50	71
Agree	45	46	37	23	16	55	55	47	43	28
Disagree	6	6	4	0	6	7	6	5	4	1
Strongly disagree	1	1	0	0	.	2	2	2	3	0

Notes: Data are from SHARE waves 1, 2, 4 and 5.

In order to gauge the potential for extending working lives by improving HR policies, it is instructive to look at retirement intentions and job satisfaction. SHARE contains a question indicating if the respondent would like to “retire as early as you can from this job”. Table 5 shows a clear association between an affirmative answer to this questions and overall job satisfaction. However, it is worth noting that among both high-skilled and low-skilled, there is a sizeable share of people who are very satisfied with their job but nevertheless wish to retire as early as possible. In fact, more than one in three 50-54 year olds very satisfied with their job would like to retire as early as possible. The percentage of an age group who want to retire as early as possible is higher for low-skilled at every level of work satisfaction and for all age groups as one would expect.

**Table 5. Percentage wanting to retire ‘as early as possible’ by work satisfaction and age groups, 50-75 year olds.**

Satisfied with main job?	High-skilled					Low-skilled				
	50-54	55-59	60-64	65-69	70-74	50-54	55-59	60-64	65-69	70-74
Strongly agree	33	32	21	13	12	43	43	36	27	4
Agree	51	46	38	20	37	56	61	55	35	57
Disagree	68	71	53	92	1	79	81	86	93	61
Strongly disagree	64	51	97	100	.	88	85	75	100	100

**Note:** Data are from SHARE waves 1, 2, 4 and 5.

The tendency to wanting to retire as soon as possible is very similar across genders (not reported). The reported statistics so far will affect the size of effect we can expect from better HR policies. To further investigate

potential differences, we look at the employed individuals from wave 1 who were also observed in later waves. Most information is contained for individuals interviewed in both period 1 and 4. Table 6 presents the average number of years worked since 2004 through to 2013 by age group and education.

**Table 6. Average number of years worked after 2004 for individuals observed in 2013, by age group and job satisfaction.**

Satisfied with main job?	High-skilled					Low-skilled				
	50-54	55-59	60-64	65-69	70-74	50-54	55-59	60-64	65-69	70-74
Strongly agree	8.2	5.8	3.1	1.9		7.4	4.8	2.6	1.2	
Agree	8.1	5.1	3.8			7.4	5.0	2.7	1.9	
Disagree	6.6	5.0				6.7	4.6			
Strongly disagree						6.5				
<i>% top coded (i.e. percentage of individuals still employed in 2013)</i>										
Strongly agree	64	25	6	10		50	20	4	13	
Agree	60	17	0			48	16	2	0	
Disagree	37	12				43	9			
Strongly disagree						45				

Note: N=3,314. Cells with less than 20 observations are blank.

Note that the top panel Table 6 does not tell the complete story because some people were still working in 2013 and, hence, would have worked more than the recorded 9 years (i.e. their observation is top-coded in our data set). This is the case around 50 percent of the sample, and more prevalent among high-skilled than low-skilled workers. However, the differences are often small, albeit less so for 50-54 age cohort. Arguably more noteworthy is the small difference in percentage of top coded observations among those who *strongly* agree that they are satisfied with their work and those who merely agree, in particular in the youngest age group. This suggests that the two categories may be treated as one, and comparison restricted to those agreeing or disagreeing with the statement. In other words, the differences in the top panel of Table 6 may be a reasonable guide for the impact one should expect from ‘moving’ all individuals from disagreeing with the statement and, hence, expressing dissatisfaction with the workplace, to agreement with the statement and, hence, expressed satisfaction with their work place.

Taking the group of high-skilled 50 to 54 year olds as an example, 1.6 additional years (8.2 years – 6.6 years; see top left corner) can be obtained, on average, if everyone currently dissatisfied with their workplace could be ‘transitioning’ be becoming very satisfied. This would indicate a marked change, but it would only apply to less than 10 percent of employed people in this age group (cf. Table 4).

### **Drivers of job satisfaction**

We now return to the fuller econometric treatment of the effect of work satisfaction on length of working lives. Our base regression relates the number of years worked since the first interview (wave 1) to work satisfaction. Because of the few number of observation with individuals stating ‘*strong* disagreement’ with the statement that they are satisfied with their job, we collapse the categories of strong and simple disagreement. For simplicity, from this point, we will refer to those agreeing with the statement as ‘satisfied’ or ‘very satisfied’ with their job, and those disagreeing as those ‘unsatisfied’.

In our analyses, we further include fixed effects for gender, country, age and education (measured on a three point scale; ISCED 0-2, ISCED 3-4 and ISCED 5-8).

Table 7 presents results from different estimation variants of equation 2. The main coefficients of interest are ‘satisfied’ and ‘unsatisfied’ with ‘very satisfied’ being the base category. We vary two important characteristics of the regression, namely the age group of 50 to 54 year olds because this age group is least influenced by potential sample selection issues, and the waves considered. Using only wave 1, the estimates should be less sensitive to the specific selection mechanism in the estimation procedure, whereas most observations from wave 4 will be top coded, because the distance in time between wave 4 (2011) and wave 5 (2013) most individuals will not have retired in this timespan.

