**NATASHA DANILOSKA[[1]](#footnote-1)\***

**DIANA BOSHKOVSKA[[2]](#footnote-2)\*\***

**DEMOGRAPHIC CHANGES AND ECONOMIC ACTIVITY IN THE VARDAR REGION**

**Abstract**

The results of the 2021 Census of Population, Households and dwellings showed that in the first decades of the 21st century in the Republic of North Macedonia, there was a decline in the total resident population and hinted at unfavorable demographic changes. These changes will undoubtedly have implications for the future development of the population, socio-economic and regional development.

In this paper[[3]](#footnote-3), through available data from secondary sources, the Vardar region is analyzed as one of the eight non-administrative units-statistical regions in the Republic of North Macedonia. The available human resources and their economic characteristics (working age population and labor force) are perceived from the data of the two consecutive censuses 2002 and 2021. Also, some indicators of the economic activity of the Vardar region are analyzed (GDP per capita, GDP index, Gross value added by sectors of activity, Gross fixed capital formation by sector of activity and number of active enterprises) for the period 2010-2021. The identified changes of the basic demographic and socio-economic characteristics of the population and economic activity in the Vardar region can serve in the creation of appropriate policies, measures and activities for its development.

**Key words: Vardar region, population, demographic changes, socio-economic indicators**

**JEL classification: J11, J21**

**Introduction**

In the RN Macedonia, a period of 20 years passed between the two last censuses of 2002 and 2021. That in itself is an incentive to analyze the demographic changes that occurred during this time period. In this paper, Vardar region as one of the eight statistical regions in the RN Macedonia is analyzed.

The analyzes begins with comparison of the demographic changes that occurred in this region between two censuses of 2002 and 2021. The changes in the total population and the population density, then the number and percentage share of the population by age groups and educational attainment, rates of activity, as well as the employment and unemployment rates are observed. The analysis was done on three levels (at national level, at Vardar region level and by municipalities in the region), which allows a multi-purpose comparison of the data. This enables evaluation of the situation in the region in relation to the country, and state of the municipalities in relation to the region and between themselves.

In the second part, the region’s economic activity is analyzed in comparison to the national level activity. Several indicators are used such as GDP per capita, GDP index, Gross value added by sectors of activity, Gross fixed capital formation by sectors of activity and the number of active enterprises.

The purpose of this analysis is to determine the interaction between demographic changes and economic activity in the Vardar region. The research relies solely on secondary data and hence some limitations arise. Some refer to demographic data and result from methodological changes from one census to another, which make it impossible to make a direct comparison of certain data from the Population Censuses for 2002 and 2021. Another limitation refers to the fact that the indicators for economic activity are taken from the annual regional publications that have been issued since 2009, in which aggregated data for the regions are published, but not for the constituting municipalities.

1. **DEMOGRAPHIC CHANGES BETWEEN TWO CENSUSES IN THE VARDAR REGION**

According to the latest statistical data, the Vardar region has the smallest number of inhabitants, i.e. 7.5% of the total population in the country (estimated population on June 30, 2022). Spatially, the region covers an area of 4,042 km2 or 16.2% of the Macedonian territory and is also the least populated region with only 38.07 inhabitants per km2 in 2002, compared to 34.1 inhabitants per km2 in 2021.[[4]](#footnote-4) The region consists of 9 municipalities: Veles, Gradsko, Demir Kapija, Kavadartsi, Lozovo, Negotino, Rosoman, Sveti Nikole and Chaska, in which 215 settlements are located. Table 1 presents a comparative overview of the situation between two censuses (2002-2021), regarding the changes in the total population in the Vardar region and its municipalities.



The data shows that the total population in the region decreased by 10.2% (or by 15813 inhabitants), which is more than the national average (-9.2%). The largest municipality by population in the region in both censuses is Veles, which accounted for 35.7% of the population in 2002, and 35% in 2021. The second largest is the Kavadartsi municipality, in which 25% of the total region’s population lived in 2002, while in 2021 the share is 25.1%. The smallest municipality by population is Chaska, which is the only one where the total population between two censuses increased, from 5% in 2002, to 5.7% in 2021.

Тhe total population in Vardar region municipalities corresponds to the size of their territory and the population density. In all municipalities, the reduction of the total population is also reflected in the reduction of the population density. Only in Chaska municipality there is a positive change in population density, i.e. grew from 9.4 to 9.7 inhabitants per km2.[[5]](#footnote-5)

When analyzing the situation of the population according to five-year age groups, it should be pointed out that in the Census 2002 there was also a group of "unknown age", which has a small absolute value and does not affect the percentage share distribution.





