ANALYSIS OF THE PHENOMENON OF ROMANIA'S POPULATION AGING

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Abstract

In this article, I started from the consideration that the indicator on the resident population provides valuable information, which is used by public and local authorities in adopting decisions based on the demographic and economic realities of the country or a region, which have an economic and social impact. Thus, depending on the structure and dynamics of the resident population, policies and strategies are established regarding the level of public pensions, social benefits and allowances, subsidies and other types of benefits. Also, an important aspect refers to the allocation of financial resources in the formation of public budgets, thus depending on the number of the resident population, funds for health, social assistance and education are established. At the same time, depending on the evolution of this indicator, demographic strategies are established, public authorities being able to adopt measures to encourage birth rates or migration in certain areas.

In this article, I have conducted an analysis of the evolution of some indicators that characterize the demographic potential of Romania, such as the resident population, its average age, the demographic dependency ratio or the elderly dependency rate, highlighting the impact of the increase in life expectancy and the accentuation of the population aging phenomenon on the national economy. In this regard, I have used data published by the National Institute of Statistics and Eurostat. In order to highlight the data more clearly, I have used statistical tools, through their graphical representation and in tabular form.

Keywords: resident population, average age of the population, demographic dependency ratio, demographic structure, population aging

JEL Classification: C10, J11, R23.

Introduction

The analysis of the demographic structure is important for understanding population trends and for adopting economic, social and political decisions, determining the type of public policies needed, such as birth or migration incentives to counteract population aging. An aging population leads to a decrease in the labor force and increased health costs, putting pressure on pension and health systems. In contrast, a young and economically active population leads to economic growth. The age of the population also influences the type of products and services consumed, for example, an aging population increases the demand for medical services.

To measure the size of the population, in Romania two indicators are calculated, namely: the resident population and the population by domicile, the two types of populations having different scopes. Thus, the resident population highlights all persons with Romanian citizenship, foreign and stateless persons who have their usual residence in Romania for a period of at least 12 months, while the population by domicile shows the number of persons with Romanian citizenship and domicile on the territory of Romania. At the same time, I mention that the resident population includes persons who have immigrated to Romania, but excludes persons who have emigrated from Romania.

Literature review

Andersen, Markussen and Røed (2021) addressed a number of issues related to a pension reform in Norway and the inequality of old age incomes. Anghel (2021) conducted an analysis of the situation of the elderly population in Romania, with a focus on the health crisis caused by the coronavirus

pandemic, which revealed that Romania is far from meeting the European directives regarding the expected average level of pensioner income. Anghel, Radu and Bîrsan (2020) conducted a comprehensive study on the evolution and structure of the population by residence in Romania.

Anghelache, Anghel and Ciobanu (2022) highlighted the fact that the resident population in Romania has registered a worrying trend of decrease, which should concern public authorities. Anghelache et al (2021) showed that a country's population is an essential element for characterizing its economic potential.

Cooley and Henriksen (2018) noted that a possible explanation for slower economic growth can be given by demographic change, namely aging populations, combined with increased life expectancy. Cruz and Ahmed (2018) considered that demographic changes can influence economic outcomes and analyzed the correlation between the share of the working-age population with economic growth per capita and the poverty rate.

Hernæs, Markussen, Piggott and Røed (2024) conducted an analysis in which they showed that improving work incentives led to a considerable increase in employment rates at the expense of early retirement and exit through disability insurance. Hummel et al. (2013) considered that the data on the correlations between population dynamics and sustainability are relatively fragmented and dispersed across several disciplines, encompassing various theories, paradigms and methodologies.

Ishika (2025) argues that demographic structure substantially affects economic development, shaping labor markets, consumer trends, and investment approaches, so policymakers must adopt an approach that harnesses the potential of individuals and strengthens societies in the face of new demographic realities.

