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Population Dynamics, Labor Market Integration, and Migration

Stephen Ayerst and Simona Kovachevska Stefanova

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Population Dynamics, Labor Market Integration, and Migration, Republic of North Macedonia Prepared by Stephen Ayerst and Simona Kovachevska Stefanova*

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ABSTRACT: The population of North Macedonia has been steadily declining over the past two decades and is projected to continue to decline into the foreseeable future due to emigration. This paper estimates an expected cost of the population decline on potential output growth of around 0.5 percentage points. The paper employs a structural model of the European labor market with migration. Increasing productivity benefits potential output and helps protect the labor force from emigration. Productivity-increasing structural reforms, active labor market policies, new business support, and labor participation support can boost output, helping to offset some of the negative impact of migration.

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SELECTED ISSUES PAPERS

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Republic of North Macedonia

Prepared by Stephen Ayerst and Simona Kovachevska Stefanova



REPUBLIC OF NORTH MACEDONIA

SELECTED ISSUES

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POPULATION DYNAMICS, LABOR MARKET INTEGRATION, AND MIGRATION

The population of North Macedonia has been steadily declining over the past two decades and is projected to continue to decline into the foreseeable future due to emigration. This paper examines the expected costs of the population decline on potential output growth. Staff estimates that the population decline would create a drag on output growth of around 0.5 percentage points. Increased emigration, potentially driven by further EU integration, presents a downside risk to outlook as it could further worsen population dynamics. To study the impact of further EU integration, the paper employs a structural model of the European labor market with migration. Negative impacts of further EU integration from increased emigration can be offset by increasing productivity. The paper also shows that productivity-increasing structural reforms, active labor market policies, new business support, and labor participation support can all boost potential output, helping to offset some of the negative impact of migration.

A. Introduction

1. The population in North Macedonia has been steadily declining, largely because of high emigration, and is expected to continue declining into the medium term. The 2021 population census revised the population down by around 11 percent relative to its previously estimated values (Figure 1, left panel). The loss in population is not unique to North Macedonia as other Western Balkan countries experienced similar declines in population over the past decade, as well as similar downward revisions following censuses (Figure 1, right panel). The UN World Population Prospects (2024 Revision) projects the population of North Macedonia to decline by around 4 percent by 2030. Estimates by the statistics office of North Macedonia are more pessimistic, projecting the population to decline by almost 9 percent over the same period (see Figure 1, left panel).



2. Large declines in population can have a devasting impact on potential output, warranting the need for policymaker action. Standard theories predict that long-run potential output varies one-for-one with the aggregate population of the country (see Section B) implying that a 4 to 9 percent decline in population should result in an equivalent drag on potential output growth. That said, several additional factors may represent downside or upside risks to the link between population and potential output.

- Downside risk factors. Young and higher skilled individuals may be more likely to seek opportunities elsewhere draining valuable future knowledge sources in the economy. Additionally, empirical evidence for North Macedonia points to entrepreneurial individuals being more likely to migrate (see, Li and Gade, 2023). A loss of the young population could accelerate population aging in North Macedonia and increase the associated costs. Lower entrepreneurship and an aging population could also spill over to lower productivity growth, further limiting potential.
- *Upside risk factors.* Workers with closer links to the market (i.e., those employed or with strong networks) may be less likely to search outside the economy. Return migrants may bring new knowledge and networks opening new paths for future growth. Further emigration may be limited as individuals with the highest willingness to move may have previously emigrated.

B. Projecting Future Potential Output

3. Staff employ a production function methodology to project future potential output growth. Potential output Y_t is produced using a combination of capital K_t and labor L_t according to $Y_t = A_t K_t^{\alpha_t} L_t^{1-\alpha_t}$. Rearranging this expression, output-per-capita depends on

$$\frac{Y_t}{N_t} = A_t^{\frac{1}{1-\alpha_t}} \left(\frac{K_t}{Y_t}\right)^{\frac{\alpha_t}{1-\alpha_t}} \frac{L_t}{N_t}$$

where A_t is total factor productivity and α_t is that capital share of production.