Presented numerical situation and percentage share of the population by age groups (Table 3) indicates that at national level, the median age increases from 35 to 40.8 years. Median age (together with share of the total population under 20, under 40 and over 60, as well as the aging index), causes a change in the population aging rank from 5 (demographic age) to 6 (deep demographic age). The Vardar region follows this trend, i.e. the median age of 36.3 years has grown to 42.2 years and the population aging rank moved from 5 to 6. At municipal level, Veles, Demir Kapija, Lozovo and Sveti Nikole moved to rank 7 (deepest demographic age), and only Chaska municipality has rank 5.

Although the absolute numbers show a stable, slight downward trend, when inter-census changes analyzed and compared in percentage share (structural change) at the municipal level (Graph 1), it is clear that in some of them the situation regarding population growth is more serious. Namely, in the municipalities of Veles, Demir Kapija, Kavadartsi and Lozovo there is a more serious structural decrease in the age groups 10-14, 15-19 and 20-24 years. In the same time, there is a significant increase in the age groups 55-59, 60-64 years in the municipalities of Demir Kapija, Kavadartsi, Lozovo, Negotino, Rosoman and Sveti Nikole, and significant increase in the age groups 65-69 and 70-74 years in the municipalities of Veles and Negotino. Hence, the aging of the population is more pronounced in the Vardar region than at the national level. The situation becomes even more serious if we add that in the inter-census period there is also a downward trend in the functional age-gender contingents.[[6]](#footnote-6) The decline of the share of women in the reproductive period, that is, the age groups of the female fertile population (15-49 years) and women in the optimal reproductive age (20-34 years), is of particular concern here. At the national level, in the period 2002-2021, the participation of female fertile population decreased from 25.5% to 22.4%, and at region’s level from 25.3% to 21.0%. In the same time, both at national and at region’s level, the drop in the contingent of women in optimal reproductive age is 11.2% to 9.2%, and 10.5% to 8.5%, respectively. The only exception is Chaska municipality, with slight increase in the female fertile population (15-49 years), 20.8% to 21.2%.[[7]](#footnote-7) Thus, the unfavorable age structure of the population not only worsens the problem of population growth, but also worsens the reproduction of the population, that it reduces the reproductive base.

According to the educational attainment, the Vardar region follows national trends. In the inter-census period, the share of the population with uncompleted primary and lower secondary education decreases, while a positive trend is observed in other types of educational attainment. Considering that this analysis refers to the socio-economic situation and follows the changes of the population in terms of available human resources (working age population and labor force), in the following text only the demographic changes in the population with educational attainment from upper secondary education[[8]](#footnote-8) or higher, that can engage in economic activity will be commented. In addition, it should also be said that in the country the high education segment has undergone reforms, so according to Article 184 of the Law on Higher Education from 2000[[9]](#footnote-9), the high schools in the RN Macedonia went through a process of transformation and continued their activity as higher education schools.

According to both censuses, population with upper secondary education from Vardar region participate about 9% in the national structure (Table 4). However, at the region’s level, a slight increase in the population with upper secondary education is observed from 42.2% in 2002 to 50.8% in 2021. In both censuses, the majority of this population are in the municipalities of Veles (38.7% and 36.3%, respectively), Kavadartsi (28.5% and 27.9%, respectively) and Negotino (12.4% and 13.3%, respectively), while Lozovo municipality has the least (1.2% and 1.4%, respectively). In both censuses is noticed a seemingly large increase in the share of the population with higher education school, faculty and academia, both in national and region’s level (from 6.5% to 17% and 5.2% to 15%, respectively), which is actually due to the transformation of high schools into higher education school and compulsory upper secondary education. Largest percentage of population with higher education school, faculty and academia in both censuses have the municipalities of Veles (42.7% and 37.9%), Kavadartsi (30.8% and 31.8%) and Negotino (12% and 13.3%), respectively. Regarding this group of population, there have been changes in relation to the municipalities with the lowest share, that is, in 2002, the municipalities of Chaska and Rosoman had the smallest participation with 0.4% each, and in 2001, it was the Lozovo municipality with 0.8%.





Before going into the population's economic characteristics, it is important to note that the data from the 2002 and 2021 censuses cannot be directly compared. Namely, in the 2002 census, data on the economic characteristics of the population were based on the Labour Force Survey, whereas in 2021, they were acquired from administrative data sources (registers) in the country. It indicates a methodological mismatch in these data, making direct comparison impossible. Furthermore, according to Eurostat's recommendations and the existing Macedonian legal framework, which provides retirement at the age of 64 (with the exception of certain categories of employees), it is more relevant in the analysis to use the working-age population aged 15 to 64 years. However, only data on the working-age population aged 15 and up were published in the State Statistics Office's database for the Census 2002 year.

