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## Being Old in the Age of Aging: Macro-Level Determinants of Change in Perception of Old Age Threshold in EU Countries

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**Abstract:**

**Purpose:** The question about the determinants of perception of old age still has not found an unequivocal answer in the literature. Most of the studies so far have concentrated on the analysis of micro factors in selected years. This study attempts to fill this gap by evaluating macro-level variables associated with changes in individual perception of the beginning of old age. Our analysis, which is based on the 2008 and 2018 editions of the European Social Survey, attempts to capture changes in the perception of old age.

**Design/Methodology/Approach:** We have analysed four macro factors, health, socioeconomic, institutional, and the labor market. Among these groups, the socio-economic and labor market factors have the most considerable significance. The change of the real GDP per capita factor explains 13% of the variability of the perception of the old age threshold. Almost all labor market indicators, 55-64 employment rate, 65-69 and 75+ labor force participation rates, have proven to be statistically significant.

**Findings:** The most notable result of this study is the significant role of factors related to the labor market, both concerning the old age perception threshold and the change of this threshold.

**Practical Implications:** The study results provide a strong indication that the situation of the elderly in the labor market is the primary macro determinant of the perception of old age.

**Originality/Value:** The results of our study indicate that the most effective tools of influencing the perception of the onset of old age are provided by labour market policy directed at employment support for people aged 55+, mainly 75+. This is a conclusion important from the point of view of the results of the COVID-19 pandemics, where the people most at risk are the eldest, both for health reasons (highest mortality in this age group), and for an increased risk of job loss, as such people, by having the right to a pension or drawing a pension, will be relatively least impacted financially by the loss of employment.

**Keywords:** Ageing, old age threshold, perception.

**JEL Classification:** I19, J14.

**Paper Type:** Research paper.

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## **1. Introduction**

Every stage of the human life cycle has its characteristics and is interesting from a research perspective. Due to contemporary demographic transition and the process of population aging, the attention of researchers is becoming more and more focused on the last of these stages: old age. Representatives of various areas of science are becoming interested in this issue. New scientific sub-disciplines are appearing more and more clearly, which combine the problems of aging and older adults (gerontology) with other areas, e.g., finance (financial gerontology), engineering (gerontechnology), political science (political gerontology), cultural studies (cultural gerontology), etc. However, the research conducted in these areas encounters a fundamental problem, which is establishing the old age threshold, also called the age parameter of old age. This is the moment when a transfer from adulthood into old age occurs. This moment is widely discussed in the literature. However, it has not yet been established.

There is no standard agreement concerning how the old-age threshold should be established and what important life event it should be connected to. Various criteria, biological, psychological, social, and economic, are used to prove it (López-Otín *et al.*, 2013; Dziechciaż and Filip, 2014). With the natural criterion, old age is connected to physical consequences of the aging process, witnessed by features such as changes in posture, skin texture, hair color, strength, speed, and sensory acuity. In this context, old age commences with the appearance of specific physical attributes of old age.

With the psychological criterion, old age is defined by changes in personality and feelings, attitudes, and emotions. In this context, the ancient period commences with increasing difficulties adapting to new situations, short-term memory deterioration, and a tendency to be more self-centered, conservative, bossy, and worried about health. With the social criterion, old age relates to being a grandmother or a grandfather. At this moment, a web transformation of family relationships occurs, and the roles played in the family change significantly. In this context, old age commences with the birth of grandchildren. With the economic criterion, old age relates to professional deactivation and with wealth decumulation. In this context, old age starts now of labour force withdrawal and retirement.

This article is interested in the subjective perception of the old age threshold. Personal feelings and opinions within this scope are very varied. They may be concurrent with what is commonly considered the old age threshold but may also significantly differ from it in both directions: upwards and downwards. For a teenager, even a forty-year-old person may appear old. In contrast, a middle-aged person may consider old age beginning only after seventy, and for a one-hundred-year-old, someone who is eighty may be regarded as “still rather young” (Leaper, 1995). Therefore, no universally accepted age is considered as starting point of old age. Each individual, based on their situation, creates their imagination of this old age threshold.

However, people who live in a society and are a part of it are not fully independent in formulating their own opinions about old age. Their cognitive autonomy, and therefore a kind of predictability in thinking, is restricted by larger-scale categories. Every society creates and uses some age categories to divide the human life cycle into stages. An individual old age threshold is therefore socially constructed rather than inevitable.

Following social construction perspectives, humans perceive reality through the lens of their culture and experience, assigning specific meanings to their perceptions. Therefore, nobody can observe objective reality separated from the senses and contexts (Gergen, 1985). This demonstrates that no objective old age threshold exists. How it is understood refers to the specifics of the given society at a specific moment in time. It is perceived differently by representatives of different communities. It was differently perceived in the past, and it is differently perceived nowadays. It is not a universal creation, but it may change under the impact of transformations of environmental circumstances (Rychtaříková, 2019).

The article aims to investigate the macro-level predictors of changes in perception of the old age threshold in selected European countries. We will present the variability of these opinions over time and across nations. Then we will connect these changes with transformations in the context of the health situation (life expectancy), institutional conditions (retirement age), professional activities (the labor-force participation rate among the elderly), and socioeconomic status (level and quality of life). We will concentrate on three main issues. First, how the perception of the old age threshold is shaped in European countries? We will attempt to present the variability of opinions across countries. Second, how does the perception of the old age threshold change over time? We will try to explain the dynamic of the change in these opinions. Third, what dictates the changes in the perception of the old age threshold? We will try to examine how environmental conditions impact subjective feelings, both over time and across countries.

