



Ukraine Economy of the Future (UEF)

Growth-Fiscal Scenario Modelling

February 2026

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5. Fiscal Scenarios: *Restoring fiscal and debt sustainability while supporting growth, reconstruction and core spending*

Growth and Fiscal Scenario Modelling for the UEF: Methodology

Growth-Fiscal Scenario Modeling:

For the UEF, the World Bank conducted (i) **growth-fiscal modelling** to lay out scenarios that support faster income convergence with the EU and investments for reconstruction (RDNA) while restoring macro stability (fiscal sustainability) and (ii) **analyses of policies and reforms to support a private sector-led economic recovery** and a growth-enhancing fiscal adjustment. This was done in collaboration with partners as requested by the Government of Ukraine.

Model 1 – Three growth scenarios (pre-war growth, moderate and high growth) using WB’s Long-Term Growth Model:

- Simulated **real annual GDP growth rates (in constant UAH terms)** based on assumptions on growth drivers: productivity growth, investment rates, and labor supply.
- Converted in **growth of GDP per capita** by considering **population growth rates**.

Model 2 – Debt Simulations (for each growth scenario) using WB debt sustainability analysis model:

- Simulated **annual change in the public debt stock as a % of GDP** based on assumptions on the primary deficit, interest rates, inflation, FX depreciation, and growth **taken from model 1**.
- **Primary deficit path** is calibrated to enable a stabilization of the debt stock as a % of GDP by t+6 and reaching 90% of GDP in debt by t+15.
- **Note that higher growth** enables a **larger primary deficit** as growth reduces debt as a % of GDP.

Model 3 - Fiscal Scenarios/Simulations (for each growth scenario)

- **All scenarios assume these essential post war expenditures:**
 - **Defense spending** (in-kind and on budget) amounts to USD 120 billion per year throughout the projection period (GoU assumption). On-budget defense spending as a % of GDP starts to gradually decline to steady state of 8% by t+10.
 - **5.5% of GDP in public capex for reconstruction** (part of meeting RDNA reconstruction needs) on budget from t+1.
- These scenarios compare the debt stabilizing primary deficit paths developed in **model 2** to the primary deficit under a **no-fiscal adjustment scenario which maintains social spending, subsidies, and tax revenue at 2026 levels as % of GDP**. The difference between these primary deficits is defined as the **needed fiscal adjustment or external grant support**.
- Lay out **combinations of social spending and tax policy that stabilize debt** –the policy choice still needs to be made, looking at the trade-off between revenue and expenditure-led consolidation.
- **These are post-war fiscal scenarios/simulations; they are NOT budget projections.**

We assume **no real exchange rate effects** through (i) annual deflator growth (5%) and (ii) annual depreciation between the hryvnia and the US dollar of 5%.

Timeframe: modelling t to t+15, assuming a ceasefire takes effect in year t, but that security risks remain which weigh on investment and require additional efforts for de-risking and continued high defense expenditures.

Growth Policy Levers:

- A set of **policy levers and interventions (government policies, reforms, programs)** identified by the World Bank, the EU, OECD, EBRD and the IMF.
- Structured into four areas: **Macro and governance foundations, Business Environment, Infrastructure, Labor Force and Social Sustainability**
- Completing all the interventions laid out under the growth policy levers work will enable the **“high” growth scenario** identified in Model 1, with fewer actions taken reducing the growth dividend.
- Policy interventions are **complementary**; all should be completed to enable the largest growth dividend.
- Actions are grouped in **three periods: Starting now, before the war ends, Short-term Year t+1 and Medium-term Years t+2 to t+5.**
- **Many reforms can be completed before a ceasefire takes effect and/or are already existing reform commitments** so should be implemented even if there is no ceasefire/end of war.

Consultations with Government of Ukraine and Development Partners:

- The growth-fiscal modelling and policy levers have been discussed with the Government of Ukraine (Ministry of Finance, Ministry of Economy, NBU, RDO), KSE, EU, IMF, OECD and EBRD, and comments have been incorporated.

Growth and Fiscal Scenario Modelling for the UEF: Caveats and Clarifications

Scenario Modelling versus Projection or Forecasts

- All results presented in the UEF are **medium-to-long-term scenario modeling**: They show how growth, revenue, expenditure, and debt evolve **if certain reforms are undertaken** in a **post-war economy**.
- This is **different from baseline and near-term projections or forecasts** (including those under the new IMF program) which show the evolution of these variables **under the most likely assumptions** (e.g. the IMF considers only committed financing and assumes the war will continue through 2026 in the baseline).
- **This means that the UEF growth-fiscal scenarios are NOT meant to be used as near-term GDP or budget forecasts.**

Growth Scenario Modelling: The UEF scenario modeling is a tool for **illustrating how reforms together with investment can transform the economy**, increase productivity, improve labor force dynamics, and improve long-term growth prospects.

- **These are NOT near-term GDP forecasts** (which show the most likely GDP growth rate)
- Instead, the growth scenarios shows **what growth would be if reforms and significant investments are undertaken**.
- As the long-term growth model is a supply-side model based on a Cobb-Douglas production function, **it does not look at short-term demand-side factors, does not incorporate output gaps or adjustment paths, and does not allow for the modeling of monetary policy dynamics**. Because of this, the modeling makes a simplifying assumption of no real exchange rate effects.

