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NORTH MACEDONIA'S DEMOGRAPHIC FUTURE: INSIGHTS FROM THE POPULATION PROJECTIONS

Abstract: *Republic of North Macedonia is undergoing a profound demographic transformation, characterized by a persistent population decline, accelerated ageing and large-scale emigration abroad. This paper analyzes the medium fertility variant of the official Population projections up to 2070, highlighting the anticipated reduction of the total population by more than one-third, alongside substantial structural changes in age and sex composition. The findings reveal a shrinking reproductive base, declining youth and working-age contingents and a rapid expansion of the elderly population, particularly those aged 80 and over. These demographic shifts will significantly increase dependency ratios, placing growing pressure on the sustainability of the pension and healthcare systems while simultaneously constraining economic growth potential. The analysis further examines the key drivers of demographic decline, low fertility, rising life expectancy and sustained emigration, as well as their compounded effects on labour supply, productivity and fiscal stability. The paper argues that mitigating the socioeconomic consequences of demographic decline requires a comprehensive and integrated policy framework, encompassing labour market participation, human capital development, strengthening migration data and governance, fiscal reforms and technological transformation. Ultimately, the study underscores the urgency*

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of adopting forward-looking strategies to strengthen North Macedonia's economic resilience and ensure sustainable development in the face of deepening demographic challenges.

Keywords: population projections, population decline, demographic development, population policy, North Macedonia

JEL Classification: J11, J18

INTRODUCTION

Republic of North Macedonia currently is navigating a profound demographic transformation, marked by a persistent and accelerating population decline. This trajectory is primarily driven by continuously low fertility rates, which are significantly below replacement levels and substantial net emigration abroad, particularly among young and skilled individuals. The cumulative effect of these trends is a rapidly aging population and a shrinking working-age cohort, which collectively create a measurable effort on the nation's potential economic growth and place increasing pressure on its public finances.

The critical challenges stemming from this demographic shift include a direct negative impact on GDP growth, escalating labour shortages across vital economic sectors, increasing fiscal unsustainability of the pension and healthcare systems, notable shifts in consumption and investment patterns and a potential dampening of innovation and entrepreneurship. Addressing these multifaceted challenges requires a comprehensive and integrated policy framework. Strategic imperatives for North Macedonia involve strengthening labour market participation and human capital development, implementing targeted migration management, undertaking robust fiscal reforms and fostering a dynamic and innovative economic environment. The timely and decisive implementation of these structural reforms is vital to ensure North Macedonia's long-term economic resilience and sustainable development.

The aim of the paper is to analyze North Macedonia's population projection data and to observe expected demographic changes and their consequences in particular segments. It examines projected changes in total population, disaggregated by age and sex, along with the dynamics of key functional age-sex groups and aging indicators, including the dependency ratios. Additionally, it offers insight into the main drivers of the demographic develop-

ment. The analysis is made based on the data from the Population projections for North Macedonia until 2070, of the State Statistical Office (SSO)[5], with focus on the medium fertility variant, which is considered as a most probable one. Understanding the implications of these projected trends and indicators is essential for policymakers when seeking to develop effective strategies to address the socioeconomic challenges of demographic decline and to leverage potential opportunities within this emerging demographic landscape.

1. NORTH MACEDONIA'S DEMOGRAPHIC SITUATION: A DEEPENING DECLINE

In the past two decades, Republic of North Macedonia has faced large-scale depopulation and changes in the population structure, which are already shaping the country's future demographic development. The demographic changes observed between 2002 and 2021 were driven by both a decline in the natural increase of the resident population and the emigration abroad. Emigration abroad, in particular, had a more pronounced impact on the decrease of the total resident population and the intensification of demographic ageing, with long-term consequences for the country's reproductive base.

The population projections are indicating that these negative trends will continue in the next decades. They are prepared in seven projection variants, each reflecting different probable demographic outcomes. The fertility, mortality and migration assumptions define the medium fertility scenario as the most probable demographic trajectory for North Macedonia. It anticipates a continued population decline in the short and medium term, followed by partial stabilization driven by modest fertility recovery, longer life expectancy and balanced migration flows. It assumes moderate and sustained changes that align with the country's current social and economic conditions. Therefore, the analysis in the paper is based primarily on the medium fertility variant, as it offers the most realistic framework for assessing the country's demographic future.

