INTERNATIONAL MONETARY FUND

SELECTED ISSUES PAPER

Potential Growth and Migration

Lukas Boer

SIP/2025/138

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on July 29, 2025. This paper is also published separately as IMF Country Report No 25/259.

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IMF Selected Issues Paper
European Department

Potential Growth and Migration, Republic of Lithuania

Prepared by Lukas Boer*

Authorized for distribution by Kazuko Shirono
October 2025

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ABSTRACT: Recent immigrants have been successfully absorbed into the Lithuanian labor market and legislative amendments have enabled easier migration for high-skilled workers despite the reduction of non-EU workers quota in 2025. The analysis in this note shows immigration can play a role in mitigating the impact of aging on labor force and support potential output growth. Policies should continue to focus on integrating migrants in the most productivity-enhancing way possible while allowing the participation of foreign professionals in those sectors with the largest shortages. At the same time, given the uncertainty about immigration developments, addressing remaining constraints limiting capital deepening and TFP growth would be crucial.

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Potential Growth and Migration

Republic of Lithuania

Prepared by Lukas Boer[1]

[1] "The author would like to thank Saioa Armendariz, Helge Berger, Harri Kemp, Alberto Musso and Kazuko Shirono for helpful comments and Sadhna Naik for excellent research assistance.

INTERNATIONAL MONETARY FUND

REPUBLIC OF LITHUANIA

SELECTED ISSUES

July 29, 2025

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European Department

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POTENTIAL GROWTH AND MIGRATION[1]

Recent immigrants have been successfully absorbed into the Lithuanian labor market and legislative amendments have enabled easier migration for high-skilled workers despite the reduction of non-EU workers quota in 2025. The analysis in this note shows immigration can play a role in mitigating the impact of aging on labor force and support potential output growth. Policies should continue to focus on integrating migrants in the most productivity-enhancing way possible while allowing the participation of foreign professionals in those sectors with the largest shortages. At the same time, given the uncertainty about immigration developments, addressing remaining constraints limiting capital deepening and TFP growth would be crucial.

A. Introduction

1. Lithuania faces severe demographic pressures with negative consequences for medium-term potential growth (Figure 1). Driven by a low fertility rate—around 1.5 percent since the 1990s—and significant negative net migration, Lithuania's working age population has fallen from 2.34 million in 1998 to 1.81 million in 2019. Since then, net migration—especially of Ukrainians, Belarussians and Lithuanians—has turned positive pushing the working age population up to 1.89 million in 2024. According to the European Commission, however, the demographic pressures from low fertility rates and renewed negative net migration will only accelerate over the next decades, decreasing the working age population further.[2] The shrinking labor force will have negative implications for Lithuania's potential growth over the medium and long term.

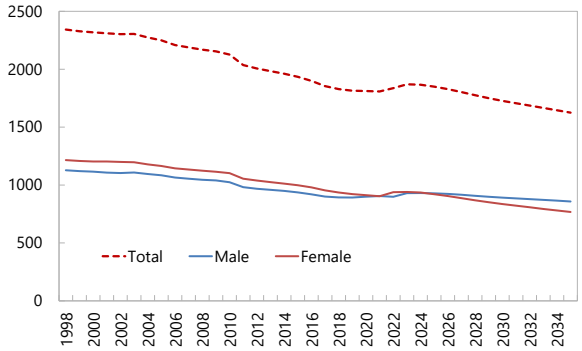
2. While the literature has generally found positive productivity effects from inward migration, adequate integration is key. A large literature has focused on the economic effects of migration (see e.g., Caselli et al., 2024 for a brief general review and Engler et al., 2023 for the economic effects of large migration waves). Migration can have positive effects on TFP growth for instance via knowledge diffusion (e.g., Andersen et al., 2011 or Hornung, 2014), or skill diversity and innovation (e.g., Stuen et al. or 2012; Ariu, 2022). An increase in migration, as seen in 2022 in Lithuania, firstly raises a country's population. Depending on the characteristics of the migrants (age, gender, skills, language) relative to the host country, such an increase will also change the structure of the population. To understand the effects of higher net migration on potential growth it is crucial to have adequate data on those characteristics. Younger migrants speaking local languages and possessing skills desired by firms are easier to integrate into the labor force and will result in stronger aggregate productivity effects if capital can adequately adjust to the increase in labor supply.

