EVOLUTION AND DETERMINING FACTORS OF THE DEMOGRAPHIC AGEING PROCESS

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Abstract

The latest demographic developments in the European Union (EU) show a growing population, approaching 450 million inhabitants, while the age structure is becoming increasingly older as the post-war baby boom generation reaches retirement age. People are living longer as life expectancy continues to rise, while fertility has been systematically declining over the past 50 years, with slight recovery trends over the past 10 years. However, the fertility rate remains well below the replacement level that would allow the population to remain at a constant size in the absence of internal or external migration.

As a result of these demographic developments, the EU will face, in the coming decades, a series of challenges closely related to the aging society that will affect a wide range of areas, including the labor market, the pension system and social-medical care, social services and the residential sector. The creation of an organizational framework that will stimulate the substantiation of development options (of localities), systematization and ecological protection, private initiative, ensuring a decent standard of living through economic and social protection measures must start from knowing the population of each country.

Viable, economic and administrative measures cannot be conceived without information on the structure and size of the population by age and sex, occupations and level of education, the current size and probable evolution of the total population.

Keywords: *demographic aging, demografic factors, economic consequences.*

Classification JEL: *H70, H83, J10, J1, G2, G23*

1. Introduction

According to a Eurostat report, people are living longer and the fertility rate is constantly decreasing in Europe, so that the natural population growth will stop around 2030, and from 2035 onwards, migration flows will become insufficient to counterbalance the negative population growth.

If current trends continue, the current ratio of four active citizens to one pensioner will be reduced to two to one in the next 50 years, resulting in a real "time bomb" in terms of pension payments across Europe.

Changes in the structure of large age groups have a strong impact on economic, social and political processes. As populations age, some benefits such as pensions, healthcare or material support for the elderly must be provided for longer periods of time. In order to remain sustainable, social security systems must change. Increased longevity can lead to medical costs and increased

demand for health services, because older people are more vulnerable to contracting chronic diseases.

The reduction in the fertility rate and the mortality rate are the main determining causes of the onset and extension of the aging process.

Among the socio-economic factors that play a role in the decrease in the fertility rate in developed countries, we specify:

- the decrease in the share of traditional agricultural households, characterized by a high fertility rate, necessary both for productive activity and for ensuring the security of older people;
- the emancipation of women, access to education at all levels and their attraction to non-agricultural activities;
- the increased demands of parents regarding the upbringing and education of children, which require significant time and expenses;
- the expansion of social insurance, especially public pension systems and institutions for the care of dependent elderly people, which have reduced the role of children in supporting parents in old age.
- increasing leisure time, access to a wide range of entertainment and modern means of collective and individual transport, the desire of adults and their families to benefit from these facilities.

Obviously, in modern society the fertility rate is also influenced by other factors related to culture, demographic policy or religion, which, like those mentioned above, act differently from one country to another.

An important consequence of the reduction in the fertility rate is the progressive reduction of future generations able to enter the labour market and contribute to the social and health insurance fund for those who will then be retired. This situation can have a significant impact on the well-being of the elderly, especially in poor countries, with limited possibilities to support this category of population.

Ensuring the sustainability of public finances, given the ageing of the population, is a key challenge for policy makers within the EU. This can be achieved by:

- reducing debt at a rapid pace;
- increasing the activity rate and labor productivity;
- reforming the public pension, health, and long-term care systems for the elderly.

At the same time, the speed of this process is also important, because when the share of the elderly in the total population increases in a short period of time, it becomes difficult for institutions to adapt quickly.

Changing the structure by large age groups, in the sense of increasing the percentage of the population aged 60 and over in total, causing a decrease in the share of other age groups, tends to create social and political pressures determined by changing the way resources are allocated in society, causing conflicts between generations.

A decrease in the potential support rate, implicitly an increased demographic dependency rate, indicates that an increasing number of beneficiaries of the public health and pension systems will be "supported" by an increasingly smaller number of taxpayers. Thus, the working-age population will be "burdened" by paying higher taxes and contributions to ensure a stable and sufficient income for pensioners.

2. Demographic factors determining the demographic aging process

➢ Reduction of the temporary fertility rate

The reduction of the temporary fertility rate was and is the basic cause of the aging process, because as it reaches lower levels, people of reproductive age have fewer children, determining the reduction of the proportion of children and young people in the total population, which leads to an increase in the share of the elderly population in the total population.

