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Economic activity of the older working-age population in the European Union

Abstract

According to Ilmarinen (1999) the main objective of policies aimed at increasing economic activity of older persons is maintaining their work ability, which is influenced by different factors, such as health, competence, norms and attitudes, and work environment. The aim of the study is to analyze whether individual characteristics and workplace features, as well as institutional settings and country context, influence having work intentions in older working-age groups. The methods used are: factor analysis, two-step cluster analysis, latent class analysis and multilevel logistic regression. Data comes from: the European Working Condition Survey 2005. From this preliminary analysis I conclude that individual factors, workplace features and the labour market situation significantly influence work intention probability in older working-age individuals; however, there are strong gender differences in this respect in the European Union (EU).

Key words: work ability, European Working Conditions Survey, work intentions, older working age population.

1. Background

Demographic projections clearly show that during the coming decades of the XXI century, serious changes will occur in the age structure of the European population. An increase in the number of people at the current retirement age or above, together with a decrease in the number of young persons who can potentially enter the labour market, will reduce the size of the working-age group in the European Union. Although since the 1950's the size of working-age population in European Union countries has been growing, the new population projections indicate that for most Member States, a long period of decline in working age population is to start in the coming decade. In some Member States this decline will start later than in others, but with the exception of Luxembourg all Member States will be confronted with a declining potential labour force, both in EUROPOP2004 and EUROPOP2008 projections (table 1). Some countries will experience an alternating pattern of growth and decline of their potential workforce; these include Belgium, France, Ireland, Cyprus, Sweden and the United Kingdom. ¹

¹ Nimwegen N., van der Erf R. (eds.), *Demographic trends, socioeconomic impacts and policy implications in the European Union*, Social Situation Observatory Demography Monitor 2008, Demography Network 2008, p.61.

Table 1. First year of decline in working-age population

EUROPOP2004		EUROPOP2008
Luxembourg	>2050	Luxembourg, United Kingdom**
Cyprus	2048	Cyprus**
	2043	
Ireland	2040	Ireland**
	2035	
	2025	Spain
	2022	Belgium**, Portugal
	2020	Austria
Austria, Malta**	2012	Germany
Belgium, France, Netherlands*, Poland, Slovenia,	2011	France**, Italy, Netherlands, Poland, Sweden**,
United Kingdom		Slovakia
Finland*, Greece, Spain, Slovakia	2010	Finland*, Greece
Sweden**	2009	Denmark*, Malta
Denmark*, Portugal	2008	
Bulgaria, Czech Republic, Estonia, Germany*,	<2008	Bulgaria, Czech Republic, Estonia, Hungary,
Hungary, Italy, Latvia, Lithuania, Romania		Latvia, Lithuania, Romania

* A general declining trend with growth for some years or an alternating pattern of growth and decline.

** No general declining trend but decline for some years or an alternating pattern of growth and decline.

Source: Nimwegen, N., van der Erf R., Social Situation Observatory Demography Monitor 2008, Demographic trends, socioeconomic impacts and policy implications in the European Union, Demography Network, 2008, calculated by NIDI on Eurostat data.

Although a decrease in the size of the working-age population cannot be directly interpreted as a decrease in the labour force, when we assume a constant labour force participation rate of people aged 55-64, there is no doubt that it will reduce labour force supply in the future. Economic activity of persons in the older working-age group (defined as persons aged 55-64) measured by employment rate clearly shows that only several countries in the EU differ in this respect. However, it is also possible to find some similarities (Table 2.). First of all, the employment rate of population aged 55-64 is much lower than that of prime-age workers, which suggests early withdrawal of older working-age population from the labour market. Second, males aged 55-64 work more often than woman of the same age. Finally, for the past decade there has been an increase in the employment rate recorded for both men and women (except Romania and Poland for women and Romania, Portugal, Malta and Denmark for men). When it comes to dissimilarities, we can mark out several groups of countries. The first one (Sweden, Finland, Denmark, Estonia, Latvia, Lithuania and the UK) is characterised by a relatively high level of employment rate among the older working-age groups (around 60-70% for men and 40-60% for women). It is also worth noting that the employment gender gap in those countries is the smallest. The second group is composed of countries where the male employment rate is high (around 50-60%), but the employment gender gap is relatively big: Germany, the Netherlands, Portugal, Greece, Spain, the Czech Republic and Ireland. The third group comprises countries with a relatively low employment rate for both men (40-50%) and women (20-35%): Italy, Poland, Hungary, Austria, France, Luxembourg, Bulgaria, Slovenia and Slovakia. However, it should be noted that despite positive changes in the employment rate of the older working-age population in most countries, there are states which are unlikely to reach the targets set in the Lisbon Strategy (50% employment rate among 55-64 year olds) This includes Poland, Hungary, Luxembourg, Italy, France, Belgium, Slovenia and Slovakia. It is difficult to establish a pattern of employment rate of older working-age population by basic group of countries. Rather, the national situation plays the biggest role in this respect.

Table 2. Employment rate of population aged 55-64, in 2001, 2006 and 2007 by sex and country

	Total			Males			Females			Ranking 2007			Change 2001 to 2007		
	2001	2006	2007	2001	2006	2007	2001	2006	2007	T	M	F	T	M	F
EU-27	37.7	43.5	44.7	47.7	52.7	53.9	28.2	34.9	36.0				7.0	6.2	7.8
EU-25	37.5	43.7	44.9	47.7	52.8	54.1	27.8	35.0	36.1				7.4	6.4	8.3
EU-15	38.8	45.3	46.6	48.9	54.1	55.3	29.1	36.9	38.1				7.8	6.4	9.0

