



CONSIDERATIONS ON THE SPEED AND QUALITY OF AGEING IN ROMANIA, RELATIVE TO OTHER EUROPEAN COUNTRIES

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Demographic aging, a major public health problem, affects the entire planet, but at a different speed from one country to another, depending on the moment of engagement in the demographic transition. This study aims to analyze the aging rate of the population in Romania, relative to other European countries. The indicator used for this purpose is the time required to double the proportion of people aged 65 or over.

Demographic aging is due to diminished fecundity and increased life span, phenomena that have occurred in all populations. Mortality has fallen due to advances in hygiene and medicine and due to economic development, but has been associated with declining birth rates.

Quality of aging is analyzed based on the life expectancy summary measures. The percentage of life expectancy at 65 years without limitation of the total life expectancy at 65 is higher in Romania than the average of EU countries, the percentage of of life expectancy at 65 years with moderate and severe limitation is smaller. Life expectancy perceived as good or very good is lower in Romania, at all ages, both men and women than the EU average. Similar differences are found for life expectancy without morbidity.

Keywords: demographic aging, demographic transition, quality of aging, life expectancy at 65 years.

INTRODUCTION

Demographic aging is due to diminished fecundity and increased life span, phenomena that have occurred in all populations. If in the past the populations were dominated by high fecundity and high mortality, so that in France in the eighteenth century, 6 out of 10 children died before reaching the age of 20, from the moment they entered the demographic transition, this ratio has steadily decreased¹. Mortality has fallen due to advances in hygiene and medicine and due to economic development, but has been associated with declining birth rates. The demographic transition led to a new population model, with a fecundity but also a low mortality. Some authors² showed that persons aged 60 years and more has increased and it is expected to increase more in the next years. Also, the same authors find that the rate of growing for older population aged 80 years and more is even higher than that for the total older population. Also,

comparing developing and developed countries, it was observed that the number of older people is growing faster in developing countries² and furthermore, it is not a positive factor for the economic growth of those countries³.

The World Health Organization published in 1984 a model of health transition with the aim of directly assessing the consequences of prolonging survival on health⁴, making the distinction between total survival, non-disability survival and morbidity-free survival. The publication of this conceptual model has led to the identification of several alternative scenarios of health status evolution in the context of increased life expectancy (increased life expectancy without disability or a state of health with disability throughout life and others) and, consequently to the summative indicators for health status: health expectancies and indicators related to the loss of health.

Health-expectancy indicators, developed primarily to assess whether a longer life is accompanied by an increase in well-being (the “compression” scenario of morbidity), or in a bad state (“extending” morbid-

ity) share the life expectancy spent in different health states, thus adding a quality dimension to the lived life.

OBJECTIVES

The objectives of this work is to assess the speed and quality of ageing in Romania relative to other European countries.

MATERIAL AND METHODS

We referred to the population ageing as the increasing of the proportion of older persons (% of 65 years and more old persons) and to the speed of ageing as the increasing percent over a period of time. Data were extracted from an online database belonging to World Bank Group⁵.

The quality of aging is analyzed on the basis of summative life expectancy indicators. For the estimation of healthy life expectancy (HLY), the following types of data were taken from EU Member States reporting to Eurostat: population by age and gender, death by age group and gender, results obtained for Romania and EU countries from EU-SILC (European Union Statistics on Income and Living Conditions) conducted in the period 2005–2012. For Romania, which has made the alignment of the questionnaires used in the surveys since the year of integration, the period analysed was 2007-2012. For this work we use the answers to the questions of the MEHM – Minimum European Health Module (pertaining to perception of health, limitation of activity and presence / absence of morbidity).

For the HLY (indicator taken as a structural indicator by the European Union) estimation, we used mortality table indicators obtained based on Eurostat method, to obtain the number of years of generation at age x , the number of years of generation after age x and life expectancy at each age⁶.

The method used by Eurostat for calculating the mortality table indicators implies:

- As input data, specific mortality rates calculated by age and by gender;
- For both sexes, the number of deaths and the population on January 1st of the year;
- The maximum age group is 85+ for all countries, genres and all years;
- Deaths occur in the middle of one year, the a_x fraction is 0.5 for all ages except for age 0 when it is 0.2.

The number of years of the generation without limitation of activity at a certain age is obtained by applying, for each age, the proportion of persons (from surveys mentioned above) without disabilities of the total number of persons (the proportion of persons who do not blame any limitation of activity) to years of generation at that age. Then the number of years of generation without disability over age x is calculated and also life expectancy at age x without disability or healthy years of life⁷.