Fiscal Scenario Modelling: The scenarios illustrate how reform efforts, investments, fiscal policy, and (significant) external financing can be combined to bring a medium-term fiscal consolidation that **restores debt sustainability**.

- **These are NOT near-term annual budget forecasts nor are they fiscal projections for the new IMF program.**
- These are post-war fiscal **scenarios with several simplifications** made to enable modeling a long-term horizon, including on debt servicing. The scenarios presented are **illustrative of a range of possible policy pathways**.
- The tax revenue and social expenditure variables shown in the UEF show an example of an evolution consistent with restoring debt sustainability. **They do NOT show a bottom-up evolution of these variables based on specific tax and social policy measures**. A menu of revenue and expenditure policy options is presented that could support a medium-term fiscal consolidation.

Growth and Fiscal Scenario Modelling for the UEF: Scenario used for the UEF

For the UEF, the following growth and fiscal scenario are used:

- **Growth: The High Growth Scenario** with faster income convergence with the EU:
 - This scenario assumes **substantial improvements in all three growth drivers**: productivity growth, total (public and private) investment, and labor supply.
 - Note that the **total annual investment required** in year t to t+9 (first 10 years) corresponds to \$524bn of RDNA4 reconstruction needs plus \$250bn of other/growth-enhancing investments (e.g., in upgrading factories or investments in new technologies).
 - To get the necessary improvements in the growth drivers, a **high effort to implement good policies and ambitious structural reforms is needed** in four areas: Macro and Governance Foundations, Business Environment, Infrastructure, and Labor Force and Social Sustainability - as laid out under the policy levers component of the UEF.
- **Fiscal: Combines the High Growth Scenario with a medium-term fiscal consolidation** to return to debt sustainability:
 - **Revenues/Income Sources**: Non-tax revenue and external grants treated as fixed. **Tax-revenue** is a **choice variable** that, together with social expenditure, is set to stabilize the evolution of debt.
 - **Expenditures**: Significant on-budget defense, capital expenditure consistent with target investment rates and RDNA4 needs, core public administration, and debt interest payments treated as fixed. **Social expenditure** is a **choice variable** that, together with **tax revenue**, is set to stabilize the evolution of debt.
 - **Financing needs for the fiscal deficit** are met through external (concessional financing at the beginning) and domestic borrowing – *we assume all financing needs are fully met in the scenarios.*
 - **Medium-term return to debt sustainability**: Social expenditure and tax revenue are chosen so that the fiscal balance gradually improves to stabilize the debt-to-GDP ratio by t+6.
 - The scenario illustrates a **balanced fiscal consolidation** in which tax revenue and social spending contribute equally. This is an illustration – many other combinations of higher/lower tax revenue and higher/lower social spending are possible.

1. Background Context: the economic, macro and social impacts of the war



Background Context: The war has created huge multi-faceted economic, macro and social challenges but also new growth and job opportunities

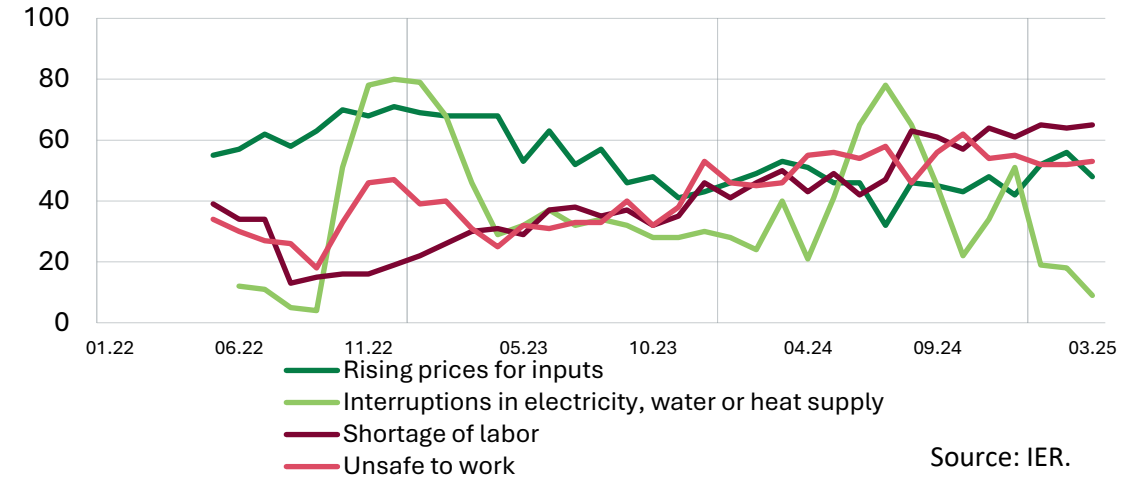
Challenges

1. Capital stock destroyed and acute labor shortages
2. Significant shadow economy, large state footprint, weak competition and firm dynamism
3. Increased poverty and social pressures from job losses, displacement, migration
4. Substantial macro imbalances built up inc. large fiscal deficits

