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Retirement policies and learning in old age in European countries: comparative analysis

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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.

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Introduction

This report is part of the MoPAct project – Mobilising the Potential of Active Ageing in Europe1. 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 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?

[1] More detailed information on the project available at: http://mopact.group.shef.ac.uk/

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 refer 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[2].

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 2nd decile); 2) below average income (2-5 decile); 3) above average income (5-8 decile); and 4) high income (above 8th 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.

[2] 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)

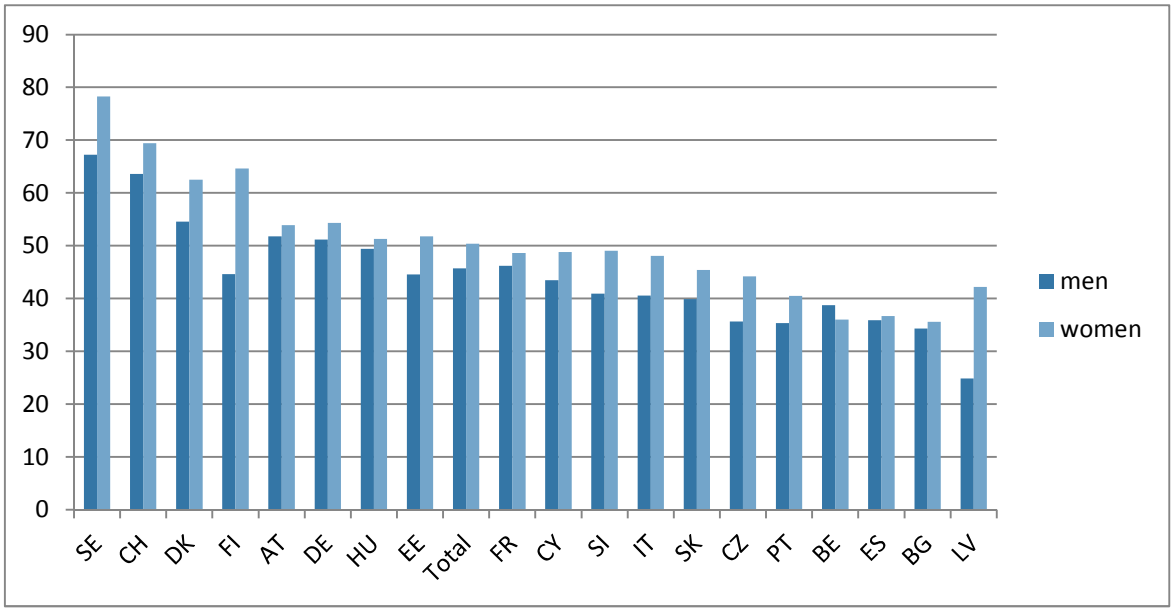
Since statutory retirement age as well as replacement ratio of pensions differ considerably for men and women in many countries, different models for men and women are estimated. Multilevel regression models avoid biased standard errors when hierarchical data structure is used, i.e. variables at different 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

	Statutory retirement at 1.1.2011		Age at which first received retirement, 2012		Difference in years	
country	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

Table 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

Error! Reference source not found.a and **Error! Reference source not found.**b 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