4. Each component of production is constructed using data and projected into the

medium term. The baseline does not take a stance on when, or whether, EU accession will occur but assumes that there is a constant increase in total factor productivity associated with structural reforms.

• Capital is constructed with the perpetual inventory method as $K_t = (1 - \delta_t)K_{t-1} + X_t$ where δ_t is the depreciation rate and X_t is gross fixed capital formation in year t. Capital in the initial period is set to $K_0 = X_0/(\bar{g}_X + \delta_0)$ where \bar{g}_X is the average growth rate of gross fixed capital formation over the sample. Capital is projected up to 2030 using the IMF WEO values and beyond 2030 by assuming that the capital-output ratio is constant, as would be implied in steady state of the textbook neoclassical growth model. This leads to a sharp drop in the capital and output growth

rate in 2031, which should be taken as indicative of the long-term growth potential rather than a year-by-year projection.

• Labor is constructed as the historical employment trend. Labor is projected as the sum of labor by age and sex sub-groups of the population. Populations for each subgroup are taken from the UN World Population Prospects dataset using the Medium Forecast scenario. Because each subgroup potentially differ in their participation $LP_{a,s,t}$ and unemployment rates $u_{a,s,t}$, the total labor stock is projected as:

$$L_t = \sum_{a,s} LP_{a,s,t} \times (1 - u_{a,s,t}) \times \frac{N_{a,s,t}}{N_t}.$$

The labor participation rate and unemployment rates are projected as:

$$LP_{a,s,t} = (1 - \xi_{a,s}^{LP})LP_{a,s,t-1} + \xi_{a,s}^{LP}\overline{LP}_{a,s}$$
$$u_{a,s,t} = (1 - \xi_{a,s}^{u})u_{a,s,t-1} + \xi_{a,s}^{u}\overline{u}_{a,s}$$

where $\xi_{a,s}^{\chi}$ is the convergence rate to some long-run steady state for labor participation and the unemployment rates. The long-run steady states for each group are taken to be the EU average values in 2023 and the convergence rate parameter is set to 2.5 percent based on the historical convergence of labor participation rates in the pre-pandemic period.¹

• Total factor productivity is constructed as a Solow residual $A_t = Y_t/K_t^{\alpha_t}L_t^{1-\alpha_t}$ using the constructed stocks of capital and labor. Productivity is constructed using the IMF WEO values until 2030 and then assumed to follow $g_t^A = (1 - \xi^A)g_{t-1}^A + \xi^A\bar{g}^A$ for $\xi^A = 2.5$ percent and $\bar{g}^A = 1$ percent, in line with values typically assumed in advanced economies.

¹ The gap in the labor participation rate of men (women) aged 15 to 64 fell from 5.7 (14.0) percent in 2004 to 0.2 (11.9) in 2019 and then rose to 3.8 (15.5) percent in 2023. Rearranging the expression for labor participation convergence implies that $\xi = 2.5\%$ is within the range of estimates. Since the labor participation rate gap has mostly closed, this parameter is most relevant for explaining the projected path for women.



5. Despite convergence of the labor participation and unemployment rates, the projections imply that employment will become a drag on output growth of around

- **0.5 percentage points by 2030.** The convergence of the labor participation and unemployment rates is strongest for women where the gap with the EU is largest and implies a steady closing of the gap over the projection horizon. That said, population dynamics dominate leading to a decline in the working-age population and employment. The net impact is that employment creates around a - 0.5 percentage point drag on growth by 2030. The model compensates for some of the decline in employment growth with higher TFP growth over the projection horizon. While capital growth is positive, capital deepening is a relatively small component of growth over the horizon.²

C. Comparison of Labor Markets in the Western Balkan Countries

6. Despite some improvement, labor market outcomes in North Macedonia have lagged the other Western Balkan countries and a considerable gap remains with the EU. The labor participation rate in North Macedonia is around 65 percent considerable below the 75 percent in the EU. While regional peers have made progress in closing the gap over the past decade, labor participation in North Macedonia has remained relatively flat. North Macedonia has performed