Overall coefficient estimates are of the same magnitude over the six specification. Moving from being ‘satisfied’ to ‘very satisfied’ extend working lives with between 0 (regression 4) and 0.36 years (regression 2). The same change from ‘unsatisfied’ gives an extension of between 0.64 (6) and 1.19 (2) years. The education variables have the right sign and are generally significant. Surprisingly, over all six specification the effect of gender is negligible and mostly statistically non-significant.

**Table 7. Regression results. Full country sample.**

	1	2	3	4	5	6
Age group	50-54	50-54	50-54	50-64	50-64	50-64
Waves included	1	1, 2	1, 2, 4	1	1, 2	1, 2, 4
Very satisfied (base)						
Satisfied	0.14 (0.22)	-0.36* (0.18)	-0.12 (0.15)	0.0012 (0.10)	-0.19** (0.07)	-0.099 (0.06)
Unsatisfied / very unsatisfied	-0.98** (0.36)	-1.19*** (0.29)	-1.00*** (0.25)	-0.70*** (0.19)	-0.75*** (0.13)	-0.64*** (0.11)
Female	0.21 (0.22)	0.28 (0.17)	0.43** (0.15)	-0.025 (0.10)	-0.14* (0.07)	-0.081 (0.06)
ISCED 0-2 (base)						
ISCED 3-4	0.32 (0.26)	0.52** (0.20)	0.75*** (0.18)	-0.14 (0.13)	-0.092 (0.09)	0.060 (0.07)
ISCED 5-8	1.05*** (0.29)	1.21*** (0.23)	1.40*** (0.20)	0.59*** (0.13)	0.56*** (0.09)	0.63*** (0.08)
Country Fixed effects	YES	YES	YES	YES	YES	YES
Age Fixed Effects	YES	YES	YES	YES	YES	YES

Constant	8.53*** (0.64)	9.01*** (0.53)	9.54*** (0.43)	8.89*** (0.39)	9.02*** (0.29)	9.17*** (0.23)
<hr/>						
Insigma						
Constant	1.27*** (0.03)	1.25*** (0.03)	1.25*** (0.02)	1.06*** (0.01)	1.00*** (0.01)	0.98*** (0.01)
Observations	2514	4789	8225	5259	10792	19582

Note: All panel observations used. An individual occur only ones with the longest observed “spell” (e.g. max spell 9 years ffrom 2004 to 2013. Shortest spell 2 years from 2011 to 2013.)

The larger sample of 50 to 64 year olds has in general smaller absolute size coefficients. This is what we would expect, since the effect should be smaller the older the worker. This point is further illustrated in Table 8 where we report coefficients from rolling regression successively including data for 2-year cohorts between the ages of 50 and 65. Data are drawn from those individuals employed in wave 1 and/or wave 2, and otherwise equivalent to specification (2) in Table 7.

**Table 8. Age groups and effect of HR policies**

	1	2	3	4	5	6	7	8
Age group	50-51	50-53	50-55	50-57	50-59	50-61	50-63	50-65
Waves included	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2
<hr/>								
Very satisfied (base)								
Satisfied	-0.50 (0.42)	-0.50* (0.22)	-0.37* (0.15)	-0.23* (0.11)	-0.23** (0.09)	-0.23** (0.08)	-0.19** (0.07)	-0.18** (0.07)
Unsatisfied / very unsatisfied	-1.39* (0.67)	-1.16** (0.35)	-0.98*** (0.24)	-0.85*** (0.19)	-0.85*** (0.16)	-0.78*** (0.14)	-0.77*** (0.13)	-0.75*** (0.13)
<hr/>								
Observations	2817	4789	6721	8332	9527	10323	10792	10938

Notes: Standard errors in parentheses. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . All regressions include fixed effects for gender, country, age and education.

In Table 9, we report results from subsamples divided by gender and education. To get conservative – or upper bound – estimates for the effect of HR policies, we rely only on wave 1 and 2 for initial observations of individuals, while using also wave 4 and 5 to calculate years worked. We use the broader sample of 50 to 64 year olds to increase the number of observation. Results are overall in line with those of Table 7, but whereas the earlier estimations had shown the coefficients of interest to be fairly stable over specifications, we now observe some interesting differences between men and women, and workers with high or low levels of education. The effect on number of years worked from being ‘unsatisfied/very unsatisfied’ is more than twice as high for women compared to men (1 year against .43 year). The difference is even larger for levels of education as those with higher levels of education work 1.29 fewer years than if they were satisfied with their job, compared to only 0.49 fewer years for those with lower levels of education.

These differences in coefficients are in line with the findings reported in Table 7. If the exercise in Table 9 is repeated for the age group 50 to 54 only (corresponding to (2) in Table 7) broadly the same results are obtained (not reported).