Working age population (active and inactive), the situation is best understood through the activity rates (general activity rate, general activity rate of the working age contingent and rate of economic underutilization of the working age contingent) which at the national level have a favorable trend. Generally, the Vardar region follows the national trend, with a more favorable structure. Having in mind methodological discrepancies, in Table 5 are given data regarding all activity rates in the two consequent Censuses. By municipalities, the general activity rates gravitate around the value at the region’s level in both censuses, with a larger deviation in Chaska municipality (24.2% and 19.7%, respectively), while in the municipality of Lozovo there is a deviation only in the census of 2002 (33%). As expected, the values other two rates correspond with the values of the general activity rates.

Regarding the employment and unemployment rates, the trends are favorable both at national and at region’s level, that is, the employment rate is increasing, and the unemployment rate is decreasing (Graph 2). More specifically, the employment rate in 2002 at the region’s level was the same as the national rate (29.2% and 29.5%), but in 2021, its increase is higher (29.5% to 55.8%, respectively), in relation to the increase of the national rate (29.2% to 49.9%, respectively). At region’s level in 2002, the unemployment rate (43.5%) was significantly higher than the national rate (38.1%), but in 2021 it drastically decreased and amounted to 12.6%, that in the same time is less than the national rate of 15, 3%.

**Graph 2. Employment and unemployment rates in in the Republic of North Macedonia, in the Vardar region (NUTS level 3) and by municipalities (NUTS level 4), 2002 and 2021**

****

On municipal level, in 2002 the employment rate was the highest in Veles (32.8%) and Sveti Nikole (30.9%), being also higher than both the national and region’s rates. Chaska municipality has the lowest employment rate (19.4% and 24.9%, respectively). Regarding the unemployment rate, it decreased in all municipalities in 2021, especially in Kavadartsi, Rosoman and Lozovo. In 2021, Kavardaci municipality has the lowest unemployment rate of 9.1%, while Gradsko has the highest, 26.5%.

**2. ECONOMIC ACTIVITY OF THE VARDAR REGION**

The economic activity of the Vardar region will be analyzed for the period 2010-2021 through several indicators: Gross domestic product per capita, GDP index, Gross value added by activity sectors, Gross fixed capital formation by activity sectors and number of active enterprises. Starting from 2009, these data are regularly published in the "Regions in the Republic of North Macedonia". They show the eight non-administrative regions in the country, divided according to the NUTS Nomenclature, harmonized with the European regulation.

In the creation of the gross domestic product at the national level, the Vardar region has a relatively low and fluctuating participation, but with a slight upward trend. When GDP is correlated with total population, keeping in mind that it is slightly and continuously growing at the national level for the majority of the analysed period, while it is slightly and continuously decreasing in the Vardar region, it is determined that GDP per capita is more favourable in the region. In the same period, GDP per capita in the Vardar region increases slightly and since 2011 it exceeds the value of GDP per capita at the national level (Graph 3).

|  |
| --- |
| **Graph 3. GDP per capita in the Republic of North Macedonia and in the Vardar Region, for the period 2010-2021** |
|  |
|  |
| *Source: State Statistical Office, "Regions of the Republic of North Macedonia" 2009-2023, https://www.stat.gov.mk/PublikaciiPoOblast.aspx?id=32&rbrObl=37 (accessed: 20.02.2024))* |

GDP index is also more favorable in the region. It exceeds the value of the national index, especially in 2019 when it is 108.4.

Regarding contribution to the gross added value at the national level, the Vardar region is in 5th or 6th place. In term of gross value added by sectors of activity, the region records a fluctuating participation on national level, and it had the largest share of 8.2% in 2013 for the period 2010-2021. (Table 8)



In terms of this indicator, from the region’s leading sectors are: agriculture, forestry, fishing; mining, manufacturing, electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities and wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities. With the exception of 2010 and 2011, the sectors of agriculture, forestry and fishing have the highest participation in the national gross value added (lowest in 2012, 2.3% and highest in 2019, 15.2%.). Other two sectors alternately appear in second and third place, with a fluctuating degree of participation in the national gross added value. The sectors of mining, manufacturing, electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities have the largest share of 21.7% in 2021 (second), and the lowest of 8.7% in 2017 (third). The sectors of wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities have the largest share of 10.7% in 2017 (second), and the smallest at 6.8% in 2010 (third). Additionally, the sectors of financial and insurance activities, have modest share until 2015 (1.2%), but since 2016 have significant and stable increase (highest share of 6.7% in 2019).