Belgium	25.1	32.0	34.4	35.1	40.9	42.9	15.5	23.2	26.0	21	23	22	9.3	7.8	10.5
Bulgaria	24.0	39.6	42.6	34.2	49.5	51.8	14.7	31.1	34.5	15	17	14	18.6	17.6	19.8
Czech Rep.	37.1	45.2	46.0	52.6	59.5	59.6	23.1	32.1	33.5	13	11	16	8.9	7.0	10.4
Denmark	58.0	60.7	58.6	65.5	67.1	64.9	49.7	54.3	52.4	3	5	4	0.6	-0.6	2.7
Germany	37.9	48.4	51.5	46.5	56.4	59.7	29.4	40.6	43.6	10	10	9	13.6	13.2	14.2
Estonia	48.5	58.5	60.0	56.7	57.5	59.4	42.1	59.2	60.5	2	12	2	11.5	2.7	18.4
Ireland	46.8	53.1	53.8	64.6	67.0	67.9	28.7	39.1	39.6	8	3	12	7.0	3.3	10.9
Greece	38.2	42.3	42.4	55.3	59.2	59.1	22.9	26.6	26.9	16	13	20	4.2	3.8	4.0
Spain	39.2	44.1	44.6	57.7	60.4	60.0	21.7	28.7	30.0	14	9	17	5.4	2.3	8.3
France	31.9	38.1	38.3	36.2	40.5	40.5	27.8	35.9	36.2	19	26	13	6.4	4.3	8.4
Italy	28.0	32.5	33.8	40.4	43.7	45.1	16.2	21.9	23.0	22	22	23	5.8	4.7	6.8
Cyprus	49.1	53.6	55.9	66.9	71.6	72.5	32.2	36.6	40.3	6	2	10	6.8	5.6	8.1
Latvia	36.9	53.3	57.7	46.2	59.5	64.6	30.0	48.7	52.4	4	6	4	20.8	18.4	22.4
Lithuania	38.9	49.6	53.4	49.2	55.7	60.8	31.1	45.1	47.9	9	8	7	14.5	11.6	16.8
Luxemb- urg	25.6	33.2	32.9	35.9	38.7	37.6	15.2	27.8	28.0	25	27	18	7.3	1.7	12.8
Hungary	23.5	33.6	33.1	34.1	41.4	41.7	14.9	27.1	26.2	24	24	21	9.6	7.6	11.3
Malta	29.4	30.0	28.3	50.4	50.4	46.2	10.2	11.2	11.8	27	20	27	-1.1	-4.2	1.6
Nether- lands	39.6	47.7	50.9	51.1	58.0	61.5	28.0	37.2	40.1	11	7	11	11.3	10.4	12.1
Austria	28.9	35.5	38.6	40.1	45.3	49.8	18.4	26.3	28.0	18	19	18	9.7	9.7	9.6
Poland	27.4	28.1	29.7	35.6	38.4	41.4	20.4	19.0	19.4	26	25	26	2.3	5.8	-1.0
Portugal	50.2	50.1	50.9	61.6	58.2	58.6	40.3	42.8	44.0	11	14	8	0.7	-3.0	3.7
Romania	48.2	41.7	41.4	54.3	50.0	50.3	42.9	34.5	33.6	17	18	15	-6.8	-4.0	-9.3
Slovenia	25.5	32.6	33.5	35.9	44.5	45.3	15.8	21.0	22.2	23	21	24	8.0	9.4	6.4
Slovakia	22.4	33.1	35.6	37.7	49.8	52.5	9.8	18.9	21.2	20	16	25	13.2	14.8	11.4
Finland	45.7	54.5	55.0	46.6	54.8	55.1	45.0	54.3	55.0	7	15	3	9.3	8.5	10.0
Sweden	66.7	69.6	70.0	69.4	72.3	72.9	64.0	66.9	67.0	1	1	1	3.3	3.5	3.0
UK	52.2	57.4	57.4	61.7	66.0	66.3	43.0	49.1	49.0	5	4	6	5.2	4.6	6.0

A change in employment rate is presented in percentage points.

Source: Nimwegen, N., van der Erf R., Social Situation Observatory Demography Monitor 2008, Demographic trends, socioeconomic impacts and policy implications in the European Union, Demography Network, 2008, based on Eurostat data.

A confirmation of the above results can be found in the analysis of the average exit age from the labour market (table 3). First of all it should be underlined that in all countries, the average exit age from the labour market is below the respective statutory retirement age. Between 2001 and 2007, the average age of withdrawal from the labour market in the EU-27 increased by 1.3 years, more strongly for men (1.5 years) than for women (1.1 years). Men still stay longer

on the labor market in the EU-27: the average age of withdrawal from the labour market in 2007 was 61.9 years for men, while for women it was 60.5 years. The highest average age of withdrawal from the labour market in 2007 (2006 in Romania, Bulgaria and Ireland) was reported in Romania (65.5), Sweden (64.2), Bulgaria (64.1) and the United Kingdom (63.6). France (59.5), Slovakia (59.7) and Italy (61) were characterized by the lowest average age of withdrawal from the labour market for men. For women the highest average age of withdrawal from the labour market was observed in Ireland (64.7), Bulgaria (64.1) and Portugal (62.3), while the lowest was noted in Poland (57.5) and Slovakia (57.8). Most of the observed countries reported an increase in average age of withdrawal from the labour market in the years 2001-2007. In this period, the average age of withdrawal from the labour market for women decreased only in Greece. To sum up, the majority of persons in the older working-age groups are outside the labour market. Low employment rates of people aged 55-64 accompanied by population ageing may result in shortages of labour supply in the future. The policy aim is therefore to establish ways and measures to increase labour market participation of older people.