Liddle (2014) has shown that demographic processes, particularly population, age structure, household size, urbanization, and population density, influence carbon emissions and energy consumption. Samways (2022) has studied the correlation between population growth and environmental change. Schmidthuber, Fechter, Schröder, and Hess (2021) have addressed a number of issues related to active aging and delayed retirement policies.

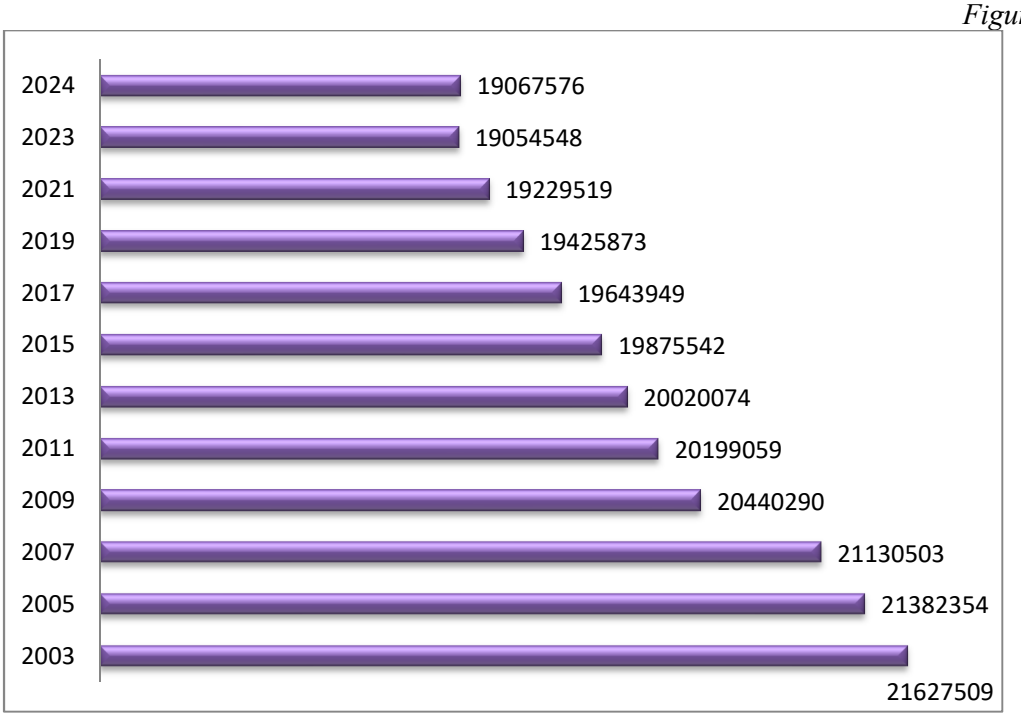
Waddell et al. (2025) conducted a comparative analysis of several approaches to supporting the elderly population, highlighting the fact that some models are not sensitive to the diversity of the elderly population, thus showing the need to reconsider the meaning of the phrase aging well.

Research methodology, data, results and discussions

Based on the available data of the National Institute of Statistics, figure no. 1 graphically represents the evolution of the resident population of Romania, during the period 2003-2024. In the period 2003-2023, a downward trend is observed, followed by a slight increase in 2024. Thus, on January 1, 2024, in Romania, the resident population was 19,067,576 people, an increase of 13,028 people compared to January 1, 2023.

Evolution of the resident population on January 1 in Romania, during the period 2003-2024

Figure no. 1



Source: author's representation based on data from the National Institute of Statistics, online tempo, accessed on March 2, 2025.

The demographic projections for Romania conducted by Eurostat show a significant population decline in the coming decades. Thus, estimates indicate that the country's resident population could fall below 16 million people by 2060, and in 2100 it could be just over 14.5 million people.

