

THE PROCESS OF POPULATION AGING AS A DETERMINANT OF THE ECONOMIC DEVELOPMENT IN THE REPUBLIC OF NORTH MACEDONIA

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ABSTRACT

The image of North Macedonia as a country with a young population has faded over time, especially in recent years. The official population statistics data show that the process of population aging in the country is nearly the same as that of highly developed countries. The working-age population is the most affected, and therefore, this paper focuses on analyzing this age group from 2002 to 2021. The population age structure and population aging are used to define the extent and features of the working-age population in the country, but also at a regional level in order to highlight the differences that exist because the working-age population also serves as the basis for future economic development and sustainability, investments, regional planning, and development, etc.

The research in this paper is focused on identifying the future direction of development as well as the serious changes taking place in the working-age population through the obtained results. Also, the aim is to formulate activities and policies to mitigate the effects of demographic aging and to contribute to defining guidelines and creating population, social and economic policies for the country at a national, regional, and local level.

Key words: population aging, working-age population, determinant, economic development, North Macedonia

INTRODUCTION

Population aging is a global phenomenon in the 21st century, characterized by a delay in births, a drop in fertility rates, the impact of living conditions and standards, as well as the volume and dynamics of migration. According to current demographic events and processes, projections for 2050 show that persons aged 65 years and more, will make up 16.2% of the global population, and even 25.7% of the population in developed countries [60]. By the mid-century, one in six people globally will be aged 65 years or older. The number of people older than 60 years has surpassed the number of children since 1995, and it can be expected that by the year 2050, in Europe, there will be twice as many old people as children (UN, World Population Prospects 2019)¹. Also, the latest projections

¹https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/files/documents/2020/Sep/un_pop_2020_pf_ageing_10_key_messages.pdf

suggest that there will be 13.5 % fewer people aged less than 55 years living in the EU-27 by 2050 [22]².

This raises concerns in countries that are particularly affected by this phenomenon, where the problem is foreseen in the biological renewal, economic development, and expected economic pressures, and as a severe impediment to complete for long-term social development. In particular, "If demographic trends have a significant impact on the fate of nations, one, in particular, deserves special attention due to its far-reaching consequences. It is the population's aging." [18], [52]. With the increase in the average age of the population, many problems will appear, which are not only of a demographic nature, because the changes in economic, social, and political conditions will be visible as well [58], [52].

According to Landry (1909) [32], and Huxley (1960) [28], the roots of population aging are primarily tied to the demographic transition, which is linked to the industrial revolution, the growth of capitalism, and numerous changes in society's overall structure. Namely, in Western and Northern Europe, for example, the transition from traditional to modern reproduction began in the second part of the 18th century and lasted until the 1930s of the last century. Later, the industrialized countries had a delayed transition, but the demographic shift is now complete in all industrialized countries [45], [59].

Although the drop in the birth rate is essential to this phenomenon, in the mid-twentieth century, a decrease in mortality, as well as advances in medicine and better living conditions, contributed to the population aging. "At the same time, birth delays in industrialized countries shifted the upper optimal age of the reproductive population, and because of the shorter reproductive period and lower number of offspring, it frequently decreases the upper limit, even though this group is biologically determined" [20].

The demographic transition took place at a different pace in less developed countries. They faced a greater population natural increase rate and a big share of young individuals; yet, population aging is becoming more visible in these countries as well [50].

Demographic aging and its implications are in different fields and the knowledge is different given the spatial, demographic, and economic specifics. Its almost universal presence has led to it being a key social, economic, health care, and cultural issue with a wide spectrum of impacts [36], [55].

In the paper by Bloom et al., (2010) [12] it is stated that the effect of aging on economic growth will be ambiguous, as the various behavioral responses may impose economic growth effects of different magnitudes across different countries. Therefore, population aging has more than a simple accounting effect on economic growth.

Declining fertility is a global phenomenon and is closely connected with economic development [63]. It has changed the role of women in family matters and allowed women to become more involved and present in the labor market and has allowed them greater independence [12], [33].

An increase in the number of older people along with a decrease in the birth rate leads to an excessive burden on the economically active part of the population. Such imbalances threaten to reduce the workforce, slow economic growth, increase social spending, increase the fiscal burden [25], inflation [49], all of which could put enormous pressure on the pension and health care systems, and would ultimately hinder the economic growth of those countries [25].

² https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Ageing_Europe_-_statistics_on_population_developments#Older_people_.E2.80.94_population_overview

Although there are differences in the level of demographic aging between EU countries [43], [15], [56], [55], in general, the demographic trends within the European Union and the deterioration of the population age structure, in the long run, point to an increasingly pronounced reduction in the labor force as the main source for the active population (labor force) but also to aging of the active population [46]. In fact, the aging of the population is worryingly defining the scope and age of the working-age population [1], [11], a phenomenon that we will refer to as "workforce aging". "Workforce aging is likely to be a significant drag on European productivity growth over the next few decades. The greatest negative impact will occur in those countries — such as Spain, Italy, Portugal, Greece, and Ireland — where rapid workforce aging is expected, and which also faces high debt burdens." [1]. Only in the period from 1995 to 2017, central, eastern, and southeastern European (CESEE) countries lost about 7% of their workforce, consisting mostly of young and educated workers. The estimates by the United Nations suggest that the population in the region will face a decline of 12% by 2050 as a result of aging and migration. The workforce will fall by a quarter in the same period. As for our neighboring countries, it is expected that Bulgaria by the year 2050, will lose up to 30% of the workforce, and Serbia around 20% [10].

The demographic aging phenomenon is present in all Balkan countries, but the intensity and the stadium of the process differ, depending on numerous factors like cultural, religious, and ethnic heterogeneity, as well as different socio-economic and political processes that occurred during the second half of the 20th and the beginning of the 21st century [31]. Significant information about this phenomenon and its consequences in the region and beyond can be summarized in the papers of Aleksandrova and Velkova (2003) [2]; about the population aging and its consequences in the Balkan countries, (Magdalenic & Galjak, 2016 [40]); about the aging process within the age structural transition in the Balkan countries [16], [27], on aging in Central and Eastern European countries; Jakovljević and Laaser (2015) [29], for 17 countries in transition from SE Europe; the aging trend of the early 21st century in Serbia [48] ; on aging and demographic change in European societies [42] ; on the impact of the aging process of the working-age population in the Republic of Macedonia in the paper of Dimitrieva and Janeska (2001) [21]; the impact of aging on the working-age population in the Republic of Macedonia in the paper of Risteski (2016) [51]; about the demographic components as a basis for forming a working-age population in the Pelagonia region in R. Macedonia, [7], age structure of the population in the East region of the Republic of Macedonia in the aspect of spatial planning [38], etc.

Changes in the aging population cause major changes in the population structures and demographic resource characteristics, which are the foundation for economic development and have a considerable impact on the country's labor force market. Also, population aging will have additional implications on health and social protection, public finances, and pension funds. In this paper, the starting hypothesis is that demographic aging will affect future economic development. The paper attempts to establish a link between population aging and economic development conditions, addressing the elements that produce population aging as well as their impact on the volume, dynamics, and forecast of the working-age population, as well as its median age. In the analyses done for this research, the territorial element of designating old and young zones is studied, an estimate for the working-age contingent is constructed, and four probable scenarios are highlighted.

METHODOLOGY AND DATA SOURCE

Population aging is defined as a process in which the share of people aged 60 and over or 65 and over increases, with the age ratio as the primary indicator [53], although, this phrase refers to a process in which the elderly population becomes more involved compared to the working-age population [9].

In the determination of demographic aging at a national, regional, and municipal level, different indicators were used, like average population age, the share of the population younger than 20, the share of the population younger than 40, the share of people older than 60, as well as the population aging index. The values and the determination of the stadiums of population aging are according to Penev's classification (1995).