² See also Republic of North Macedonia: Selected Issues (IMF, 2024) for a detailed growth accounting and comparison of the capital-output ratio in North Macedonia and other countries.

better in terms of the unemployment rate, with the unemployment rate falling from about 26 percent to 13 percent over the past decade, similar to other Western Balkan countries. That said, the unemployment rate remains around twice as high as in the EU.³



7. Closing labor market gaps present a potential avenue for combatting the negative

impact of the population loss from emigration. Based on a simple back-of-the-envelope calculation, closing the gap with the EU by increasing the participation rate by around 10 percentage points and lowering the unemployment rate by around 7 percentage points would increase potential output by around 25 percent ($\approx 75\% \times (1 - 6\%)/65\% \times (1 - 13\%) - 1$) implying that closing one-third of the gap would be more than enough to offset the projected loss in population by 2030. Additionally, any efforts to close these gaps would likely strengthen incentives for individuals to remain in the economy. The gender gap may be a particularly important channel to target as it is much larger in North Macedonia, and other Western Balkan countries, than in the EU (Box 1). Most of the labor participation gap between North Macedonia and the EU is explained by the low labor participation rate of women.⁴

³ Issues related to the large population revisions following the census make it difficult to compute employment growth over the past decade in North Macedonia.

⁴ Other potentially relevant contributing factors include much higher youth unemployment, lower educational attainments, and differences in sectoral composition (see Ayerst et al., 2024 for discussion). Additionally, the prevalence of informal employment is an important labor market barrier.

Box 1. Gender Market Gaps in North Macedonia and the Western Balkans

In North Macedonia, as well as in other Western Balkan countries, women experience more pronounced gender gaps in the labor market compared to the EU. In 2023, North Macedonia had a gender labor participation gap of about 21 percentage points (p.p.), which is higher than the Western Balkans average of 18.7 p.p. and the EU average of 8 p.p. (Box Figure). Women's employment rates are similarly lower than men's, with a gap of 16 p.p. This gap is surpassed by Kosovo (31 p.p.) and Bosnia and Herzegovina (22 p.p.) in the region. Women fare better than men in some labor market outcomes in North Macedonia. Active women are less likely to be unemployed than men, compared with the reverse in the EU and some other Western Balkan countries (Bosnia and Herzegovina, Kosovo). Men are also more likely to be informally employed than women, although this is not in all Western Balkan countries (e.g., Bosnia and Herzegovina, Serbia).



Wider gender gaps in the Western Balkan countries are driven by multiple factors. Inadequate education and lack of skills contribute to a more pronounced gender gap in labor participation at lower education levels, while this gap narrows at higher education levels. Additional constraints to women's labor market opportunities are imposed by significant caregiving burdens for women resulting from a combination of a lack of affordable quality childcare, parental leave policies, cultural norms, and increased emigration of men (Atoyan and Rahman, 2017). The tax burden on secondary earners, who are predominantly women, can affect gender participation (Gonzales, 2015), as the proportionally higher impact from taxes and social contributions on lower wages increase the overall tax burden. This is significantly relevant for the labor participation in the region, as women are often second earners who are influenced by a high tax wedge on low wages (Jousten et al., 2022), and a considerably more pronounced gender wage gaps than in the EU. Differences in wages is also a driver the gender gap in North Macedonia, and the Western Balkans. The 2018 wage gap was around 15.3 percent in North Macedonia, compared to 13 percent in the EU.