Projections regarding the Romania's population during the period 2030-2011 (persons)

Table no. 1

Year	Population
2030	18,218,553
2040	17,232,578
2050	16,439,020
2060	15,689,153
2070	15,039,871
2080	14,681,481
2090	14,574,108
2100	14,609,506

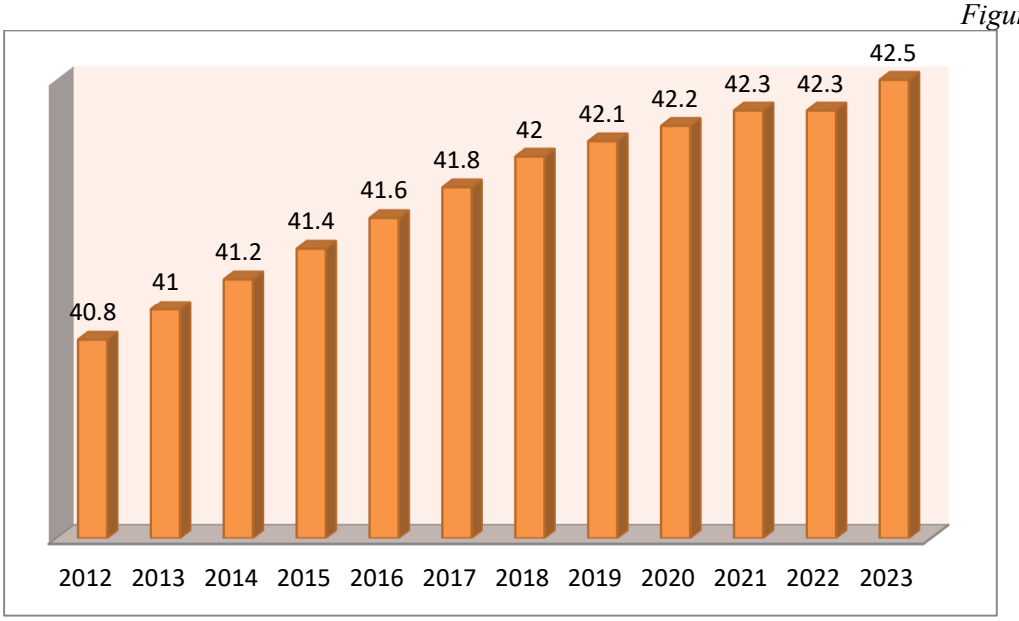
Source: Eurostat, accessed on March 15, 2025; own systematization.

These forecasts emphasize the need to implement effective public policies, in order to counteract demographic decline and support Romania's sustainable development in the future.

The demographic aging process in Romania is also reflected by the indicator relating to the average age of the resident population, which, as can be seen from the table below, was 42.5 years old, on July 1, 2023, an increase of 0.3 years compared to 2022. Throughout the 2012-2023 period, the average age of the resident population increased continuously.

Average age of the resident population on July 1 (years)

Figure no. 2



Source: author's representation based on data from the National Institute of Statistics, online tempo, accessed on March 5, 2025.

In recent years, Europe has been experiencing a natural decline and excessive population aging. This phenomenon has not bypassed Romania either. The year in which the ratio between the share of young people and that of the elderly took place, at the level of the European Union, was 2004, the share of the population aged 65 and over (16.4%) exceeding that of the young population under 15 (16.2%). In Romania, the change in the ratio between the share of young people and that of the elderly was four years later, namely in 2008.

The table below presents data on the population structure by age group, in the EU and Romania, in 2014, 2023 and 2024. Regarding the grouping by age category, it is necessary to specify that age is expressed in completed years, respectively a person who is 24 years and 11 months old is considered to be 24 years old.

Population structure by age group, in the EU and in the member states, in 2014, 2023 and 2024 (% of total population)

Table no. 2

Age group	Year	EU	Romania
0–14 years old	2014	15.3	15.5
	2023	14.8	16.1
	2024	14.6	15.9
15–64 years old	2014	66	68
	2023	63.8	64.2
	2024	63.8	64.1
65 years old or over	2014	18.7	16.5
	2023	21.3	19.7
	2024	21.6	20.0

Source: Eurostat, accessed on March 15, 2025.