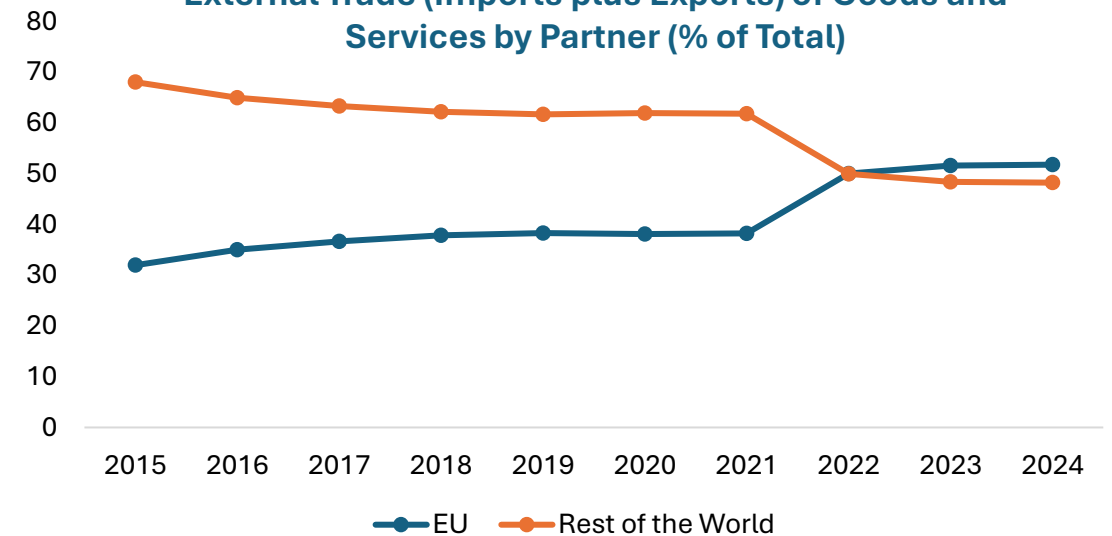
Opportunities

1. Leverage emerging sectors, skills and technologies for the new economy
2. EU integration and accession as the anchor for deep structural reforms and access to markets
3. Recovery and reconstruction offer new private investment opportunities
4. External aid can shift from basic budget support to investments

Main Obstacles to Doing Business (% of Responding Firms)



External Trade (Imports plus Exports) of Goods and Services by Partner (% of Total)

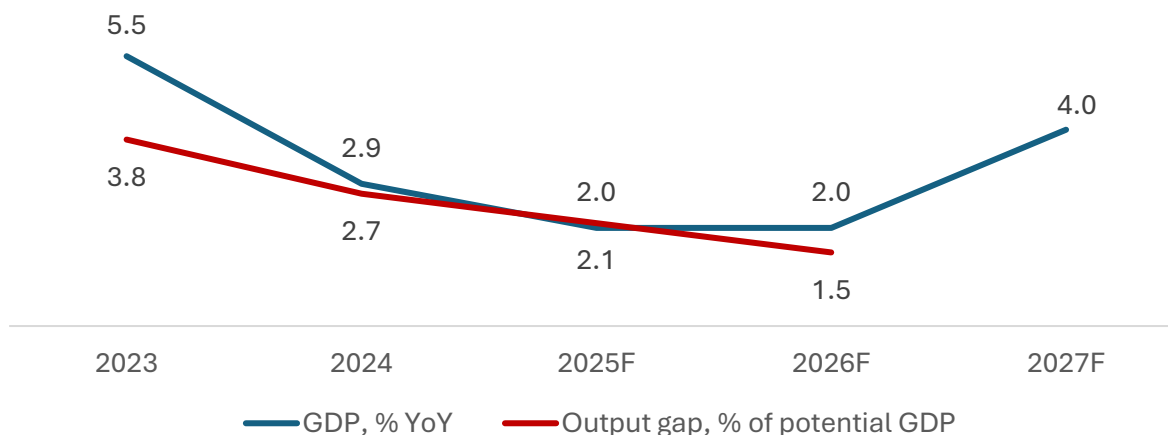


Background Context: The economic, macro and social impacts of the war (1/4)

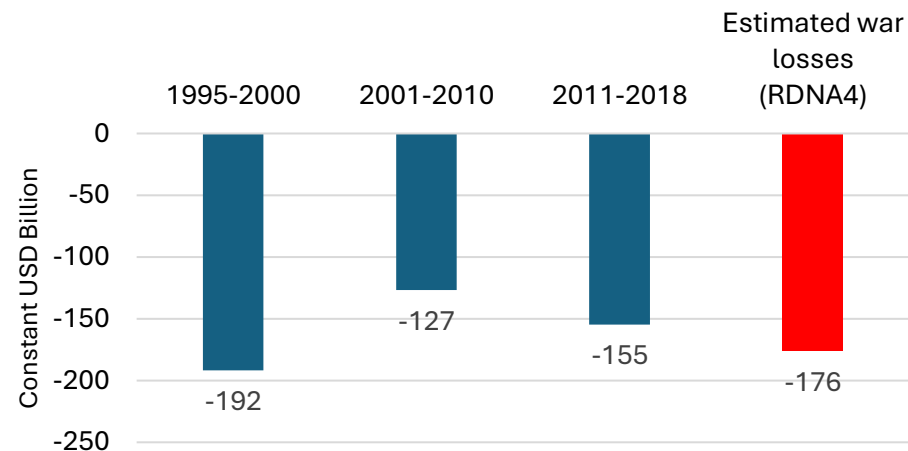
On the Size of the Economy:

- **No GDP expansion:** Ukraine's total GDP was \$190bn in 2024 (vs. \$199bn in 2021).
- Modest **growth recovery** since 2023.
- **The war reduced Ukraine's productive potential and kept output below potential**
 - **Physical capital destroyed**
 - **Population and labor force reduction: ~6.9 million refugees**
 - **Economic disruptions resulting in an output gap:** Logistical bottlenecks; supply chain disruptions; limited access to export and capital markets; increased levels of uncertainty.