Closing the gender gaps could lead to significant gains in employment and potential output across the Western Balkan countries. Reducing underemployment of women could yield even greater gains than an equivalent increase in the employment of men due to the benefits of gender diversity, meaning women bring different skills, perspectives, and approaches to the workplace that complement those of men, and sectoral reallocation driven by economic development which increases demand for gender-equal service sector jobs (Ostry et al., 2018). Employment is projected to decline by around [4 percent] by 2030, which could be mostly offset by closing the gender gap between North Macedonia and the other Western Balkan countries and completely offset by closing one-third of the gender gap with the EU. A back-of-the-envelope calculation implies that closing the gender gap completely could increase potential output by

$$\Delta Y_t / N_t \approx \Delta L_t / N_t = 14.4\%.$$

Closing the gender employment gaps could significantly increase economic development, help in addressing labor shortages, and improve productivity.

D. Modeling Labor Markets and Migration in North Macedonia and Europe

9. Staff employ a structural multi-country model of labor markets to examine

endogenous relationships between labor market outcomes and emigration. Building on Ayerst and Zhang (2025), the model characterizes household transitions between employment, unemployment, and inactivity as well as transitions across countries.⁵ Households decide whether to be inactive or enter the labor market as an unemployed worker based on personal preferences (e.g., value of leisure) and economic factors (e.g., probability of finding work, wage). Unemployed workers then search for vacancies posted by firms. With some probability, an unemployed worker is matched to a vacant firm and the pair begins to produce revenues, which are divided between the worker and firm through a bargaining process. Households can also choose whether to relocate to a different country, in which case they choose to be inactive or search for employment in the new location. Households weigh idiosyncratic preferences (e.g., locational preference), bilateral migration costs (e.g., moving costs), and economic factors (e.g., probability of finding work, wage) when deciding where to move. The equilibrium of the model describes how the flow of households in inactivity, unemployment, and employment and across countries depends on economic factors.

10. The model is estimated to match labor market flows and bilateral migration flows for EU and candidate countries. Model parameters are estimated for 35 European countries, which includes the EU countries, six Western Balkan countries, Türkiye, and Switzerland, over the 2011 to 2019 period.⁶ The labor market is matched to data on transitions between inactivity, unemployment, and employment, the labor market tightness (measured as the ratio between the vacancy rate and unemployment rate), and the net PPP-adjusted wage rate. Bilateral migration costs are set to match bilateral migration flows between countries allowing the model to replicate the migration patterns observed in the data.

E. Examining Further EU Integration and Policy Scenarios

11. The model is used to simulate the impact of further EU integration on North

Macedonia. Two scenarios are constructed that capture the impact of EU integration when, first, only migration costs between North Macedonia and EU countries are reduced and, second, when both migration costs are reduced and labor productivity is increased. EU integration could boost labor productivity either by reducing barriers (e.g., increased trade and FDI) or through inducing discretionary policy actions (e.g., structural reforms associated with EU accession). The two scenarios provide a stark contrast between EU integration with and without productivity improvements, that may be tied, at least in part, to these discretionary actions of policymakers. The reduction in migration costs are calibrated to match a doubling of the emigration rate, consistent with empirical evidence in Ayerst et al. (2025) between EU member countries. The increase in productivity is

⁵ See also Ayerst et al. (2024) for description of model and calibration used here.

⁶ Not all data moments are available for all countries over this time period. Missing data is interpolated using economic relationships as described in Ayerst et al. (2025).

calibrated to match an increase in output-per-capita of around 30 percent, consistent with evidence reported in IMF (2024).



12. The simulations highlight that productivity improvements are necessary to offset the negative impact of lower migration costs (Figure 4). Without productivity improvements, the reduction in migration costs leads to a decline in wages and output-per-capita, worsening labor market outcomes (labor participation, employment, unemployment), and a decline in population from increased emigration. Lower migration costs lead to domestic firms competing more with foreign firms leading to a higher wage rage at the cost of profits. Lower profits decrease firms' willingness to post vacancies, raising unemployment. Increasing productivity offsets these negative impacts by raising both the wages and profits received by workers and firms, incentivizing participation and entry of new vacancies. This creates positive pull factors to the domestic economy as unemployed workers more readily find employment and employed workers receive higher wages, disincentivizing emigration and incentivizing immigration. The net impact is that population is relatively unchanged while output-per-capita increases. Importantly, the results highlight that productivity may not fully offset the increase in emigration but can lead to increased immigration and labor market performance that offset the negative impacts on output-per-capita.