The age structure of the resident population in Romania reflects a population aging process, generated mainly by the decrease in the birth rate, which caused the absolute and relative reduction of the young population (0-14 years). At the same time, the increase in life expectancy led to an increase in the number and share of the population aged 65 and over.

In the period 2014-2024, in Romania, the share of the population in the 15-64 age group, which represents the working-age population, gradually decreased, from 68.0 in 2014 to 64.1% in 2024. At the same time, the population in the 65 and over age group increased significantly (from 16.5 in 2014 to 20.0% in 2024).

The studies on population evolution also analyze the demographic aging index of the population, which is the number of elderly people (65 years and over) per 100 young people (under 15 years).

The phenomenon of demographic aging in Romania continues to increase, with the gap between the elderly population aged 65 and over and the young population aged 0-14 remaining high and increasing compared to 2023. Thus, compared to 2023, an increase in the share of the elderly population (65 years and over) was observed from 19.7% in 2023 to 20.0% in 2024, representing an increase of 0.3 percentage points.

At the same time, the share of the population in the 0-14 year group in the total population decreased from 16.1% in 2023 to 15.9% in 2024. Under these conditions, implicitly, the demographic aging index registered an increase. The female resident population is numerically superior to the male one (51.38%).

Resident population on January 1, 2024 by age and sex groups, in Romania (number of people)

Table no. 3

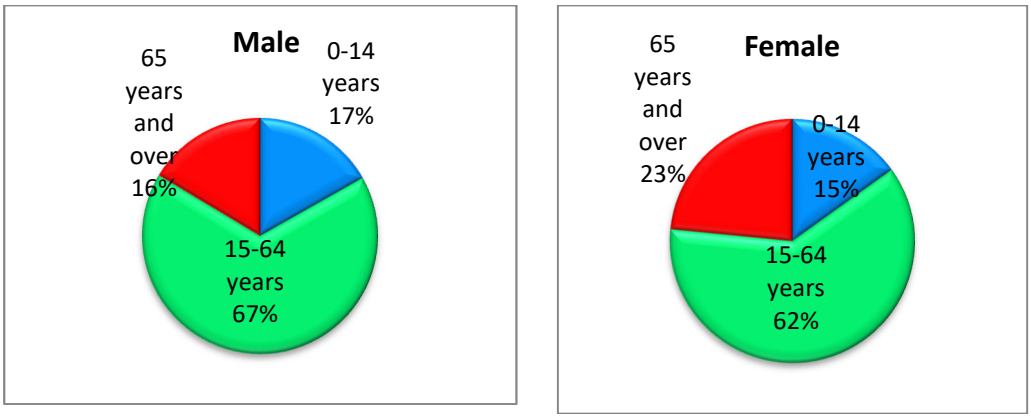
Age group	Male	Female	Total
0 - 14 years	1.558.547	1.474.592	3.033.139
15- 64 years	6.192.512	6.024.894	12.217.406
65 years and over	1.520.311	2.296.720	3.817.031
Total	9.271.370	9.796.206	19.067.576

Source: National Institute of Statistics, online tempo, accessed on March 2, 2025.

On January 1, 2024, the age group structure of the resident population highlighted the fact that people in the 15-64 age group accounted for 64.07% of the total population.

Share of the resident population on January 1, 2024 by age and sex groups, in Romania (%)

Figure no. 3



Source: author's representation based on data from the National Institute of Statistics, online tempo, accessed on March 2, 2025.

On January 1, 2024, the urban resident population was 9,896,535 people, down from the previous year. The female population was 9,796,206 people, down from 2023. Data on the resident population on January 1 by gender and area of residence in Romania, in 2023 and 2024 are included in the table below.