Table 3. Average age of withdrawal from the labour market in the EU-27 (2001 vs. 2007), and statutory retirement age in 2007

Countries	Statutory retirement age 2007		Average age of withdrawal from the labour market Total		Average age of withdrawal from the labour market Females		Average age of withdrawal from the labour market Males	
	Females	Males	2001	2007	2001	2007	2001	2007
European Union (27 countries)	–	–	59.9	61.2	59.4	60.5	60.4	61.9
European Union (15 countries)	–	–	60.3	61.5	59.9	61.1	60.7	62
Belgium	64	65	56.8	61.6	55.9	61.9	57.8	61.2
Bulgaria	59	63	58.7*	64.1	57.6*	64.1	59.8*	64.1
Czech Republic	56-59	62	58.9	60.7	57.3	59.4	60.7	62
Denmark	65	65	61.6	60.6	61	59.7	62.1	61.4
Germany	65	65	60.6	62	60.4	61.5	60.9	62.6

Estonia	60	63	61.1	62.5	.	.	.	.
Ireland	65	65	63.2	64.1**	63	64.7**	63.4	63.5**
Greece	60	65	61.3*	61	61.5*	60.5	61.1*	61.6
Spain	65	65	60.3	62.1	60	62.4	60.6	61.8
France	60	60	58.1	59.4	58	59.4	58.2	59.5
Italy	60	65	59.8	60.4	59.8	59.8	59.9	61
Cyprus	65	65	62.3	63.5	.	.	.	.
Latvia	61.5	62	62.4	63.3	.	.	.	.
Lithuania	60	62.5	58.9	.	.	.	.	.
Luxembourg	65	65	56.8	.	.	.	.	.
Hungary	62	62	57.6	.	57	.	.	.
Malta	60-64	61-64	57.6	.	.	.	.	.
Netherlands	65	65	60.9	63.9	60.8	63.6	61.1	64.2
Austria	60	65	59.2	60.9	58.5	59.4	59.9	62.6
Poland	60	65	56.6	59.3	55.5	57.5	57.8	61.4
Portugal	65	65	61.9	62.6	61.6	62.3	62.3	62.9
Romania	58	63	59.8	64.3**	59.2	63.2**	60.5	65.5**
Slovenia	61	63	.	.	.	.	.	.
Slovakia	62	62	57.5	58.7	56	57.8	59.3	59.7
Finland	65	65	61.4	61.6	61.3	61.3	61.5	62
Sweden	61-67	61-67	62.1	63.9	61.9	63.6	62.3	64.2
UK	60	65	62	62.6	61	61.7	63	63.6

. Data not available

* Data from 2002

** Data from 2006

Source: Eurostat, 2009.

One answer to the challenges called forth by population ageing is the “active ageing” concept. Widely discussed in the literature, this concept is aimed at increasing quality of life within a whole life course by improving health, raising participation in social, cultural and economic activity, and enhancing security (World Health Organization, 2001). One of the elements of active ageing directly concerns the need to increase economic activity of older people both by discouraging them from early withdrawal from the labour market before the statutory retirement age and by delaying the moment of retirement until above the statutory retirement age. This is based on the assumption that working decreases the probability of both social and economic exclusion. In this context increasing labour market participation of the older working-age population is considered a measure of development policy in conditions defined by changes in the age structure and changes on the labour market, such as: population and labour force

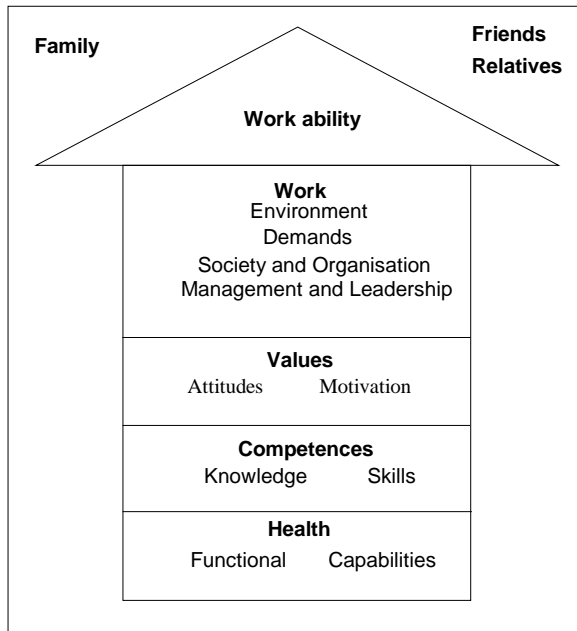
ageing, decreasing number of persons of working age and relatively low economic activity of persons of older working age. The above goal may be reached by retaining the persons in the older working-age groups on the labour market. When planning policies designed to increase older people's labour force participation, it is necessary to analyze the impact of different factors on their employability (understood as acquiring features such as knowledge, skills, opportunities that increase probability of labour market success) and work ability.

The basic recommendation coming from the literature on economic activity of the older working-age population shows that in order to retain older workers on the labour market, special attention should be paid to complex measures aimed at individuals and employers, as well as at institutions and organizations that influence policies regarding older persons. It is also essential to take into account the social context of retirement decisions. This mostly concerns values and attitudes connected with work and older people's work environments. These measures should strengthen and complement each other, in order to create a coherent support structure. Methods used in individual EU countries have so far been rather partial and have not created any comprehensive approach. Hence, in the next section of the paper I present the theoretical framework of a "work ability" concept, as a useful tool for increasing the participation of older working-age people in the labour market. The utility of the work ability concept will be examined using an analytical model describing how determinants of the work ability concept influence probability of work intentions in the longer run. First, however, the determinants of retirement decisions for older working-age population presented in the literature will be discussed. The method described in the theoretical part of the paper will then be applied **to answer the research question of the paper: How do different factors on the individual, workplace and country level influence the probability of work intentions of people in older working-age groups?**

2. Theoretical Framework

2.1. The work ability concept

Changes that have taken place in the work environment have made it necessary to precisely formulate the concept of work ability, which encompasses all basic groups of factors influencing employability of persons at all ages, with a special focus on the older population. Research conducted for recent years has provided such a precise definition of the work ability concept. It is illustrated in the figure 1.