## **2. Literature Review**

Perception of the old age threshold is a complex and multidimensional construct. To some extent, this perception results from the unique characteristics and experiences of a given person. Individual features, such as personality, beliefs, or health, shape thinking about when old age begins. Moreover, micro-level variables related to personal characteristics such as gender or age also impact perception. They cause individual feelings to be like a certain degree in specific population segments and different from other segments. The way of perceiving old age threshold is also influenced by macro-level variables related to the general context, which creates an overall climate for understanding matters in a certain way. As a result, opinions in specific societies (countries) are similar and different to those in other cultures (countries). Since the conditions of the macro-environment undergo continuous transformations, the perception in specific societies may also change.

According to Ayalon *et al.* (2014), “differentiating between macro-and micro-level predictors provides information on how much of the variability in people’s age categorization is due to broader socio-cultural effects, and how much can be attributed to individual differences among people. This reflects a long tradition in the social sciences seeking to explain categorization by either macro (e.g., social identity theory) or micro-level variables (e.g., authoritarian personality style). It also reflects a debate between two competing life course theories concerning the way life courses are organized. Whereas the institutionalization approach argues that opportunities and constraints imposed by the state determine the life course development (i.e., macro-level effect), the individualization approach argues that norms and expectations have a reduced effect on the life course, which is nowadays primarily determined by individual choices (i.e., micro-level effects)”.

On the micro-level, subjective perception of the old age threshold is shaped by various personal characteristics. The results of earlier studies indicate age, gender, and socioeconomic status here, among other factors. Concerning age-related differences, older people tend to perceive old age as starting later than younger people do (Tuckman and Lorge, 1953; Cameron, 1969; Drevenstedt, 1976; Kuper and Marmot, 2003; Barrett and Von Rohr, 2008; Taylor *et al.*, 2009). Therefore, it can be presumed that the way of perceiving the old age threshold changes across the life span (Chopik *et al.*, 2018). In effect, as people get older, they tend to put off the moment in time at which old age begins. This phenomenon is associated with an age-group dissociation effect (Weiss and Lang, 2012; Weiss and Kornadt, 2018). The point is that today, identifying with old age carries a significant stigma. This is because modernization processes (technological progress, urbanization) tend to decrease the power and status of people in old age (Shanas, 1973).

Additionally, the view of the structural dependency of the elderly has become widely established due to a common belief in their infirmity and illness (Townsend, 1981). As a result, as adults get older, they view themselves as becoming part of a group about which they have held negative attitudes. To avoid stigma and improve subjective well-being, they adopt various techniques to create psychological distance between themselves and the old-aged group. On the one hand, they enhance this distance by identifying with younger age groups. In the case of adults and the elderly, self-perceived age (called “cognitive age” or “subjective age”) is usually lower than their chronological age (Barak and Schiffman, 1981; Kleinspehn-Ammerlahn, Kotter-Grühn, and Smith, 2008; Taylor *et al.*, 2009; Chopik *et al.*, 2018). It means that most people feel younger than they are numerically after early adulthood, and this discrepancy increases with age (Kleinspehn-Ammerlahn, Kotter-Grühn, and Smith, 2008; Chopik *et al.*, 2018).

On the other hand, they enhance distance by retarding the onset of old age. As people get older, they tend to mentally prolongate the midlife period to identify as a part of a younger age group for a longer time. It is a kind of defensive denial by which they disassociate themselves from becoming “old” (Montepare and Lachman, 1989).

When considering gender-related differences, women report a significantly older age as the date for the onset of old age than men (Drevenstedt, 1976; Kuper and Marmot, 2003; Barrett and Von Rohr, 2008; Taylor *et al.*, 2009). This may be related to the fact that women perceive that they suffer more discrimination due to advanced age and therefore demonstrate a higher level of aging anxiety. On the other hand, the old age threshold is viewed as occurring earlier for women than men. Such a difference might be related to different social calendars for each gender. Deadlines for normative transition into old age (such as retirement or widowhood) appear earlier for women than for men.

Socioeconomic status (SES) is also a factor, people with a lower status often believe that old age starts earlier (Peters, 1971; Kuper and Marmot, 2003). This may be related to certain objective premises, such as earlier life course transition and shorter life expectancy, as well as the psychological consequences of occupying a disadvantaged position in a highly economically stratified society (Barrett 2003). People of a higher status, in general, go through various life-course stages later (they commence work later, they enter marriages, bear children, retire later, etc.), and thus postpone the onset of all life stages, including old age. Besides, they are also characterized by better health and longer life expectancy, related to a later old age threshold.

Many studies conducted so far indicate how individuals within countries differ concerning the perception of the old age threshold. Relatively few studies have been devoted to differences on an international level. So far, only a few survey studies have been conducted in this regard. However, little attention is being paid to macro-level determinants, which are related to differences across countries.

Eurobarometer (2012) conducted a survey study in 27 EU countries on a total sample of 26,723 respondents. One of the questions concerned the subjective perception of the old age threshold. It was worded as follows: “In your opinion, thinking about the age when one starts to be regarded as “old,” At what age would you say that happens?” The average was 63.9 years, however, with relatively significant differences between individual countries. The highest results were noted in the Netherlands (70.4), Cyprus (68.5), Belgium and Portugal (67.9 in both countries), and the lowest in Slovakia (57.7), Hungary (58), and Czechia (59.5).