Resident population on January 1 by gender and area of residence in Romania, in 2023 and 2024 (number of people)

Table no. 4

Gender	Residence area	2023	2024
Total	**Total**	19,054,548	19,067,576
-	**Urban**	9,940,887	9,896,535
-	**Rural**	9,113,661	9,171,041
Male	**Total**	9,246,151	9,271,370
-	**Urban**	4,688,305	4,670,077
-	**Rural**	4,557,846	4,601,293
Female	**Total**	9,808,397	9,796,206
-	**Urban**	5,252,582	5,226,458
-	**Rural**	4,555,815	4,569,748

Source: National Institute of Statistics, online tempo, accessed on March 2, 2025.

At the European Union level, according to Eurostat estimates, by 2100, the share of the working-age population will continuously decrease, while the share of elderly people in the total population will increase. Thus, people aged 65 and over will constitute 32.5% of the EU population by 2100, compared to 21.6% in 2024. In recent years, Romania has been facing rapid population aging, with over 3.8 million people aged 65 or over on 1 January 2024, accounting for 20.02% of the resident population, compared to around 14% in 2003-2005. At the same time, it is estimated that the share of this category of the population will continue to increase.

Total resident population and resident population aged 65 and over on January 1 by age group, during 2003-2024, in Romania (number of persons)

Table no. 5

Year	Total	65 years and over*	% of the population aged 65 and over in the total population*
2003	21,627,509	3,053,118	14.12
2004	21,521,142	3,042,148	14.14
2005	21,382,354	3,026,156	14.15
2006	21,257,016	3,132,931	14.74
2007	21,130,503	3,110,437	14.72
2008	20,635,460	3,187,018	15.44
2009	20,440,290	3,299,478	16.14
2010	20,294,683	3,274,699	16.14
2011	20,199,059	3,256,361	16.12
2012	20,095,996	3,242,349	16.13
2013	20,020,074	3,258,198	16.27
2014	19,953,089	3,296,428	16.52
2015	19,875,542	3,374,954	16.98

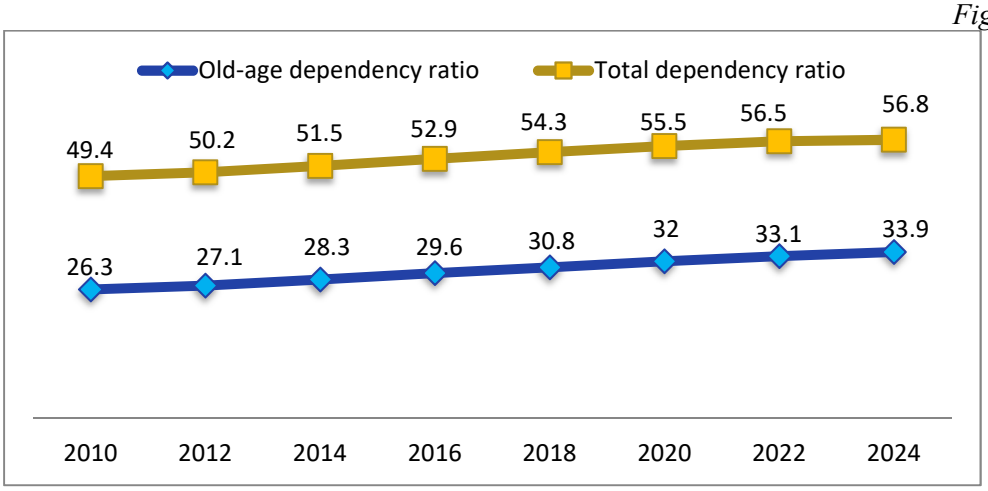
Year	Total	65 years and over*	% of the population aged 65 and over in the total population*
2016	19,760,585	3,435,455	17.39
2017	19,643,949	3,494,137	17.79
2018	19,533,481	3,549,232	18.17
2019	19,425,873	3,595,481	18.51
2020	19,354,339	3,660,542	18.91
2021	19,229,519	3,703,136	19.26
2022	19,043,098	3,706,284	19.46
2023	19,054,548	3,755,746	19.71
2024	19,067,576	3,817,031	20.02

*Source: National Institute of Statistics, online tempo, accessed on February 15, 2025; *author's calculations.*