[1] Prepared by Lukas Boer (EUR). The author would like to thank Saioa Armendariz, Helge Berger, Harri Kemp, Alberto Musso and Kazuko Shirono for helpful comments and Sadhna Naik for excellent research assistance.

[2] At the same time, upside risks to net migration cannot be ruled out, given the recent trend of positive net migration of Lithuanians and the increasing number of migrants from the third countries. This possibility is explored in one of the scenarios in the paper.

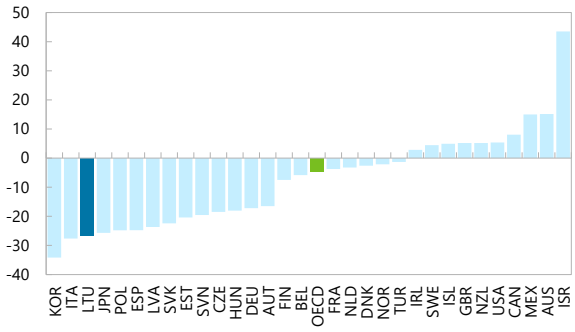
Figure 1. Labor Force and Migration

Working Age Population
(in thousands)



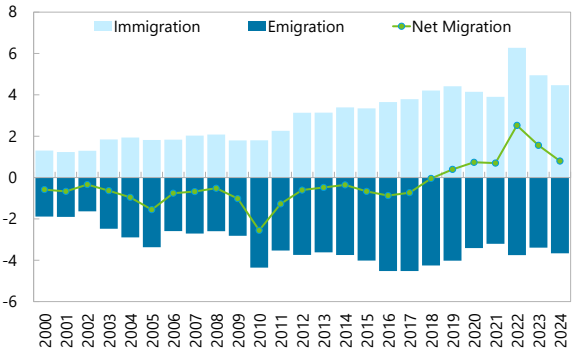
Sources: Eurostat

Change in Working-Age Population, 2024-2050
(Percentage change, 20-64 years)



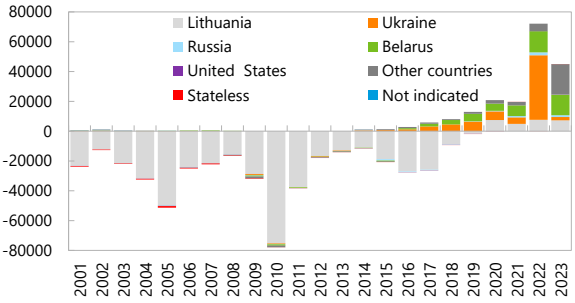
Sources: United Nations World Population Prospects 2024; and IMF staff calculations.

Lithuania: Net Migration
(Percent of total population)



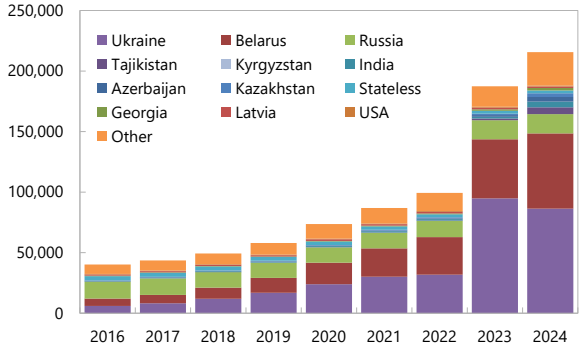
Source: Statistics Lithuania.