In 2018 IPSOS (Boyon and Jackson, 2019) conducted a survey in 30 countries around the world on a sample of 18,262 respondents in the age range of 16-64 years. The question was: “At what age do you think people can be considered old?”. The average for all respondents was 66 years, with significant differences between individual countries. The lowest results were noted in Saudi Arabia (55), Malaysia (56), and Russia (61), the highest in Spain (74), Chile (71), and Argentina (70). The perception of the old age threshold has appeared three times in European Social Surveys, twice in the “Timing of life” module in round 3 (2006) and round 9. The question was worded: “At what age, approximately, would you say women/men reach old age?” It was also asked once in the “Experiences and Expressions of Ageism” module in round

4 (2008). The question was worded: "At what age do you think people generally start being described as old?" The results of these studies will be discussed later.

Based on data from the European Social Survey (round 4), Ayalon *et al.* (2014) evaluated both micro-and macro-level variables associated with the perception of, among other things, the old age threshold. They found that only 5.7% of the variance related to the perception of the old age threshold had been accounted for by macro-level variability. The main conclusion they made is that "individual differences in the perception of (...) the beginning of old age (...) are more pronounced than contextual differences".

### **3. Research Methodology**

We base our analysis on the fourth (the year 2008) and ninth (the year 2018) round of the European Social Survey (ESS: <http://www.europeansocialsurvey.org/>). The ESS is an academically driven cross-national survey that has been conducted across Europe since its establishment in 2001. Every two years, face-to-face interviews are conducted with newly selected, cross-sectional samples. One of the main advantages of the ESS concerns the vigorous attempts to ensure equality or equivalence in sampling and translation of questionnaires to allow for cross-national comparisons.

The studies have considered 8 to 24 countries, depending on whether data on a given indicator is available for the country in question. The number of answers in the surveys amounted to N=48,258 and N=42,194, respectively, for 2008 and 2018. In the study of the change dynamics, 22 countries for which solutions were obtained to a question asked in both surveys were considered.

#### **3.1 Dependent Variables**

The study distinguished three dependent variables. The first is the average result for the given country answering the question from round four of ESS (2008): "At what age do you think people generally start being described as old?" The second dependent variable is the average result for the given country, answering the question from round nine of ESS (2019): "At what age, approximately, would you say woman/men reach old age?" Additionally, a third dependent variable was created, the difference of average answers to those two questions.

#### **3.2 Independent Variables**

To grasp the contextual differences between countries, relevant country-level variables were collected independently from the European Social Survey data. All evaluated variables were divided into four groups: (1) health, (2) socioeconomic, (3) institutional, and (4) labour market related.

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(1) Health improvement is directly related to an increased life expectancy, which implies consequences to understanding and perceiving the old age threshold (Denton and Spencer, 2002). It seems natural that along with the extension of lifespan, its stages also extend, deferring the moments of transitioning from one location to another. Moreover, at the micro-level, it was indicated that health status is one factor that impacts the perception of the old age threshold. Kuper and Marmot (2003) found that people with excellent self-rated health reported middle age to end two years later than people with poor or fair self-rated health.

Consequently, one might then suspect that macro-level health status indicators are also associated with the perception of the old age threshold. In this group of factors, we consider, life expectancy at birth, life expectancy at the age of 65, the expected number of years in Retirement for men, and the expected number of years in Retirement for women. Data in this section come from two sources: the World Population Prospects (United Nations Department of Economic and Social Affairs, Population Division 2019) and the OECD Statistics database.

(2) Similar, to the case of socioeconomic status at the micro-level, it is expected that macro-level indicators of socioeconomic status are also associated with the perception of the old age threshold. Here we consider both the standard of living measured in terms of GDP per capita and the quality of life measured with the HDI indicator. One may suspect that the higher the standard and quality of life, the later the onset of old age. Data in this section come from the World Bank.

(3) Retirement legislation dramatically impacts the perception of the old age threshold in society (Leaper, 1995). The retirement age, to some degree, has become an arbitrary benchmark that defines the moment at which old period commences. One might then suspect that when the age of retirement changes, the perception of the old age threshold would also change. Data in this section come from the internet website Trading Economics ([www.tradingeconomics.com](http://www.tradingeconomics.com)).

(4) Currently, the retirement age may impact professional status but does not have to. It seems that beyond the legal circumstances (pension eligibility), the level of professional activity among people in higher age categories has also to be considered. The perception of old age may be impacted by whether someone is still an employee after retiring or becomes a retiree. According to Blau (1956), "Analysis revealed that of the two major changes in social status that commonly occur in old age — Retirement and widowhood — only Retirement appears to hasten the onset of old age. (...)”.

Retirement implies a social judgment that the person has become old. Besides, Retirement has serious consequences for age identification because it removes the individual from an influential peer group". One might then suspect that the more frequently people in higher age categories are active on the labor market, the more

likely the conviction that old age starts later. Data in this section come from OECD Statistics.

### 3.3 Analysis

The goal of the analysis is to assess the impact of macro-level factors on the change of perception of old age threshold in selected European countries. The old-age threshold perception indicator at the macro-level was established by assigning an average value at which respondents assess the old age threshold from a given country to each country included in the Analysis. An ANOVA test confirmed significant differentiation between the countries concerning the old age perception threshold. Analysis of dependencies between the declared old age threshold and the assumed macro-level factors was conducted by the multiple regression (MR) method.