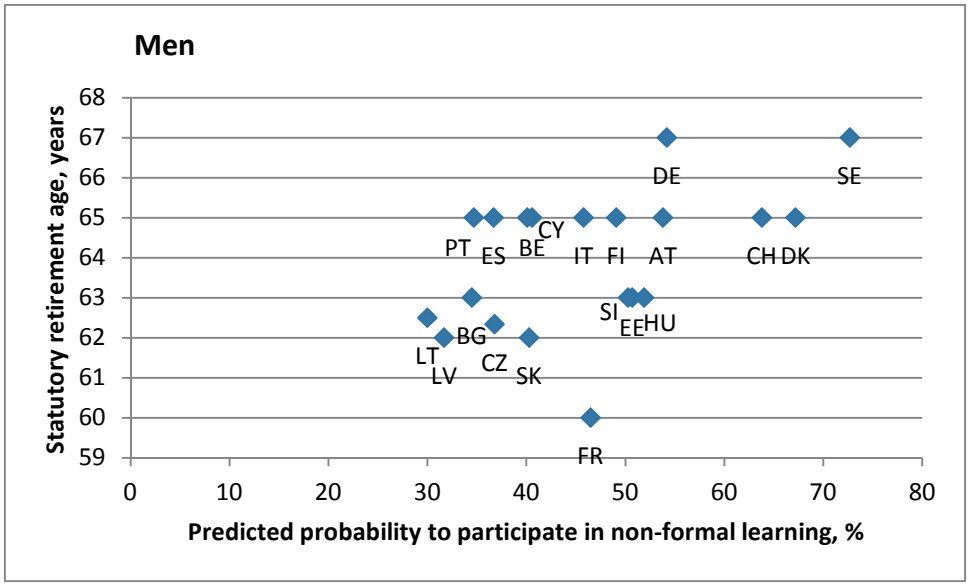
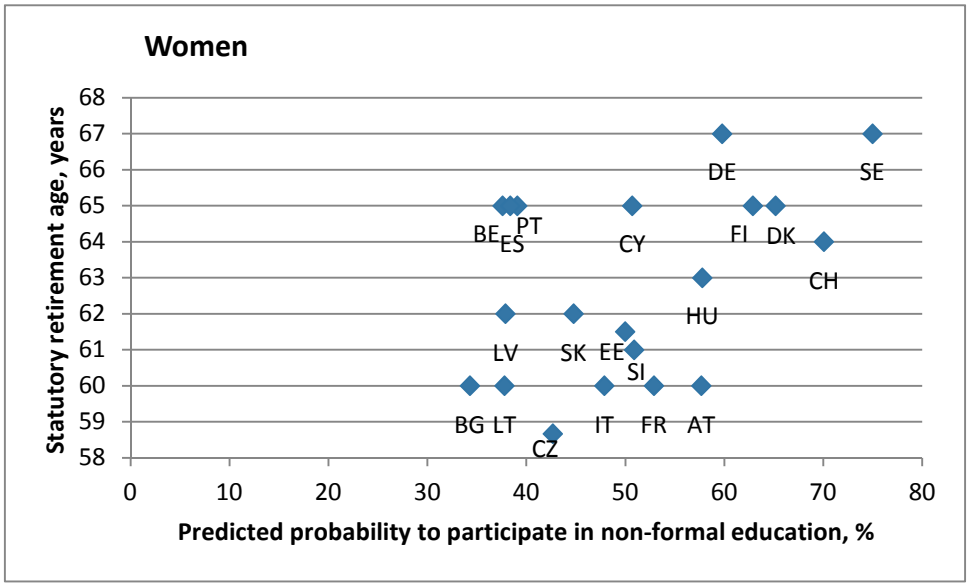