Figure 1. Dimensions of work ability, the house of work ability

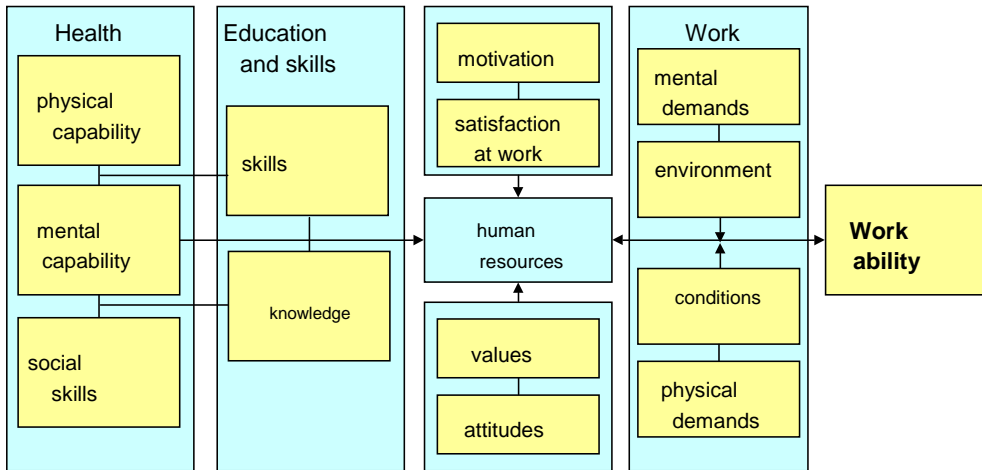
Source: J. Ilmarinen Ageing workers in the European Union – Status and promotion of work ability, employability and employment, Helsinki: Finnish Institute of Occupational Health, Ministry of Social Affairs and Health, Ministry of Labour, 1999.

The dimensions of work ability can be presented as a four-level house. The three lower levels reflect individual potential, whereas the fourth concerns all aspects connected with the work environment. The concept of work ability emphasizes the significance of the balance between work environment and individual potential. Moreover, it is also necessary to incorporate the external environment outside work, such as family, friends and relatives. Other social factors such as: legislation, infrastructure, economy, services etc. create a broader background for an individual's work ability. However, it is worth mentioning that the workplace is the most important aspect of individual work ability, because it links people with the tasks they do.

The basic floor of the house depicted in figure 1 is formed by health and functional capabilities: physical, mental and social. The second floor encompasses competences; whereas the third, values, attitudes and motivations. The role of health and competences has been examined broadly in the literature. The meaning of values, attitudes and motivations, although less known, gains importance in the context of increasing employment rates of older working-age population. The fourth and largest floor of work ability is work environment. Company management is able to organize and conduct activities on this level. Increasing work

demands and constant changes in work organization result in an imbalance between the fourth level and the remaining three. The well-being of an employee depends mostly on the fourth level. The first (health) and the fourth (work environment) levels are most strongly related with work ability. The links between dimensions of work ability are depicted in figure 2.

Figure 2. Relations between dimensions of work ability



Source: Ilmarinen JE., Ageing Workers, Occupational and Environmental Medicine., 2001; 58,456 (August).

In this model, the potential of an individual is interpreted as his/her health and functional capabilities (physical, mental and social); skills and competences as well as values, attitudes and work motivation. When individual potential thus described is confronted with the demands of work (physical and mental), work environment and the management system, the result can be defined as individual work ability. Work ability is a dynamic process, which changes during the individual life course. The basic factor of change is the stepwise ageing process of an individual and its impact on individual human capital. The other changes concern work. Work organization, methods and tools, as well as work intensity, are currently changing much faster than individual adaptive capabilities. For example, implementation of new technologies has been very problematic for ageing workers. Adaptation of workers to new demands remains constant despite higher dynamics of change, which results in older persons being pushed out of the labour market. This fact has been explained incorrectly, by the assertion that the competences of older workers are insufficient, and their experience useless. The main cause was actually uncontrolled changes in work environments, which were not accompanied by appropriate measures adapting human resources to new demands. It is therefore necessary to redefine the range of responsibility of persons in charge

of planning and implementing changes at work. As soon as lacks of human resources become reality, attitudes towards older workers will change. The first step is to identify crucial aspects that need to be adopted to develop and test mechanisms of change in work environments, which will act in favor of older workers. To sum up, complex analysis of economic activity of persons in the older working-age groups in relation to maintaining their work ability should take into account not only individual factors, such as health or competences, but also factors of a social nature, connected with values and attitudes towards older people and their work, and also with the work environment. Therefore, it is necessary to consider the following aspects: individual life course, work environment and role of employers, as well as values, norms and attitudes pertaining to older persons.

2.2. Determinants of work intentions of older working-age population

In this part of the paper, I will briefly present determinants of retirement decisions for older working-age population cited in literature. Due to space limitations I will not elaborate on each determinant.

There are several determinants of retirement decisions, of economic and non-economic nature. The classification below was developed by the author for the purposes of this paper. It is necessary to take into account that in many cases, the determinants are interdependent, with a strong role of legal and institutional factors. The determinants of retirement decisions can be classified as follows:

A. Institutional (direct impact):

- pension system (Blöndal, Scarpetta 1999, Gruber, Wise 1999, Disney, Whitehouse 1999a, Casey et. al. 2003)
- other elements of the social security system:
 - disability allowances (Atkinson, Micklewright, 1991, Ruzik 2004)
 - tax system (Socha, Sztanderska, 2000)
 - coherence of social security systems (Moffit, 1992)
 - escape from risk (understood as instability of employment and work income, which can be compensated with savings or transfers) and level of wealth (Sztanderska, 2008, Costa, 1998, Perek-Białas, Rószkiewicz, 1999)

B. Non-institutional (in the case of which there is no institutional impact or the impact is indirect):

- individual (including family):
 - health and disability issues (Currie, Madrian, 1999, Lumsdaine, Mitchel, 1999, Bound, 1991, Anderson, Burkhauser, 1985)
 - care delivery (Kotowska, Sztanderska, Wóycicka 2007, Kotowska, Wóycicka 2008)
 - human capital (Vlasblom, Nekkers, 2001, Blöndal, Scarpetta 1999, Socha, Sztanderska, 2000)

- socio-cultural and economic:
 - norms and attitudes towards older people and their economic activity (Jóźwiak, Kotowska, Abramowska, 2008, Kotowska, Wójcicka, 2008, Schoenmaeckres, Callens, Vanderleyden, Vidovicova, 2008)
 - workplace environment (Sztanderska 2008, Villosio, 2005, Bohacek, Myck, 2008).