The calculation formulas are as follows:

$$YD_x = L_x * prev_x$$

Where:

YD_x is the number of years living in the D state between ages x and $x + 5$

L_x is the number of years of the cohort of the mortality table between ages x and $x + 5$

$Prev_x$ represents the prevalence of health status D between ages x and $x + 5$

$$YWD_x = L_x * (1 - prev_x)$$

Where:

YWD_x is the number of years without the D state between ages x and $x + 5$

$$DFLE_x = \frac{\sum_{i=x}^w YWD_i}{L_x}$$

Disability free life expectancy (DFLE) is the sum of YWD_i from age $i = x$ to w (the last age of the mortality table) divided by L_x (survivors at age x).

Disability life expectancy (DLE) is the sum of YD_i for $i = x$ to w , divided by L_x (survivors at age x).

$$DLE_x = \frac{\sum_{i=x}^w YD_i}{L_x} = LE_x - DFLE_x$$

Similarly, other prevalence results from the EU-SILC survey have been applied: the proportion of people with a perception of their own health as good, the proportion of people without morbidity, etc., resulting in life expectancy indicators with a very good, good or bad perception of health respectively life expectancy with/without morbidity⁸.

For Romania, the data have been available since 2007, for the other European countries, the data are available starting with 2004. Life expectancy at the age of 65 was analyzed in the European Union countries for the year 2011, life expectancy at 65 years of age without restriction of activity (HLY at 65 years), 65-year life expectancy with moderate activity limitation and the same indicator with severe activity limitation for the same year. The indicators were analysed during time interval and comparatively women with men. The same way of

analysis was also used to analyze life expectancy with a very good, good or bad perception of health or life expectancy with / without morbidity.

RESULTS

Considering the ageing speed, the time period in which the proportion of people aged 65 and over increased from 7% to 14%, we find that in Romania⁵ this period was 40 years longer in men (about 50 years). In addition, the 7% share is seen in men since 1967 as compared to women whose demographic aging begins before 1960.

In 1960, most countries that later formed the European Union already had the proportion of 65+ over 7%. Exceptions were made by Romania, Poland, Croatia, Cyprus, Slovakia. The first country to reach 14% was Austria in 1971. Small countries such as Ireland or Luxembourg reached 14% of the proportion of people aged 65 and over in 2016, with the longest period of doubling this proportion⁵.

Within European Union, % of 65 years old and over increased during 1960–2015 period from a maximum of 14,2% in France in 1960 to a maximum of 24,76% in Italy in 2015 for males and a similar increasing we can observe for females (Fig. 1, 2). In Romania, there was an even greater increase, in the 60s this indicator being among the lowest in the European Union while in 2015 it is approaching the maximum.

The comparison of life expectancy in Romania with that existing in the European Union shows that for both women and men, at all ages, life expectancy in Romania is lower than the EU average.

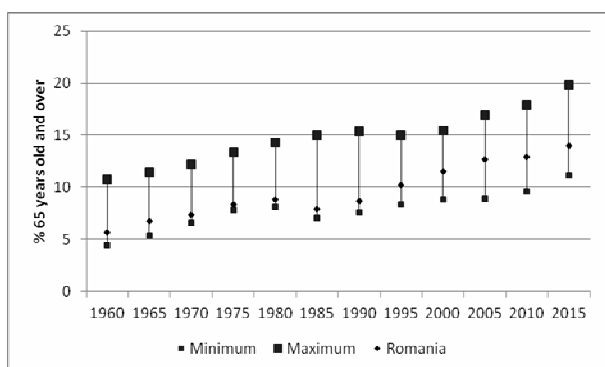


Figure 1. The evolution % of 65 years old and over, Romania by comparison with the maximum and the minimum within European Union, 1960–2015 (males).

The number of years of life without activity limitation (HLY) of the European Union population

in 2011 reached 61.7 years for men and 62.2 years for women. They represent 79.72% of men's life expectancy and 74.76% of life expectancy in women. For survivors at age 50, remaining HLY are 17.5 years in males and 17.9 years in females.

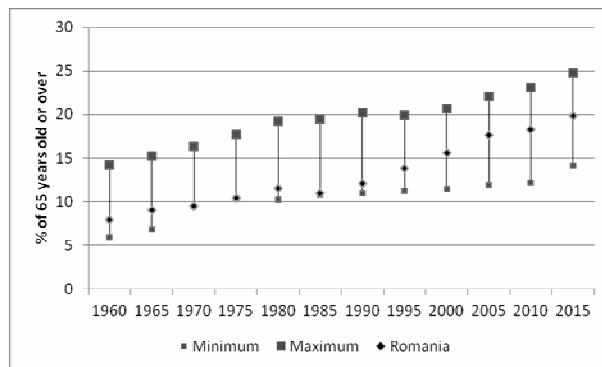


Figure 2. The evolution % of 65 years old and over, Romania by comparison with the maximum and the minimum within European Union, 1960–2015 (females).