FIGURE 3B. ADJUSTED PARTICIPATION PROBABILITY IN STATUTORY RETIREMENT AGE IN 50-64 AGE GROUP, WOMEN



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

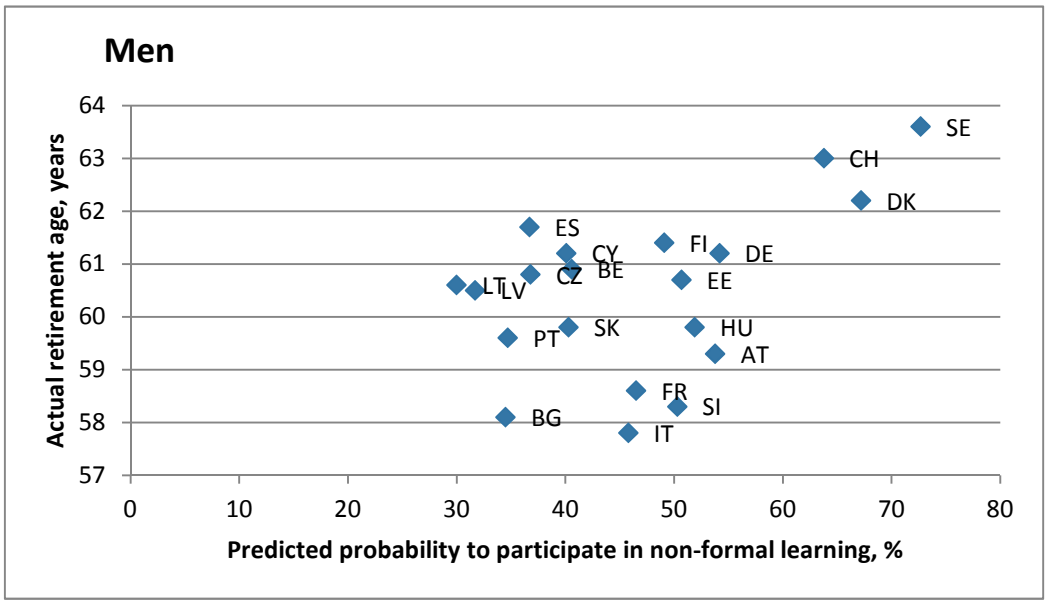
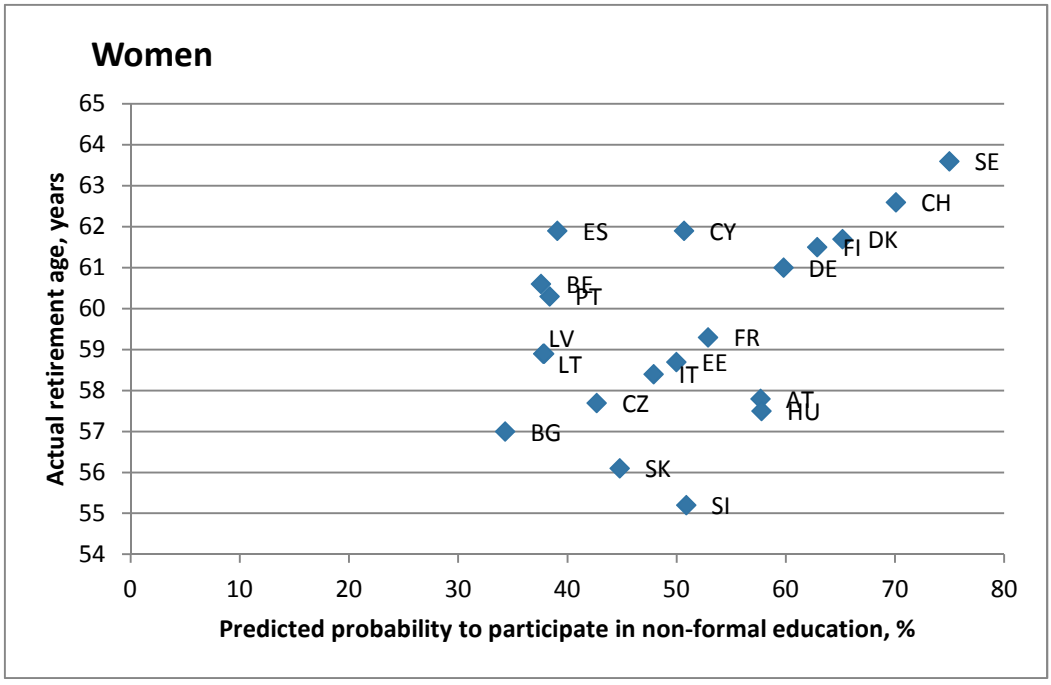


FIGURE 5B. ADJUSTED PARTICIPATION PROBABILITY AND ACTUAL RETIREMENT AGE IN 50-64 AGE GROUP, WOMEN



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.