|  |
| --- |
| **Graph 4. Percentage share in Gross value added, by sector of activity in the Republic of North Macedonia and in the Vardar Region, for the period 2010-2021** |
|  |
|  |
| *Source: State Statistical Office, "Regions of the Republic of North Macedonia" 2009-2023, https://www.stat.gov.mk/PublikaciiPoOblast.aspx?id=32&rbrObl=37 (accessed: 20.02.2024)* |

When observing the participation in the gross added value according to the sectors of activity within the region itself, the situation is different (Graph 4). Only in 2010, 2011 and 2021, the sectors of mining, manufacturing, electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities were leading. In all other years, the sectors of wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities have the largest share. For the entire period, the sectors of agriculture, forestry and fishing are third.

In terms gross fixed capital formation by sectors of activity at the national level in the period 2010-2021, the participation of the Vardar region is modest and fluctuating. It had its minimum in 2012 (4.6%), and its maximum in 2016 (7.3%).[[10]](#footnote-10) Within the region, the sectors of mining, manufacturing, electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities and agriculture, forestry and fishing have a leading and stable participation.

|  |
| --- |
| **Graph 5. Percentage share in Gross fixed capital formation, by sector of activity in the Vardar region, for the period 2010-2021** |
|  |
| *Source: State Statistical Office, "Regions of the Republic of North Macedonia" 2009-2023, https://www.stat.gov.mk/PublikaciiPoOblast.aspx?id=32&rbrObl=37 (accessed: 20.02.2024)* |

The share of gross fixed capital formation by sectors of activity at the region’s level for the period 2010-2021 is different (Graph 5). Three leading sectors are: mining, manufacturing, electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities; construction and wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities. Gross fixed capital formation in the sectors of agriculture, forestry and fishing are insignificant, with the exception of 2010.

|  |
| --- |
| **Graph 6. Total number of active enterprises in the Republic of North Macedonia and in the Vardar Region, for the period 2010-2021** |
|  |  |
|  |
| *Source: State Statistical Office, "Regions of the Republic of North Macedonia" 2009-2023, https://www.stat.gov.mk/PublikaciiPoOblast.aspx?id=32&rbrObl=37 (accessed: 20.02.2024* |

Total number of active enterprises for the period 2010-2021 records a negative trend both at national and region’s level (smaller fluctuations). There was an insignificant increase in the number of active enterprises in 2012, while in 2019 that increase is more pronounced, both at the national and region’s level (Graph 6). The lowest number of active enterprises in RN Macedonia was in 2015, while in the Vardar region in 2018.

3. **Conclusions and recommendations**

The numerical state of the resident population and its structure are one of the most important aspects of the population that affect its development, but also the possibilities for the overall socio-economic development.

The analysis of inter-census demographic changes showed that they are less favorable in the Vardar region, compared to the general situation at the national level.

The unfavorable demographic situation in the Vardar region leads to the reduction of the total population and increased participation of the aging contingent. This also leads to a decrease in the labor force, that has better activity and educational attainment in the region than the one at the state level. The accelerated aging of the population and the reduction of the contingent of the reproductive female population reduce the reproductive base of the region, which means that in the medium term the region will face an even more pronounced labor shortage.

Data on the rate of active population, employment and unemployment in the Vardar region are more favorable than the national level, but the region fails to achieve significant economic development and follow the trends in more developed regions. This is primarily due to the fact that newly added value and gross fixed capital formation are created and placed in labor-intensive sectors. In addition, the continuous decrease in the number of active enterprises in the region has an unfavorable effect on economic development.

At the same time, the analysis of educational attainment showed that the level of education of the workforce in the Vardar region is growing, which points to the conclusion that the region should expect an increased lack of workforce with low and medium qualifications, necessary to maintain labor-intensive activities. In order to alleviate the shortage of labor force caused by the unfavorable demographic trends in the Vardar region, there is a need to properly redefine the priorities and the relevant policies of action.

In the short term, the shortage of available labor could be alleviated through labor imports. Although there is a legal framework for this, initial experiences show that it needs simplification of the administrative procedures and the issuing of permits.

In the medium term, it is necessary to increase and improve the structure of gross fixed capital formation both in the leading and in the other sectors of activities in the region. Namely, part of the labor shortage in the leading labor-intensive sectors could be mitigated by investments in mechanization, automation and digitization of production processes. However, in order to engage and retain the young highly qualified workforce in the region, it will be necessary to intensify investments and encourage the development of other sectors of activities that could offer suitable jobs for them.