Lithuania: Net External Migration by Citizenship
(Number of people)



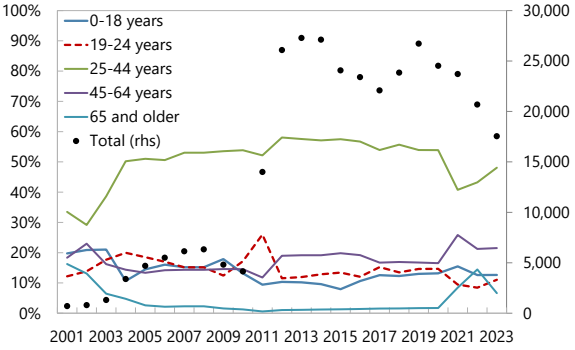
Sources: Statistics Lithuania; and IMF staff calculations. Notes: Other countries in 2023 are Uzbekistan, Kirgizstan, Tajikistan, India, Azerbaijan, Kazakhstan and others (in descending order).

Foreign-born Population
(total)



Sources: European Migration Network.

Lithuanian Nationals Returning
(age group share of nationals returning and total returning)



Sources: Statistics Lithuania.

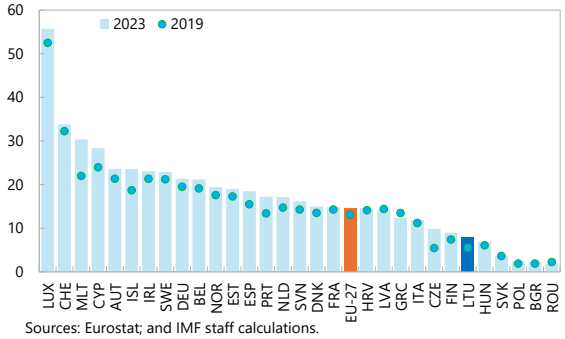
3. Lithuania has experienced strong growth of net migration in recent years (Figure 1)**.** The foreign-born population has more than doubled to around 8% from 2022 to 2024. Ukrainians and Belarusians were the largest foreign groups migrating to Lithuania. Ukrainians were integrated extremely quickly and currently around 70% of them are actively participating in the labor market.

However, they mostly work low-wage jobs. Citizens of Belarus mostly work in higher value-added sectors and only very rarely in low-skilled activities (Bank of Lithuania, 2024). The net migration of Lithuanians has become positive in recent years, reflecting both the decline in emigration flows and the increased number of returning Lithuanians. While the number of Lithuanians moving back to the country has recently somewhat fallen and the share of retirees among them increased, continued net migration of Lithuanians could partially mitigate the declining labor force.

Figure 2. Integration of Migrant Workers

Share of Foreign-Born in Population

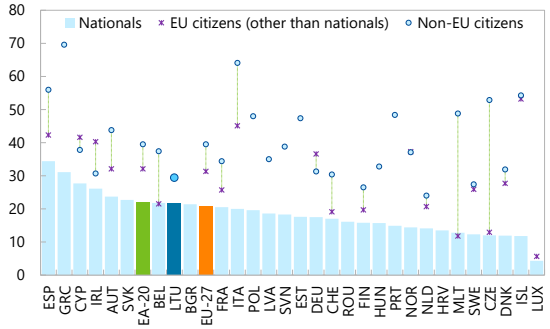
(Percent)



Sources: Eurostat; and IMF staff calculations.
Note: Population 15 years and older.

Over-Qualification Rate by Citizenship, 2023

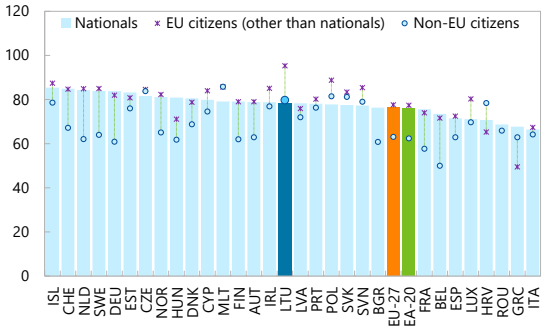
(Percent; age class: 20-64)



Source: Eurostat.