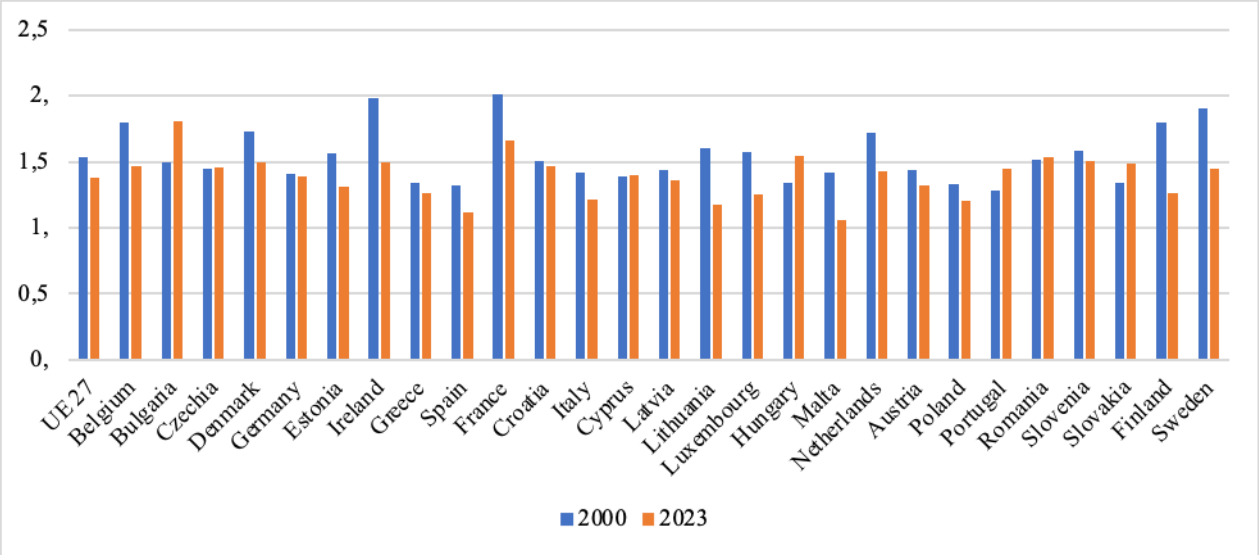
Currently, the temporary fertility rate is 1.38 in the EU 27 countries (down from 1.54 in 2000), none of these countries having this indicator above the threshold of 2.1 (the level necessary to ensure generational replacement). In 5 countries of the European Union (Malta – 1.06, Spain – 1.12, Lithuania – 1.18, Poland – 1.20, Italy – 1.20) the level of the temporary fertility index is below 1.2 children per woman, a level unprecedented in the history of humanity, and their situation is not expected to improve in the future.

In Romania, a slight increase of 0.2pp is observed (from 1.52 in 2000, to 1.54 in 2023), Romania being among the few EU countries where this was recorded (Fig. no. 1):

- Bulgaria from 1.50 to 1.81 the highest increase (0.31pp)
- Hungary from 1.34 to 1.55 (0.21pp)
- Portugal from 1.28 to 1.45 (0.17pp)
- Slovakia from 1.34 to 1.55 (0.21pp)
- Czech Republic and Cyprus with an increase of only 0.1pp, from 1.45 to 1.46 and from 1.39 to 1.40.

All other countries recorded decreases, with the largest decrease in Finland at -0.54pp (from 1.80 to 1.26), followed by Sweden with a decrease of -0.46pp (from 1.91 to 1.45).

Figure no. 1 *Evolution of the short-term fertility index in EU countries in 2023 compared to 2000*



Source: Eurostat https://ec.europa.eu/eurostat/databrowser/view/tps00199__custom_16068160

In the perspective of 2050, a slight increase in the fertility rate is expected in some countries, namely an increase in the percentage of the population in the [0-14] age group. The replacement level of generations could be ensured by a short-term fertility rate of 2.1 children per woman, a level that will not be reached by any country by 2050, resulting in the demographic decline being improved, but not its stopping.

The consequences of demographic aging to which the decrease in the fertility rate has led can be placed on 2 levels in terms of the financial field, namely:

- increase in the cost of health services;
- difficulty in ensuring a decent standard of living for pensioners

➢ **Reducing the mortality rate of the elderly population**

In Romania, mortality rates are decreasing, especially in the older age groups. Given that the fertility rate is decreasing and continues to remain low, the reduction in mortality rates in the elderly is an important cause of population aging.