**Table 9. Regression results. Subsamples, all countries.**

	Base	Female	Male	Low educ	High educ
Age group	50-64	50-64	50-64	50-64	50-64
Very satisfied (base)					
Satisfied	-0.19** (0.07)	-0.14 (0.10)	-0.17 (0.10)	-0.12 (0.09)	-0.33** (0.12)
Unsatisfied / very unsatisfied	-0.75*** (0.13)	-1.00*** (0.18)	-0.43* (0.19)	-0.49** (0.16)	-1.29*** (0.23)
Female	-0.14* (0.07)			0.13 (0.09)	-0.67*** (0.11)
ISCED 0-2 (base)					
ISCED 3-4	-0.092 (0.09)	-0.17 (0.12)	-0.013 (0.12)		
ISCED 5-8	0.56*** (0.09)	0.077 (0.13)	1.02*** (0.13)		
Country Fixed effects	YES	YES	YES	YES	YES
Age Fixed Effects	YES	YES	YES	YES	YES
Constant	9.02*** (0.29)	8.59*** (0.41)	8.86*** (0.39)	8.23*** (0.34)	11.0*** (0.51)

Lnsigma					
Constant	1.00***	0.97***	0.99***	0.99***	0.98***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Observations	10792	5061	5731	6736	4056

Note: Only wave 1 and 2 are used as starting point for employment spells. An individual occur only ones with the longest observed “spell” (e.g. max spell 9 years ffrom 2004 to 2013. Shortest spell 2 years from 2011 to 2013.)

The number of observations in the panel dimension, in particular in the age groups relevant to our study, is too small to allow for a full country by country investigation. Nevertheless for the countries where more than 500 observations for the age groups 50 to 59 can be assembled with all waves, results are reported in the Table A2 in the appendix.<sup>10</sup> The coefficients are remarkable stable, albeit rarely significant. If anything, they tend to be smaller than our base line specification. This is likely because we include the age group of 55 to 59 year olds to increase the number of observation. Only Sweden stands out with a workplace conditions which improve work satisfaction from ‘unsatisfied/very unsatisfied’ to ‘very satisfied’. In terms of the total effect on the extension of working lives, the difference is less dramatic since only five percent of the relevant sample say they are ‘unsatisfied/very unsatisfied’. These country specific results provide confidence in the magnitude of the effect found in the base regression.

We finally turn to the total effect on length of working lives. Our baseline is the age group of 50 to 54 year olds with the coefficients coming from regression (2) in Table 7. First, for each individual in the sample the number of years worked after the age of 50-54 is predicted using the baseline regression. Then ‘very satisfied’ is assigned to every individual and the number of years in work is again predicted using the same coefficients as in step 1 and retaining all other individual level characteristics.

Table 10 shows the total combined effect for the full sample as well as country specific effects (based on country specific regressions from Table A2 in appendix). The effect when using the full sample is 0.3 year, or approximately equal to four months. This result is at the higher end of the country specific results, except for Sweden where the effect is closer to seven months. As noted earlier, the inclusion of 55 to 59 year olds in the country specifications in order to increase sample sizes is likely to be responsible for some of these differences.

**Table 10. Effects on length of working life from optimal HR policies**

Sample:	Full	AT	DE	SE	NL	ES	IT	FR	DK	CH	BE	CZ
Age group:	50-54					50-59						
Number of additional working years:												
Estimated	10.2	5.3	8.2	10.1	9.2	9.8	7.2	6.9	9.0	11.5	7.0	5.8

<sup>10</sup> Countries include: AT, DE, SE, NL, ES, IT. FR, DK, CH, BE and CZ.

Counterfactual	10.5	5.6	8.4	10.7	9.7	9.8	6.9	7.0	9.1	11.7	7.1	6.1
Difference	0.3	0.3	0.3	0.6	0.4	-0.1	-0.3	0.1	0.1	0.2	0.2	0.3
Sample size	4789	974	872	1289	1333	814	911	1879	1567	1278	1876	982

Notes:

The results are in line with Beehr et al. (2000: 219) who found that “a larger number of the non-work variables (five of eight) predicted retirement age than work-related variables (one of seven). In other words, more elements of life outside the workplace were predictors of the retirement criterion than attitudes and perceptions about the workplace itself. This suggests that employees contemplating retirement are most likely taking into account personal as well as workplace related push or pull factors.

## V. Conclusion and implications

This paper has presented new evidence of a link between workplace and working conditions typically under the purview of HR policy, job satisfaction and associated retirement behaviour in Europe. Its sobering conclusion is that, while job satisfaction among older workers is at a high level, the currently typical timing of retirement among highly and less job-satisfied older workers suggests little scope for extending working lives through higher job satisfaction. Insofar as we were able to demonstrate the link between job satisfaction and specific workplace and working conditions, there would also appear to be little room for HR to incentivise delayed retirement by furthering a better (or even better) working environment. Our estimation suggests that increasing job satisfaction of 50-54 year old workers to its highest possible level, if that were feasible, would extend working lives by just four months, on average.

Retirement decisions are the results of complex and multifaceted considerations, options and opportunities, as well as unforeseen events, ranging from the personal (e.g. suddenly deteriorating health) to the collective (e.g. business closure). Moreover, retirement decisions continue to be largely framed by legislation, the presence and extent of ‘enforcement’ of statutory retirement ages (van Dalen, Henkens and Wang 2014). A loosening of such regulations, such as the abolition of the default retirement age in the UK and previously the US may, however, lead to change in retirement and, importantly, employer hiring behaviour, with potentially far reaching implications for the structure of the labour market for older worker (Lain 2012).