Employment Rate by Citizenship, 2023

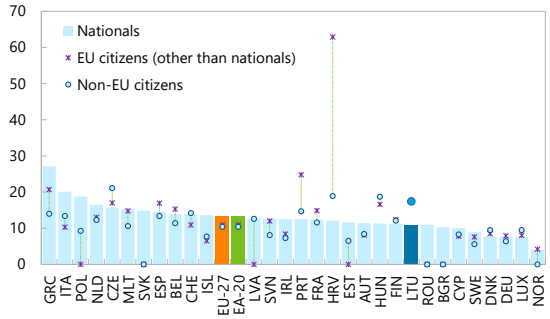
(Percent; age class: 20-64)



Source: Eurostat.

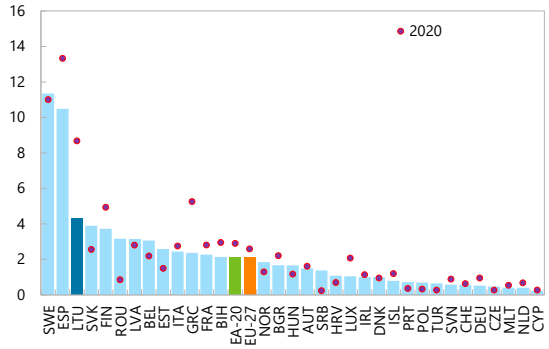
Share of Self-Employed in Total Employment, By Citizenship

(Percent of total employed; age class: 20-64)



Source: Eurostat.

Skills Mismatch Index, 2023



Source: Eurostat; and IMF staff calculations.

Annual Migration Quotas

Year	Quota	Share of working age population	Quota used
2021	32,200	1.8%	32,200
2022	35,600	1.9%	35,600
2023	40,250	2.2%	40,250
2024	40,250	2.1%	37,933
2025	24,830	1.3%	

Sources: Migration Department. Notes: Quotas before 2025 were structured with sub-quotas for certain industries. This was abolished in 2025. High-skilled industries that lack workers are excluded from the quotas.

4. While the level of foreign-born population is still relatively low, migrants are integrated well into the local labor market (Figure 2)**.** Compared to European peers, Lithuania's foreign-born share in the domestic population is relatively low implying potential for additional immigration. Migrant workers seem relatively well integrated: Overqualification of non-EU citizens is not particularly high while their employment rates are exceptionally high. Moreover, non-EU citizens are relatively more often entrepreneurs than nationals. Skills mismatch is relatively high but has come down significantly since net migration has picked up in 2020. Finally, quotas during the last years have kept non-EU migration at around two percent, contributing to a persistently low foreign-born share of the population.

B. Estimation Approach

5. This note will use a production function approach to explore the effects of different migration scenarios on potential growth in Lithuania over the medium term. The estimation relies on a standard Cobb-Douglas production function.[3] Capital inputs over the scenario horizon until 2030 are in line with IMF staff forecasts, while labor inputs rely on different migration scenarios from Eurostat. The analysis shows that potential growth could be 0.2 percent lower or higher in a low- or high-migration scenario.

6. Potential output growth is estimated with a production function approach. The analysis assumes a standard Cobb-Douglas production function with constant returns to scale.[4] Potential output is given by:

$$\overline{Y_t} = \overline{A_t}(\overline{K_t})^{\alpha}(\overline{L_t})^{1-\alpha} \quad (1)$$

where Y_t is real GDP, A_t is total factor productivity (TFP), K_t is the capital stock, and L_t is labor. Bars represent potential values of the inputs and $(1-\alpha)$ is the labor share of production. Taking logs on both sides and differentiating yields the following expression for potential output growth which can be estimated by applying a Hodrick-Prescott (HP) filter to the underlying data series:

$$\Delta \log(\overline{Y_t}) = \Delta \log(\overline{A_t}) + \alpha \Delta \log(\overline{K_t}) + (1-\alpha)\Delta \log(\overline{L_t}). \quad (2)$$

For the estimation the labor share, taken from the Penn World Tables, is kept constant at its average value of 51% over the historical sample from 1995 to 2023.