In Romania, in 2023 there were 244,624 deaths, 28,902 fewer than in 2022 (273,526), the mortality rate reaching 11.2 deaths per 1000 inhabitants. The general mortality rate recorded, in

2023, a value of 20.80/oo in the age group 65-69 years, a value of 80.20/oo in the age group 80-84 years and a maximum of 149.8 0/oo in the age group 85 years and over.

Throughout the period 1990-2023, the mortality rate in rural areas exceeded that in urban areas according to the table below.

Table no. 1 *Mortality rate by area during the period 1990-2023*

	1990	2000	2010	2020	2021	2022	2023
Total	10,6	11,2	11,5	13,5	15,2	12,4	11,2
Urban	8,2	8,6	9,2	12	13,6	10,9	10
Rural	13,4	14,4	14,6	15,6	17,4	14,4	12,7

Source: National Institute of Statistics, Tempo online database

The more difficult accessibility to medical care services, the reduced number and poor equipment of the units in the health system, the higher degree of demographic aging of the population, were the main causes that determined a higher mortality rate in rural areas. In contrast, higher pollution, unhealthy and insufficient nutrition, loneliness and stress were important factors that affected the health of the elderly population in urban areas.

During the period 2000-2023, there was a decrease in the mortality rate of the elderly in all age groups, both for men and women (table no. 2). Mortality rates are clearly higher in favor of the male sex, at younger age intervals, with the differences flattening out as people get older.

Table no. 2 *Mortality rate of the elderly population (by age group and sex – deaths per 1000 inhabitants)*

Age groups	Genders	Years						
		1990	2000	2010	2020	2021	2022	2023
60-64 years	Total	18,7	18,7	16,2	17,7	20	15,7	13,9
	Male	25,1	26,5	23,5	26,3	28,8	23,5	20,8
	Female	13,1	12,2	10	10,1	12,4	8,9	7,8
65-69 years	Total	28,3	27,7	24,1	25,9	29,5	22,8	20,8
	Male	36,1	37,2	34	38	42	33,9	31,2
	Female	22,2	20,1	16,4	16,2	19,6	13,9	12,6
70-74 years	Total	44,4	43,4	36,7	37,4	43,8	33,3	29,9
	Male	54,5	54,8	49,8	52,8	60,2	47,2	42,3
	Female	37,5	35	27,6	26,2	32,1	23,4	21,1
75-79 years	Total	:	69,8	59,4	59,9	67,8	53	46,3
	Male	:	82,8	74	79,8	88,7	70,1	61
	Female	:	61,7	50	47,3	54,6	42,1	36,9
80-84 years	Total	:	113	99,4	97,6	112,3	91,8	80,2
	Male	:	126	114,4	122,2	138,2	112,4	96
	Female	:	106	90,5	84,1	98,5	80,9	71,8
85 years and over	Total	:	207,6	176,7	180,8	198,2	176,3	149,8
	Male	:	217,5	187,5	197,3	215,4	189,1	155,4
	Female	:	202,5	171,4	172,4	189,6	170,1	147

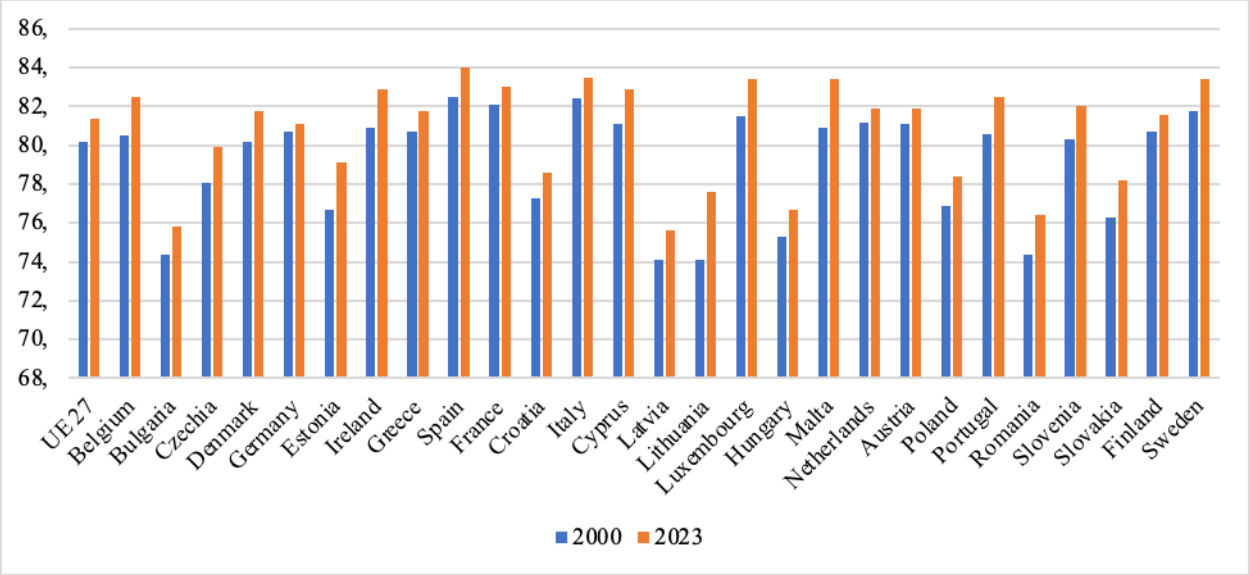
Source: National Institute of Statistics, Tempo on line database