Table 1. Stadiums of demographic aging and criteria for their determination (Penev, 1995)

Stages of demographic aging		Average age (year)	Young population (0-19) in %	Young and mature population (0-39) in %	The older population (60+) in %	Index of aging (4/2)
1	Early demographic youth	0-20	58+	85+	0-4	0-0,07
2	Demographic youth	20-25	50-58	75-85	4-7	0,07-0,14
3	Demographic maturity	25-30	40-50	65-75	7-11	0,14-0,28
4	Threshold of demographic old age	30-35	30-40	58-65	11-15	0,28-0,50
5	Demographic aging	35-40	24-30	52-58	15-20	0,50-0,83
6	Deep demographic old age	40-43	20-24	45-52	20-25	0,83-1,25
7	Deepest demographic old age	43+	0-20	0-45	25+	1,25+

In order to analyze the changes that have occurred regarding population aging and labor force aging in the country, several indicators were calculated using mainly data from the State Statistical Office of North Macedonia³.

Population aging index

Indicator of the ratio of people aged 60 and over and young people up to 19 years. The aging index's limit value is 0.44. It is assumed that the population has begun to grow old when the index exceeds this value [52], [9], [30].

Population aging ratio

The share of people aged 60 and over or 65 and over in the total population. The limit value of the population aging ratio is 12% [52], [9], [30].

Mean or average population age

Average years of life of the population at the time of the census (in our case, the population estimates). It is calculated as a weighted arithmetic mean

$$\bar{x} = \frac{\sum x \times f}{\sum f} \quad (1)$$

\bar{x} – is the mean or average population age, $\sum x \times f$ – is the total distribution (x = dilute mean of age groups) and f – population frequency [9], [30].

³ State Statistical Office [Online] Available at www.stat.gov.mk (last accessed in May 2023).

The median age of the working-age population

The most appropriate measure of central tendency for an age distribution is the median. The median age of an age distribution may be defined as the age that divides the population into two groups of equal size, one of which is younger and the other which is older than the median. It corresponds to the 50-percentile mark in the distribution.

$$M_x = L_1 + \left[\frac{\frac{N}{2} - \sum f_1}{f_{Mx}} \right] \times i \quad (2)$$

M_x – is the median age, L_1 – the lower limit of the medial interval class, $\frac{N}{2}$ is the total population number (the frequency) divided in 2, $\sum f_1$ – the sum of all frequencies in the cumulative sequence ("less than") to the median interval class, f_{Mx} – the frequency of the medial interval class and i – the size of the medial interval class [9], [30], [57].

Inflow in the working-age population

In the total number of the working-age population for the next five-year period, we count the number of people aged 10-14 at the beginning of the period [9].

Outflow from the working-age population

The working-age population for the next five-year period counts the number of persons aged 60 to 64 at the beginning of that five-year period, assuming that everyone will be alive at the end of that period [9].

The growth rate of the working contingent

Using the five years age groups data, the volume of the working contingent of the population can be calculated at the beginning of the five-year period $P_{(15-64)i}$ and at the end of that period period $P_{(15-64)i+4}$

$$P_{(15-64)i+4} - P_{(15-64)i} = \Delta P_{(15-64)} \quad (3)$$

If the inflow in the contingent of working age population for the next five-year period is deducted from the data on age structure i.e., the population aged 10 to 14 years from the previous five-year period, the outflow from the working contingent is calculated as the difference between the inflow into the working contingent and the growth of that contingent. $S_R = E_R - \Delta P_{(15-64)}$ Furthermore, the growth rate of the working contingent is calculated using the formula [9]:

$$s' = \frac{P_{(15-64)i+4} - P_{(15-64)i}}{P_{(15-64)i}} \times 100 = \frac{\Delta P_{(15-64)}}{P_{(15-64)i}} \times 100 \quad (4)$$

Substitution coefficient

The ratio between the absolute size of the inflow and the outflow of the working-age population [9].

$$z' = \frac{E_R}{E_R - \Delta P_{(15-64)}} \times 100 = \frac{E_R}{S_R} \times 100 \quad (5)$$

Crude birth rate

The simplest and most common measure of natality is the crude birthrate. The crude birthrate is defined as the number of births in a year per 1000 midyear population—that is:

$$\frac{B}{P} \times 1000 \quad (6)$$

where B is the number of births and P is the midyear population [57].

The Total Fertility Rate (TFR)

According to the Population Reference Bureau⁴, TFR is defined as the average number of children a woman would have if she survived all of her births or reproductive years. Reproductive years mean the age between 15 and 49 years. If that value is 2.1 it means that a basic population reproduction is ensured, i.e., that there is a replacement of generations. This value is known as the critical value.

Crude death rate

Is the simplest and most common measure of mortality. The crude death rate is defined as the number of deaths in a year per 1000 of the midyear population. That is,

$$\frac{D}{P} \times 1000 \quad (7)$$

where D is the number of births and P is the midyear population [57].

Crude natural increase rate

The crude rate of natural increase is thus the (algebraic) excess of births over deaths per 1000 of the population, or the difference between the crude birthrate and the crude death rate. This rate can be expressed as

$$\begin{aligned} r_n &= \frac{B - D}{P} \times 1000 \\ &= b - d \end{aligned} \quad (8)$$

where r_n = rate of natural increase, B = births during a calendar year, D = deaths during a calendar year, P = midyear population, b = the birthrate, and d = the death rate [57].

Crude net migration rate

The difference between moving to a certain area and moving out of the same area, in a certain time interval

$$\frac{I - E}{P} \times 1000 \quad (9)$$

I is the number of immigrated persons, E is the number of emigrated persons, and P is the midyear population [57].

For the purpose of this research, four scenarios were developed. They are considered a valuable tool that helps organizations to prepare for possible eventualities and makes them more flexible and more innovative [26].

The creation of the scenarios for the effects of population aging in the future demographic development, used in this paper is a result of quantitative and qualitative analysis [3], [14], [65].

During the development of the scenarios, several phases of activities were distinguished throughout the quantitative analysis: gathering and analyzing the available data for demographic movements, and analysis of the previous demographic trend and processes. Tracing the indicators of the labor market and human capital was analyzed the unemployment based upon the Employment Agency of the Republic of Macedonia during the COVID-19 pandemic, and the estimations for replacement of the working-age

⁴ <https://www.prb.org/glossary/>

population. Connecting all demographic changes with the indication to create the scenarios through the cross-sector analysis which determined the position of the young and old population. The quantitative analysis is based on published papers, field research in the period from June 2019 until July 2020, conducted interviews with specific focus groups regarding migrations, and interviews with people that have migrated (during 2020). However, scenarios do not predict the future, but it explores multiple plausible future situations [64], with the purpose of extending the sphere of thinking of the participants in the scenario development process [23], [24], [54], [65]

According to the Law amending the Law on the Territorial Organization of the Local Self-Government adopted in August 2008⁵ [34], analyses for the volume, dynamics, and population structures by gender and age are undertaken at the national level, regional level (NUTS 3 - eight planning regions), and municipality level (NUTS 4 - 80 municipalities). The analyses of internal and international migration movements are performed at a national level, regional (NUTS 3), and municipality level (NUTS 4) for the period 2002 – 2021.

DEMOGRAPHIC DETERMINANTS OF POPULATION AGING IN NORTH MACEDONIA

The country's population has gone through all stages of the demographic transition in a very short period of time (between 1930 and 2000), such that the population natural increase has dropped below 5‰ at the turn of the century [19] and in 2002 it was 3.1‰. The rate rapidly decreases at the beginning of the second decade of the 21st century, reaching -5.4‰ in 2021. If in 2002, a negative natural increase rate was recorded only in the Pelagonia region, in the last analyzed year, all regions have a negative natural increase rate, among which the lowest values were recorded in the Skopje (-2.4‰), and Polog regions (with -3.2‰). With a declining rate of -10.1‰ in 2021, the East region has the most unfavorable value.

The Skopje region had the highest birth rate of 12‰ in 2021, which is above the national average (10.2‰). Within this region, the highest values for the birth rates were recorded in the municipalities Arachinovo (20 ‰), Studenichani (19.7‰), Zelenikovo (18.7‰), Saraj (16.1‰), Centar (16.3‰), and Shuto Orizari (14.8‰). Right after the Skopje region, is the Polog region with 11‰. The birth rate in the East region is the lowest (7.8‰).