The model's assumptions were tested by analysing diagrams of standardized residuals compared to the anticipated values. Since the model's beliefs were not met for all factors, it was decided to construct a model for each group of factors separately. In the event multicollinearity occurred ( $VIF > 10$ ), the linear combination variable was removed from the model. The model did not consider the factors related to the labour market since data on the employment rate for people aged 70+ were only available in 9 of the countries subjected to the Analysis. That is why in the case of this group of factors, it was decided to use the Spearman correlation method. Analysis was conducted using Statistica 13.3.

## 4. Results

*Comparison of ESS Surveys Results:* Perception of the old age threshold changes across countries (Table 1). In 2008 in the group of examined nations ( $n=22$ ), the average age specified by respondents as the threshold for the onset of old age amounted to 63.3 years. The highest values were noted in Cyprus (66.9), Switzerland (66.2) and Portugal (65.7), and the lowest in the United Kingdom (60.4), Croatia (60.7) and Czechia (60.9). Ten years later, in 2018, the average age specified by respondents as the threshold for the onset of old age amounted to 68.5. The highest values were noted then in Latvia (72.3), Ireland (72.2), and Cyprus (72), and the lowest in Croatia (61.6), Hungary (64.2), and Czechia (65.6).

**Table 1.** *Changes in the perception of the old age threshold according to countries (those countries for which data from both 2008 and 2018 were obtained were included)*

country	2008						2018						Diff. M
	M	min.	max.	Q1	Q3	SD	M	min.	max.	Q1	Q3	SD	
<b>The entire sample</b>	<b>63.3</b>	<b>40</b>	<b>100</b>	<b>60</b>	<b>70</b>	<b>9.92</b>	<b>68.5</b>	<b>40</b>	<b>100</b>	<b>64</b>	<b>75</b>	<b>8.59</b>	<b>5.2</b>
Croatia	60.7	40	90	55	65	8.86	61.6	40	99	60	65	7.53	<b>0.9</b>
Slovenia	64.2	40	100	60	70	10.49	65.9	40	100	60	70	8.94	<b>1.7</b>



Poland	64	40	100	60	70	9.79	66.2	40	90	60	70	7.43	<b>2.2</b>
Hungary	61.8	40	90	60	70	8.16	64.2	40	98	60	70	6.92	<b>2.4</b>
Bulgaria	63.6	40	90	60	70	8.82	66.2	40	95	60	70	8.3	<b>2.6</b>
Spain	64.4	40	99	60	70	10.5	67.4	40	90	65	70	6.8	<b>3</b>
Switzerland	66.2	40	100	60	70	10.08	69.4	40	100	65	75	9.16	<b>3.2</b>
Slovakia	61.8	40	100	56	70	8.86	65.8	40	100	60	70	8.39	<b>4</b>
Germany	61.9	40	100	55	70	10.07	66	40	100	60	70	8.83	<b>4.1</b>
Czechia	60.9	40	100	55	70	9.07	65.6	40	100	60	70	8.22	<b>4.7</b>
Estonia	61.7	40	100	55	70	10.1	66.4	40	100	60	70	8.7	<b>4.7</b>
Belgium	65	40	100	60	70	10.83	70.1	40	99	65	75	8.12	<b>5.1</b>
Cyprus	66.9	40	90	60	70	6.53	72	47	100	67	80	7.91	<b>5.1</b>
Portugal	65.7	40	100	60	70	8.42	71.6	40	100	65	78	8.08	<b>5.9</b>
France	64.4	40	100	60	70	11.05	70.7	40	100	65	80	9.43	<b>6.3</b>
Sweden	62.8	40	100	55	70	10.31	69.6	40	100	65	75	8.16	<b>6.8</b>
Finland	62	40	100	55	70	9.48	68.9	40	100	65	75	7.86	<b>6.9</b>
Norway	62.9	40	90	60	70	9.54	69.9	40	100	65	75	7.07	<b>7</b>
Netherlands	63.9	40	93	60	70	10.77	71.7	45	92	70	75	6.23	<b>7.8</b>
Ireland	63.7	40	100	60	70	10.99	72.2	40	100	70	80	7.67	<b>8.5</b>
Latvia	63.4	40	100	60	70	9.94	72.3	40	100	65	80	10.04	<b>8.9</b>
United Kingdom	60.4	40	100	50	70	10.28	70.2	40	100	65	75	7.95	<b>9.8</b>

*Note:* Data for the year 2008: ESS4e04.5\_F; AGDCOLD variable (56,752 cases); a code of 0 was assigned to variable values of <40 and >100; for the year 2018: ESS9e02.0\_F1; AGEAGE variable (47,086 cases); a code of 0 was assigned to variable values of <40 and >100, M Mean, SD Standard Deviation

*Source:* Own elaboration of on-line ESS data.

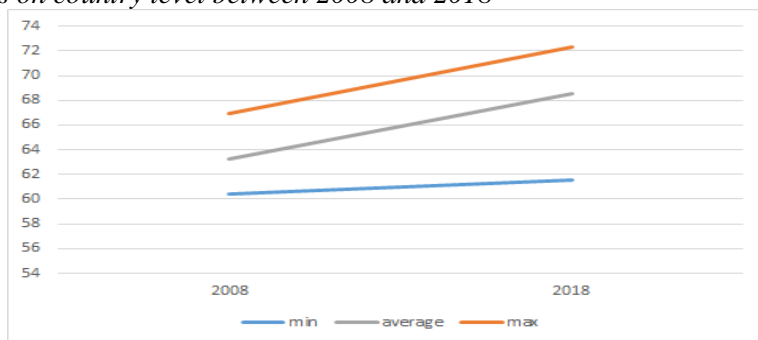
Perception of the old age threshold also changes across time (Table 1). Over ten years, the old age threshold increased in all examined countries by more than five years on average. The highest increase occurred in the United Kingdom (9.8), Latvia (8.9), and Ireland (8.5), and the lowest in Croatia (0.9), Slovenia (1.7), and Poland (2.2). Our research will establish what factors impacted this change and caused the increase to be relatively high in some countries and relatively low in others.