Modifying, i.e. removing or extending the statutory retirement age may, in fact, be a more effective measure for extending working lives, as a range of studies that sought to estimate the (likely) effects of changes to statutory retirement ages have indicated. However, the net effects are typically less than the increase in the legislated retirement age.

Thus, simulations of the impact of the increase in the statutory retirement age by two years from age 65 to age 67 in Germany concluded that this change would delay retirement by less than one year (10.8 months), on average (Fehr et al. 2010); just slightly higher than estimated a decade earlier by Berkel and Börsch-Supan (2004) who determined a likely nine month increase resulting from a two year delay of the retirement age. De Grip et al. (2013) found a similar 10.8 month increase in expected retirement age among

public sector employees if their statutory retirement were raised by two years. Díaz-Giménez and Díaz-Saavedra (2009) estimate an additional 20 months in delayed retirement in Spain if the early retirement age were raised from 60 to 63 years, and the statutory retirement age from 65 to 68 years. In contrast, a reform package proposed for Finland, which includes entry ages to regular pension raised by two years alongside greater access to part-time pensions, was estimated to delay retirement by just six months (Määttänen 2014). Estimates of this kind are necessarily diverse and uncertain. They are also likely to reflect social and economic context, which includes the openness of employers to retain and recruit older workers, rather than to retire them. From that perspective, one is reminded of the benefits that come from supporting public policy on retirement with strong anti-discrimination/equality legislation in order to induce a cultural as well as economic shift that accepts, integrates and strengthens an ageing workforce (Lain 2012).

## References

- Andersen, T. M., Holmström, B., Honkapohja, S., Korkman, S. H., Söderström, H.T., Vartiainen, J. (2007) The Nordic Model. Embracing globalization and sharing risks. The Research Institute of the Finnish Economy (ETLA).
- Beehr, T.A., Glazer, S., Nielson, N.L., Farmer, S.J. (2000) 'Work and Nonwork Predictors of Employees' Retirement Ages', *Journal of Vocational Behavior* 57, 206-225.
- Beehr, T.A., Bennett, M.M. (2007) 'Examining retirement from a multi-level perspective', in K.S. Shultz, G.A. Adams (eds.), *Aging and work in the 21st century*. New York: Psychology Press, 277-302.
- Berkel, B., Börsch-Supan, A. (2004) 'Pension Reform in Germany. The Impact on Retirement Decisions', *MEA Discussion Paper 62-2004. Mannheim*.
- Blekesaune, M., Solem, P.E. (2003) 'Working conditions and early retirement: A prospective study of retirement behavior', in M. Blekesaune, E. Øverbye (eds.), *Familieendring, helse og trygd. Fire longitudinelle studier*. Norsk institutt for forskning om oppvekst, velferd og aldring NOVA Rapport 22/2003.
- Blekesaune, M., & Solem, P. (2005) Working conditions and early retirement: A prospective study of retirement behaviour. *Research on Ageing*, 27, 1, 3-30.
- Borella, M., Moscarola, F. (2009) 'Microsimulation of Pension Reforms: Behavioural versus Nonbehavioural Approach. CeRP (Center for Research on Pensions and Welfare Policies) Working paper 86/09.
- Burke, R., Dolan, S.L., Fikesenbaum, L. (2012) 'Predictors of the decision to retire among nurses in Spain: A descriptive survey', *International Journal of Nursing*, 1(2), 2012, 25-32.
- Cameron, A. C., and P. K. Trivedi. (2005) *Microeconometrics: Methods and Applications*. New York: Cambridge University Press.
- Carr, E., Hagger-Johnson, G., Head, J., Shelton, N., Stafford, M., Stansfeld, S., Zaninotto, P. (2016) 'Working conditions as predictors of retirement intentions and exit from paid employment: a 10-year follow-up of the English Longitudinal Study of Ageing', *European Journal of Ageing*, 13, 1, 39-48.
- Conen, W.S., Henkens, K., Schippers, J. (2012) 'Employers' attitudes and actions towards the extension of working lives in Europe', *International Journal of Manpower*, 33, 6, 648-665.
- D'Addio, A.C., Keese, M., Whitehouse, E. (2010) 'Population ageing and labour markets', *Oxford Review of Economic Policy*, 26, 4, 613-635.
- De Grip, A., Fouarge, D., Montizaan, R. (2013) 'How Sensitive are Individual Retirement Expectations to Raising the Retirement Age?' *De Economist* (2013), 161, 225-251.

Dal Bianco, C., Trevisan, E. & Guglielmo Weber (2015) "I want to break free". The role of working conditions on retirement expectations and decisions, *European Journal of Ageing* 12:17-28.

Díaz-Giménez, J., Díaz-Saavedra, J. (2009) 'Delaying retirement in Spain'. *Review of Economic Dynamics* 12, 147-167.