1.1. Population trends and projections

North Macedonia's population has been steadily declining for two decades. The 2021 census recorded 1,836,713 residents, a drop of 185,834 (9%)

[5] SSO of Republic of North Macedonia, Population Projections for Republic of North Macedonia until 2070, 2023, https://makstat.stat.gov.mk/PXWeb/pxweb/mk/MakStat/?rxid=46ee0f64-2992-4b45-a2d9-cb4e5f7ec5ef

since 2002. Projections to 2070 confirm further decline under all scenarios. By 2040, the population is expected to fall between 1.36 million (variant with constant mortality) and 1.72 million (variant with no migration), representing a 25.4% and 5.9% drop compared to 2022, respectively. The decline will deepen and by 2070 is estimated to range from just over 500,000 or by 72.6% (variant with constant mortality) to 1.49 million or by 18.9% (with the no-migration scenario). Under the medium fertility scenario, North Macedonia's population is projected to decline to 1,436,152 by 2040 and 1,192,963 by 2070, representing drops of 21.6% and 34.9% compared to 2022 (Table 1).

Table 1. Population projections in Republic of North Macedonia, 2022-2070

	2022	2030	2040	2070	Growth index 2040 (2022=100)	Growth index 2070 (2022=100)
Variant 1: Low fertility	1831712	1642299	1427885	1120279	-22,0	-38,8
Variant 2: Medium fertility	1831712	1643450	1436152	1192963	-21,6	-34,9
Variant 3: High fertility	1831712	1663333	1502590	1408911	-18,0	-23,1
Variant 4: Constant fertility	1831712	1649656	1456117	1217438	-20,5	-33,5
Variant 5: Constant mortality	1831712	1621395	1365794	1029243	-25,4	-43,8
Variant 6: Constant values	1831712	1654901	1382585	501506	-24,5	-72,6
Variant 7: No migration	1831712	1792479	1724052	1485738	-5,9	-18,9

Source: SSO, *Population Projections for North Macedonia* until 2070, https://www.stat.gov.mk/publikacii/2023/Proekcii_2070_mk.pdf

The sex structure will also shift notably. By 2040, the male population is projected to fall by 23.7% and the female by 19.5%, with deeper declines in 2070 (36.7% and 33.1%, respectively). As a result, men's share of the population will drop from 49.6% (2022) to 48.2% (both in 2040 and 2070), while women's share will rise from 50.4% to 51.8%, respectively. The masculinity ratio will decline from 0.983 males per 100 females in 2022 to 0.931 by 2040, remaining at that level through 2070 (Table 2).

In 2040, North Macedonia's age structure will alternates sharply. The analysis of the large age groups show that younger population will shrink, with children (0–14) declining by 42.4%, youth and young adults (20–39) by 34.1% and those aged 40–59 by 25.3%. In contrast, the elderly population will expand. The 60–79 age group will grow by 4.5%, while those aged 80+ will more than double, rising from 3.1% to 7.4% of the total. Looking ahead

to 2070, the demographic transformation becomes even more pronounced. The 0–19 population will shrink by nearly 48%, reducing its share of the total population from 22.5% to 18.0%, reflecting both persistently low fertility and youth emigration. The population aged 20–59 will also contract significantly. In contrast, the 80+ population will expand intensely, rising from 3.1% in 2022 to 13.9% in 2070, where the share is higher for women, underscoring both the aging process and women's longer life expectancy. These trends, affecting both sexes, highlight steep declines among the young and significant growth among the oldest cohorts.