As the number of births declines, so does the total fertility rate (TFR). Throughout the studied period, this value has been substantially below the critical value of 2.1 children per woman of reproductive age, needed for generation replacement. The national total fertility rate has dropped from 1.8 in 2002 to 1.6 in 2021. The highest value of TFR was in the Skopje region (1.9), while the North-Eastern and Vardar regions have values of 1.6. All other regions have TFR of 1.4 and 1.5.

⁵ Official Gazette of the Republic of Macedonia "No. 49/1996; 59/1996; 55/2004; 98/2008; 101/2008

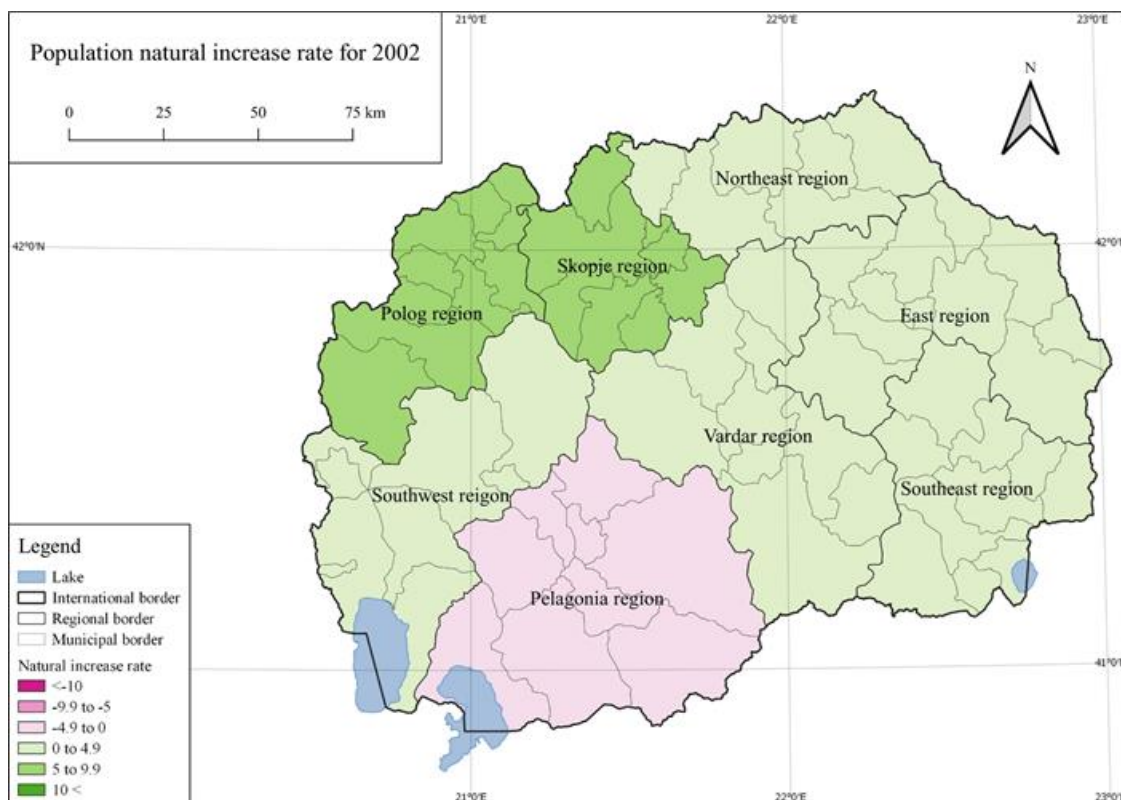


Figure 1. Population increase rate for 2002

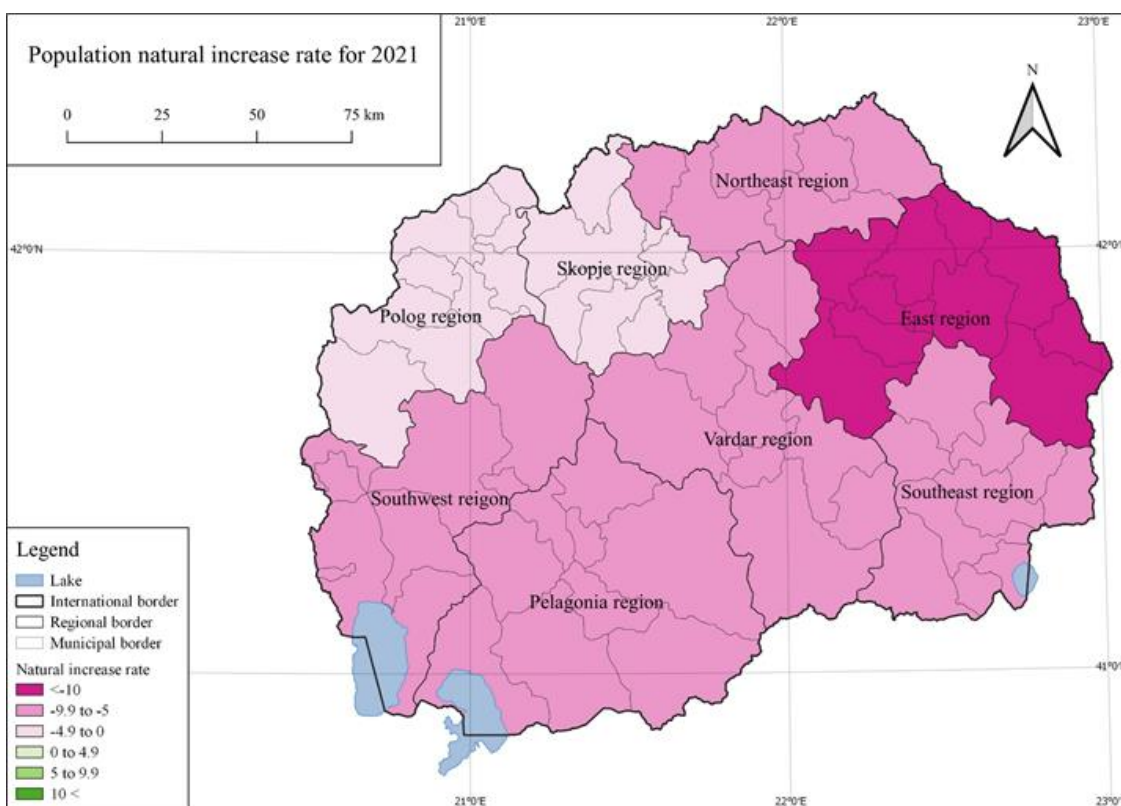


Figure 2. Population increase rate for 2021

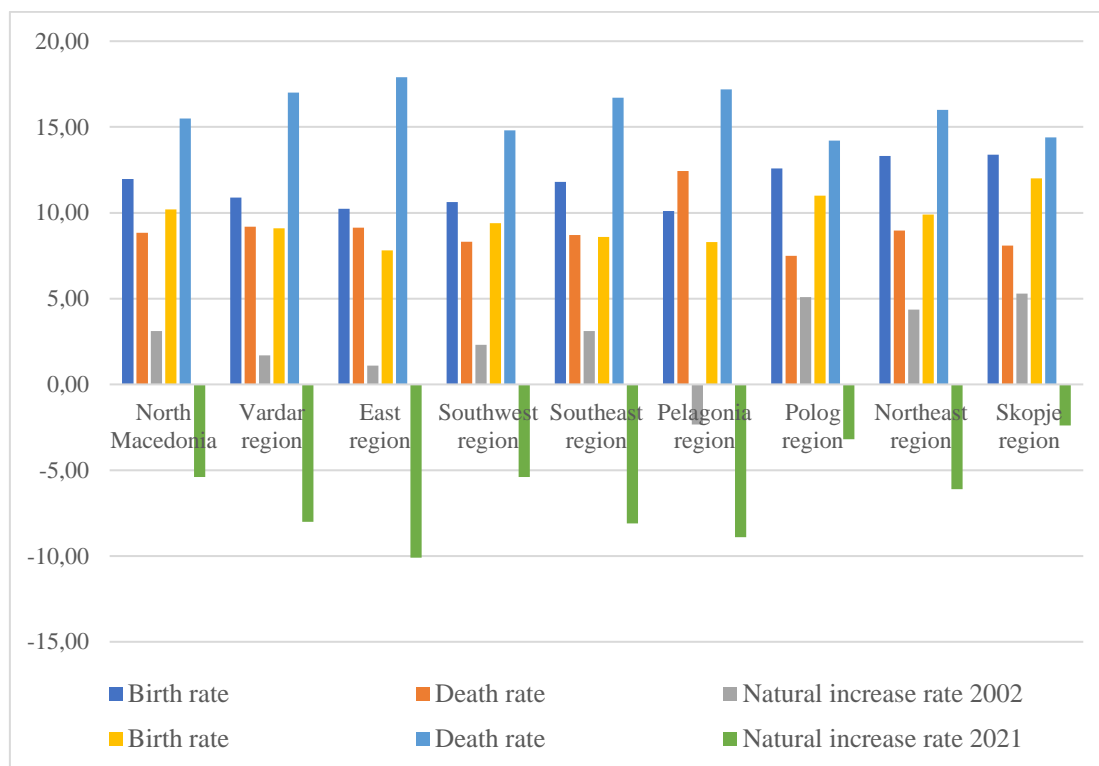


Figure 3. Birth rate, death rate, and natural increase rate for 2002 and 2021, by region

Changes in the number and birth rates occur as a result of changes in society and lifestyles, which lead to an increased share of women in the educational process and the (labor) market, delayed marriage, and giving birth at an older age, which leads to a shorter reproductive period [35]. The acceptance of modern lifestyles and the definition of the role of the genders in society and the family; the right to self-determination for the (non)realization of parenthood, "dramatic shift in norms toward progressiveness and individualism, which moves away from marriage and parenthood" [61] where "altruism is replaced by individualism", in which, "first and foremost, individual rights and self-fulfillment are emphasized ... who make plans for their future based on a mix of familism, consumerism, careerism, and other lifestyles." [51] ... led to the definition of the birth (fertility) rate, which has been steadily declining in recent years.

The mortality rate has increased from 8.84‰ in 2002 to 15.5‰ in 2021. The increase in the mortality rate is present in all regions, which is the result of the rapid process of population aging. In five regions, the values are higher than the national average (Southeast, Vardar, East, Southeast and Pelagonia), while the other three were below the value of 15.5‰. The East region had the greatest mortality rate (17.9‰) in 2021, while the Polog region had the lowest (14.2‰). Out of a total of 80 municipalities, 40 have higher mortality rates than the national average. The highest value was recorded in the municipality of Staro Nagorichani (30‰), followed by Novaci (26.8‰), Novo Selo (26.8‰), Lozovo (26.5‰), and Pehchevo (24.1‰), Cheshinovo (23.8‰), Demir Hisar (23.6‰), Debarca (22‰), Mogila (21.6‰), Zrnovci (20.1‰) and Kratovo (20‰). All of this reflects on the volume and age structure of the working-age population, as well as the population structures, range, and pace of population "feeding" of the young population age group. The process and intensity of population reproduction, as well as the structural linkages developed between the birth rate and mortality, are critical for every country's economic development [9].

The long-term high unemployment rate [8], associated with a significant increase in poverty and social exclusion among several population segments has been considered the most important "push" factor for emigration [44].

Emigration is primarily characteristic for the young population, the core of the working-age population, and the fertile contingent (aged 20 to 39 years), which in the emigration areas cause a reduction in the volume of these age groups, resulting in so-called shortened generations [9], whereas, in the immigration areas, these generation groups mark an extension.