- **Increase in life expectancy**

a) at birth

Life expectancy at birth is the number of years a newborn would live if the current mortality pattern were maintained. The extension of life expectancy is a constant in developed countries (Fig. no. 2).

Figure no. 2 *Evolution of life expectancy at birth in EU countries in 2023 compared to 2000*



Source: Eurostat https://ec.europa.eu/eurostat/databrowser/view/tps00199__custom_16068160

Life expectancy at birth is increasing in all European Union countries. In the period 2000-2023, life expectancy is highest in: Italy (83.5 years), Sweden Malta and Luxembourg (all three with a life expectancy at birth of 83.4 years) and lowest in: Latvia (75.6 years), Bulgaria (75.8 years), Romania (76.4 years) and Hungary (76.7 years).

Life expectancy at birth is higher for women than for men, for all EU countries (5.3 years more than the EU 27 average), with the largest differences recorded, in order, in: Latvia (10.1 years), Lithuania (9.0 years), Romania (7.8 years) and Bulgaria (7.7 years), and the smallest differences recorded in: the Netherlands (3.0 years), Sweden (3.3 years) and Luxembourg (3.3 years).

b) at 60 years

Life expectancy at 60 years is represented by the number of years that a person who has reached 60 years of age would live, if the current mortality pattern were maintained.

For the EU 27 countries, life expectancy at 60 years is 24.2 years, (up 3.8 years since 2000). Life expectancy at age 60 is highest in Spain (26.2 years) and France (26.0 years), and lowest in Bulgaria (20.4 years).

Life expectancy at age 60 is higher for women than for men for all countries, with the largest differences being recorded, in order, in: Latvia (6.1 years) and Lithuania (6.0 years) and the smallest differences in: the Netherlands (2.2 years), Sweden (2.6 years) and Ireland (2.6 years).

c) at age 80

Life expectancy at age 80 is the number of years a person would live at age 80 if the current mortality pattern were maintained.

For the EU-27, life expectancy at age 80 is 1.6 years (up 1.9 years since 2000). Life expectancy at age 80 is highest in France (10.8 years), Spain (10.7 years) and Luxembourg (10.1 years), the only countries where the 10-year threshold is exceeded, and lowest in Bulgaria (7.8 years) and Hungary (7.9 years).

Life expectancy at age 80 is higher for women than for men, for all European Union countries, with the largest differences recorded, in order, in: Estonia (2.5 years) and Spain (2.2 years) and the smallest differences in: Cyprus (0.7 years), Luxembourg (1.1 years) and the Netherlands (1.2 years).

3. Evolution of the demographic aging process at the level of the European Union states

In Europe, the population of the European Union is also in the midst of an aging process. This type of demographic evolution can also be the imminent consequence of the progress and improvement of lifestyle recorded at the level of society. Social progress determines a substantial decrease in mortality rates, resulting in a higher life expectancy, but there are also other factors that lead to this aging process of the population.

In perspective, it was found that the active population of the European Union will decrease, while the number of inhabitants aged 65 and over will continue to increase by almost 2 million people per year. The age group of 65 and over of the total EU population will represent, in 2060, more than 28.4% compared to 16% in 2010.

Following this evidence, the year 2012 was declared the "European Year of Active Ageing and Solidarity between Generations".

By this measure, the European Year of Active Ageing and Solidarity between Generations aimed to raise public awareness of the contribution of older people to the development of our society and of the various ways to promote this contribution. The initiative seeks to encourage decision-makers (at all levels) and stakeholders to mobilize and take action to promote active ageing and strengthen solidarity between generations.