These demographic shifts will substantially raise the total and old-age dependency ratios, posing serious policy challenges. The total dependency ratio, 52.2% in 2022, is projected to climb to 78% by 2070, reflecting a growing share of dependents relative to the working-age population. The old-age dependency ratio will more than double, growing from 26.5% to 54.4%, underscoring the accelerated ageing of the population. Meanwhile, the youth dependency ratio is expected to fall from 25.7% in 2022 to 19.1% by 2040, before recovering slightly to 23.6% by 2070.

Table 2. Population age structure in Republic of North Macedonia

	Total	0-19	20-39	40-59	60-79	80+	0-19	20-39	40-59	60-79	80+
	Total						Share in the total population (in %)				
2022	1831712	412424	469076	507215	386929	56068	22,5	25,6	27,7	21,1	3,1
2030	1643450	339866	355597	464877	411582	71528	20,7	21,6	28,3	25,0	4,4
2040	1436152	237530	309108	378813	404390	106311	16,5	21,5	26,4	28,2	7,4
2070	1192960	214209	242742	304683	265680	165646	18,0	20,3	25,5	22,3	13,9
	Men						Share in the total population-men (in %)				
2022	908165	212610	238798	251461	182004	23292	23,4	26,3	27,7	20,0	2,6
2030	803717	173949	179618	231123	191513	27514	21,6	22,3	28,8	23,8	3,4
2040	692503	120458	155768	188838	188222	39217	17,4	22,5	27,3	27,2	5,7
2070	575202	108903	121073	152316	127624	65286	18,9	21,0	26,5	22,2	11,4
	Women						Share in the total population-women (in %)				
2022	923547	199814	230278	255754	204925	32776	21,6	24,9	27,7	22,2	3,5
2030	839733	165917	175979	233754	220069	44014	19,8	21,0	27,8	26,2	5,2
2040	743649	117072	153340	189975	216168	67094	15,7	20,6	25,5	29,1	9,0
2070	617761	105307	121671	152367	138056	100360	17,0	19,7	24,7	22,3	16,2

Source: SSO, *Population Projections for North Macedonia* until 2070, https://www.stat.gov.mk/publikacii/2023/Proekcii_2070_mk.pdf

Between 2022 and 2070, significant changes are also expected across functional age-sex contingents. By 2040, the number of preschool children (0–5) is projected to fall by 45.2%, school-age children (6–14) by 46.9% and

the working-age population (15–64) by 27.7%. The number of women of reproductive age (15–49) will decline by 33.6%, including a 28.4% drop among those in their optimal reproductive years (20–34). In contrast, the elderly population will grow, with the 65+ group increasing by 25.4% and the 80+ group nearly doubling, rising by 90%. These changes highlight a shrinking base of younger and working-age population, alongside rapid growth in the oldest contingents (Table 3).

By 2070, these trends will develop. While a slight recovery is expected among preschool children and a modest decline in the 65+ population compared to 2040, the overall trajectory remains negative. The oldest age group (80+) will continue its steep rise, tripling in size compared to 2022 to nearly 166,000 people. In terms of population share, all functional contingents will shrink except for the elderly. Under the medium fertility scenario, preschool children will represent only 5.3% of the total population, school-age children 7.9%, the working-age group 56.2%, women of reproductive age 18.3% and those in optimal reproductive years just 7.7%. In contrast, the 65+ population will grow to 30.6% of the total, with the 80+ alone reaching 13.9%.

Table 3. Age-sex functional population contingents in Republic of North Macedonia

	Total	Pre-school contingent (0-5)*		School-age contingent (6-14)*		Working-age contingent (15-64)		Women of reproductive age (15-49)		Women in optimal reproductive years (20-34)		Olde 65 years and over		Elderly contingent (80+)	
		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
2022	1831712	115070	6,3	194213	10,6	1203230	65,7	407934	22,3	167503	9,1	319199	17,4	56068	3,1
2030	1643450	81369	5,0	156940	9,5	1039297	63,2	339762	20,7	126076	7,7	365844	22,3	71528	4,4
2040	1436152	63098	4,4	103156	7,2	869645	60,6	271068	18,9	119952	8,4	400253	27,9	106311	7,4
2070	1192963	63549	5,3	94428	7,9	670351	56,2	217826	18,3	91715	7,7	364635	30,6	165646	13,9