From 2002 to 2021, of the total number of internal migrants, even 75.4% were involved in the migration between municipalities. A total of 63,085 people were involved in migration movements among the eight regions. Thereby, 41.8% of the total migrations were directed to the Skopje region which in the entire analyzed period is the only region with positive net migration in the country. Mainly directed towards the municipalities of Skopje, internal migrations create the basis for a series of problems that can arise due to the unequal distribution of population, and disadvantages in the gender and age structure of the population in particular regions [4], which creates a situation of demographic and economic polarization [37], [5], and on the other hand, there is an intensive demographic emptying and creation of an unfavorable demographic state.

Except for the Skopje region, over 90% of the emigrated population in all other regions is in their working-age with over 70% of the population aged 20 to 39 years old in all but the Skopje region. People aged 30 to 64 are most frequently involved in the overall migration between municipalities, followed by people aged 15 to 29, only with a slightly smaller share. More than two-thirds of the participants emigrating from the rural municipalities are between the ages of 20 and 39, i.e., the working-age and reproductive population, which is critical for the municipalities' demographic and economic survival [39]. The positive net migration in international migrations comes as a result of the immigration of foreign citizens [6]. Starting from 2005 to 2021, with few exceptions, the net migration for the citizens of the Republic of North Macedonia has a negative sign.



Figure 4. Net migration (total, citizens of North Macedonia and foreigners) for the period 2002-2021

The Pelagonia region is the only one that has maintained a positive net migration (only when it comes to citizens of North Macedonia). The other regions have oscillating negative net migration. Unlike the previous analyzed years, in 2021 in the Skopje region, the international migration flows have a high value. A major portion of the rural population still chooses to relocate to the cities, while the number of people from the rural areas migrating outside of the country is decreasing. Urban municipalities have a significant outflow of population abroad.

The combination of low fertility and emigration exacerbates the effects of aging, as it is young people who are more likely to migrate. This creates a double "whammy" in terms of population aging, as young people are also potential parents, so their leaving further reduces the size of the new generations [13].

Given the fact that demographic change has a long-term impact on the economy and all other aspects of society, present internal and international migration trends can be regarded as negative, with the prospect of widening regional disparities in population distribution and structural features. The size and characteristics of the working-age population are defined by such creators of the population age structure, which also serves as the foundation for investment, regional and economic development, and economic sustainability in certain locations.

ANALYSIS OF THE POPULATION AGING IN NORTH MACEDONIA

The age structure of the country's population changed dramatically after World War II. From its prior status as a "young" country in 1953, with a share of 47,4% of young people and only 8.2% of the senior population, in seven decades, the situation has significantly changed.