Díaz-Giménez, J., Díaz-Saavedra (2014) 'The Future of Spanish Pensions', serie ThE Papers, Working Paper no.14/03, University of Granada.

Díaz-Saavedra, J. (2015). Tax and transfer programs, retirement behavior, and work hours over the life cycle. *Journal of Economic Policy Reform*, 1-22.

Euwals, R., van Vuuren, D., Wolthoff, R. (2010) 'Early Retirement Behaviour in the Netherlands: Evidence from a Policy Reform.' *De Economist*, 158, 209-236.

Fehr, H., Kallwit, M., Kindermann, F. (2010) 'Pension reform with Variable Retirement Age - A Simulation Analysis for Germany', *Journal of Pension Economics and Finance*, 11, 3, 389-417.

Henkens, K., Leenders, M. (2010) Burnout and older workers' intentions to retire. *International Journal of Manpower*, 31, 3, 306-321.

Fischer, J.A.V., Sousa-Poza, A. (2007) 'Does Job Satisfaction Improve the Health of Workers? New Evidence Using Panel Data and Objective Measures of Health', *IZA Discussion Paper No. 3256*.

Fleischmann, M., Koster, F., Dykstra, P., Schippers, J. (2013) 'Hello pension, goodbye tension? The impact of work and institutions on older workers' labor market participation in Europe. *International Journal of Ageing and Later Life*, Vol. 8, 2, 33-67.

Furunes, T., Mykletun, R.J., Solem, P.E., de Lange, A.H., Syse, A., Schaufeli, W.B., Ilmarinen, J. (2015) 'Late Career Decision-Making: A Qualitative Panel Study', *Work, Aging and Retirement*, 1, 3, 284-295.

IW (2015), 'MINT-Frühjahrsreport (2015) Rente mit 63 zeigt erste Nachteile', *IW (Institut der deutschen Wirtschaft Köln)*, <https://www.iwd.de/artikel/rente-mit-63-zeigt-erste-nachteile-224796/>

Jensen, P.H, Møberg, R.J. (2012)'Age Management in Danish Companies: What, How, and How Much? *Nordic Journal of Working Life Studies* 2.3 (Aug 2012), 1-18.

Jürges, H., Thiel, Lars., Bucher-Koenen, T., Rausch, J., Schuth, M., Börsch-Supan, A. (2014) 'Health, financial incentives, and early retirement: Micro-simulation evidence for Germany'. *Schumpeter Discussion papers*, No. 2014-003, <urn:nbn:de:hbz:468-20140206-112013-6>.

Kivimäki, M., Vahtera, J., Elovainio, M., Virtanen, M., Siegrist, J. (2007) 'Effort-reward imbalance, procedural justice and relational injustice as psychosocial predictors of health: complementary or redundant models? *Occupational & Environmental Medicine*, 64, 659-665.

Krause, N., Lynch, J., Kaplam, G.A., Cohen, R.D., Goldberg, D.E., Salonen, J.T (1997) 'Predictors of disability retirement', *Scandinavian Journal of Work, Environment Health*, 23, 6, 403-413.

Kyyrä, T. (2015) 'Early retirement policy in the presence of competing exit pathways: Evidence from pension reforms in Finland', *Economica*, 82, 46-78.

Lahelma, E., Laaksonen, M., Lallukka, T., Martikainen, P., Pietiläinen, O., Saastamoinen, P., Gould, R., Rahkonen, O. (2012) 'Working conditions as risk factors for disability retirement: a longitudinal register linkage study. *BMC Public Health*, 12:309. <http://dx.doi.org/10.1186/1471-2458-12-309>.

Lain, D (2012) Working past 65 in the UK and the USA: segregation into 'Lopaq' occupations? *Work, employment and society*, 26, 1, 78-94.

Lunau, T., Wahrendorf, M., Dragano, N., Siegrist, J. (2013) Work stress and depressive symptoms in older employees: impact of national labour and social policies. *BMC Public Health*, 13, 1086, [PubMed: 24256638]

Määttä, N. (2014), 'Evaluation of Alternative Pension Policy Reforms Based on a Stochastic Life Cycle Model'. Lassila, J., Määttä, N., Valkonen, T. (eds.): *Linking retirement age to life expectancy - what happens to working lives and income distribution?* Finnish Centre for Pension Reports, ETLA B 260, 2/2014, 17-52.

Maslach, C., Jackson, S.E. (1981), 'The measurement of experienced burnout', *Journal of Occupational Behaviour*, Vol. 2, No. 2, 99-113.

Mastrubuoni, G. (2006) 'Labor Supply Effects of the Recent Social Security Benefit Cuts: Empirical Estimates Using Cohort Discontinuities. *CEPS Working Paper No. 136*.

Mein, G., Martikainen, P., Stansfeld, S.A., Brunner, E.J., Fuhrer, R., Marmot, M.G. (2000) Predictors of early retirement in British civil servants, *Age and Ageing*, 29, 529-536.

Perek-Biatas, J., Turek, K. (2012) 'Organisation-level policy towards older workers in Poland', *International Journal of Social Welfare*, 21, 101-116.

Roodman, D. (2009) Estimating fully observed recursive mixed-process models with cmp. Available at SSRN 1392466.