Source: SSO, *Population Projections for North Macedonia* until 2070, https://www.stat.gov.mk/publikacii/2023/Proekcii_2070_mk.pdf

The assessment of demographic aging rank for the period 2022–2070 reveals that the population aging process will intensify significantly in the coming decades. Based on five key indicators used to classify aging rank, in 2022, North Macedonia was already in a stage of deep demographic aging (rank 6). By the early 2030s, it is expected to reach the highest stage, i.e. deep-

est demographic aging (rank 7)[6]. This transition, driven by the rapid growth of the elderly population, highlights how quickly the demographic situation is worsening.

The projected population decline by 2070 is primarily shaped by the current age structure, the shrinking reproductive base and changing reproductive behavior. These changes are compounded with rising mortality linked to population aging and persistent socio-economic challenges that accelerate emigration. Given the long-term nature of these processes, they will strongly determine North Macedonia's demographic trajectory in the decades ahead.

1.2. Drivers of the population decline in North Macedonia

North Macedonia's population decline is driven by persistently low fertility, rising life expectancy and high emigration. The total fertility rate (TFR) has long remained below the replacement level of 2.1 children per woman. In 2022, it stood at 1.6, but is projected to fall to 1.42 by 2040. Assuming eventual EU integration, which could improve economic and social conditions, fertility is expected to gradually recover reaching **1.81 in 2070**. Despite this recovery, fertility would remain well below the **replacement level**, meaning that population renewal would not be ensured.[7] Consequently, the number of births is expected to fall for nearly 40%, from 18,073 in 2022 to 10,874 in 2070. Respectively, the crude birth rate will drop from 9.9 per 1,000 in 2022 to 7.6 in 2040, followed by a modest recovery to 9.1 in 2070 (Table 4). These patterns reflect factors such as women's expanded access to education, the rising costs of childbearing and shifting social attitudes toward family size.

Mortality assumptions in the medium fertility variant rest on the expectations of steadily declining age-specific mortality rates across both sexes, leading to rising life expectancy. Although mortality levels have fluctuated, projections suggest the total number of deaths will decline by 18% between 2022 and 2070, reaching 18,417 in the last year. Despite this decrease in absolute numbers, the crude death rate will rise from 12.3 deaths per 1,000 citizens in 2022, to 15.4 by 2070, reflecting the impact of population aging (Table 4).

[6] Lozanoska A., Janeska V., "Demographic changes in the Republic of North Macedonia with a focus on the 2021 Population census – causes, consequences and implications", Institute of Economics-Skopje, 2024, p.194

[7] Ibid, p.188

Table 4. Vital statistics indicators in North Macedonia

	Births		Deaths		Natural population growth	
	Number	Rate	Number	Rate	Number	Rate
2022	18073	9.9	22459	12.3	-4676	-2.4
2030	12950	7.8	20946	12.6	-7996	-4.8
2040	10904	7.6	20734	14.4	-9830	-6.8
2070	10874	9.1	18417	15.4	-7543	-6.3

Source: SSO, *Population Projections for North Macedonia* until 2070, https://www.stat.gov.mk/publikacii/2023/Proekcii_2070_mk.pdf

Life expectancy at birth is anticipated to improve steadily, from 78.4 years (women) and 75.3 (men) in 2022 to 88.3 and 84.3 by 2070, respectively. While rising longevity accelerates aging, persistently low fertility remains the dominant driver of population decline, outweighing gains in life expectancy. The gender gap in life expectancy will widen from 4.5 years in 2022 to 5.1 years by 2040 in benefit of women. Later, male longevity is projected to improve at a faster pace, narrowing the gap to about 4 years by 2070.[8]

Natural population growth in North Macedonia is projected to remain negative throughout the coming decades. The annual decrease will worsen from –4,386 people in 2022 to –7,543 by 2070. Similarly, the natural population growth rate will fall from –2.4 to –6.3 per 1,000 citizens. These figures underline a deepening demographic imbalance, where deaths increasingly outnumber births. Without major policy intervention or changes in fertility and migration patterns, this negative natural growth will continue to accelerate population decline and reinforce the challenges of population aging.