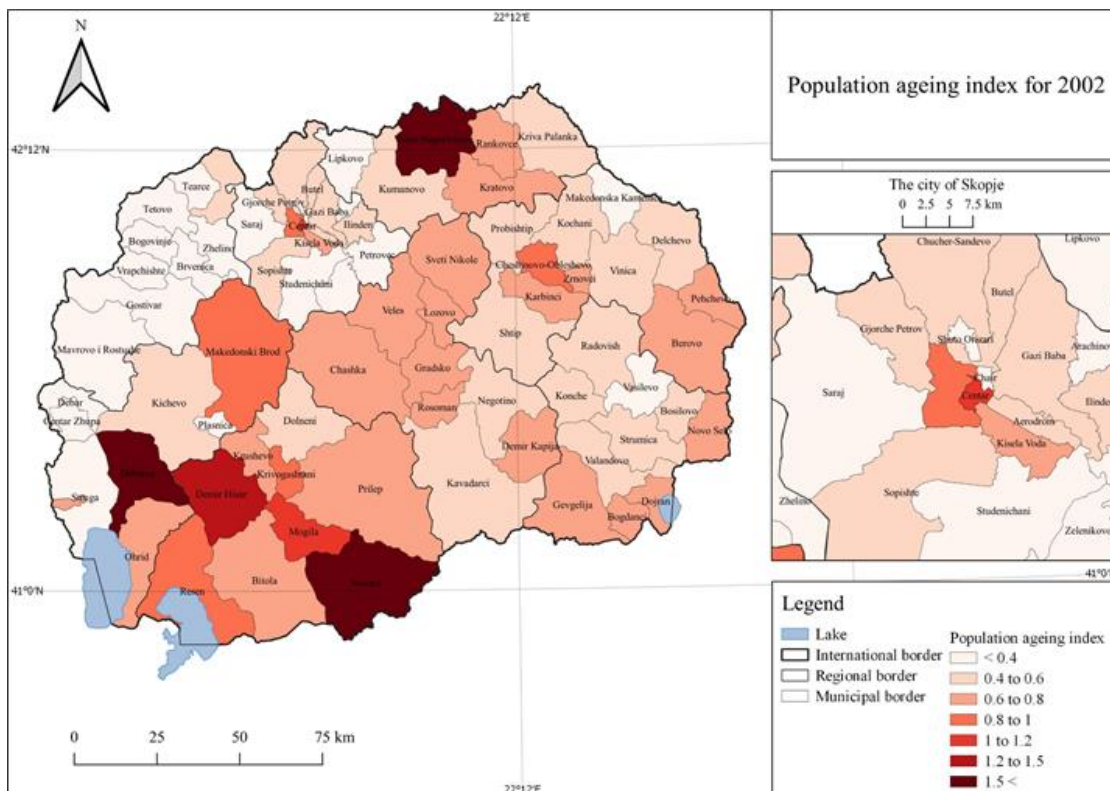


Figure 5. Population ageing index for 2022

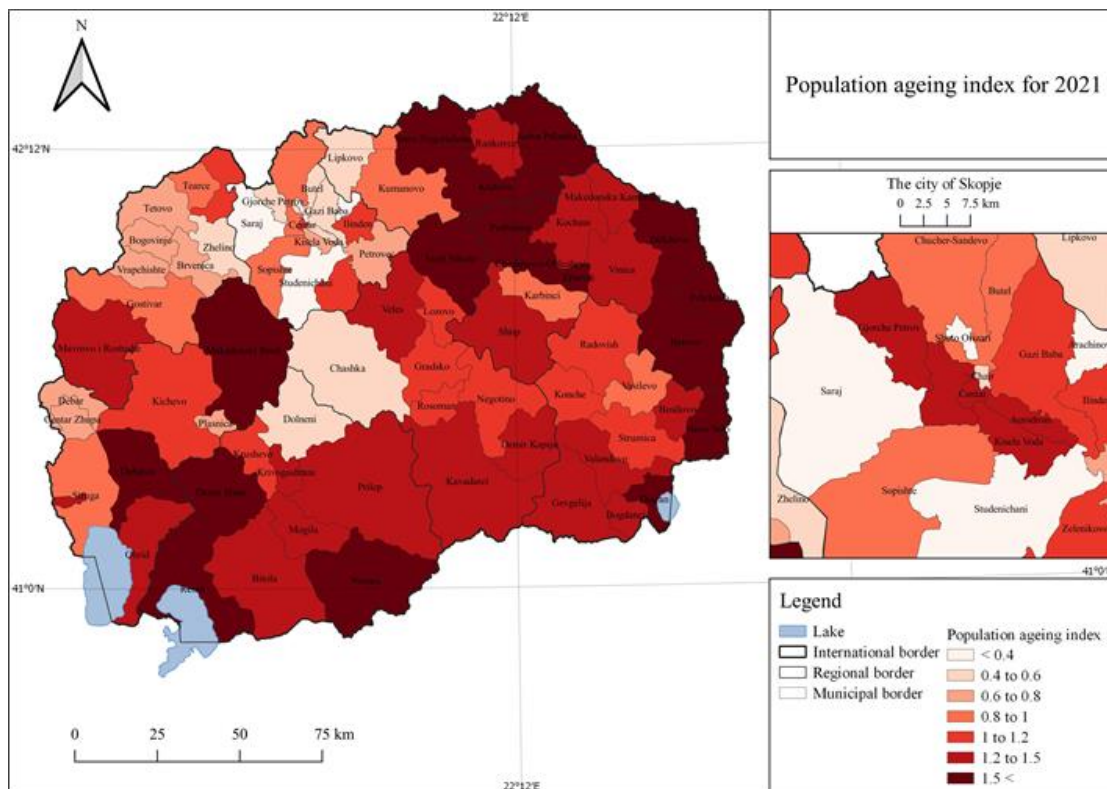


Figure 6. Population aging index for 2021

The decrease in the share of the young population from 29.3% in 2002 to 22.6% in 2021, as well as the increase in the share of the old population from 15% to 24% in the same period, confirms this. Simultaneously, the population ageing index grew from 0.51 to 1.06, and the average age increased from 34.6 to 40.3 years, indicating that the population in North Macedonia has reached a deep demographic old age.

Displacement to the border of older age is evident in all regions. The Skopje region, where a higher number of births and share of young people are present as a result of the increased immigration of young people, has the smallest decline in the share of the young population. The evident decline in the birth rate and the emphasized emigration contributed to the decline in the participation of the young population even in the Polog and Northeast regions. On the other hand, the share of the old population increased in all regions. In 2021, the average age of the population in the Polog region, Skopje, the Northeast, and the Southwest regions is lower than the state average, whereas Vardar, Pelagonia, the East, and the Southeast regions have an average age of over 40 years.

The Pelagonia, East, and Southeast regions are "the oldest", although the Polog region has characteristics of a "younger" region based on the share of young and old population, the shift from the stadium of a threshold of demographic age to a stage of demographic aging is visible. From 2002 to 2021, the population under the age of 19 decreased by -35% in urban municipalities, by -33.9% in rural municipalities and by -9.5% in the municipalities within the city of Skopje, with the highest decrease of -20.3 % in the municipality of Gazi Baba, and a decrease of -17.1% in Gjorche Petrov. At the same time, the population over 60 years of age increased by 47% in the urban, 25% in the rural, and 58.2% in the municipalities of the city of Skopje. Among the municipalities of the city of Skopje, the largest increase in the elderly population is evident in the municipality of Aerodrom (123%), Shuto Orizari (105%), and Gjorche Petrov (90.2%).