The average standard deviation for all examined countries amounted to 9.92 in 2008, and it fell to 8.59 in 2018. The decrease occurred in all countries, apart from Cyprus (an increase from 6.53 to 7.91) and Latvia (from 9.94 to 10.04). Because the interquartile range has a similar value in both these periods (in 2008: Q3-Q1=10 years; in 2018: Q3-Q1=11 years), it may be inferred that changes to the perception of the old age threshold occurred mainly for the lowest indications (no more than Q1) and the highest indications (above Q3). This means that the perception of old age became more convergent. The distance between those who declared extremely low and extremely high values for the old age threshold decreased.

Whereas the convergence of the perception of the old age threshold increased within the examined countries, a reverse process occurred between these countries. In 2008 the range between the highest and the lowest values of the average old-age perception threshold between the countries amounted to 6.5 years. In 2018 this range increased to 10.7. Thus, the diversification between the examined nations increased within ten years (Figure 1). This result is odd from the perspective of the occurring

socioeconomic convergence and thus the expected unification of attitudes and opinions. Meanwhile, it turns out that a reverse phenomenon is occurring about the perception of the old age threshold, countries, instead of becoming more alike, are becoming even more differentiated. This conclusion results from an unequal increase in the perception of the old age threshold.

**Figure 1.** A change of the minimum, average, and maximum old age perception thresholds on country level between 2008 and 2018



*Source:* Own elaboration of on-line ESS data.

*Changes of macro-level factors:* Assuming life expectancy to be an objective indicator of population health, it may be established that health improved in all studied countries in the examined period. Life expectancy at birth (LE(0)) extended by an average of 2.2 years (SD=0.82). As presented in Table 2, the highest progress in this area occurred in Estonia (4.68), Lithuania (3.77), and Latvia (3.5), the relatively lowest in Austria (1.22), Germany (1.37), and UK (1.46). The case is similar for the extension of life expectancy from the age, commonly assigned to be the old age threshold, that is, 65 years old (LE(65)). This period extended in all examined countries by an average of 1.32 years (SD=0.38), by the most in Lithuania (2.34), Estonia (2.08) and Latvia (1.76), and by the least in Austria (0.61), France (0.95) and Bulgaria (0.97). Generally, higher growth in LE was noted in the countries of Central and Eastern Europe (the "new EU" countries) than in Western Europe, which may be related to the "low base" effect and "catch-up" of average EU indicators by new member countries as part of the demographic convergence process.

**Table 2.** Health factors in examined countries in 2008 and 2018

Country	Health variables							
	LE (0)		LE (65)		LE (retirement), men		LE (retirement), women	
	2005-2010	2015-2020	2005-2010	2015-2020	2008	2018	2008	2018
Austria	80.14	81.36	19.23	19.84	22.9	19.3	27.3	25
Belgium	79.58	81.39	18.98	20.14	21	21.1	25.5	25.5
Bulgaria	73.13	74.85	15.09	16.06	..	..	..	..
Croatia	76.09	78.25	16.22	17.48	..	..	..	..
Cyprus	78.96	80.75	17.23	18.5	..	..	..	..
Czechia	76.98	79.16	16.89	18.14	16.7	17.7	23.6	22.8
Denmark	78.59	80.68	17.97	19.3	17.3	17.8	21.5	22.7
Estonia	73.77	78.45	16.53	18.61	12.9	15.4	19	20.1

Finland	79.55	81.65	19.23	20.39	19.7	19.1	24.7	23.5
France	80.96	82.46	20.51	21.46	22.7	22.7	27.3	26.9
Germany	79.74	81.11	18.86	19.87	20	19.1	24.5	22.5
Hungary	73.74	76.65	15.94	17.23	16.9	15.9	22.8	22.9
Ireland	79.69	82.05	18.6	20.32	17.1	18.7	20.3	22.2
Latvia	71.55	75.05	15.61	17.37	13	13.9	19.6	19.7
Lithuania	71.86	75.63	15.73	18.07	14.1	15.1	22.6	22.1
Netherlands	80.18	82.06	18.84	20.05	18.7	18.6	23.7	23.4
Norway	80.61	82.18	19.26	20.28	17.4	18	21.4	22.5
Poland	75.56	78.46	17.01	18.75	17.1	17.8	24.7	24.3
Portugal	79.29	81.76	18.79	20.34	15.7	15.7	20.2	21.6
Slovakia	74.77	77.31	15.89	17.41	17.5	17.8	25.6	23.4
Slovenia	78.55	81.08	18.26	19.62	18.8	19	26.8	25.6
Spain	81.22	83.36	19.97	21.38	20.5	21.7	23.7	26.6
Sweden	81.07	82.57	19.4	20.45	17.3	18	22.4	21.3
Switzerland	81.78	83.56	20.3	21.36	17.4	18.8	22.4	22.6
United Kingdom	79.69	81.15	18.85	19.85	18.4	18.9	22.8	22.2

**Source:** Own elaboration of on-line UN and OECD data.

As far as the expected number of years in retirement is concerned, in this case, the value depends on the one hand on life expectancy, and the other hand, on retirement age. In the case of men, this value on average for all examined countries slightly increased by 0.28, albeit with a high standard deviation (1.12). In the case of women, it fell somewhat by 0.12, also with a significant standard deviation. The expected number of years in retirement increased most in Estonia for men (2.5 years) and Spain for women (2.9 years). It decreased most in Austria, both for men (by 3.6 years) and women (by 2.3 years).