However, there are other classifications of retirement decision determinants. A commonly used division is into push and pull factors. In this classification, the direction of impact is the key. The factor itself can both push out of and pull onto the labour market, depending on its construction or level. For example, a pension system constructed in such a way that it encourages older working age population to stay longer on the labour market is definitely a pull factor. However, in some countries there have been pension systems which facilitate earlier withdrawal from the labour market: in such cases the pension system can be regarded as a push factor. In many cases an individual factor has different directions and strength of influence and should be considered with respect to all dimensions.

3. Work intentions model for older working-age population in the EU – integrated approach

The work ability concept described above forms the theoretical background for the analysis presented in this part of the paper. The utility of the work ability concept will be examined using an analytical model describing how determinants of the work ability concept influence probability of work intentions in the long run. The aim of the model is to compare European countries, also by adding country covariates. The model answers the research question of this study, that is how different factors on the individual, workplace and country level influence the probability of work intentions of people in older working-age groups.

3.1. Data

The data used in the analysis comes from the European Working Conditions Survey (EWCS) undertaken by the European Foundation for the Improvement of Living and Working Conditions. The source is the fourth wave of the survey, carried out in 2005. The total number of interviewed respondents reached almost 30 000 workers aged over 15 from 31 countries: the European Union 27, Norway, Croatia, Switzerland and Turkey. The survey is entirely comparable: the same questionnaire was used in all countries. The data can be used for comparative research, but analysis on the country level is inappropriate due to the small

number of respondents in each country (around 1000). Only employed persons took part in the survey (employees and self employed – according to the Eurostat definition). In each country the sample was drawn on the basis of multi-stage, stratified cluster design with a “random walk” procedure for selection of the respondents at the last stage, with the exception of Belgium, the Netherlands, Sweden and Switzerland, where selection of respondents was done on the basis of a telephone register. All interviews were conducted personally at the respondent’s household.

3.2. The method

The method used in analysis is multilevel logistic regression. The main characteristics and assumptions of multilevel modelling are presented below:

1. Multilevel logistic regression assumptions:

- binary responses y_{ij} depending on:
 - x_{ij} individual-level explicative variable,
 - z_j group-level explicative variable.
- a two-level nested data structure:
 - level 2: N groups ($j = 1, \dots, N$),
 - level 1: n_j individuals ($i = 1, \dots, n_j$) in each group,
 - in each group: responses y_{ij} are correlated.
- the standard logistic regression model is not adequate, because:
 - independence assumption is violated here,
 - inclusion of multiple group-level covariates is impossible.

2. In the analysis, the Laplace method of estimation is used, which is a good approximation of the maximum likelihood method and gives estimation of deviance statistic used to verify the model. However, it is less efficient and slower than the other method, PQL (*penalized quasi likelihood method*). Analyses were done in the R programme (lmer procedure).

3. Estimation equations:

- standard logistic regression model

$$\text{logit}(p_{ij}) = \log\left(\frac{p_{ij}}{1 - p_{ij}}\right) = \alpha + \beta x_{ij}$$

- random logistic regression models

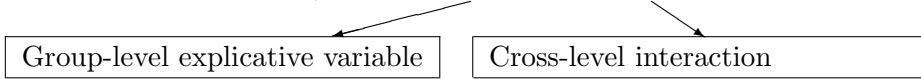
$$\text{logit}(p_{ij}) = \alpha_j + \beta_j x_{ij}$$

Random intercept: $\alpha_j \sim N(\alpha, \sigma_0^2)$

Random slope: $\beta_j \sim N(\beta, \sigma_1^2)$

- extended random logistic regression models

$$\text{logit}(p_{ij}) = \alpha_j + \beta_{1j}x_{ij} + \beta_2z_j + \beta_3x_{ij}z_j$$



4. Advantages of multilevel modelling:

- ability to analyze complex data structures (nested data), in which individuals are not independent;
- correction of standard error underestimation;
- ability to incorporate random effects – when we want to draw conclusions about the population from which individuals are taken, and not about the individuals themselves;
- ability to estimate individual and group-level variation.

Variables and model description

The analysis performed here is restricted to workers aged 45-60 years old in the EU-27. Moreover, research done by Ilmarinen (Ilmarinen, 1999) shows that for maintaining efficiency at work, the most effective measures up to the age of 45 are those aimed at promoting a healthy life style, whereas after 45 complex support is more effective. This encompasses the adaptation of the workplace to the needs of older workers, building good relationships at work, lack of discrimination in access to training, as well as higher quality of management and leadership than for younger workers. That is why the proposed age interval of the analysis seems to be reasonable. The analysis is carried out for men and women separately.

Dependent variable:

- possibility of staying in the same job till the age of 60. The questionnaire question is: *“Do you think you will be able to do the same job you are doing now when you are 60 years old?”*
- coding: 1: possibility of staying in the same job till the age 60
0: no possibility or reluctance to stay in the same job till aged 60.

It should be noted that people over 45 are less mobile in terms of occupation and job changes. In many cases, especially in older working-age groups, leaving a job means permanent withdrawal from the labour market. So, factors determining whether workers aged 45-60 hold the same job in the long run are crucial to their labour market participation.

Independent variables:

Independent variables are listed below by work ability dimension. It is worth underlining that the variables used in the model have an objective character.

Moreover, the character of the variable (individual or country) is indicated in the tables below.

As the aim of this study is to analyze the whole range of factors influencing intentions to stay in the same job, an extended random intercept model was chosen to track the impact of both individual and country covariates.