7. Potential growth estimates over the scenario horizon rely on several assumptions in line with IMF staff forecasts. Data on the capital stock is taken from the European Commission and projected forward using the capital accumulation equation

$$K_{t+1} = I_t + (1-\delta)K_{t-1} \quad (3)$$

[3] See Caselli et al. (2024) for a related EU-wide exercise using a semi-structural general equilibrium model.

[4] The setup follows Annex II. Potential Growth in IMF (2024).

where I_t is real gross fixed investment and δ is the implicit capital depreciation rate. The forecasts for fixed investment are taken from the latest IMF staff forecast.[5] The depreciation rate is kept fixed at its average 2015-2023 level, implicitly calculated from the capital accumulation equation. Growth in the real capital stock is expected to slow from 5.5 percent in 2024 to 4.5 percent in 2030 (Figure 3). Labor input is defined in terms of hours worked as

$$L_t = WAPOP_t * LFPR_t * (1 - UNR_t) * HOURS_t \quad (4)$$

where $WAPOP_t$ is the working age population (age 15-64), $LFPR_t$ is the labor force participation rate, UNR_t is the unemployment rate and $HOURS_t$ are the average hours worked per worker. Forecasts for the working age population are from Eurostat. In the baseline migration scenario, the working age population is assumed to shrink by 1.1 percent per year. The labor force participation rate and hours worked are kept constant over the scenario horizon at their 2023 levels (Figure 3). Labor force participation has increased significantly since the 2000s and is already at a relatively high level with female participation close to male participation. The unemployment rate is projected forward using IMF staff forecasts.

8. Demographic pressures are weighing on total factor productivity over the medium-term. Historically, TFP is calculated as the Solow residual of the potential output function (1), with its growth calculated as:

$$\Delta \log(A_t) = \Delta \log(Y_t) - \alpha \Delta \log(K_t) - (1 - \alpha) \Delta \log(L_t). \quad (5)$$

TFP growth has been decreasing over time with average TFP growth around 1.6 percent. Most recently, TFP growth has been negative in 2022-2024 as Lithuania was hit by a large terms of trade shock resulting from Russia's invasion of Ukraine while firms responded by hoarding labor. Over the medium-term TFP growth is assumed to pick up again to close to 1 percent, the historical average over 2012-2024 (Figure 3). This drag on growth is related to the rapid aging of the Lithuanian society; the population share aged 60+ has increased from 19 percent in 2000 to 28 percent in 2023 and is projected to increase further to 31 percent by 2030 (see Maestas et al., 2023 for evidence on the relation between the 60+ population share and growth for the US).

C. Scenario Analysis

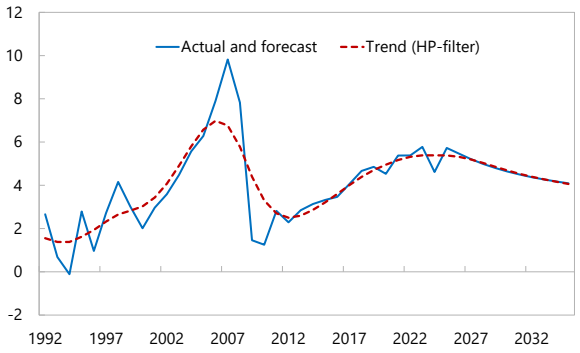
9. The trend in potential growth has been decreasing over time with time-varying contributions. Using the described inputs above, potential growth can be estimated as the sum of labor, capital and TFP, as shown in equation (2). The HP-filter is used to obtain potential levels of each of the individual input series across the entire sample. Potential growth according to this production function approach has been highest before the financial crisis, dropped sharply during the crisis and then recovered to 4 percent in 2017 (Figure 4). Since then, potential growth has been

[5] Forecasts for underlying inputs are extended beyond the current WEO forecast horizon, before applying the HP filter, to mitigate the end-point bias when using the HP-filter to calculate the potential level of production inputs.

somewhat declining driven by lower TFP growth. Capital has contributed most to potential growth while labor has played a negligible role and the TFP contribution has fallen over time.