**Table 3.** Socio-economic factors in examined countries in 2008 and 2018

Country	Socio-economic variables			
	HDI		GDP per capita	
	2008	2018	2008	2018
Austria	0.884	0.914	36280	37800
Belgium	0.899	0.919	33640	35580
Bulgaria	0.771	0.816	5140	6550
Croatia	0.805	0.837	11470	11990
Cyprus	0.852	0.873	24680	24120
Czechia	0.854	0.891	15500	17980
Denmark	0.909	0.93	45700	48530
Estonia	0.841	0.882	12640	15070
Finland	0.904	0.925	37330	36900
France	0.869	0.891	31310	32860
Germany	0.916	0.939	32320	35720
Hungary	0.818	0.845	10510	12680
Ireland	0.9	0.942	38600	57780
Latvia	0.821	0.854	10010	12180
Lithuania	0.831	0.869	10130	13390
Netherlands	0.906	0.934	39810	41450
Norway	0.938	0.954	68610	69560
Poland	0.824	0.872	8910	12420
Portugal	0.814	0.85	17260	18190
Slovakia	0.822	0.857	12600	15520
Slovenia	0.878	0.902	19190	20220
Spain	0.856	0.893	24200	24910

Sweden	0.901	0.937	40100	43760
Switzerland	0.917	0.946	56940	59870
United Kingdom	0.896	0.92	30940	32640

*Source:* Own elaboration of on-line World Bank data.

Concerning the socioeconomic situation presented in Table 3, considering the HDI indicator, which is assumed to be the quality of life in the examined period, progress was noted in all studied countries on average by 0.03 (SD=0.01). The most significant improvement occurred in Poland (0.05), Bulgaria (0.04), and Ireland (0.04), and the lowest in Norway (0.02), Belgium (0.02), and Finland (0.02). This difference may result from a relatively low base in countries with a high increase and limited space for improvement in countries with an eager gain. Considering the standard of living measured by GDP per capita, two examined countries (Cyprus and Finland) noted a regress. This indicator decreased thereby, respectively, 560 and 430 dollars. The average increase in all studied countries amounted to 2554 dollars, with the highest noted in Ireland (19,180), Sweden (3,660), and Poland (3,510).

The financial crisis of 2007-09 forced consolidation of public finances and a reform of the social security system. In the years 2011-13, many European countries decided to increase the retirement age (Beetsma *et al.*, 2020). However, the later period of relative prosperity in many cases brought a change in this decision. In the light of improvement of the economic and financial situations, it was decided to either roll back the reform and return to the previous retirement age (such a situation occurred in Poland) or to ease off and reduce the speed at which a previously established ceiling is to be reached (such a situation occurred in the Netherlands). As shown in Table 4, in 10 years, the retirement age for men increased by most in France (by two years), Slovenia (2 years), Netherlands (1.67) and Czechia (1.66 years), and for women in the UK (5 years), Czechia (3.34 years) and Estonia (2.5 years).

**Table 4.** Institutional factors in examined countries in 2008 and 2018

Country	Institutional variables			
	Retirement age (men)		Retirement age (women)	
	2008	2018	2008	2018
Austria	65	65	60	60
Belgium	65	65	64	65
Bulgaria	63	64.08	59.5	61.17
Croatia	65	65	60	62
Cyprus	65	65	65	65
Czechia	61.67	63.33	59.33	62.67
Denmark	65	65	65	65
Estonia	63	63.5	60.5	63.5
Finland	63	63	63	63
France	60	62	60	62
Germany	65	65.75	65	65.75
Hungary	62	63.5	61	63.5
Ireland	65	66	65	66
Latvia	62	63.25	61.5	63.25
Lithuania	62.5	63.67	60	62.33
Netherlands	65	66.67	65	66.67

Norway	62	62	62	62
Poland	65	65	60	60
Portugal	65	66.42	65	66.42
Slovakia	62	62.42	62	62.42
Slovenia	58	60	58	59.67
Spain	65	65.83	65	65.83
Sweden	61	61	61	61
Switzerland	65	65	64	64
United Kingdom	65	65	60	65

*Source: Own elaboration of on-line data from Trading Economics.*

The professional situation of people in near-retirement age and older dynamically changes over this period. As shown in Table 5, the employment rate for 55-64 increased in all examined countries. The average increase amounted to almost 12 percentage points. The highest increase was noted in Hungary (by 23.5 pp), Germany (17.7 pp), and Netherlands (by 17.7 pp), and the lowest in Norway (by 2.8 pp), Croatia (by 5.7 pp), and Cyprus (by 6.1 pp). Concerning the labour market situation of people in the highest age categories, it is wildly varied between individual countries. Labour force participation of people aged 65-69 and 70-74 decreased in three of the examined nations, most in Portugal, and (even though by much less) in Latvia and Slovenia. The most significant increase was noted in Estonia, Germany, and Lithuania.