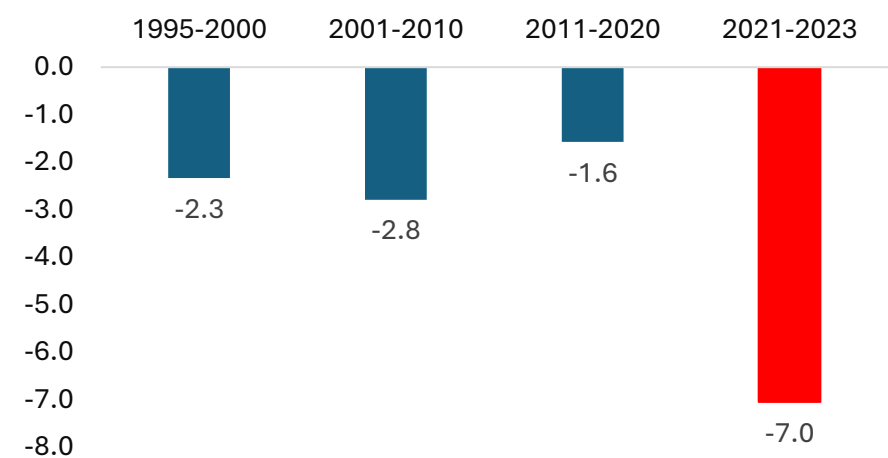
GDP Growth and Output Gap



Physical capital stock changes (USD billion in constant 2022 values)



Population changes, millions

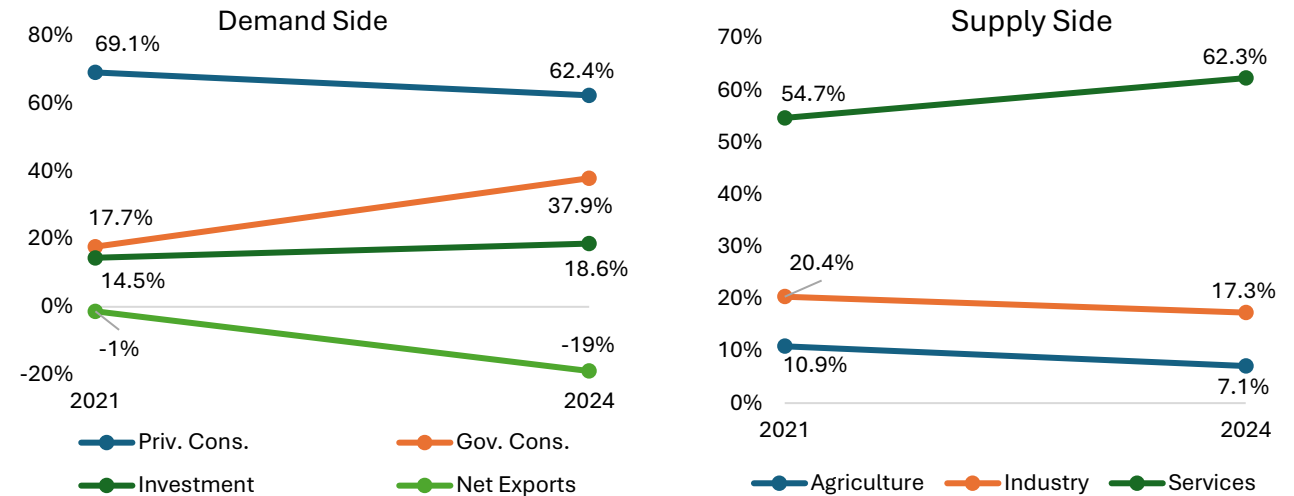


Background Context: The economic, macro and social impacts of the war (2/4)

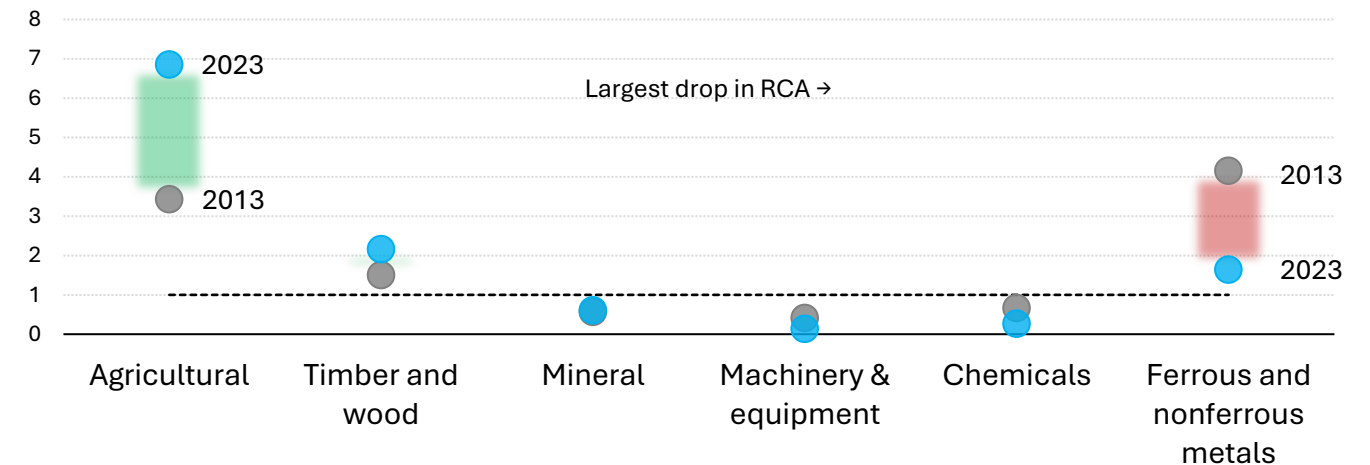
On the Structure of the Economy:

- The **transition to a war economy** and its **direct and indirect impacts** changed Ukraine's economic structure.
- **Demand side:** Large increase in government consumption, at the expense of private consumption. Import surge due to high government demand, coupled with subdued exports.
- **Supply side:** Services increased their share due to a sharp rise in the public administration sector and strong wholesale and retail demand, while industries and agriculture sectors have been more impacted by the war.
- **Export competitiveness and complexity** has suffered, as Ukraine lost out in manufacturing (especially metals), leaving it with **agriculture as its only remaining comparative advantage**.

Change in Demand and Supply Side Composition of GDP (% of GDP)



Change in Revealed Comparative Advantage (RCA. 2023 vs. 2013)

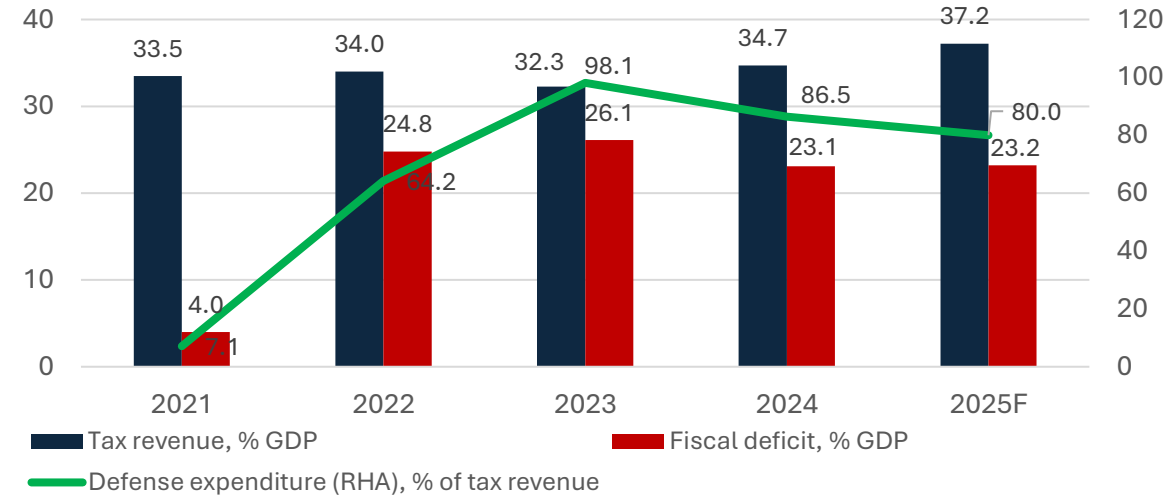


Background Context: The economic, macro and social impacts of the war (3/4)

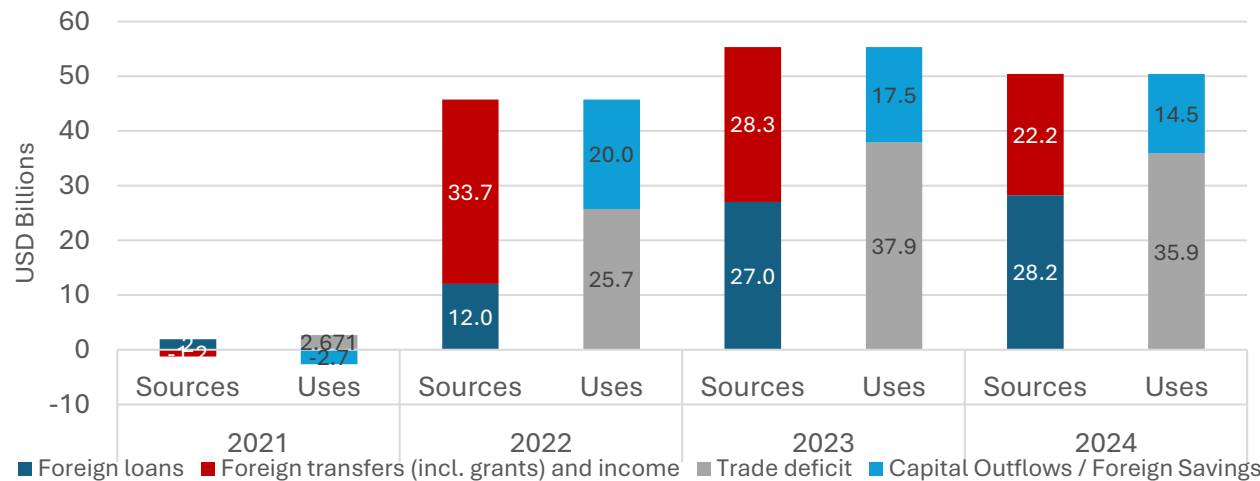
Macroeconomic Imbalances:

- **Fiscal Imbalance:** A large increase in defense expenditure increases the fiscal deficit without a corresponding tax revenue increase
- **External Imbalance:** Substantial widening of the trade deficit and capital outflows exert downward pressure on FX reserves
- **External loans and grants** act as a lifeline to manage both imbalances

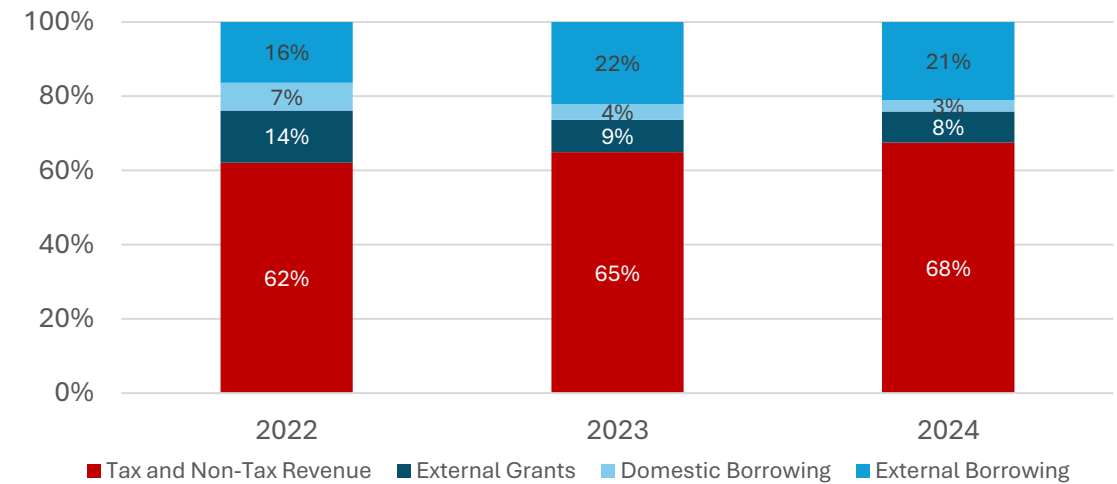
Selected Fiscal Indicators (% of GDP)



Sources and Uses of Foreign Currency (in USD Billion)



Financing Sources for Budget Expenditure (% of Total Expenditure)

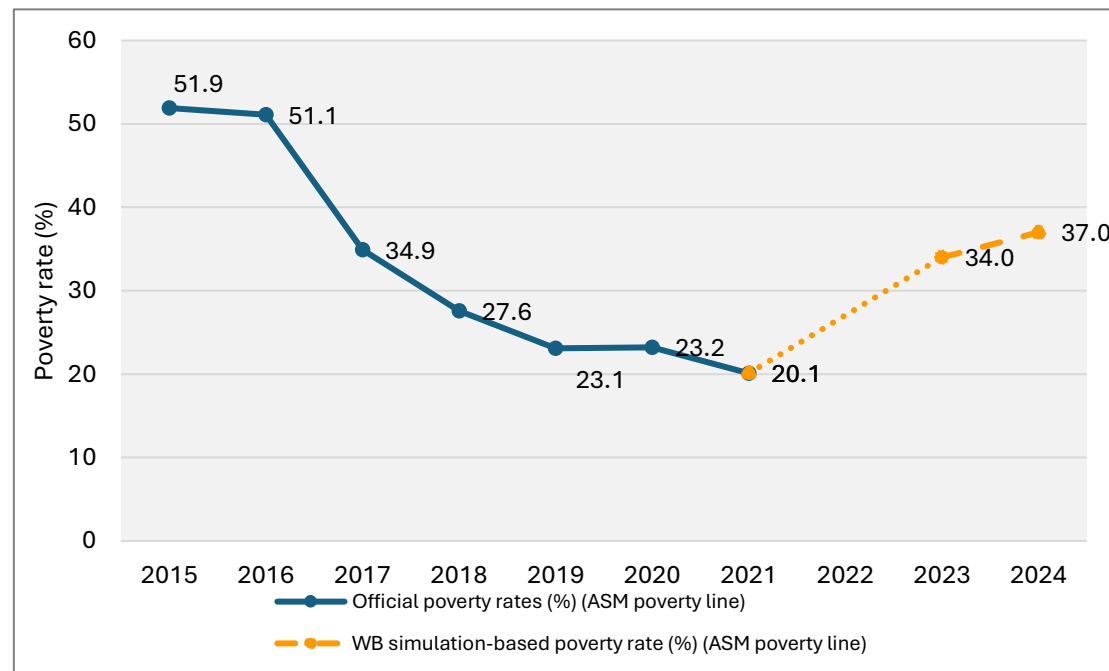


Background Context: The economic, macro and social impacts of the war (4/4)