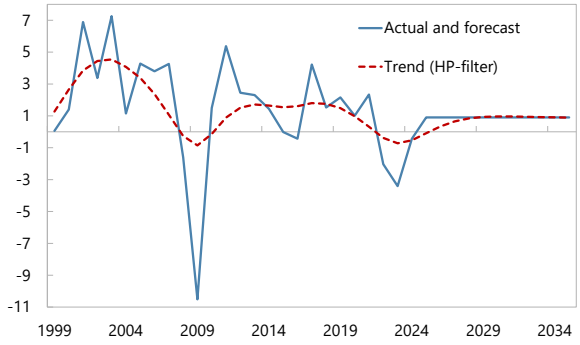
Figure 3. Model Assumptions

Capital Stock Growth
(percent change year-on-year)



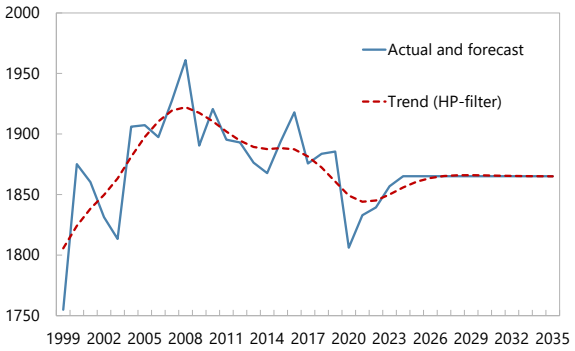
Sources: Haver and IMF staff calculations

Total Factor Productivity Growth
(Percent change year-on-year)



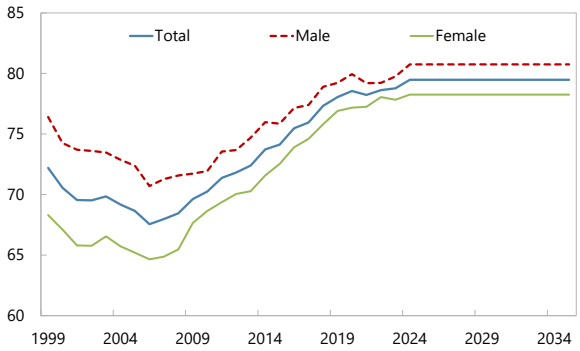
Sources: Haver, Penn World Tables, Eurostat and IMF staff calculations

Hours Worked
(Number per worker per year)



Sources: Haver and IMF staff calculations

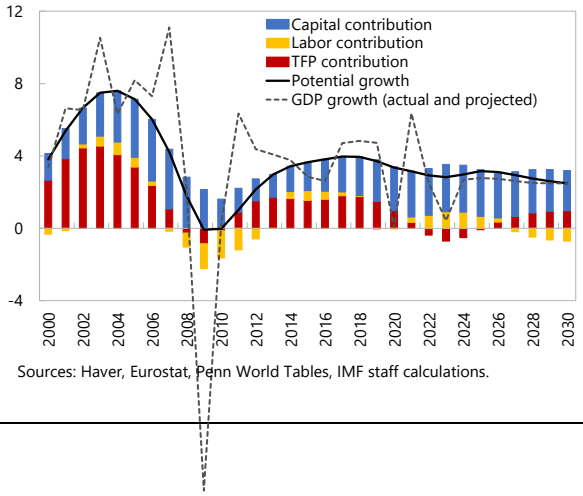
Labor Force Participation Rate
(Percent, actual and forecast)



Sources: Haver, Eurostat and IMF staff calculations

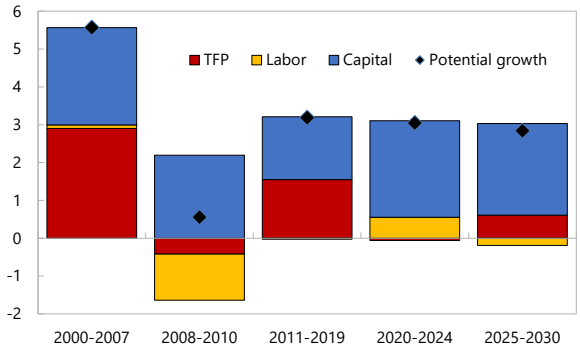
Figure 4. Potential Growth and Contributions

Potential Growth and Contributions
(Percent change year-on-year)



Sources: Haver, Eurostat, Penn World Tables, IMF staff calculations.