- **Demographic evolution by age groups**

In 2000, within the EU 27 population, the population aged 0 to 14 years represented 16.8%, and after 10 years, in 2010 it decreased to 15.6% of the total and to 15.1% in 2023 (Table no. 3). At the same time, people considered to be of working age (from 15 to 64 years) represented 67.2% of the total population in 2000 and decreased to 66.5% in 2010, then registering a recovery of this population segment, to 67.8% in 2023.

Elderly people (aged 65 or over) had a share of 16% in 2000 and 17.9% in 2010, with an increase of 1.9 percentage points in 10 years. But, in 2023, this share reached 20.3%, with an increase of 2.4 percentage points in 13 years. So, the growth of the population aged over 65 accelerated at the EU 27 level (Table no. 3).

Among the EU Member States, the highest share of the young population (0-14 years) in the total population in 2023 is in Ireland with 21.4%, followed at a fairly large distance by Denmark with 16.9%. All EU 27 states recorded decreases in the share of this population category compared to 2010 (Table no. 3).

Table no. 3. *Population evolution in structure by major age groups*

-% of total population -

	0-14 yers			15-64 yers			65 years and over		
	2000	**2010**	**2023**	**2000**	**2010**	**2023**	**2000**	**2010**	**2023**
EU 27	**16.8**	**15.6**	**15.1**	**67.2**	**66.5**	**67.8**	**16.0**	**17.9**	**20.3**
Belgium	17.5	17.0	15.9	65.6	65.7	65.5	16.9	17.3	19.7
Bulgaria	15.0	13.4	13.1	68.1	67.8	68.9	16.9	18.8	21.3
Czech Republic	15.9	14.7	14.3	70.3	69.1	70.0	13.9	16.2	18.9
Denmark	18.7	17.7	16.9	66.5	65.0	66.3	14.8	17.3	20.0
Germany	15.3	13.2	12.6	67.6	66.1	67.8	17.1	20.6	22.8
Estonia	16.9	15.5	15.2	67.6	66.8	67.9	15.4	17.7	20.1
Ireland	21.2	21.6	21.4	67.6	66.5	67.5	11.1	11.9	14.3
Greece	15.2	14.7	14.2	67.4	65.6	66.8	17.4	19.7	22.2
Spain	14.5	15.1	14.7	68.5	67.5	68.7	17.0	17.4	19.8
France	19.0	18.6	18.1	65.0	64.3	65.5	16.0	17.1	19.6

	0-14 yers			15-64 yers			65 years and over		
	2000	2010	2023	2000	2010	2023	2000	2010	2023
Croatia	16.6	15.1	14.4	66.9	67.0	68.5	16.5	17.9	20.3
Italy	14.2	14.0	13.5	67.1	65.2	66.4	18.7	20.8	23.3
Cyprus	21.5	16.5	15.9	66.8	70.7	72.0	11.7	12.8	15.3
Latvia	16.7	14.3	13.9	67.9	67.2	68.4	15.4	18.6	20.9
Lithuania	19.0	14.8	14.2	66.5	67.1	68.7	14.5	18.1	20.3
Luxembourg	18.9	17.1	16.5	67.1	68.9	70.6	13.9	14.0	16.1
Hungary	16.3	14.5	13.9	68.4	68.6	70.0	15.3	16.9	19.3
Malta	19.2	14.8	14.1	68.2	68.8	69.9	12.6	16.4	19.2
Netherlands	18.6	17.3	16.7	67.7	66.5	67.6	13.7	16.2	18.9
Austria	16.7	14.6	13.9	67.8	67.6	69.1	15.5	17.8	20.2
Poland	18.4	15.1	14.5	69.0	71.1	72.3	12.6	13.8	16.3
Portugal	16.2	14.9	14.3	67.3	66.0	67.4	16.6	19.0	21.5
Romania	17.7	15.2	15.1	68.4	68.5	69.6	13.9	16.3	18.4
Slovenia	15.4	14.3	14.0	70.1	68.9	70.0	14.5	16.8	19.2
Slovakia	18.7	15.4	14.9	69.9	71.8	73.1	11.4	12.8	15.2
Finland	17.9	16.5	15.9	66.9	65.4	66.4	15.2	18.1	20.9
Sweden	18.2	16.7	16.4	64.6	64.5	65.6	17.2	18.8	21.2

Source: processing based on Eurostat statistics (online data code: demo_pjanind, tps00028)

Following the evolution of the age group 0-14 years, during the period from 2000 to 2023, we can see that in all EU countries, its share in the total population of each country is decreasing, less than two, so the fertility, the live birth rate is decreasing.