Schils, T. (2005) Early retirement patterns in Europe: A comparative panel study. Tilburg: Tilburg University.

Schnalzenberger, M., Schneeweis, N., Winter-Ebmer, R., Zweimüller, M. (2011) Job Quality and Employment of Older People in Europe, *The Austrian Center for Labor Economics and the Analysis of the Welfare State Working Paper No. 1105*.

Schreurs, B., de Cuyper, N., van Emmerik, I.J.H., Notelaers, G., de Witte, H. (2011) 'Job demands and resources and their associations with early retirement intentions through recovery need and work enjoyment', *SA Journal of Industrial Psychology/SA Tydskrif vir Bedryfsielkunde*, 37 (2), Art. #859, 11 pages.

Shacklock, K., Brunetto, Y. (2008) 'A model of older workers' intentions to continue working', *Personnel Review*, 40, 1, 252-274.

Siegrist, J., Wahrendorf, M. (2010), 'Quality of Work, Health and early Retirement: European Comparisons', *mea Mannheim Research Institute for the Economics of Aging Discussion Paper 224-2010*

Solem, P.E., Syse, A., Furunes, T., Mykletun, R.J., de Lange, A., Schaufeli, W., Ilmarinen, J. (2014) 'To leave or not to leave: retirement intentions and retirement behaviour', *Ageing & Society*, doi: <http://dx.doi.org/10.1017/S0144686X14001135>.

Szubert, Z., Sobala, W. (2005), 'Current determinants of early retirement among blue collar workers in Poland', *International Journal of Occupational Medicine & Environmental Health*, 18, 2, 177-184.

Taylor, P., Tillsley, C., Beausoleil, J., & Wilson, R. (2000) Factors affecting retirement: A literature review. London: Department for Education and Employment.

Thorsen, S., R. Rugulies, K. Løngard, V. Borg, K. Thielen and J.B. Bjorner (2012) 'The association between psychosocial work environment, attitudes towards older workers (ageism) and planned retirement', *Int Arch Occup Environ Health*, 85, 4, 437-445.

Tikanmäki, H., Sihvonen, H., Salonen, J. (2015) 'Distributional Effects of the Forthcoming Finnish Pension Reform - a Dynamic Microsimulation Approach. *International Journal of Microsimulation*, 8 (3), 75-98.

Topa, G., Moriano, J.A., Depolo, M., Alcover, C.-A., Morales, J.F. (2009) 'Antecedents and consequences of retirement planning and decision-making: A meta-analysis and model'. *Journal of Vocational Behavior*, 75, 38-55.

von Bonsdorff, M.E., Huuhtanen, P., Tuomi, K., Seitsamo, J. (2010) 'Predictors of employees' early retirement intentions: an 11-year longitudinal study', *Occupational Medicine*, 60: 94-100.

Wang, M., Zhan, Y., Liu, S., Shultz, K.S. (2008) 'Antecedents of Bridge Employment: A Longitudinal Investigation', *Journal of Applied Psychology*, 93, 4, 818-930.

Van Dalen, H., & Henkens, K. (2003) De dubbele moraal rond langer werken. *Economisch Statistische Berichten*, Oktober, 514 -516.

Van Dalen, H.P., Henkens, K., Wang, M. (2014) 'Recharging or Retiring Older Workers? Uncovering the Age-Based Strategies of European Employers', *The Gerontologist*, doi: 10.1093/geront/gnu048.

Van Solinge, H., Henkens, K. (2013) 'Work-related factors as predictors in the retirement decision-making process of older workers in the Netherlands', *Ageing & Society* 34, 9, 1151-1174.

Wahrendorf, M., Dragano, N., Siegrist, J. (2013) 'Social Position, Work Stress, and Retirement Intentions: A Study with Older Employees from 11 European Countries, *European Sociological Review*, 29, 4, 792-802.

Wooldridge, J. M. (2009) *Introductory Econometrics: A Modern Approach*. 4th edition. Cincinnati, OH: South-Western.

**Annex**

**Table A1**

Satisfied with job	1	2	3	4	5	6	7	8	9
<b>Physically demanding</b>									
2	-0.25** (0.09)	-0.25** (0.09)	-0.26** (0.09)	-0.26** (0.09)	-0.22 (0.14)	-0.27** (0.10)	-0.44* (0.17)	-0.18 (0.14)	-0.43** (0.13)
3	-0.14 (0.08)	-0.14 (0.08)	-0.14 (0.08)	-0.14 (0.09)	-0.12 (0.14)	-0.17 (0.10)	-0.30* (0.15)	-0.18 (0.15)	-0.24 (0.12)
4	-0.14 (0.10)	-0.14 (0.10)	-0.14 (0.10)	-0.16 (0.10)	-0.12 (0.16)	-0.14 (0.13)	-0.37* (0.16)	-0.20 (0.20)	-0.17 (0.15)
<b>Time pressure</b>									
2	-0.048 (0.08)	-0.048 (0.08)	-0.053 (0.08)	-0.054 (0.08)	-0.043 (0.13)	-0.040 (0.10)	-0.062 (0.13)	-0.37* (0.15)	0.40** (0.13)
3	0.11 (0.08)	0.11 (0.08)	0.099 (0.08)	0.080 (0.08)	0.13 (0.14)	0.18 (0.11)	0.014 (0.13)	-0.14 (0.16)	0.61*** (0.13)
4	0.33* (0.14)	0.33* (0.14)	0.30* (0.14)	0.29* (0.14)	0.44 (0.25)	0.56** (0.18)	-0.22 (0.23)	0.47 (0.28)	0.74*** (0.21)
<b>Autonomy</b>									
2	0.042 (0.11)	0.042 (0.11)	0.042 (0.11)	0.054 (0.11)	- 0.0097 (0.18)	0.11 (0.12)	-0.30 (0.26)	0.22 (0.19)	-0.10 (0.15)
3	0.26* (0.11)	0.26* (0.11)	0.25* (0.11)	0.26* (0.11)	0.17 (0.17)	0.26* (0.12)	0.13 (0.25)	0.35* (0.18)	0.093 (0.14)