**References:**

* Agata Szymańska: ”Demographic Changes in the Countries of the Western Balkans-A Comparative Analysis with the European Union”, nomic Research. Central and Eastern Europe Volume 25, Number 3, 2022, available at: https://doi.org/10.18778/1508-2008.25.26
* Cane Koteski, Dusko Josheski, Zlatko jakovlev, Nikola V. Dimitrov and Snezana Bardarova, “Macedonia Demographic Aging”, Journal of Earth Science and Engineering 4, 2014, pp. 445-454, available at: https://eprints.ugd.edu.mk/10970/1/7-Macedonia%20Demographic%20Aging2.pdf
* Lutz,W., Butz, W.P. and Samir, K.C.: ”World Population and Human Capital in the TwentyFirst Century“, Oxford,UK: Oxford University Press, 2014, available at: https://api.pageplace.de/preview/DT0400.9780191008221\_A24387738/preview-9780191008221\_A24387738.pdf https://api.pageplace.de/preview/DT0400.9780191008221\_A24387738/preview-9780191008221\_A24387738.pdf
* Publication Office of the European Union: ”Demographic developments in the Western Balkans and Turkey“, 2021, available at: https://ec.europa.eu/eurostat/documents/4031688/12964134/KS-02-21-839-EN-N.pdf/c28bc490-eba4-8f8f-c368-40ad7b68c968?t=1624974063259
* Republic of North Macedonia State Statistical Office, “Regions of the Republic of North Macedonia, 2012-2023” available at: https://www.stat.gov.mk/PublikaciiPoOblast.aspx?id=32&rbrObl=37
* Republic of North Macedonia State Statistical Office, ”Census of the population, households and dwelings in the Republic of Macedonia, 2002“ (Book XIII), available at: https://www.stat.gov.mk/Publikacii/knigaXIII.pdf
* Republic of North Macedonia State Statistical Office, ”Census of the population, households and dwelings in the Republic of Macedonia, 2021“, available at: https://www.stat.gov.mk/publikacii/2022/POPIS\_DZS\_web\_MK.pdf
1. \* Ph.D. full time professor, University of “Ss. Cyril and Methodius“, Institute of economics-Skopje, natasha.daniloska@ek-inst.ukim.edu.mk [↑](#footnote-ref-1)
2. \*\* Ph.D. full time professor, University of “Ss. Cyril and Methodius“, Institute of economics-Skopje, diana@ek-inst.ukim.edu.mk [↑](#footnote-ref-2)
3. The research was conducted for the purposes of the project: *Demographic changes in the Republic of North Macedonia in the context of the population Census in the 2021 census - causes, consequences and implications*, financed by the University of Ss. Cyril and Methodius-Skopje, Republic of North Macedonia [↑](#footnote-ref-3)
4. Census of the population, households and apartments in the RN Macedonia, 2002 (Book XIII), https://www.stat.gov.mk/Publikacii/knigaXIII.pdf; (accessed on February 15, 2023). [↑](#footnote-ref-4)
5. Ibid [↑](#footnote-ref-5)
6. Women in the reproductive period (15-49 years) influence the values of the total fertility rate (TFR) which is considered as hypothetical or possible fertility and represents the number of live births that a woman is expected to have during her reproductive period. [↑](#footnote-ref-6)
7. Census of the population, households and apartments in the Republic of Macedonia 2002 (Book XIII), https://www.stat.gov.mk/Publikacii/knigaXIII.pdf; (accessed on February 15, 2023); Census of the population, households and apartments in the Republic of North Macedonia 2021 https://www.stat.gov.mk/publikacii/2022/POPIS\_DZS\_web\_MK.pdf (accessed on 15.02.2023) [↑](#footnote-ref-7)
8. According to Article 3 of the Law on Secondary Education, published in Gazette of the Republic of Macedonia no. 49/2007, starting from the academic year 2008-2009, upper secondary education in the Republic of Macedonia is mandatory. [↑](#footnote-ref-8)
9. Gazette of the Republic of Macedonia: Law on Higher Education, no. 64/2000, https://www.slvesnik.com.mk/Issues/766C5EB039794C2186FCDC03417A69D1.pdf (accessed on 24.1.2024) [↑](#footnote-ref-9)
10. State Statistics Office, Regions in the Republic of North Macedonia, publications 2009-2021, https://www.stat.gov.mk/PublikaciiPoOblast.aspx?id=32&rbrObl=37 (accessed on: 20.02.2024) [↑](#footnote-ref-10)