On the People

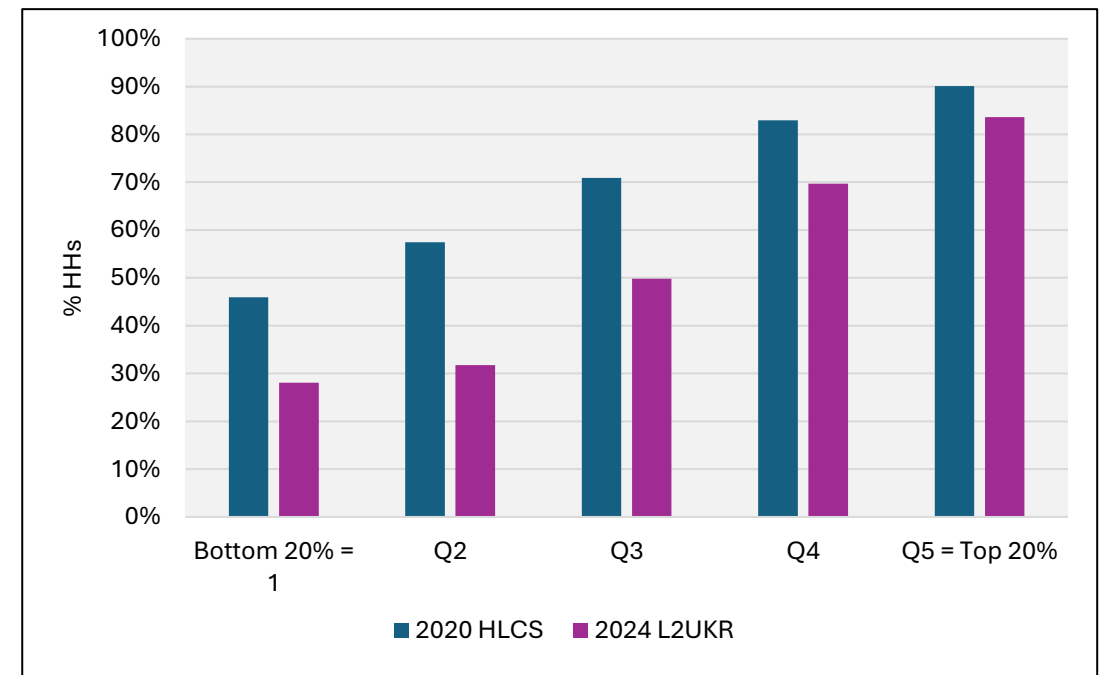
- **Mass out-migration** of ~6.9 million refugees and **internal displacement** of ~4.6 million
- **Increased poverty** due to **loss of wage income**
- **Increased income and spatial inequality**

**National poverty rates (% of population in poverty)
2015-2021 official, 2023 and 2024 WB estimates**



Note: Poverty rates based on the national methodology use the “actual subsistence minimum poverty line (ASM)”, and welfare is income per adult equivalent.

**Share of households with wage income (%) in 2020 vs
2024, by household income quintile**



Note: % Households with wage income in 2024.
Source: 2020 Household Living Condition Survey (HLCS), 2024 L2UKR

2. Ukraine Economy of the Future: Challenges and Opportunities

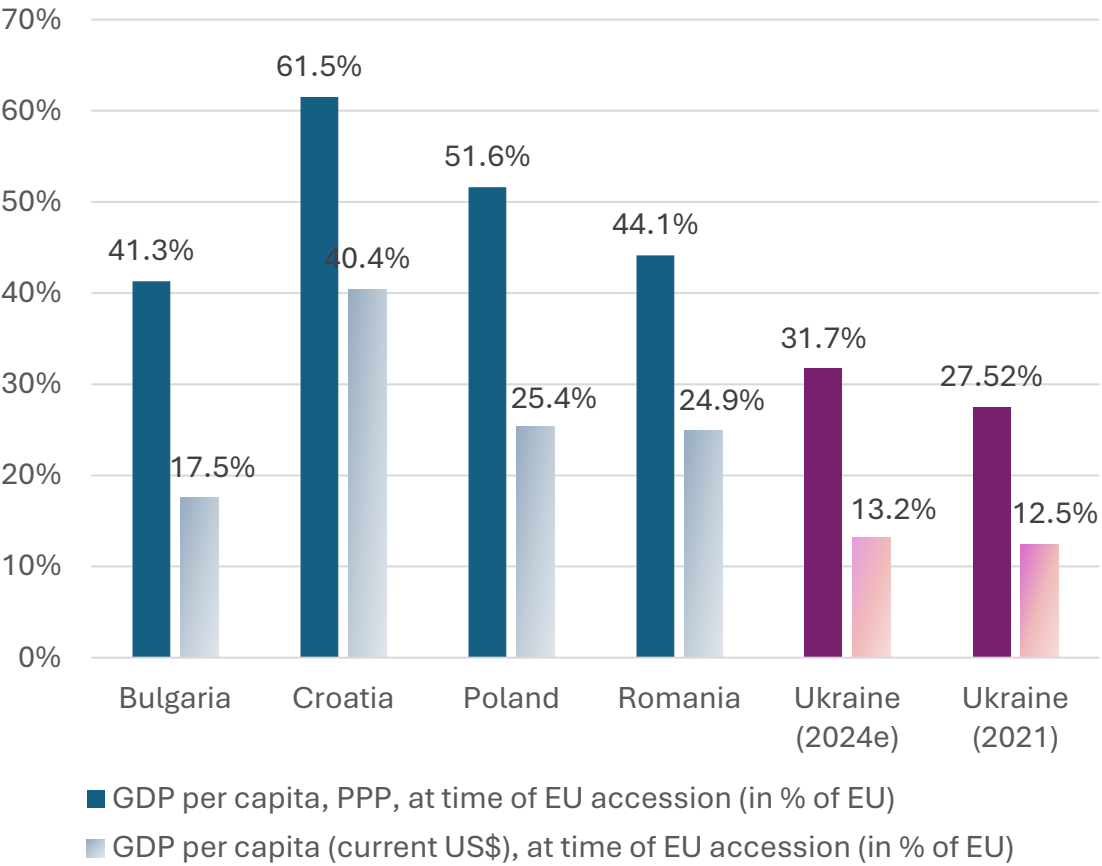
- The Growth and Jobs Challenge
- The Fiscal Sustainability Challenge
- Opportunities