4.	0.61***	0.61***	0.59***	0.59***	0.44*	0.55***	0.59*	0.54*	0.52**
	(0.12)	(0.12)	(0.12)	(0.12)	(0.20)	(0.14)	(0.24)	(0.21)	(0.17)

**Opportunity to develop**

2	0.32**	0.32**	0.31*	0.30*	0.45*	0.30*	0.58*	0.25	0.30
	(0.12)	(0.12)	(0.12)	(0.12)	(0.21)	(0.14)	(0.25)	(0.22)	(0.16)

3	0.68***	0.68***	0.68***	0.65***	0.75***	0.62***	1.06***	0.59**	0.63***
	(0.11)	(0.11)	(0.11)	(0.11)	(0.19)	(0.13)	(0.23)	(0.20)	(0.15)

4	1.28***	1.28***	1.28***	1.25***	1.39***	1.14***	1.66***	1.09***	1.18***
	(0.13)	(0.13)	(0.13)	(0.13)	(0.23)	(0.17)	(0.24)	(0.25)	(0.19)

**Support in difficult situations**

2	0.16	0.16	0.17	0.19	0.13	- 0.00044	0.38	-0.22	0.28
	(0.14)	(0.14)	(0.14)	(0.14)	(0.23)	(0.17)	(0.22)	(0.26)	(0.20)

3	0.44***	0.44***	0.45***	0.47***	0.44	0.32	0.65**	0.083	0.62**
	(0.13)	(0.13)	(0.13)	(0.13)	(0.23)	(0.17)	(0.20)	(0.25)	(0.19)

4	0.89***	0.89***	0.91***	0.91***	0.67**	0.77***	1.06***	0.56	1.04***
	(0.15)	(0.15)	(0.15)	(0.15)	(0.26)	(0.19)	(0.24)	(0.29)	(0.21)

**Receive recognition**

2	0.51***	0.51***	0.51***	0.54***	0.70***	0.56***	0.32	0.74**	0.37*
	(0.13)	(0.13)	(0.13)	(0.13)	(0.21)	(0.15)	(0.23)	(0.24)	(0.18)

3	0.95***	0.95***	0.94***	0.99***	1.15***	0.99***	0.78***	1.15***	0.85***
	(0.12)	(0.12)	(0.12)	(0.13)	(0.21)	(0.15)	(0.22)	(0.24)	(0.18)

4	1.54***	1.54***	1.52***	1.58***	1.81***	1.54***	1.36***	1.66***	1.43***
	(0.14)	(0.14)	(0.14)	(0.15)	(0.23)	(0.18)	(0.25)	(0.27)	(0.22)

**Adequate salary**

2	0.18*	0.18*	0.18*	0.18*	0.078	0.18	0.13	0.20	0.17
	(0.09)	(0.09)	(0.09)	(0.09)	(0.15)	(0.11)	(0.18)	(0.17)	(0.14)

3	0.46***	0.46***	0.47***	0.46***	0.40**	0.47***	0.41*	0.48**	0.49***
	(0.09)	(0.09)	(0.09)	(0.09)	(0.14)	(0.11)	(0.17)	(0.16)	(0.13)

4	1.15***	1.15***	1.15***	1.12***	0.98***	1.17***	1.14***	1.04***	1.41***
	(0.14)	(0.14)	(0.14)	(0.14)	(0.23)	(0.19)	(0.21)	(0.26)	(0.24)

**Prospects for job advancement**

2	-0.049	-0.049	-0.040	-0.025	-0.10	-0.023	-0.036	-0.050	-
	(0.08)	(0.08)	(0.08)	(0.08)	(0.13)	(0.09)	(0.12)	(0.15)	0.000046
									(0.11)

3	0.21**	0.21**	0.22**	0.22**	0.085	0.19	0.30*	0.22	0.12
	(0.08)	(0.08)	(0.08)	(0.08)	(0.14)	(0.10)	(0.13)	(0.16)	(0.12)

4	0.24	0.24	0.23	0.22	0.29	0.24	0.29	0.42	0.073
	(0.14)	(0.14)	(0.14)	(0.14)	(0.24)	(0.18)	(0.21)	(0.24)	(0.26)