13. The model is also used to simulate four types of broad policies to boost potential **output and support the labor market.** The previous experiment highlights how increased

productivity can combat the negative impacts associated with further EU integration. The policy experiments show that policymakers have a range of options to support the economy, all with broadly similar impacts on key outcomes (Figure 5). The policies are described below.

- Structural reforms. The first class of policies is productivity-enhancing structural reforms that boost production. These policies are modeled as a one percent increase in the production of matched firms and workers. In practice, these policies would include any types of policies that increase output in the economy including, for example, reduced misallocation of factors of production through reducing financial constraints and/or increased investment by firms driven by improved rule of law and corruption or reduced competition by the informal sector.⁷
- Active labor market policies. The second class of policies is active labor market policies (ALMP) that help match unemployed workers and vacancies. These policies are modeled as a 10 percent increase in the matching rate between unemployed workers and vacancies, all else equal. In practice, these policies would include any types of policies that help unemployed workers find work (or firms find new employees) such as, for example, job search assistance programs, vocational training, lifelong learning programs, and youth training and apprenticeship programs.
- Business support. The third class of policies is support for small and medium sized enterprises (SME). These policies are modeled as a 10 percent reduction in the vacancy cost of new firms entering the market. In practice, these policies would include any types of policies that reduce bureaucratic barriers to firms entering the market such as one-stop shops to business registration and improving access to digital public services.
- Labor participation. The fourth class of policies is increased support for labor participation (LP). These policies are modeled as a 10 percent reduction in the benefits from inactivity, which increases the relative value of working.⁸ In practice, these policies would capture any types of policies that incentivize workers to enter the economy such as increasing access to quality child and elder care, improving access to flexible work arrangements, and programs to help out-ofthe-labor-force individuals acquire skills and knowledge to reenter the labor market.

⁷ See also the Republic of North Macedonia: Selected Issues (IMF, 2024) for a detailed discussion on policies that can boost productivity.

⁸ The policy simulation reduces home production benefits to inactive and unemployed workers, which are valuable to the individuals living in the country. Due to model limitations, this leads to some counter-intuitive results with emigration for this experiment.



F. Conclusions and Policy Discussion

14. A declining population, driven by emigration, threatens to drag down potential output growth going forward. Based on UN projections, higher emigration is projected to lead to a decline in the working-age population and, consequently, is expected to shrink employment by around 0.5 percentage points going into the future. Without counteracting measures, the decline in employment is projected to drive a similar decline in potential output, as a smaller labor force translates into less output and less investment.

15. Policies can bolster the labor market and be a catalyst for economic growth. The analysis highlights large structural barriers in the productivity of workers, the matching efficiency between workers and firms, and the cost of creating new vacancies in North Macedonia compared to European countries. Policies targeting these areas could help lift the quality of the labor market and boost potential. A key result from the policy simulations is that, while the policies target different stages of the labor market (e.g., participation, job finding, the productivity of the match), the policies have similar macroeconomic impacts. In this regard, it is important for policymakers to focus on policies with the largest potential impact relative to the cost of implementation. Additionally, policies should be combined with careful monitoring and updating to ensure that they remain effective and efficient.

16. Reducing the gender gap can be an effective way to combat the loss in employment

and protect potential output growth. The gender gap in North Macedonia is around 21 percentage points, compared with 18.7 in the Western Balkan countries and 8 in the EU. Closing the gender gap with the other Western Balkan countries by 2030 would offset most of the projected loss in employment from emigration. Closing the gender gap with the EU would offset the loss in employment that is projected up to 2050. Policies to close the gender gap could include increasing access to affordable childcare, improving education investment in women, aligning parental leave policies with EU standards including introducing mandatory paternity leave, and removing tax disincentives for multi-income households.

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