Ageing and increased life expectancy are usually associated with prolonged periods of frailty and dependency. In Romania, there is a significant proportion of elderly people, especially those over 80, who require long-term care services. An important indicator in establishing a country's socio-economic strategies is the old-age dependency ratio. This ratio represents the ratio between the number of people aged 65 and over (65 is the age at which people are generally economically inactive) and the number of people aged 15 to 64. The value of this ratio is expressed per 100 people of working age (15-64). It should be noted that the 15-64 age group is also under pressure from dependent people under 15. Thus, the total dependency ratio is calculated, which is the ratio between the number of people of "dependent" age (this category includes people under 15 and people over 64) and the working-age population (15-64) expressed per 100 people. The following figure highlights the evolution of the total dependency ratio and the old-age dependency ratio in the European Union, during the period 2010-2024.

Evolution of the total dependency ratio and the old-age dependency ratio in the European Union, in the period 2010-2024 (%)

Figure no. 4



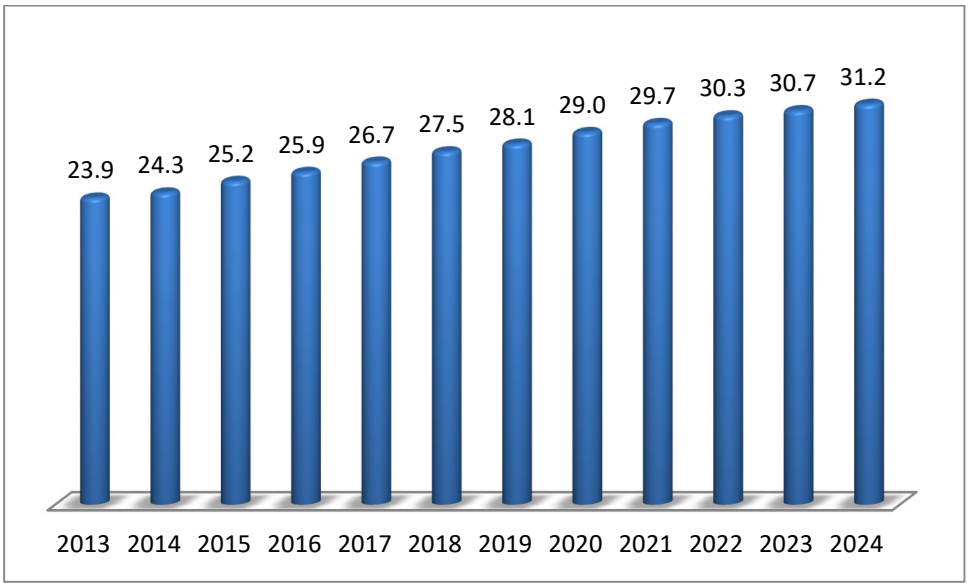
Source: author's representation based on Eurostat data, accessed on March 9, 2025.

During the period 2010-2024, the total dependency ratio in the European Union increased continuously, from 49.4 to 56.8 young and elderly people per 100 adult persons. Also, the dependency ratio of the elderly increased from 26.3% in 2010 to 33.9% in 2024. A similar situation is recorded in Romania, with the dependency ratio of the elderly increasing significantly in recent years. Thus, if in

2013, this ratio was 23.9%, in 2024 it reached 31.2% (Figure no. 5). Usually, the dependency ratio of the elderly is higher in rural areas, but, over time, the gap between rural and urban areas has diminished.