The most powerful driver of North Macedonia's population decline is the emigration abroad. Since 2000, the country has faced its largest wave of modern emigration. Because a reliable national data is lacking, the estimates from Eurostat, UN, World Bank, OECD and host country statistics, suggest that emigration has reached dramatic proportions, involving large numbers of highly educated professionals. Recent trends also show a shift toward family-based and permanent emigration. The Atlas of Migration currently provides the most comprehensive overview of these movements. In 2020, an estimated 694,000 Macedonian citizens were living abroad, with 38% residing in EU countries

[8] Ibidem.

and 62% on other destinations.[1] Based on the 2021 Census population, this corresponds to an emigration rate of 37.8%. Although future migration flows for 2040 or 2070 cannot be reliably projected, the persistence of current trends would impose an even heavier burden on the country's demographic development, reinforcing emigration as a key driver of long-term population decline.

The interaction of low fertility and high emigration is creating a compounded demographic crisis for North Macedonia. Persistently low fertility limits the entry of new generations, while emigration, especially of young, productive individuals removes a vital part of the population. This situation jointly cause shrinking of the population and accelerate aging. The loss of youth through emigration raises the average age in the country, then, reduces the working-age contingent and increases dependency burdens. It not only diminishes the size of the labour force, but also shifts its age composition, leaving the country with both a smaller population and a disproportionately older one. The result is a more severe demographic challenge than a decline driven by a single factor.

2. ECONOMIC IMPLICATIONS AND POLICY RESPONSES TO DEMOGRAPHIC DECLINE

North Macedonia's demographic transition is marked by sustained population decline, persistently low fertility, large-scale emigration, especially of young and skilled individuals, as well as rapid population ageing. Together, these shifts are reshaping the demographic structure, transforming the traditional pyramid into an "obelisk," with a shrinking youth and working-age base and an expanding elderly population. The demographic inversion creates severe intergenerational imbalances and places escalating pressure on economic growth, public finances and social protection systems. The strategy to alleviate these negative changes must address underlying drivers of demographic change, mitigate economic consequences and foster resilience through reforms in labour markets, education, technology, family support and fiscal policy.

The shrinking working-age population will constrain North Macedonia's economic potential. IMF projections indicate that demographic decline could lower annual output growth by about 0.5 percentage points, with real GDP growth at around 3% by 2030. This drag stems mainly from slower labour productivity growth, which accounts for two-thirds of the impact, while

[1] European Commission, Atlas of Migration 2024, p. 101

reduced employment growth contributes the remaining third.[2] Given North Macedonia's already low productivity and reliance on labour-intensive industries, demographic pressure increases existing structural weaknesses, making it harder to sustain growth without targeted policy interventions.

Labour shortages are already evident in key sectors such as healthcare, education and construction. Beyond the decrease of the labour force, these shortages are intensified by the emigration of young, skilled individuals, reducing innovation capacity and slowing economic dynamism. Therefore, measures should gradually raise retirement ages in line with life expectancy and promote flexible work arrangements for older workers. Active ageing policies and incentives for re-entry into the labour force can help mitigate deficiencies. At the same time, targeted programs to attract and retain the diaspora, through relocation assistance, tax incentives, recognition of foreign qualifications and entrepreneurship support are critical. Establishing a diaspora talent network would further promote knowledge exchange and business development. Strengthening human capital is essential to sustaining growth under demographic constraints. Education and vocational training must be better aligned with labour market demand. Public–private partnerships should expand apprenticeships, continuous training and upskilling, with a focus on mid-career and older workers. Promoting gender equality through childcare expansion, parental leave and flexible work policies can boost female labour force participation and support underrepresented groups. Balanced regional development is equally vital. Policies supporting rural revitalization and decentralization can reduce internal migration, as well as emigration pressures and sustain local labour markets.