**Table 5. Labour market related factors in examined countries in 2008 and 2018**

Country	Variables related to labour market							
	Employment rate, age group 55-64		Labour force, participation rate (65-69)		Labour force rate (70-74)		Labour force participation rate (75+)	
	2008	2018	2008	2018	2008	2018	2008	2018
	%	%	%	%	%	%	%	%
Austria	38.8	54.0	7.83	9.53	5.43	5.59	2.10	1.97
Belgium	34.5	50.3	3.65	5.34	1.63	2.48	..	..
Bulgaria	46.0	60.7	..	..	..	..	..	..
Croatia	37.1	42.8	..	..	..	..	..	..
Cyprus	54.8	60.9	..	..	..	..	..	..
Czechia	47.6	65.1	9.53	14.09	3.90	6.78	1.18	1.63
Denmark	56.0	69.2	14.16	21.29	6.17	7.24	..	..
Estonia	62.3	68.9	24.90	34.72	10.01	17.13	..	..
Finland	56.5	65.4	9.84	14.40	4.23	7.43	..	..
France	38.2	52.3	3.81	6.72	1.11	2.94	0.36	0.61
Germany	53.7	71.4	7.68	17.13	3.66	7.71	1.08	..
Hungary	30.9	54.4	4.76	6.94	1.59	3.78	..	..
Ireland	53.8	60.4	18.21	22.30	7.89	9.45	..	..
Latvia	59.1	65.4	27.03	25.39	12.93	10.75	..	..
Lithuania	53.0	68.5	14.12	22.33	3.92	7.82	..	..
Netherlands	50.0	67.7	10.75	17.83	4.44	7.43	1.34	1.81
Norway	69.2	72.0	24.45	29.73	6.19	7.03	..	..
Poland	31.6	48.9	9.37	10.58	4.89	4.92	1.85	..
Portugal	50.7	59.2	26.27	19.79	19.58	12.88	11.33	6.07
Slovakia	39.2	54.2	3.69	8.09	1.32	3.43	0.30	0.44
Slovenia	32.8	47.0	8.95	8.56	7.81	4.64	..	..
Spain	45.5	52.2	6.19	6.44	1.51	1.60	0.37	0.31
Sweden	70.1	78.0	17.16	24.09	6.06	10.76	..	..
Switzerland	..	72.6	18.81	23.10	9.72	14.05	..	..
UK	58.0	65.3	17.07	21.70	6.56	10.76	1.71	3.25

*Source: Own elaboration of on-line from OECD data.*

Determination of differences in the change of perception overtime of the old age threshold across countries. Differences in the perception of the old age threshold presented in Table 1 were explained using macro factors grouped into four sets, health, socioeconomic, institutional, and labour market-related factors. The results of multiple regression analysis of the indicators from the three first groups were presented in Table 6, and the effects of rank correlation of the last group's factors were provided in Table 7.

**Table 6.** Analysis of the perception of the old age threshold and its changes in the 2008-2018 period on a macro level

	2008		2018		Change 2008-2018	
Predictors	Beta (SE)	R <sup>2</sup> (SEE)	Beta (SE)	R <sup>2</sup> (SEE)	Beta (SE)	R <sup>2</sup> (SEE)
<b>Health factors</b>						
life expectancy at 65	0.76* (0.40)	0.25 (1.55) Adj R <sup>2</sup> 0.05 (1.55)	0.86* (0.35)	0.32 (2.38) Adj R <sup>2</sup> 0.15 (2.38)	0.03 (0.33)	0.23 (2.64) Adj R <sup>2</sup>
percentage of people aged 65	-0.059 (0.23)		-0.19 (0.22)		0.03 (0.28)	
expected number of years in retirement for men	-0.54 (0.23)		-0.63 (0.57)		0.18 (0.35)	
expected number of years in retirement for women	0.25 (0.50)		0.00 (0.42)		0.09 (0.31)	
<b>Socio-economic factors</b>						
GDP	0.83* (0.48)	0.14 (1.71) Adj R <sup>2</sup> 0.05	0.55 (0.43)	0.21 (2.75) Adj R <sup>2</sup> 0.14	0.43* (0.22)	0.21 (2.31) Adj R <sup>2</sup> 0.13
HDI	-0.64 (0.48)		-0.10 (0.43)		-0.40 (0.22)	
<b>Institutional factors</b>						
Retirement age for men	-0.26 (0.34)	0.28 (1.55) Adj R <sup>2</sup> 0.22	-0.056 (0.28)	0.11 (2.92) Adj R <sup>2</sup> 0.03	-0.10 (0.24)	0.04 (2.55)
Retirement age for women	0.68** (0.25)		0.37 (0.28)		0.21 (0.24)	--

**Note:** \* $p < 0.10$ , \*\* $p < 0.05$

**Source:** Own calculations.

**Table 7.** Analysis of the old age perception threshold and its changes in the 2008-2018 period at a macro level, considering factors related to the labour market

	N	2008	N	2018	N	and 2008	2008-2018
55-64 employment rate	22	-0.17 (-0.77)	24	0.25 (1.22)	21	0.72** 4.56	-0.32 -1.46
65-69 labour force participation rate	20	0.01 (0.03)	21	0.35 (1.66)	19	0.50** 2.39	0.28 1.22
70-74 labour force participation rate	20	0.14 (0.59)	21	0.36 (1.67)	19	0.31 1.35	0.16 0.66
75+ labour force participation rate	9	0.13 0.33	8	0.57* 2.25	7	0.21 1.35	0.71* 2.28

**Source:** Own calculations.

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The interpretation only included those factors, the share of which is statistically significant. Therefore, assessing the degree of explanation of the dependent variable's variance was based on an adjusted  $R^2$  value.