Although in 2011, the life expectancy at birth in the European Union was among the highest in the world, 77.4 years for men and 83.2 years for women, for a population of approximately 508 million inhabitants, there are still many years you live with work limitations, 15.6 years for men and 21.1 years for women, of which 5.2 and 7 years are severely restricted in men and women.

In Romania, the number of years of life without activity limitation (HLY) was 57.4 years for men and 57 for women in 2011. They represent 80.73% of men's life expectancy and 72.89% of life expectancy in women. For survivors at age 50, remaining HLY are 13.1 years for males and 12.1 years for females. Women in Romania have a life expectancy 6 years older than men, but most of these years are experiencing moderate or severe limitations of activity.

Between 2007 and 2011, life expectancy at birth increased in the EU by 1.3 years for men and 1 year for women, the number of years living with limitations on daily activity remaining roughly the same. Unlike EU countries, life expectancy has increased in Romania by 1.2 years for men and by 1.3 years for women, but the number of years with activity limitations has increased dramatically, ie 4.2 years for men and 7 years in women, these limitations increasing the risk of becoming addicted to day-to-day tasks.

At Member State level, national life expectancy varies between 65.29 years in 2007 for men (the difference is 14.2 years) and between 75.07 and 84.78 years for women (the difference of 9.71 years).

In 2011, the difference between the maximum and minimum SV in males drops to 12.6 years, and in women it drops to 7.94 years, especially by raising the minimum (Fig. 3, 4).

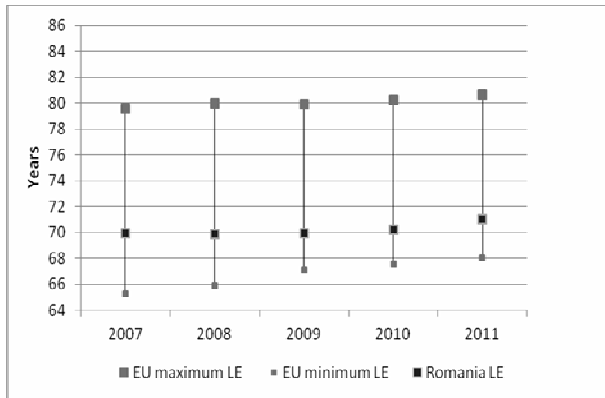


Figure 3. Evolution of life expectancy in Romania and EU (males).

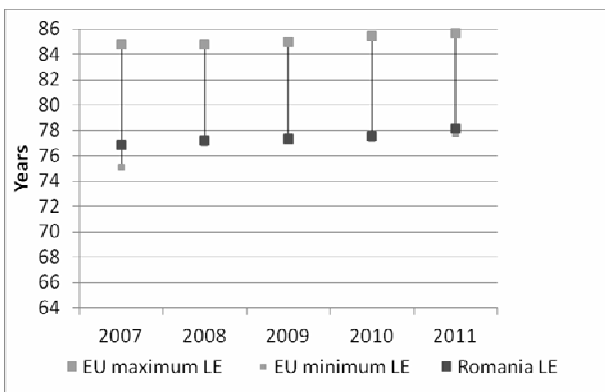


Figure 4. Evolution of life expectancy in Romania and EU (females).

The corresponding HLY difference is 21.7 years for men and 19.8 years for women, and for 2011 it drops to 18.93 for men and 18.39 for women.

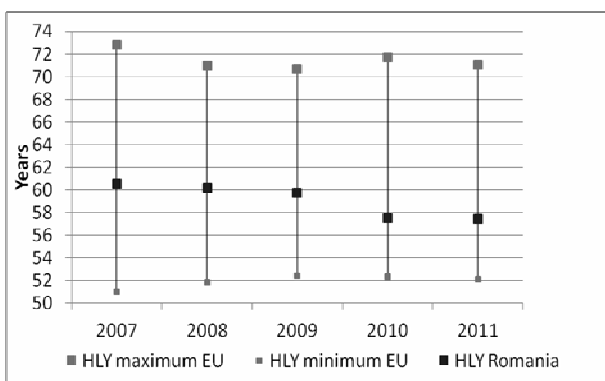


Figure 5. Evolution of HLY in Romania and EU (males).