Evolution of the old-age dependency ratio in Romania, during the period 2013-2024 (%)

Figure no. 5



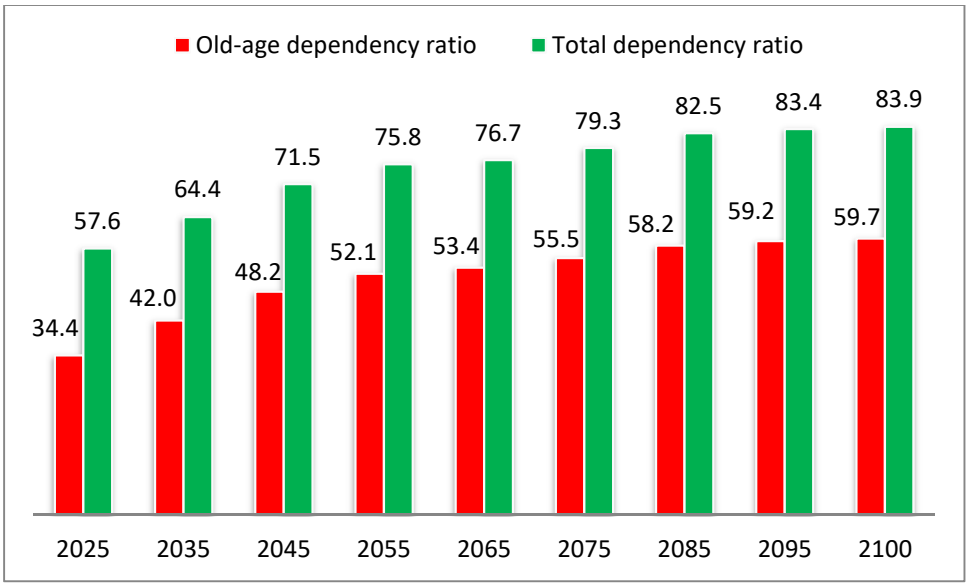
Source: author's representation based on Eurostat data, accessed on March 9, 2025.

The old-age dependency ratio in Romania is high and is expected to continue to increase, due to the aging of the population and the decline in the birth rate. In order to cope with this situation, a series of measures are needed in the economic, social and public policy fields, such as increasing the sustainability of the pension system, by encouraging contributions to privately managed pension funds and voluntary pension funds, introducing economic and fiscal facilities to attract Romanians who have gone abroad to work to return to the country, increasing the attractiveness of the Romanian labor market, through competitive salaries and better working conditions, to determine Romanians to stay in the country.

At the same time, to reduce the negative impact of the increase in the dependency ratio, measures could be implemented to ensure a better quality of life for older people, such as increasing incentives for continuing professional activity after the standard retirement age or support for activities that encourage active aging (sports, volunteering, senior clubs), health education programs, prevention and medical care at an advanced age.

Projections regarding the evolution of the total dependency ratio and the old-age dependency ratio in the European Union, during the period 2025-2100 (%)

Figure no. 6



Source: author's representation based on Eurostat data, accessed on March 9, 2025.

The EU's old-age dependency ratio is projected to almost double to 59.7% by 2100, from 33.9% in 2024. This will be driven by population movement between age groups. The overall dependency ratio will also increase from 56.8% in 2024 to 83.9% by 2100. More data can be found in the chart above.

The rising old-age dependency ratio puts pressure on the employed population and public spending, often hindering economic growth. At the same time, reducing the youth dependency ratio could improve labour market inclusion, potentially boosting economic output.

Conclusions

Following the analysis carried out in this research, several conclusions can be drawn. Thus, the aging process of the Romanian population causes a reduction in the labor force participation rate, generating fears about the slowdown in economic growth. Statistical indicators that characterize the labor market, such as the active population, the employed population, unemployment or vacancies reflect the stability or imbalances existing at the socio-economic level.

In Romania, demographic changes target, in particular, the age structure of the population, the increase in the share of the population aged 65 and over, raising particular economic and social problems. Simultaneously with the increase in life expectancy, Romania is also faced with low birth rates. During the period 2014-2024, the resident population aged 0-14 registered a decreasing trend in the share of the total population, representing, in 2024, 15.9%, and the population aged 65 and over registered a permanent increase, reaching 20% of the total resident population.