Among all the included variables in this group, the change in the perception of the old age threshold is explained only by the life expectancy at 65 indicators. It may be assumed that in 2008 this indicator "was responsible" for 5% of the change in the perception of the old age threshold, and in 2018 for 15%. The higher the life expectancy at 65 in the country in question in 2008, the higher the old age perception threshold increase during the next decade. The change of life expectancy at 65 did not appear to influence the increase of the perception of the old age threshold, probably because it was tiny. From the two variables included in this group, the only GDP per capita explains a change of perception of the old age threshold. Just as in the previous case, the role of this indicator increased from 5% in 2008 to 14% in 2018. Just as in the last point, the higher increase of the old age perception threshold was connected to the higher level of GDP per capita in 2008 and 2018. As a result, the rise in GDP per capita was also significant this time, which is "responsible" for 13% of the old age perception threshold change in the group of included countries.

In this group, only women's retirement age in 2008 can explain 22% of the change at the old age perception threshold. Neither the value of this indicator nor its transformation in 2018 had a statistically significant relationship with the dependent variable. That means that the higher retirement age for women in 2008 was correlated with a higher chance of perceiving the old age threshold. Since higher retirement age is related to the need to work longer, this result is directly connected with the effects observed in the last group of factors — related to the labour market. The collected data indicate that the situation in the labour market in 2008, as presented by indicators in table 3, did not impact the value of the old age perception threshold at this time. High positive correlation of the 55-65 employment rate and the 65-69 labour force participation rate indicator in 2008 with the change of perception of old age (respectively 0.72 and 0.50) suggest that a higher level of these two indicators had a connection with a higher level of the old age perception threshold in the next decade.

A correlation was also observed between the change of the 75+ labour force participation rate and the evolution of the perception of the old age threshold (0.71). This means that in the group of analysed countries, the increase of the employment rate of the 75+ group significantly translated into a delay of the old age perception threshold. This conclusion is confirmed by the appearance of a correlation at the end of the studied period, in 2018.

## **5. Discussion**

This study evaluated macro-level predictors associated with the perception of changes at the old age threshold. The most notable finding of this study is the significant role of factors related to the labour market, both concerning the old age perception

threshold and the change in this threshold. The study results provide a strong indication that the situation of the elderly in the labour market is the primary macro determinant of the perception of old age. This is following the results of Pilipiec *et al.* (2020). This is important since the micro factors, even though being the most important, are "external" in the sense that they may not be influenced, or they change very slowly, because of the interaction of many different factors (partnership status, social class, and life satisfaction). This means that the significance of macro factors, despite their much lower role in the explanation of the old age perception level, is in practice much higher, since they are the only channel of influencing the change at the old age perception threshold following the hypothesis (Hendricks, 2004) of the importance of policy in the shaping of the perception of old age.

Let's consider population aging one of the most significant challenges of the 21st century in Europe. The results of our study indicate that the most effective tools of influencing the perception of the onset of old age are provided by labour market policy directed at employment support for people aged 55+, mainly 75+. This is a conclusion important from the point of view of the results of the COVID-19 pandemics, where the people most at risk are the eldest, both for health reasons (highest mortality in this age group), and for an increased risk of job loss, as such people, by having the right to a pension or drawing a pension, will be relatively least impacted financially by the loss of employment. So, they are the first to be let go in case their employer has problems.

This means that the actual employment status of people in older age groups has a higher impact on the perception of the old age threshold than institutional conditions related to official retirement age. It is not the legal regulations but the actual employment status that decides when people become old. This follows the conventional perception of old age as a period of passiveness, rest, and withdrawal if the employment of people near retirement age or even of post-retirement age increases, the more rarely they will be associated with old age since they do not exhibit behaviors typical for this stage of life. The adulthood period would thus be extended, and the old age threshold would be moved to a later age. From this perspective, the implementation of an active aging policy, in addition to multiple other socio-economic benefits, also results in a positive change in mentality and approach to old age. It seems thus necessary to continue actions intended to improve the situation of mature persons in the labour market and use their professional potential, even though this is a complex and multi-dimensional problem (van Soest and Zaidi, 2015).

In addition to labour market policy, the influence of the state is also visible in the critical role of creating economic factors. The statistical effect is confirmed by the result observed by Ayalon *et al.* (2014) and contradicts Abrams *et al.* (2011). They showed that there are no significant effects of national characteristics on the perceived start of old age. The differences may result from the use of various ESS editions in the studies. However, the observed relationship between the value of an economic indicator and the change at the old age perception threshold is necessary.



A strength of our study is the analysis of the dynamics of the perception of the old age threshold. To the best of our knowledge, this is the first study that concentrates on analysing the causes for the change in this perception. We have noticed that even though the perception of the old age threshold has converged within the countries covered by the studies, between the countries, the perception has diverged. This is the effect of uneven changes which occurred within this scope. In some countries, the perceived old age threshold has increased relatively highly, and in some, it has increased only slightly. We have tried to establish the macro conditions for these differences.

Despite its strengths, this study was limited by the availability of macro-level data and limited theory, which could potentially point to significant predictors that should be explored. Unfortunately, we lack international studies in which the same people would be asked the same questions over a more extended period, reducing the scope of conclusions.

We need further studies that more precisely address the impact of macro-level factors, particularly labour market policies, on the perception of old age. The results of our studies indicate the need for a closer analysis of economic factors.

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