**Job security**

2	0.071	0.071	0.078	0.080	0.058	0.18	-0.42	0.37	-0.029
	(0.14)	(0.14)	(0.14)	(0.15)	(0.21)	(0.18)	(0.22)	(0.22)	(0.29)

3	0.39**	0.39**	0.39**	0.38**	0.41*	0.51**	-0.056	0.67***	0.34
---	--------	--------	--------	--------	-------	--------	--------	---------	------

	(0.13)	(0.13)	(0.13)	(0.13)	(0.18)	(0.16)	(0.20)	(0.19)	(0.27)
4	0.81***	0.81***	0.80***	0.80***	0.78***	0.94***	0.35	1.13***	0.74**
	(0.13)	(0.13)	(0.13)	(0.13)	(0.19)	(0.16)	(0.19)	(0.20)	(0.28)
Gender (Female)		0.0029	0.015	-0.0091	-0.027				
		(0.05)	(0.05)	(0.05)	(0.08)				
Age dummies (50-74)			YES	YES	YES				
Country fixed effects				YES	YES				
<hr/>									
cut1									
Constant	-	-	-	-1.77***	-	-1.43***	-	-1.50***	-1.43***
	1.51***	1.51***	1.45***		1.66***		2.20***		
	(0.22)	(0.22)	(0.24)	(0.24)	(0.35)	(0.25)	(0.41)	(0.36)	(0.34)
<hr/>									
cut2									
Constant	0.19	0.19	0.25	-0.054	0.0067	0.20	-0.20	0.0085	0.38
	(0.20)	(0.20)	(0.22)	(0.22)	(0.33)	(0.23)	(0.37)	(0.34)	(0.31)
<hr/>									
cut3									
Constant	3.53***	3.53***	3.61***	3.33***	3.32***	3.61***	2.99***	3.52***	3.70***
	(0.21)	(0.21)	(0.23)	(0.24)	(0.36)	(0.26)	(0.38)	(0.37)	(0.34)
<hr/>									
Pseudo R <sup>2</sup>	0.14	0.14	0.15	0.15	0.14	0.14	0.15	0.13	0.15
Observations	31445	31445	31445	31445	12876	18775	11008	9964	8811

Standard errors in parentheses

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



**Table A2. Country level regressions**

	AT	DE	SE	NL	ES	IT	FR	DK	CH	BE	CZ
model											
1bn.satis	.	.	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.	.	.
2.satis	-0.49*	-0.37	-0.62*	-	0.14	0.68*	-0.22	-0.17	-0.53	-0.30	-0.44*
	(0.20)	(0.27)	(0.29)	0.74**	(0.25)	(0.41)	(0.30)	(0.17)	(0.23)	(0.32)	(0.17)
						)	)		)	)	
3.satis	-	-	-	-0.88	-0.15	-0.12	-0.23	-0.92*	-0.24	-	-0.49
	1.11**	1.34**	3.99**							0.79*	
	(0.40)	(0.51)	(0.50)	(0.52)	(0.70)	(0.47)	(0.30)	(0.47)	(0.88)	(0.31)	(0.40)
						)	)		)	)	
Female	-	-0.38	-	0.59*	1.15**	0.24	0.55*	-	-0.33	0.84*	-
	0.93**		1.28**				**	0.98***		**	1.74***
	(0.20)	(0.26)	(0.28)	(0.24)	(0.39)	(0.30)	(0.16)	(0.23)	(0.31)	(0.17)	(0.22)
						)	)		)	)	
	.	.	.	.	.	.	.	.	.	.	.
2.edu	-0.35	0.12	0.27	0.51	0.14	0.75*	-	0.59	-0.53	0.43*	-0.083
	(0.29)	(0.52)	(0.33)	(0.31)	(0.47)	(0.31)	0.42*	(0.20)	(0.39)	(0.35)	(0.21)
						)	)			)	)
3.edu	0.88**	1.12*	1.42**	0.17	0.17	1.63*	0.094	0.90*	0.23	0.84*	0.92**
	(0.31)	(0.53)	(0.34)	(0.28)	(0.48)	(0.43)	(0.21)	(0.39)	(0.51)	(0.20)	(0.34)
						)	)		)	)	
Age fixed effects	YES	YES	YES	YES							

Constant	9.06** *	10.8** *	16.6** *	12.2** *	9.74** *	10.6* **	10.4* **	13.0***	11.1* **	8.27* **	12.1***
	(0.57)	(1.06)	(1.68)	(0.80)	(0.80)	(0.91 )	(0.44 )	(0.84)	(0.68 )	(0.44 )	(1.33)
<hr/>											
Insigma											
Constant	0.73** *	0.90** *	1.11** *	0.92** *	0.90** *	1.05* **	0.96* **	1.01***	1.06* **	0.87* **	0.83***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04 )	(0.03 )	(0.04)	(0.05 )	(0.03 )	(0.04)
<hr/>											
Pseudo $R^2$											
Observations	974	872	1289	1333	814	911	1879	1567	1278	1876	982