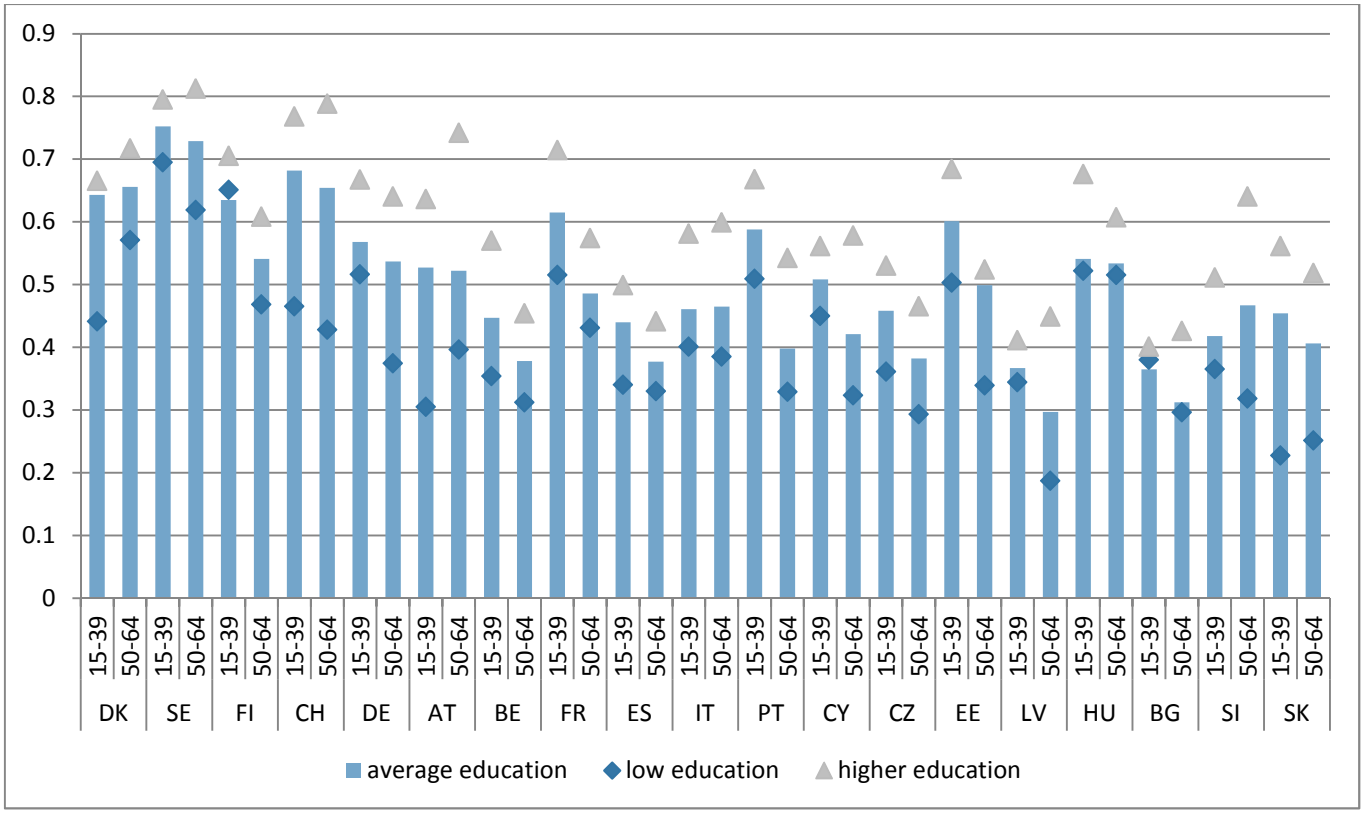
TABLE 3. MARGINAL EFFECTS OF EDUCATIONAL ATTAINMENT (REFERENCE GROUP AVERAGE EDUCATION) BY AGE GROUPS

		15-39	50-64		15-39	50-64		15-39	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 DETEMINANTS 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 DETEMINANTS 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