The demographic transition is set to aggravate fiscal pressures, particularly on pension and healthcare systems. Rising dependency ratios will increase the burden on public finances, as North Macedonia's pay-as-you-go pension system already runs chronic deficits that require state budget transfers, covering about 41% of its needs in 2025.[3] By 2030, nearly 30% of the population will be aged 60 or older, meaning further burden on the pension system as the contributor-to-beneficiary ratio worsens. Ageing raises healthcare costs while expanding pension obligations, together creating fiscal pressures that limit resources for other public services. Without structural reforms, these pressures could need higher taxes, more borrowing or benefit cuts, each carry-

[2] IMF, https://www.imf.org/en/Countries/MKD

[3] Pension and disability insurance fund of the Republic of North Macedonia, Budget planning for 2025, p. 12

ing significant economic and social risks. Long-term fiscal planning requires integrating demographic impact assessments into major policy and infrastructure strategies.

Demographic decline also weighs heavily on productivity and innovation. An ageing labour force is generally less adaptable to technological change, while the emigration of young, digitally skilled talents erodes the country's innovative capacity. Skill mismatches between education outputs and labour market demands further limits efficiency. Without targeted investment in human capital, faster technological adoption and structural transformation toward higher-value-added industries, productivity growth will remain weak, undermining North Macedonia's long-term competitiveness. Investment in digital transformation and productivity-enhancing innovations will help offset the shrinking labour force. Incentives for automation, digital tools and hybrid work models can enhance efficiency and address sector-specific shortages.

North Macedonia's demographic transition imposes severe challenges, but also an opportunity for reform. Addressing the abovementioned demographic challenges requires a broad, multi-pronged policy response. A coherent, multi-sectoral strategy, focused on labour force participation, diaspora engagement, human capital development, technological innovation, regional equity and fiscal sustainability, will be critical to mitigate the effects of population decline and secure long-term social and economic resilience.

CONCLUSION

The analysis of North Macedonia's demographic trends and projections to 2070 reveals a profound and sustained population decline that will reshape the country's social and economic landscape. Persistently low fertility, rising life expectancy and large-scale emigration, especially of young and skilled individuals have already eroded the reproductive base and accelerated ageing. Under the medium fertility scenario, the total population is projected to fall by more than one-third in 2070. Structural shifts in the age-sex composition are equally alarming, due to the expected reductions of child and youth contingents, a shrinking working-age population and unprecedented growth of the elderly, particularly those aged 80 and above. These changes will intensify dependency burdens and push North Macedonia into the stage of "deepest demographic ageing", placing it among Europe's most vulnerable societies.

The economic consequences are far-reaching. A shrinking labour force will constrain growth, with IMF estimates suggesting that demographic decline

could reduce GDP growth by 0.5 percentage points annually. Labour shortages are expected to deepen, while the continued loss of young, highly skilled workers through emigration undermines innovation and long-term productivity. Rising old-age dependency will also put higher pressure on the pension and healthcare systems. The pay-as-you-go pension system runs chronic deficits, while ageing drives higher medical spending, which without appropriate reforms, risks collapse of the systems, producing weaker growth, tighter fiscal space and rising social tensions.

Despite these challenges, demographic transition also presents an opportunity for structural transformation. A comprehensive policy agenda must tackle both the drivers and consequences of the population decline. Strengthening human capital is vital through education reforms, skills alignment and reskilling programs, while expanding labour market participation among women, older adults and other underrepresented groups can counterbalance labour force shrinkage. Migration policies, diaspora engagement and targeted return programs can partially offset emigration. Equally important is fostering productivity through digital transformation, technological innovation and higher value-added sectors. Fiscal reforms should secure pension and healthcare sustainability, complemented by private savings and active ageing strategies. Addressing regional disparities and rural revitalization will reduce internal migration pressures and support local communities.

Demographic decline should not be viewed only as a threat, but also as a catalyst for reform. While the trends are unlikely to reverse soon, their consequences can be managed through timely, coordinated and evidence-based policymaking. A coherent national demographic strategy, integrated with labour, social and migration policies, will be critical for building resilience and securing sustainable growth.

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