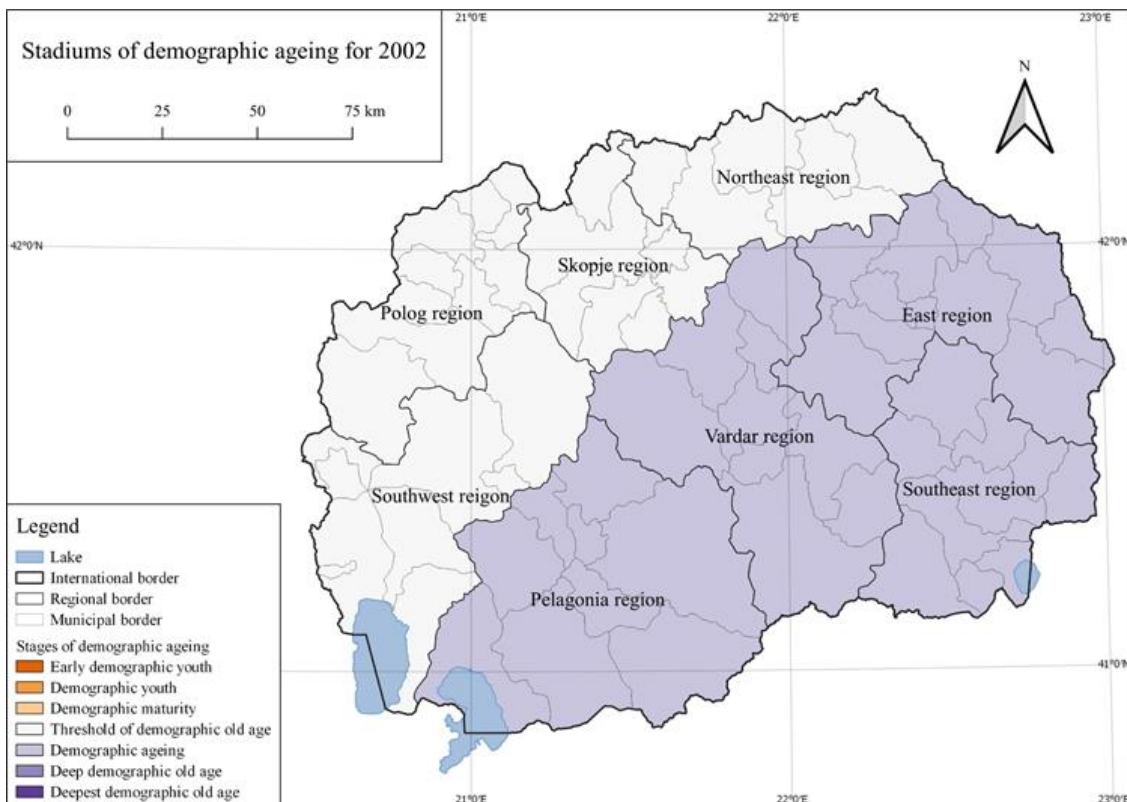


Figure 7. Stadiums of demographic age by regions 2002

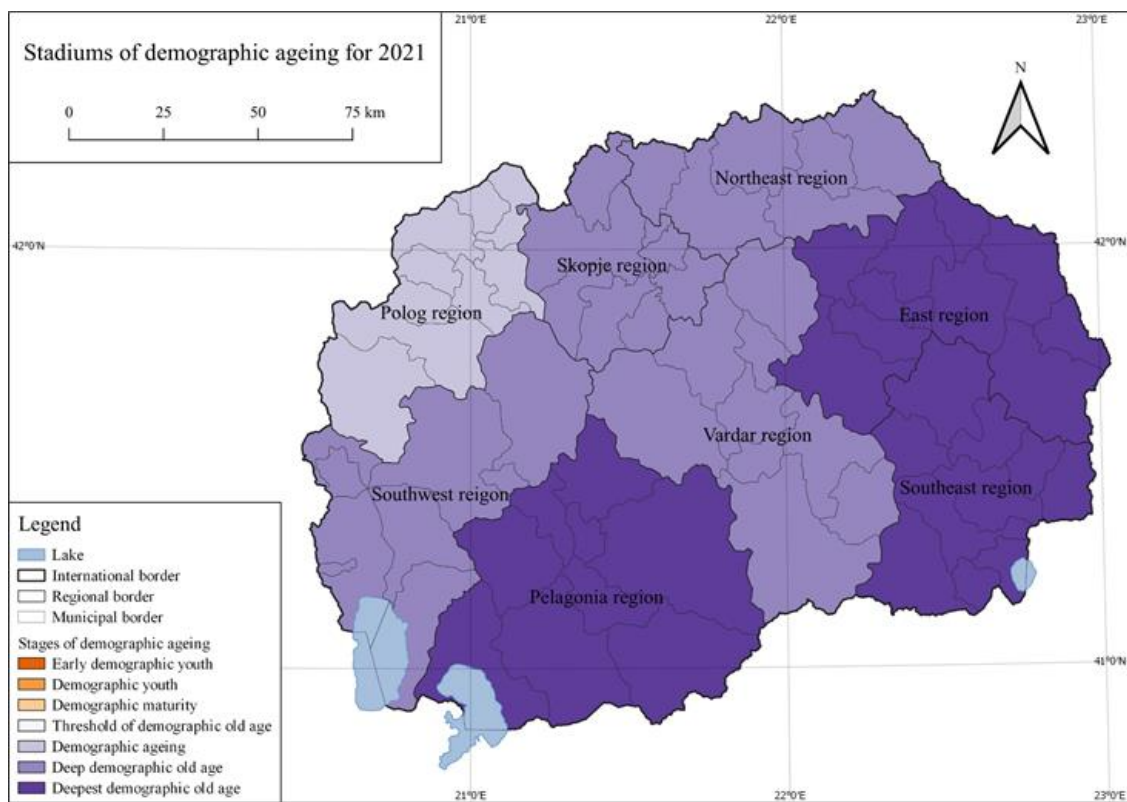


Figure 8. Stadiums of demographic age by regions 2021

The process of population aging is due to greater life expectancy, but it is also because of the decrease in the number of births on the other hand. As a result, the population is aging "from above" due to a decrease in the inflow of new young generations. The number of generations born in the 1960s and 1970s will migrate into the elderly group in the next 10 to 20 years, increasing the elderly population's share of the total population.

Hence, the few relatively "young" population zones and other locations where demographic aging is strongly ingrained, stand out. As a prerequisite for economic development, this phenomenon highlights the question of current demographic resources and the consequences that would be expected on the volume and characteristics of the labor contingent.

CHARACTERISTICS OF THE WORKING-AGE POPULATION AS A BASIS FOR THE ECONOMIC DEVELOPMENT

Labor supply is essential to economic growth, though the reality is far more complicated and less demographically defined. A shrinking working force does not necessarily cause problems in the labor market, because productivity is far more important than size. But in the long run, population aging will undoubtedly present a threat to economic growth, because it leads to a decline of the working-age population and aging of the labor force [62].

The variables for determining the volume and composition of the labor contingent are defined by its scope and structural characteristics, which determine its dynamics.

When looking at the population aged between 15 and 64 years old, after World War II, can be noted pronounced increase that lasted until the 1980s and the 1990s of the 20th century. This age group maintains a consistent volume and share in the overall population of over 2/3. This is related to the constant inflow of population in this age group which comes as a result of the relatively higher birth rate and the presence of several generations born in the 1950s and 1960s of the last century that will continue to participate in the increased volume of the working-age population for a long time. After 2002, however, a more significant change in the labor force is expected, both in volume and age, due to the decline in inflow and increased outflow of these generations, as described earlier in the text. "It is common knowledge, as an empirically verified law, that as the birth rate falls, the share of the working-age population in the total increases. There is an aging process of the labor force, recorded in the later stages of the demographic transition (central stage and late-stage)" [51]. The economic implications of population aging are mostly reflected in the impact of the volume of young individuals entering the working age. In particular, the share of the incoming age groups of 0 to 4, 5 to 9, and 10 to 14 years nearly doubled decreased from 1961 to 2002. On the other hand, the share of the age groups of 50 to 54, 55 to 59, 60 to 64, and over 65 years doubled their involvement throughout the same period.

The share of the working contingent in the total population amounts to 68.3% in 2002 and 65.9% in 2021. During this time period, it reduced its volume by 171,317 inhabitants or -12.4%, primarily in the age group of 15 to 29 years (-32%). On the other hand, there is greater growth in the age groups of 55 to 59 years (32,518 individuals) and 60 to 64 years (34,973 people). Negative growth in the working-age population is predicted due to the reduced inflow expected in the next five years, which will not be able to compensate for the outflow.