Table 4. Description of covariates

Work ability dimension	Covariate	Methods of establishing
Health (individual covariate)	Work affecting health*: yes, no	Questionnaire question
Competences** (individual covariate)	Level of education: primary, secondary, tertiary	Questionnaire question
Social background (individual covariate)	Balance between work, and social and family life: exists, does not exist	Questionnaire question
Social background (individual covariate)	Household income source: main, not main, equal with partner	Questionnaire question
Social background (individual covariate)	Partner's labour market status: working, not working, one-person household, other types of households	Questionnaire question

Work environment (individual covariates)	Remuneration groups: deciles 1-4, deciles 5-8, deciles 9-10; Coding due to right positive skew of wages	Questionnaire question
Work environment (individual covariates)	Working time: flexible, fixed by an employer	Questionnaire question
Work environment (individual covariates)	Working time range: part time work, full time work	Questionnaire question
Work environment (individual covariates)	Working time schedule: shift work, standard hours of work	Questionnaire question
Work environment (individual covariates)	Type of contract: permanent contract, fixed-term contract, no contract, self-employed	Questionnaire question
Work environment (individual covariates)	Physical and chemical risk at the workplace: small, medium, big	The questionnaire included several questions connected with conditions at the workplace, measured on a seven-point interval scale (all of time – never). It is assumed that there exist latent variables connected with the intensity of the underlying workplace features that influence answers in the questionnaire. Due to the fact that those variables were of a quasicontinuous nature, it was possible to extract independent factors by means of factor analysis (principal component method) with rotation. The outcome variables (factors) were assumed to be continuous. Three factors were extracted: physical and chemical risk, risk connected

Work environment (individual covariates)	Risk at the workplace connected with lifting, moving loads or repeating tiring movement: small, medium, big	with lifting, moving heavy loads or repeating tiring movements and risk of being infected and of moving people. The last risk is probably connected with jobs involving care services. For further analysis, factors were standardised and divided into groups: (big risk: up to -0.5, madium risk: -0.5 to 0.5, small risk: from 0.5)
Work environment (individual covariates)	Risk of being infected and of moving people at the workplace: small, medium, big	
Work environment (individual covariates)	Work organisation: modern type, traditional type	In the questionnaire there were several questions describing various aspects of work organisation, from which types of work organisation can be extracted. Variables were of a categorical character. The method used to categorise cases was two-step cluster analysis. Two clusters were extracted, which are connected with two types of work organisation: modern, giving more autonomy at work and less intensity, generally in favour of older persons' work, and traditional, with high intensity and a low degree of autonomy at work.
		In the questionnaire there were several questions on incidents of discrimination, harassment and violence at the work place. The studied phenomenon has a latent and discrete character. Incidents of discrimination, harassment or violence either occur or they do not. The method used to categorise cases is latent class analysis (calculations were done in Węziak-Białowolska, Grabowska, 2011). The analysis extracted six classes for further analysis: 1: no

Work environment (individual covariates)	Discrimination, harassment and violence at the workplace: no incidence, incidents occur	incidents of discrimination, harassment or violence at the workplace, 2: subjected at work to sexual discrimination /discrimination linked to gender and to unwanted sexual attention 3: subjected at work to threats of physical violence only, 4: rather not discriminated, 5: subjected to threats of physical violence or to physical violence and harassment because of nationality or ethnic background, 6: discriminated because of nationality or ethnic background only. Due to the fact that further analysis was restricted to workers aged 45-60, it was necessary to join six groups into two: 1, 4 and 2,3,5,6.
Institutional background (country covariate)	Type of pension system: restrictive, medium and non-restrictive	The classification was made on the basis of: statutory retirement age, early retirement possibilities and possibilities of deferring pension age. It refers to the situation at the beginning of 2006 in order to be complementary with the time of survey used in the model (the European Working Condition Survey, from around 2005). However, it has to be kept in mind that this variable is a necessary simplification, because it refers to persons who were retiring in that period. It is impossible to track the individual pension eligibility of all respondents, because it was not included in the survey questionnaire. But the argument for this variable is that the dependent variable concerns work intentions, which are more influenced by perceived mechanisms of the pension systems. Due to the complexity of pension systems and their perception as ambiguous, opinions in this respect are usually based on real cases of retiring persons. Moreover, the analysis concerns workers aged 45-60, to whom pension reforms have rather limited application. For full classification – see annex.
		Data from: Current and prospective theoretical replacement rates report by the Indicators Sub-Group (ISG) of the Social Protection Committee (SPC), May 2006. The analysis used

Institutional background (country covariate)	Theoretical replacement rate	data calculated for 2004. Data for Bulgaria and Romania come from 2006, from the Updates of current and prospective theoretical pension replacement rates 2006-2046 report by the Indicators Sub-Group (ISG) of the Social Protection Committee (SPC), July 2009). Replacement rates for these two countries were calculated according to methodology used for the rest of the EU countries. The current replacement rate was used in the analysis. However, the limitations of this variable have to be kept in mind. In some cases it can be imprecise for persons retiring in coming years due to implementation of new reforms between the time of calculation of the replacement rate and the real time of retirement. However, people usually take into account the present value of such measures in their further work decisions.
Attitudes towards a longer stay on the labour market (country covariate)	Share of working people aged 50-69 planning to work over 65 or as long as possible	Data comes from the Labour Force Survey special module: Transition from work to retirement. This variable is treated as an approximation of the attitudes of older workers towards a longer stay on the labour market. For more details see socio-economic context.

* This is the only question concerning health in the EWCS.

** Variables connected with life-long learning were not included in the model due to a high correlation with education level.

Estimated equations:

Logistic regression models were estimated by the Laplace method. Models have the following notation:

$$\text{logit}(p_{ij}) = \ln \left(\frac{p_{ij}}{1 - p_{ij}} \right) = (\beta_{0j} + \beta_{1j}X_{ij}), \quad (1)$$

where X_{ij} – individual independent variables.

The model demands that β_{0j} coefficient differ by to group and be modeled by the equation (level two):

$$\beta_{0j} = \gamma_{00} + \beta_{2j}Z_j + u_{0j}, \quad (2)$$

where Z_j – country level variables (level two).

Putting equation (2) into equation (1), the random intercept regression model has the following notation:

$$\text{logit}(p_{ij}) = \ln \left(\frac{p_{ij}}{1 - p_{ij}} \right) = \gamma_{00} + \beta_{1j}X_{ij} + \beta_{2j}Z_j + u_{0j}, \quad (3)$$

where: γ_{00} – random intercept, β coefficients – fixed regression parameters.