Contributions to Potential Growth
(Percentage points, yearly averages)



Sources: Haver, Eurostat, Penn World Tables, IMF staff calculations.

10. The shrinking working age population is a major drag on potential growth. Baseline projections by the European Commission indicate a decrease in Lithuania's labor force by around 7 percent from 2025 to 2030, around 1.3 percent per year. Assuming a constant labor force participation rate, which is already at an internationally high level and a slight increase in hours per worker—however below pre-Covid levels—labor will contribute negatively to potential growth at around -0.7 percent in 2030 (Figure 4). Lower capital stock growth, driven by presumably lower receipts of EU funds after 2026 and a normalization of investment growth after exceptionally strong investment growth in 2021-23, is assumed to also bring down potential growth gradually. Contributions from TFP are increasing over time given their negative contributions in 2022-24. They remain, however, below historical averages given the ageing population. The results show that it is critical for Lithuania to improve productivity growth to make up for the drag on potential growth from labor.

11. Different migration scenarios could exacerbate or ameliorate the drag of labor shortages on potential growth over the medium-term (Figure 5)**.** Eurostat provides different scenarios of the working age population based on low (downside), medium (baseline) and high (upside) net migration scenarios[6] The labor force is shrinking in all three scenarios—decreasing by 1.5 and 1.0 percent per year in the downside and upside migration scenarios, respectively. The average labor force growth rate in the upside migration scenario is similar to a scenario with zero net migration. Preventing the labor force from shrinking would require positive net migration of around 20,000 people per year—levels reached in 2020-23. This is equivalent to yearly net migration of around 0.7 percent of the population. Whether it is possible to sustain the level of migration remains to be seen.[7] Potential growth is significantly affected by different migration levels. It could be 0.2 percent lower or higher in the upside or downside Eurostat migration scenarios, while sustained migration closer to levels seen in recent years would increase potential growth strongly[8, 9]

D. Conclusions

12. Providing favorable conditions for migration, ensuring effective integration into the labor market, and addressing skills mismatch is critical to stabilize potential growth. The large skills mismatch between the domestic labor force and vacancies poses a significant issue for potential growth which could be partly alleviated by the right migration flows. Recent immigration

[6] The low immigration scenario assumes 33 percent less immigration from non-EU countries relative to baseline in each individual year, while the high immigration scenario assumes 33 percent more non-EU immigration per year. In absolute numbers of working age population net migrants, the baseline scenario assumes cumulative net migration of around -20,000 from 2025 to 2030, the low migration scenario around -45,000 and the high migration scenario around 5,000. In a no migration scenario, which is close to the high migration scenario, the labor force falls by 6.4 percent from 2025 to 2030. See Eurostat for further details.

[7] This may be possible if net migration of Lithuanians continues while Lithuania becomes an attractive destination of workers from a more diversified set of countries—an emerging trend seen in recent years.

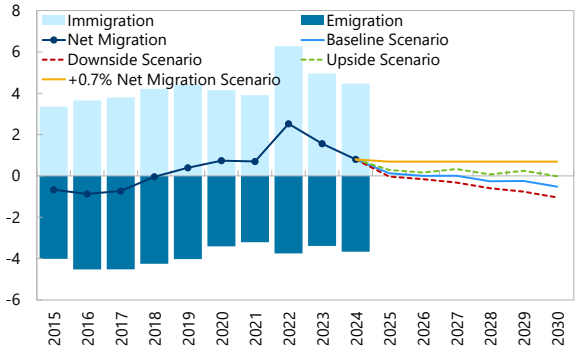
[8] The effects on GDP per capita depend on the evolution of TFP. It is assumed that higher migration improves TFP growth.