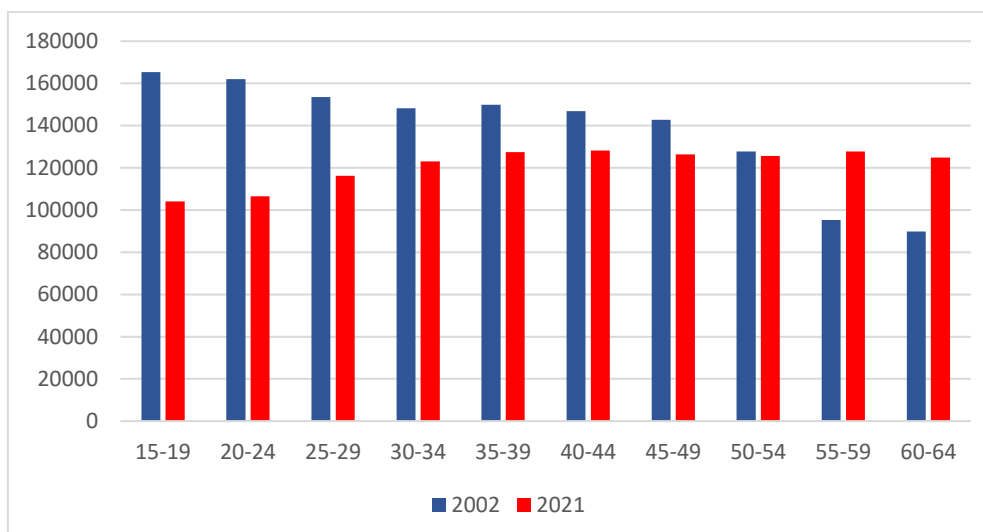


Figure 9. The working-age contingent in 2002 and 2021

In addition to the changes in volume, there are noticeable shifts in the aging of the labor force. In the analyzed period, the population aged 15 to 29 years, declined from 34.8% to 27%, and the population aged 30 to 44 years decreased from 32.2% to 31.3%. The share of people aged 45 to 59 years old has risen from 26.5% to 31.4%. In particular, we have a larger increase of the population in the older age group of the working-age contingent, in comparison to the younger i.e., the working-age population contingent from 40 to 64 years increases with the highest average annual growth rate of 0.3%, compared to the total population (-0.5%) and the young working-age population aged between 15 and 39 years (-1.6%). This unfavorable trend among the young age groups of the labor force only highlights the country's demographic resource constraints and rapid aging of the labor force in the coming years. The growth in the median age, as an adequate measure, given that "it is not affected by the extreme values of the population displacement by age", [9], confirms the aging of the labor force. The labor force median age has risen from 35.1 in 1981 to 35.3 in 1994; 36.6 in 2002, and 40.4 in 2021. "The effects of the aging labor force will be felt in the aging of the active population, as well as the direct and indirect repercussions on the labor market" [51].

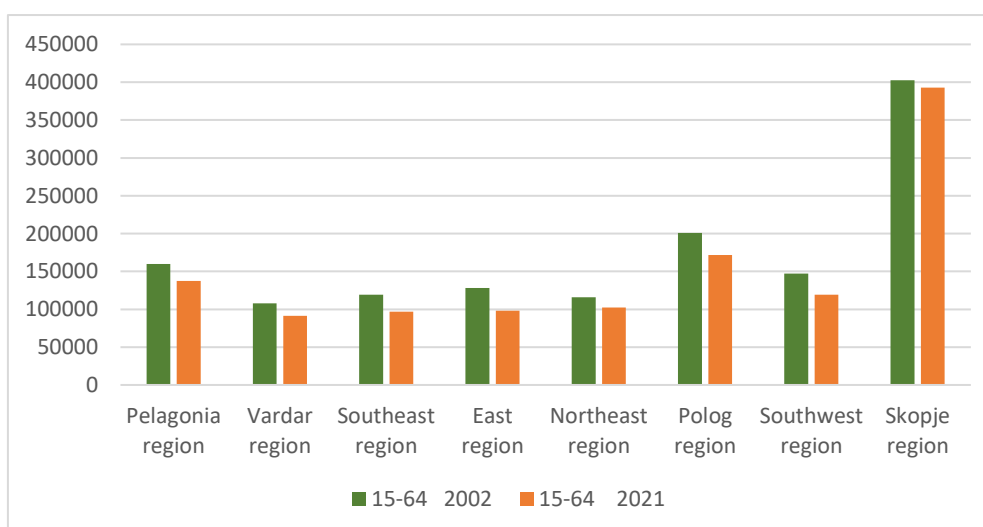


Figure 10. Reduction in the working-age contingent in 2021 compared to 2002

A decrease in the working contingent can be noticed in all regions, with the Skopje region having the smallest decrease of -2.4%, mainly due to the increase in the working contingent in several municipalities (Studenichani by 27.7%; Shuto Orizari by 17.1%; Sopshte by 15.9%; Arachinovo by 15.5% and Saraj by 11.3%).

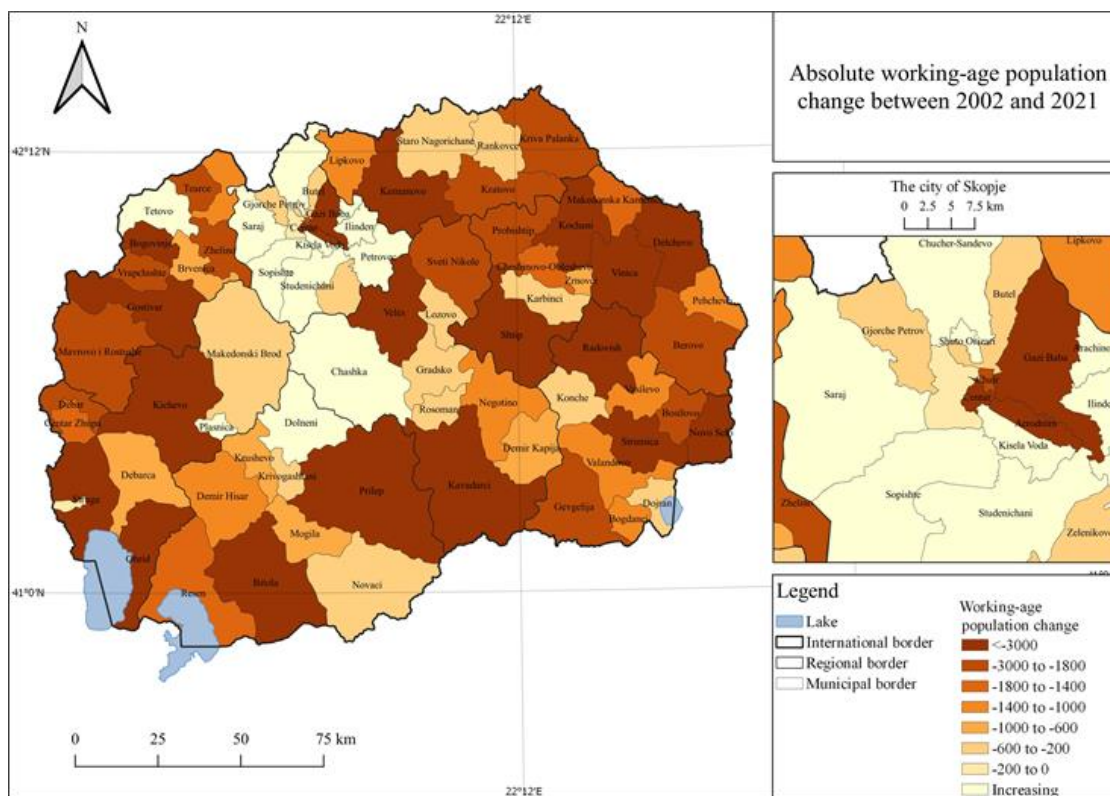


Figure 11. Absolute working-age population change between 2002 and 2021

Due to the increased inflow of new generations into the working-age population, these municipalities will be able to compensate for the reduced birth rate, migration, and outflow of generations for some time. However, because of the noticeable demographic depopulation in the other municipalities, it will be impossible to renew the labor force after 2026, but especially after 2031.

In terms of volume and generational replacement, the Skopje region will maintain longer, owing to the significant concentration of population that has resulted from immigration. In that period between 2002 and 2021, the working-age population in urban municipalities declined by 128,550 individuals, 28,647 in rural municipalities, and 14,120 in the municipalities of the city of Skopje. These points to a serious problem especially in rural areas, which have long been weakened as a result of strong industrialization, spontaneous de-agrarization, and undirected urbanization, and are no longer economically or infrastructurally attractive to keep the existing young and mature population. In 2021, rural municipalities account for only 17.4% of the overall population of the country, with the Polog region accounting for one-third. Four municipalities in the Polog region, along with Studenichani and Arachinovo from the Skopje region, will be the main carriers of the total rural population in the next ten years, contributing to the replacement of the working-age population. The apparent fall in generational replacement points to the lack of demographic resources required for economic development, a concern in all rural municipalities.