Model verification:

Interclass correlation coefficient (ICC):

Model variability (computed on the basis of the empty model) due to country of origin (level 2 variability) can be described as a measure of individual independence: men (around 5.6%), women (around 9%). A country of origin does not play a big role in determining work intentions at the same job, especially for men.

If the ICC has such small values, especially for men, the question arises whether it is worth using multilevel modelling? To answer this question a design effect should be taken into account. If its value is over 2, multilevel modelling is reasonable. The design effect is computed according to the following rule:

DEFF (design effect) = $1 + (\text{average group size} - 1) * \text{ICC}$

Men: DEFF = $1 + (34947/27 - 1) * 0.056 = 9.13 > 2$

Women: DEFF = $1 + (4205/27 - 1) * 0.09 = 149 > 2$

Therefore, we can conclude that multilevel modelling brings new information.

Model comparisons: to test the parsimony of modelling, three models have been estimated: an empty model (M0), a model with only individual-level covariates (M1) and a model with both individual and country level covariates (M2).

a) The empty model (M0) – concerns populations of countries, where success probability is constant in each country

Statistics	AIC	logLik	Deviance
Men	5226	-2611	5222
Women	4173	-2085	4169

N: men=3947, women=4205.

b) The model with individual covariates (M1) – as a result of incorporation of individual covariates into the model, success probability is not constant for individuals in one country:

Statistics	AIC	logLik	Deviance
Men	2432	-1172	2344
Women	1979	-945.3	1891

N: men=2000, women=2281.

c) The model with individual and country level covariates (M2):

Statistics	AIC	logLik	Deviance
Men	2430	-1167	2334
Women	1971	-937.3	1875

N: men=2000, women=2281.

According to the AIC² (Akaike Information Criterion), as well as the chi-square³ test based on deviance (for $\alpha=0.05$) the best model for both men and women is M2.

4. Results

The basic results of model estimation are depicted in table 4.

Table 5. Expected and real impact of covariates used in the model on dependent variable

Covariate	Expected influence	Real influence Odds ratio Women	Real influence Odds ratio Men
Age			
46-49	Ref.	Ref.	Ref.
50-54	+	1.43***	1.06
55-60	+	2.26***	1.97***
Education			
primary	Ref.	Ref.	Ref.
secondary	+	1.32	1.54**
tertiary	+	1.89***	1.54*
Household income source			
main	Ref.	Ref.	Ref.

² AIC = $-2 \log \text{Lik} + 2K$, K – number of parameters in the model, The smaller the AIC, the better the model.

³ $\chi^2 = |\text{difference in deviance of both compared models}| \sim \chi^2$ distribution with degrees of freedom = difference in parameters of both compared models. If a statistic is statistically insignificant, the more complicated model is not better.

not main	not clear	1.18	0.78
equal with partner	not clear	1.69**	1.20
Partner's labour market status			
employed	Ref.	Ref.	Ref.
not employed	not clear	0.62**	1.52***
single household	not clear	0.84	1.05
other household type	not clear	0.88	1.70*
Work affecting health			
no	Ref.	Ref.	Ref.
yes	–	0.31***	0.56***
Type of contract			
permanent	Ref.	Ref.	Ref.
fixed-term	–	0.82	0.83
no contract	–	1.41	0.75
self-employment	+	1.07	0.83
Remuneration			
decile 1-4	Ref.	Ref.	Ref.
decile 5-8	+	0.96	1.04
decile 9-10	+	1.57**	1.10
Working time			
fixed by the employer	Ref.	Ref.	Ref.
flexible	+	1.20	1.62***
Working time schedule			
standard hours of work	Ref.	Ref.	Ref.
shift work	–	1.28	0.60***
Balance between work, social and family life			
does not exist	Ref.	Ref.	Ref.
exists	+	0.96	1.52***
Working time range			
part time work	Ref.	Ref.	Ref.
full time work	–	1.22	0.44**
Physical and chemical risk at the workplace			
big	Ref.	Ref.	Ref.
medium	+	1.82	1.08
small	+	1.29	2.09***
Risk at the workplace connected with lifting, moving loads or repeating tiring movement			
big	Ref.	Ref.	Ref.

medium	+	1.89***	1.40**
small	+	2.39***	1.78***
Risk of being infected and of moving people at the workplace			
big	Ref.	Ref.	Ref.
medium	+	1.01	1.70***
small	+	1.08	1.64***
Work organization			
modern type	Ref.	Ref.	Ref.
traditional type	–	0.47***	0.72***
Discrimination, harassment and violence at the workplace			
no incidence	Ref.	Ref.	Ref.
incidents occur	–	0.70	0.56**
Type of pension system			
not restrictive	Ref.	Ref.	Ref.
medium	+	1.39**	0.87
restrictive	+	1.68***	1.43
Theoretical replacement rate	–	0.98***	1.00
Share of working people aged 50-69 planning to work over 65 or as long as possible	+	1.01***	1.01**

Remarks:

1. Control for sector of employment (according to NACE classification) and occupation (according to ISCO classification);
2. Signif. codes: 0.01: '***'; 0.05: '**'; 0.1: '*'.

Source: Own calculations.

There are some differences in the impact of particular factors on probability of staying in the same job in the longer run, in most cases in significance rather than in direction. This is observed for individual, work place and country-level factors.

Age significantly increases the probability of staying longer in the same job, more for women than for men. The direction of influence is intuitive and is connected with younger respondent's uncertainty about the future. The gender difference should be assigned to woman's earlier withdrawal from the labour market.

The significant difference can be observed for educational status. Persons with higher education have higher work intentions in comparison to persons with primary education. However, for men secondary education increases probability to the same degree as tertiary education. Thus for men the disadvantaged group

is low-skilled workers, who leave the labour market earlier. For women, the highest return on education in terms of work intentions is to be observed for the highly educated.

When it comes to family situation, there are important gender differences. For women an unemployed partner – in most cases retired - decreases the probability of working longer in the same job, whereas in the case of men the situation is opposite – if their partner does not work, the probability of working longer in the same job increases. Moreover, having the same income as their partner increases probability of staying in the same job for women. However, this issue should be examined in more details before conclusions are drawn. One can be that highly educated women probably have an income comparable to that of their partner's more often and that is why they tend to work longer. What is surprising is that for men, work - family balance increases probability significantly, whereas in case of women it slightly decreases probability, but not significantly.