[9] A decrease in hours worked back to 2022 levels could reduce potential growth by up to 0.2 percent (compare Figure 3 on model assumptions).

flows have been successfully absorbed into the Lithuanian labor market and legislative amendments have enabled easier migration for high-skilled non-EU workers. Policies should continue to focus on integrating migrants in the most productivity-enhancing way possible and allow also for non-EU migration of lower-skilled workers to address skills-mismatch in those occupations. Given survey evidence on views towards migration, taking the local population onboard remains critical, informing the population of the potential positive spillovers, ensuring adequate provision of public services and compensating potential losers.

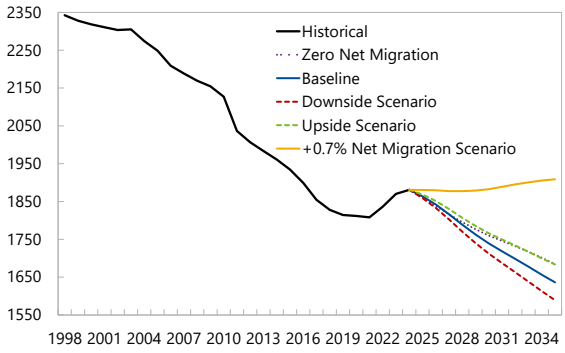
Figure 5. Working Age Population and Potential Growth Across Migration Scenarios

Lithuania: Net Migration
(Percent of total population)



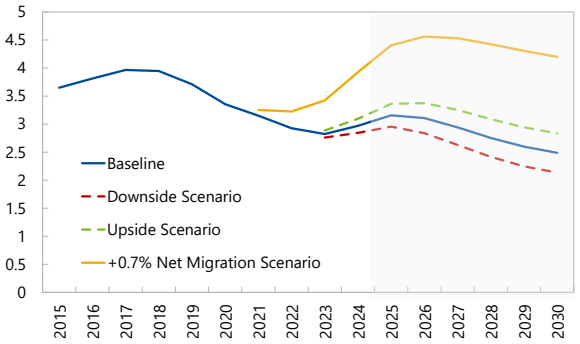
Source: Statistics Lithuania, Eurostat, IMF staff calculations.

Working Age Population Projections
(thousand)



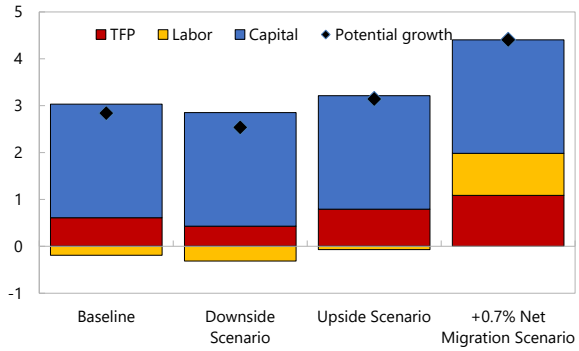
Sources: Eurostat, Lithuania Department of Statistics.

Potential Growth under Different Migration Scenarios
(Percent change year-on-year)



Sources: Haver, Eurostat, Penn World Tables, IMF staff calculations.
Notes: Potential growth is historically higher in '+0.7%' scenario due to the HP-filter.

Contributions to Potential Growth
(Percentage points, yearly averages 2025-2030)



Sources: Haver, Eurostat, Penn World Tables, IMF staff calculations.

13. These scenarios and the implications for potential growth are based on several simplifying assumptions. The uncertainty surrounding these scenarios is high, linked not only to the uncertainty about the assumptions for capital deepening and TFP growth, but also to the complexity of the possible interactions between all the factors of production. Since the scope for increasing the labor force contribution is likely limited even with migration, it is important to deepen our understanding of developments in capital intensity and TFP growth to project potential output growth. The next SIP will examine driving forces and remaining constraints affecting these factors and provide a discussion of structural reforms allowing to unlock their full potential.

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