In Romania, life expectancy, which is at the EU's lowest level, increases slightly between

2007–2011, from 69.94 years to 71.05 years for men and from 76.86 years to 78.17 years for women.

The number of HLY decreases over the same period in both women (5.54 years) and males (by 3.13 years).

Life expectancy at 50 years without limitation of activity (HLY 50), both for women and men, is among the last among the countries of the European Union (Fig. 7, 8).

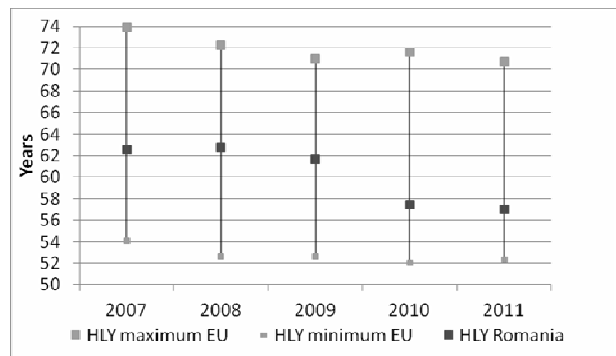


Figure 6. Evolution of HLY in Romania and EU (females).

The differences between the maximum and minimum HLY 50 in men in the EU drop from 2007 to 2011 from 10.17 years to 9.16 years (Fig. 7). In women, the difference between the maximum and minimum HLY 50 in the EU remains constant over the period of about 7 years (Fig. 8).

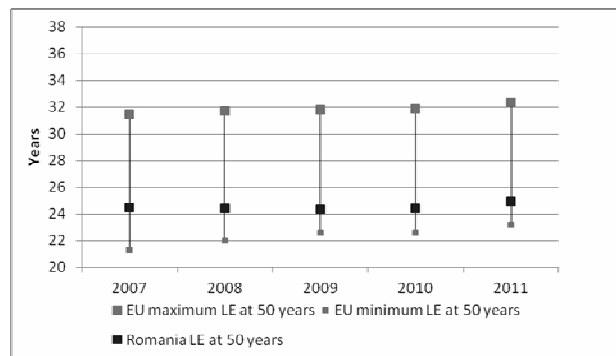


Figure 7. Evolution of LE at 50 years in Romania and EU (males).

The existence of these differences between countries and between men and women shows that the impact on the unemployment of older workers is still different in the countries of the European Union.

Life expectancy at 65 years did not change significantly in Romania, according to EHLEIS data⁸, neither women nor men, in 2007–2012 and is about 2.5 years less than the same indicator in the European Union.

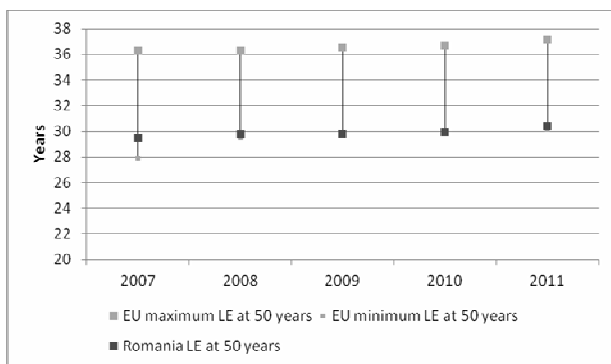


Figure 8. Evolution of LE at 50 years in Romania and EU (females).

Life expectancy at 65 is, on average, significantly higher for women than for men in the European Union. With the exception of 12 EU countries, life expectancy at 65 years without activity limitation is higher for women than for men, but the differences are not significant. Women hope to live over 65, significantly longer than men with moderate and severe limitation of activity.

Life expectancy at 65 years without activity limitation is maintained in Romania below the European average in all years for which data were available for both men and women.

Table 1 shows that the share of life expectancy at 65 years without limiting the activity from total life expectancy to 65 is high in Romania compared to the average of the EU member states, the share of life expectancy at 65 years with moderate limitation or severe, being smaller, this difference being due, both to women and men, to the difference in perception of the limitation of activity recorded in the above-mentioned investigation.

The highest life expectancy at 65 is found in France, both for women (23.79 years) and men (19.25 years), and the lowest in Latvia for men

(13 years), respectively in Bulgaria, in women (16.7 years).

In terms of the value of this indicator for men, Romania ranks 22th in the hierarchy of EU member states, and in women it is in the penultimate place. The group of former socialist countries occupies the last places, both in men and women (Fig. 7, 8).