When it comes to workplace features, work affecting health decreases work intentions strongly for both sexes, more so for women (around 69%) than for men (44%). This is one of the strongest determinants of work intentions. The type of contract does not differentiate probability of staying longer either for men or for women. Remuneration has an impact on probability only in case of women. Women in remuneration deciles 9 and 10 have a higher probability than women in deciles 1 to 4. It is worth underlining that time schedule matters significantly for men. Flexible working hours increase probability of staying longer at the same job, whereas shift work decreases it. Full-time work also decreases the probability for men.

Also factors directly concerning work conditions have a stronger influence in the case of men. A low level of physical and chemical risk at the workplace increases probability of staying longer at the same job in comparison with high levels of risk. For women, this factor is not significant; neither is the risk of biological contamination, whereas for men low levels of this risk increase probability of work intentions. Work involving a low risk of lifting or moving heavy loads, repeated movements, etc. increases probability of work intentions for men and women, but with a stronger effect for women. The result seems to be quite intuitive due to gender differences in physical capacity.

When it comes to work organisation, the role of modern type work organisation (autonomy at work, low work intensity) should be stressed. People working in more traditional types of work organisation (high intensity and low autonomy) have a significantly lower probability of staying longer at the same job, irrespective of gender. Incidents of discrimination on various grounds seem to have a negative impact only in the case men.

An analysis of country-level covariates gives interesting results. First of all, country-level covariates have a markedly stronger influence on women. The more restrictive the pension system type, the higher the probability of staying longer at the same job for women; such a result was expected. What is interesting is that such a significant impact was not observed in the case of men. An increase in the replacement rate by 1 percentage point decreases probability of working longer in the same job by 2% for women, whereas for men it does not. Plans to work over 65 or as long as possible is the only country-level covariate that is significant for both sexes: with an increase in the share of persons intending to work longer in a country, the probability of staying in a particular job increases. This result is important due to the fact that this last country-level covariate can be interpreted as an approximation of societal attitudes towards a longer stay on the labour market. The lower impact of institutional country-level covariates for men probably results from the fact that the statutory age of withdrawal from the labour market is usually above 60 years, that is above the threshold which was stated in the dependent variable (possibility of staying in the same job up to the age of 60), whereas for women the situation is reversed.

5. Conclusions

Economic activity and employment of older working-age population is still relatively low in many countries of the European Union despite positive changes. The average age of withdrawal from the labour market is below the statutory retirement age in all EU countries, which suggests that there are other determinants of a longer stay on the labour market than just the pension system. The aim of this paper was to analyse the determinants of work intentions in older working-age population within the integrated framework of the work ability concept, paying special attention to factors connected with the work environment.

The analysis of factors that determine whether workers aged 45-60 stay in the same job till the age of 60 revealed that there are gender differences in factors determining work intentions. This is of crucial importance for the planning of policies designed to prevent earlier withdrawal from the labour market. The measures should be directed at workers over the whole of their life course and especially when they are over 45 and still working, because leaving a job at that age is connected with a high risk of earlier withdrawal from the labour market. Generally, when analysing the possibility of staying in the same job till the age of 60, determinants connected with individual and workplace covariates have a larger significance for men than for women. However, country-specific determinants are more important in the case of women than of men. This suggests that the cultural context is crucial for female labour market participation at

older ages. Therefore, particular attention should be paid to norms and attitudes towards older persons working and their intentions connected with the labour market.

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Aktywność ekonomiczna osób w starszym wieku produkcyjnym w Unii Europejskiej

Abstrakt

Kluczową rolę w projektowaniu polityk publicznych nakierowanych na zwiększenie aktywności ekonomicznej osób w starszym wieku produkcyjnym jest zachowanie ich indywidualnej zdolności do pracy (Ilmarinen, 1999), na które wpływ na szereg czynników o różnym charakterze, takich jak: zdrowie, poziom kompetencji, normy i postawy w stosunku do osób starszych i ich pracy, środowisko pracy, itp. Celem opracowania jest analiza wpływu indywidualnych charakterystyk, cech pracy, a także uwarunkowań instytucjonalnych i kontekstu krajowego na zamierzenia dotyczące dalszego wykonywania pracy w starszych grupach wieku produkcyjnego. Do analiz użyto następujących metod: analiza czynnikowa, dwukrokowa analiza klastrowa, analiza klas ukrytych, wielopoziomowa regresja logistyczna. Dane pochodzą z Europejskiego Badania Warunków Pracy z 2005 r. Wyniki analiz wskazują, że charakterystyki indywidualne, cechy miejsca pracy, a także sytuacja na rynku pracy wpływa znacząco na zamierzenia dotyczące dalszego wykonywania pracy w starszym wieku, jednakże w Unii Europejskiej w tym kontekście występują znaczne różnice ze względu na płeć.

Słowa kluczowe: zdolność do pracy, zamierzenia dot. wykonywania pracy, Europejskie Badanie Warunków Pracy, osoby w starszym wieku produkcyjnym.

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6. Annex

Table 6. Types of pension systems in EU-27 in 2006

Pension system	Characteristics of the pension system	Countries
Restrictive	Statutory retirement age for men and women over 65, early retirement impossible or seriously restricted, possibility of deferring retirement over the statutory retirement age (except Ireland)	Denmark, Finland, Sweden, UK, Ireland
Medium	Statutory retirement age around 65, early retirement restricted but possible	Belgium, Netherlands, Luxembourg, Germany, Greece, Spain, Portugal
Not restrictive	Statutory retirement age usually below 65, even lower for women, early retirement possible	France, Austria, Italy, Poland, Czech Republic, Hungary, Lithuania, Latvia, Estonia, Slovenia, Slovakia, Malta, Cyprus, Romania, Bulgaria

Source: Own description based on: Transition from work to retirement, www.europa.eu, 22.12.2008 r.