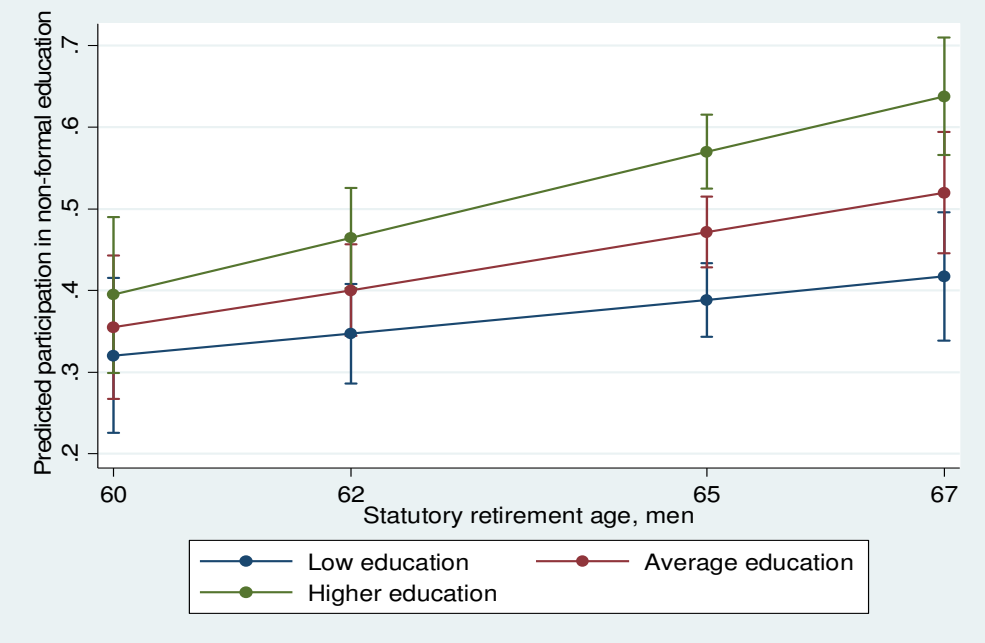
	Men	Women
Ref: low education		
Average education	-2.261	-1.347

	(1.97)	(1.54)
Higher education	-5.020*	-0.903
	(2.13)	(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
		(0.04)
Ref: Low education#statutory retirement age, women		
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.

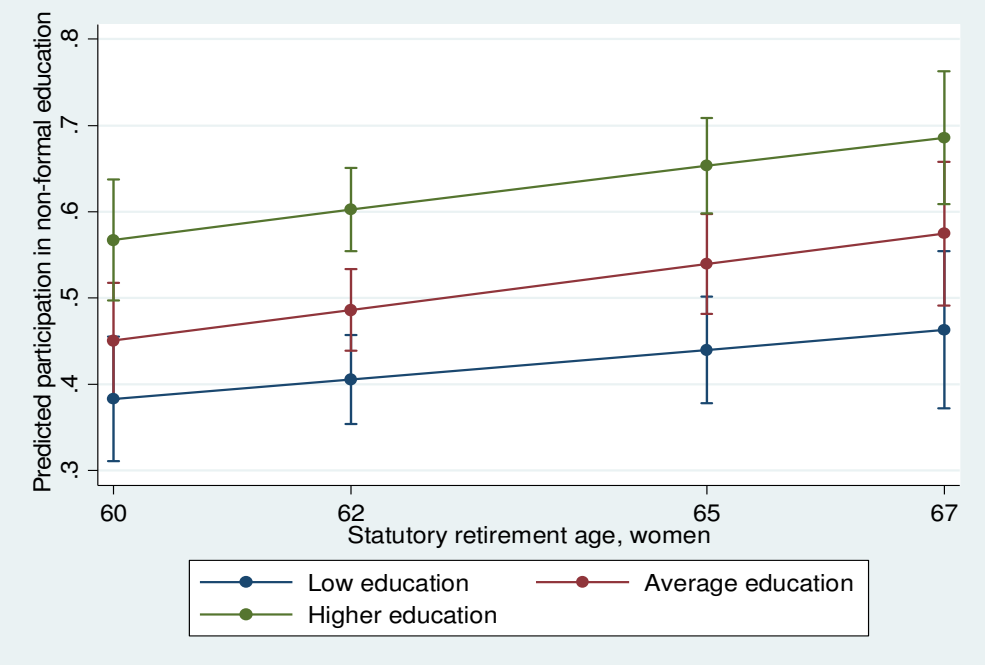
Source: AES 2011, MISSOC database, Eurostat online database (SILC), author's calculations

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.

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