The phenomenon of demographic aging is influenced by the progress achieved in medical sciences, the development of technology, as well as the improvement of the quality of life that have determined the increase in life expectancy and, automatically, the increase in the share of elderly people in the total population.

According to Eurostat estimates, the dependency ratio of the elderly in Romania will increase considerably and continuously, in less than 25 years (i.e. in 2050) it will exceed 50%.

In order to reduce the demographic pressure on the national economy and ensure long-term sustainability, it is necessary to adopt a set of measures as soon as possible. Among these, increased

attention should be directed towards increasing the employment rate, for example, through more efficient integration of young people into the labor market, the attractiveness of the Romanian labor market through competitive salaries and better working conditions, creating an attractive climate for the return of Romanians abroad, or promoting continuous training and retraining for people over 50. Also, to reduce the pressure on the public budget, alternative options should be identified to diversify the sources of financing for the pension system, such as contributions to private pension funds.

References

1. Andersen, A.G., Markussen, S, Røed, K. (2021). Pension reform and the efficiency-equity trade-off: impacts of removing an early retirement subsidy. *Labour Economics*, 72, 102050
2. Anghel, M.G. (2021). Study on the perspective of the evolution of the situation of the elderly population in the context of the pandemic crisis. *Romanian Statistical Review, Supplement*, 4, 76-84
3. Anghel, M.G., Radu, I., Bîrsan, O. (2020). Analysis of the evolution of the population by domicile in Romania at the end of 2019. *Romanian Statistical Review, Supplement*, 4, 150-157
4. Anghelache, C., Anghel, M.G., Ciobanu, G. (2022). The resident population is showing an alarming declining trend. *Romanian Statistical Review, Supplemen*t, 2, 97-107
5. Anghelache, C., Popescu, A.M., Grigorescu, D.L. (2021). Population is an important element in the characterization of economic potential. Concept, content and structural analysis. *Romanian Statistical Review, Supplement*, 7, 23-42
6. Cooley, T., Henriksen, E. (2018). The demographic deficit. *Journal of Monetary Economics*, 93, 45-62
7. Cruz, M., Ahmed, S.A. (2018). On the impact of demographic change on economic growth and poverty. *World Development*, 105, 95-106
8. Hernæs, E., Markussen, S., Piggott, J., Røed, K. (2024). The impact of pension reform on employment, retirement, and disability insurance claims. *Journal of Population Economics*, 37, article number 76
9. Hummel, D., Adamo, S., de Sherbinin, A., Murphy, L., Aggarwal, R., Zulu, L., et al. (2013). Inter-and transdisciplinary approaches to population–environment research for sustainability aims: A review and appraisal. *Population and Environment*, 34(4), 481-509
10. Ishika, J. (2025). Age-Structure and Economic Growth: Analysing Third Demographic Dividend in Europe and Central Asian Region. *Asian Journal of Economics and Business*. 6(1), 1-15
11. Kudrna, G., Tran, C., Woodland, A. (2019). Facing demographic challenges: pension cuts or tax hikes?. Macroeconomic Dynamics, 23(2), 625-673
12. Liddle, B. (2014). Impact of population, age structure, and urbanization on carbon emissions/energy consumption: evidence from macro-level, cross-country analyses. *Population and Environment*, 35(3), 286-304
13. Samways, D. (2022). Population and sustainability: Reviewing the relationship between population growth and environmental change'. *The Journal of Population and Sustainability*, 6(1), 15-41
14. Schmidthuber, L., Fechter, C., Schröder, H., Hess, M. (2021). Active ageing policies and delaying retirement: comparing work-retirement transitions in Austria and Germany. *Journal of International and Comparative Social Policy*, 37 (2), 176 – 193
15. Waddell, C., Van Doorn, G., Power, G., Statham, D. (2025). From Successful Ageing to Ageing Well: A Narrative Review. *The Gerontologist*, 65 (1), 8 pp.
16. *** Institutul Național de Statistică, tempo online
17. *** Eurostat; https://ec.europa.eu/eurostat/statistics-explained