Table 2. Dynamics of the working-age population, by regions (NUTS 3)

region	Year	Inflow	Outflow	Increase in the working-age population	Increase rate	Replacement rate
RN Macedonia	2021-26	105508	124795	-19287	-1,6	84,5
	2026-31	109318	127752	-18434	-1,5	85,6
	2031-36	96521	126444	-29923	-2,5	76,3
Skopje	2021-26	36588	35113	1475	0,4	104,2
	2026-31	39658	37646	2012	0,5	105,3
	2031-36	36582	40006	-3424	-0,9	91,4
Polog	2021-26	15962	15670	292	0,2	101,9
	2026-31	16547	17705	-1158	-0,7	93,5
	2031-36	14370	17539	-3169	-1,9	81,9
Southwest	2021-26	9953	12800	-2847	-2,4	77,8
	2026-31	9891	12772	-2881	-2,5	77,4
	2031-36	8524	12182	-3658	-3,2	70,0
Pelagonia	2021-26	11448	16197	-4749	-3,5	70,7
	2026-31	10896	15359	-4463	-3,4	70,9
	2031-36	9148	14335	-5187	-4,0	63,8
Vardar	2021-26	7390	10612	-3222	-3,5	69,6
	2026-31	7625	10367	-2742	-3,1	73,6
	2031-36	6620	9935	-3315	-3,9	66,6
Northeast	2021-26	8901	10174	-1273	-1,2	87,5
	2026-31	9126	10764	-1638	-1,6	84,8
	2031-36	7953	10528	-2575	-2,6	75,5
East	2021-26	7307	12555	-5248	-5,4	58,2
	2026-31	7276	11711	-4435	-4,8	62,1
	2031-36	6144	10698	-4554	-5,2	57,4
Southeast	2021-26	7958	11674	-3716	-3,8	68,2
	2026-31	8299	11428	-3129	-3,4	72,6
	2031-36	7180	10420	-3240	-3,6	68,9

Source: Authors' calculations using SSO population census data and the database

Table 3. Dynamics of the working-age population in the urban, rural municipalities and the municipalities within the city of Skopje

	Year	Inflow	Outflow	Increase in the working-age population	Increase rate	Replacement rate
rural	2021-26	21131	19897	1234	0,6	106,2
	2026-31	21921	21680	241	0,1	101,1
	2031-36	18633	21942	-3309	-1,6	84,9
urban	2021-26	53817	73706	-19889	-3,0	73,0
	2026-31	54146	72800	-18654	-2,9	74,4
	2031-36	47198	68754	-21556	-3,5	68,6
Municipalities in the city of Skopje	2021-26	30560	31192	-632	-0,2	98,0
	2026-31	33251	33272	-21	0,0	99,9
	2031-36	30690	34947	-4257	-1,3	87,8

Source: Authors' calculations using SSO population census data and the database

At the same time, the situation implies unused natural resources, restricted revitalization opportunities, and rural areas' demographic and economic insufficiency. Demographic and economic development would point to four possible scenarios based on the analysis and projections of the trend of behavior on the political scene.

Scenario 1 - Progressive scenario

North Macedonia's aspiration for European Union membership, among other things, aims to open up opportunities for economic development and contribute to a better demographic picture of the country. Assuming that the country's EU membership commitments are met on time, the hopes for a more stable economic condition, increased investment prospects, more jobs, a better social image of the country, and poverty reduction are achievable. There are numerous grounds to expect a decrease in emigration from the country, as well as retention of a young, working-age population and enough labor force to satisfy the demands of supplying adequate demographic resources for the expected increasing economy. It is a step toward achieving greater balance in terms of even population distribution by age and gender, as well as economic development.

Such preconditions for a better demographic picture will serve as a firm basis for a new trend in the scope and characteristics of the working-age population, as well as new economic development potential.

This progressive scenario is primarily associated with urban municipalities. On the other hand, rural municipalities are anticipated to receive investments to improve their quality of life and raise their population's living standards, reroute migration, and stimulate daily and cyclical migration. The retention of the population and the facilitation of population development are merely a starting point for promoting economic development.

Scenario 2 - Regressive scenario

The working-age population from rural municipalities is expected to continue to move mostly to urban settlements and abroad because of the current conditions of spatial and economic organization and infrastructural equipment of the rural area. Such emigration, combined with the lower birth rate, will surely result in significant population loss and aging in this area. In the few rural municipalities that have a higher birth rate than other ones, the losses of the emigrating population will be compensated in the next few years, while the effects will be seen by the end of this decade when the impact of reduced birth rates and emigration will be felt.

A continuing outflow of the population is unavoidable given the weaker economic base in urban municipalities such as Delchevo, Makedonski Brod, Krushevo, Valandovo, Bogdanci, Pehchevo, Kratovo, Sveti Nikole, and others. In this period, the consequences will be visible even in the municipalities with a larger population such as Gostivar, Tetovo, Kumanovo, etc. Thus, demographically weakened and with population aging, municipalities will have real difficulties in demographic and economic sustainability and development.

Scenario 3 - Optimistic scenario

The optimistic scenario depicts a future in which the country will be attractive to foreign immigrants as a potential EU member. Larger investments would produce more job possibilities and bring employment and unemployment rates closer to those in European Union countries.

The optimistic scenario allows us to observe the advantages in terms of demographic situations, such as moderating current and preventing further depopulation.

This circumstance will help to prevent the rapid aging of the total population and the working-age population, as well as economic development predispositions. Serious opportunities for safe investments, product placement, income, and the possibility of a higher standard will be realized.

Scenario 4 – Pessimistic scenario

Assuming that North Macedonia joins the EU, deviations from the desired trends in terms of economic development are possible. Namely, the opening of the opportunity to be a part of the EU brings the privilege of looking for a job in the member states, where the job earnings are higher. Therefore, the expectations for a mass outflow of the labor force and greater acceleration of the population aging process are realistic. After all, these scenarios have already been recorded in countries like Croatia, Bulgaria, etc.

CONCLUSION

The parallel between demographic aging and labor force features as a basis for economic development planning, highlighted the current poor position, which, sadly, is anticipated to worsen under current economic and political conditions. The population in the country is in the stage of deep demographic old age and only a few municipalities stand out as young zones, whose "youth" is a result of greater birth rates in recent years or immigration, as is the case in certain municipalities within the Skopje city area.

The extent and features of the working-age population are directly impacted by this circumstance. Its volume lowers and records aging.

After 2026, the problem with a lack of labor force by volume and age characteristics will become increasingly severe in all municipalities and regions. This will be more pronounced in rural municipalities, as their material and institutional infrastructure makes them unattractive for maintaining young people or attracting new people and investments in the economy. At the same time, unfavorable changes in the working-age population will have an impact on the current labor force (employed and unemployed population), while the outflow of the labor force will cause skills shortages in the Macedonian labor market [44].

In a country facing all these economic, political, and social issues, the problem of replacing generations of the labor force will have severe implications for the country's future economic development. The problem is much worse when we first consider the young population's tendency to migrate to societies with developed economies and higher incomes, which are "psychologically" imposed on the population as countries synonymous with standard and earnings, and second, the state's inability to retain or attract such a population due to non-competitiveness both on economic power, as well as living conditions. There seems solution to population aging, and the remedies for its negative effects need to be sought among non-demographic policies [17].

In the current conditions, the negative sign of population aging gives an alarm to governments in order to consider changes in social, demographic [41], and economic policies. Among the social measures, it is necessary to define the social problems and needs of individuals and to overcome social exclusion, equal education opportunities, acquisition of skills, continuous i.e., lifelong learning, life, and work.

Investments in the business sector are highly needed, then, creating conditions for more jobs and higher personal income, which as a motive will contribute to retaining the population and would have a positive impact on labor resources. It is extremely important to strengthen the agricultural sector and the agro-industry, benefits packages for the agricultural production development, which is the basis for strengthening the economy considering the country's agrarian resources, opportunities for balanced regional development, economic but also demographic strengthening of rural municipalities, etc. At the same time, society must get rid of the devaluation of the values of the individual, the great partisanship, the inaccuracy of the institutions, and the poor environmental

conditions, so that young people may decide to choose their own country as a place where they will build their future.

This situation highlights the urgent necessity to join the EU as soon as possible and invest in critical sectors, as well as the unavoidable need to adapt to European laws, rules, and norms. This would surely avoid creating a "depopulation and destitute country", which would undoubtedly result in a new problem in the region and beyond.

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