We can see that Cyprus had the highest share in the total population of this age group (0-14 years) in 2000 with 21.5%. In the same ten-year period, we can see that the most pronounced decrease followed, with 5 percentage points in this period to 16.5% in 2012, and followed by 16.4% in 2023, remaining, however, above the EU 27 average of 15.6% (Table no. 1.3). In Malta, which was in third place in 2000 with 19.2%, a decrease in this share compared to 2000 can be observed, by 4.4 percentage points in 2012 and by 4.6 percentage points in 2023, which continues this trend to 14.6%, below the EU 27 average of 15.6%. In the case of Lithuania, the situation is similar to Malta, reaching a share of 14.7% in 2023 (Table no. 3).

In 2023, the lowest share was recorded in Germany with 13.1%, 2.5% below the EU 27 average, coming from a share of 15.3% in 2012. In 2000, the lowest share in this segment was in Italy, with a share of 14.2% which decreased to 14% in 2023.

If we study the share of the 0-14 age group as a whole, decreases of approximately 2 percentage points in the countries of South-Eastern Europe during this period are highlighted (Table no. 3).

The 15-64 age group represents the working-age population, according to the legislation in force. The EU 27 average of the share of this group decreased in the studied interval, from 67.2% to 66.2% (Table no. 3)

In 2023, 5 EU 27 member states can be observed that have the share of this segment increasing, and above the European average, these are Slovakia, Poland, Cyprus, Luxembourg and Lithuania. The other states have the share of this age group decreasing compared to 2000.

The highest share of the age group 15-64 years, in the total population of the respective country in 2023, is in Slovakia with 71.5%, increasing from 69.9% in 2000, by 1.6 percentage points.

In Poland, which is in second position in 2023 with a share of 70.7%, an increase in this share compared to 2000, by 1.7 percentage points, but a decrease compared to 2012 by 0.4 percentage points, being in any case above the EU 27 average. In Cyprus, the decrease in the share of the previous group in the total population is compensated and increases from 66.8% in 2000 to 70.4% in 2023 (Figure 1).

Luxembourg, which is in fourth position in terms of the share of the 15-64 age group in the EU 27 in 2023, is also one of the states in which the share increases from 67.1% in 2000 to 69.0% in 2023 (Figure 1).

In 2023, the lowest share is recorded in France with 63.9%, 2.3% below the EU 27 average, coming from a share of 65.0% in 2000. Sweden is close to France with 64% in 2023, down from 64.6% in 2000, when it had the lowest share in the EU.

The Czech Republic has the highest share in 2000, with 70.3%, followed by Slovenia with 70.1%, but which have a share reduced to 68.4% in 2023 (Table no. 3). If we study the share of the 15-64 age group as a whole, we can conclude that this segment also shows decreases in the share in the total population in most EU 27 countries during this period.

4. Conclusions

Population ageing is a long-term trend that has been going on for several decades in Europe. This ageing is visible in the development of the age structure of the population and is reflected in a growing share of older people and a declining share of young and working-age people in the total population. The share of the population aged 65 and over is increasing in every EU Member State, candidate country and EFTA member state. The increase over the last decade ranges from 3.8 percentage points in Malta and 3.6 percentage points in Lithuania and Germany, to less than 0.5 percentage points in Luxembourg, Spain and Belgium. Over the last decade, an overall increase of 1.9 percentage points was observed for the EU 27 as a whole. On the other hand, the share of the population aged less than 15 years in the EU 27 population decreased by 1.2 percentage points. As a result, the top of the EU 27 age pyramid was higher in 2023 than in 2001.

The increase in the relative share of older people can be explained by increasing longevity - a pattern that has been evident for several decades as life expectancy has increased (see mortality and life expectancy statistics) - this development is often referred to as "ageing at the top" in the population pyramid.

On the other hand, low fertility levels have been maintained in most of the EU (see fertility statistics) in recent years; this has led to a low percentage of young people in the total population. This process, known as "ageing at the bottom", is visible in the population pyramids by a reduction at the base of the age pyramids, as seen between 2001 and 2023.

The effects of demographic aging of the population are quite complex and are felt at both the macroeconomic and microeconomic levels. Based on current policies, spending related to population ageing will increase in the European Union by around 4 percentage points of GDP by 2060. The increase in spending will prove to have a more significant impact of at least 7 percentage points for the nine European Union Member States, including Romania. An ageing population implies increased public spending on long-term care.

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