From the point of view of the evolution in time, in Romania, in men, it is noted the stationary evolution of life expectancy at 65 years with the severe limitation of the activity, in the period 2007–2012. However, life expectancy is reduced to 65 years without limitation activity and increases life expectancy to 65 years with moderate activity limitation. The evolution of these indicators in men is similar to that of women, which lowers life expectancy to 65 years without limiting activity, increases life expectancy to 65 years with moderate activity limitation and slightly increases life expectancy to 65 years with severely limiting activity.

The share of life expectancy at 65 years without limitation of activity from total life expectancy at 65 is high in Romania compared to the average of EU member states, the share of life expectancy at 65 years with moderate or severe limitation is lower, this difference it may be due, both for women and men, to the difference of perception. The perceived life expectancy as good or very good is lower in Romania, at all ages, both in men and women, than in the European Union average. Similar differences can be found for life expectancy without morbidity.

These two, and HLY, are the best-known health expectations and have the essential role of highlighting the years living in different health settings (depending on the conceptual model of health used).

Table 1

The share of life expectancy components at 65 years compared to men in Romania and the European Union, 2011

Indicator	Males		Females	
	Romania	European Union	Romania	European Union
% of life expectancy at 65 without activity limitation	36.9%	48.2%	26.7%	40.4%
% of life expectancy at 65 with moderate activity limitation	43.2%	33%	44.8%	36.3%
% of life expectancy at 65 with severe activity limitation	19.8%	18.8%	30.4%	23.3%

CONCLUSIONS

Comparison has become possible between countries since the harmonization of the measurement tools used to collect prevalence data has been achieved. It is also a question if the data collection method is similar (estimating the prevalence of the disease may be different if the interview is face-to-face, by phone or the questionnaire is sent by mail). Systematic errors can also occur depending on the inclusion or not inclusion of institutionalized persons in the study.

Adopting HLY as a structural indicator, harmonizing instruments to measure the prevalence of disability across EU countries, creating a life expectancy analysis unit shows increasing interest in analyzing the quality of life, not just the number of years it hopes to live a person after a certain age.

Increasing the number of years of healthy life has become one of the main objectives of European health policy, faster growth than life expectancy will in time assess the success of measures taken in the health and economic and social sectors, both on health individuals as well as by lowering medical care expenses.

The role of health policy is to maintain and improve public health within the existing resource constraints⁹. Decision makers have to choose between a wide range of potential interventions and address both the causes and consequences of health problems. Summarizing life expectancy indicators can provide a common value with which to assess the potential benefits of a wide range of interventions as well as to project the implications of changes in population structure and technologies.

The number of healthy life years lost due to different diseases can lay the foundations for policy-making that takes into account the relative burden of disease, although correlation of these

estimates with possible costs and potential techniques for disease elimination and / or reduction is necessary before advocating for a specific policy.

The value for the health policy of summative indicators such as life expectancy stems from their integrative and comparative peculiarities. Thus, any health interventions can be evaluated according to their ability to increase healthy years of life.

REFERENCES

1. Pison G, *Le vieillissement démographique sera plus rapide au Sud qu'au Nord*, *Population & Sociétés*, **2009**: 457; 1–4.
2. United Nations, Department of Economic and Social Affairs, Population Division *World Population Ageing 2017*, ST/ESA/SER.A/408, **2017**: 2; available at http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Report.pdf (last accessed in 15th of June 2018).
3. Teixeira AAC, Nagarajan NR, Silva ST, *The Impact of Ageing and the Speed of Ageing on the Economic Growth of Least Developed, Emerging and Developed Countries, 1990–2013*. *Rev Dev Econ*, **2017**: 3; 909–934.
4. World Health Organization, *The uses of epidemiology in the study of the elderly: Report of a WHO Scientific Group on the Epidemiology of Aging*. *World Health Organ Tech Rep Ser.*, **1984**:706; 1–84.
5. Data bank, available at <https://data.worldbank.org/indicator/> (last accessed in 15th of June 2018).
6. https://ec.europa.eu/health/indicators/healthy_life_years/hly_en.
7. Robine JM et. all, *Health Expectancy Calculation by the Sullivan Method: A Practical Guide*, 2007 available at https://webgate.ec.europa.eu/chafea_pdb/assets/files/pdb/2006109/2006109_d5sullivan_guide_final_jun2007.pdf ((last accessed in 15th of June 2018).
8. Eurohex, available at <http://www.eurohex.eu/index.php?option=ehleisproject> (last accessed in 15th of June 2018).
9. Barendregt J, Bonneux L, and van der Maas P, *Health expectancy: From a population health indicator to a tool for policy making*. *Journal of Aging and Health* **1998**: 10; 242–258.