Photo author: Yevhen Nosenko Okhmatdyt, HRMMU

Growth and Jobs Challenge: Ukraine's recent pre-war growth performance is insufficient for a fast income convergence towards EU levels

Countries' relative GDP per capita at time of EU accession and Ukraine (2021, 2024e)



Note: The relative increase in Ukraine's GDP per capita in 2024 vs 2021 reflects two factors: 1) Outmigration and 2) (more important) real appreciation due to forex inflows (leading to high domestic inflation but less exchange rate depreciation so in USD terms the GDP increased).

Ukraine and EU historic growth performance

- Ukraine's average real GDP per capita growth rate between 2016 and 2021: **2.5% per year.**
- EU's average real GDP per capita growth rate between 2016 and 2021: **1.5% per year.**



Growth and Jobs Challenge: Ukraine has significantly lagged peers in ALL growth drivers: investment rates, labor and productivity/TFP growth

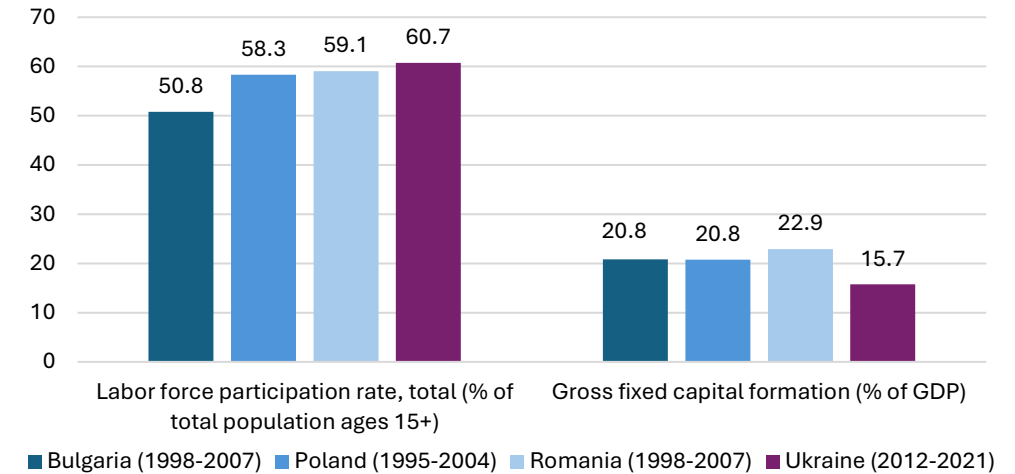
Ukraine has historically significantly lagged peers in growth drivers:

- **Capital:** Between 2016 and 2021, average annual **investment rates** were **16% of GDP** (public investment averaged 3.7% of GDP) and dropped to **12% of GDP in 2022**.
- **Labor:** Between 2016 and 2021, **total population declined by 1.3 million and labor force participation (LFP) declined from 62% to 55%** and the dependency ratio increased from 44% to 48%.
- **Productivity:** Between 2010 and 2019, **very low total factor productivity (TFP) growth, averaged 0.4% per annum**, with some recent pre-war improvement to **1.1% p.a.** between 2016 and 2019.

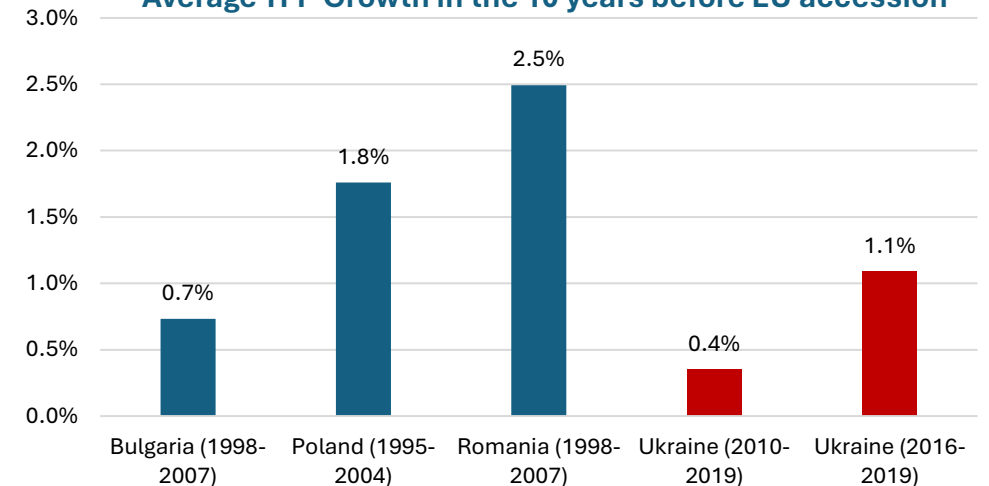
The full-scale invasion has exacerbated Ukraine's growth challenges:

- **Large scale destruction** (RDNA4 estimates needs of US\$524 over the next 10 years) requires accelerated investment to restore capital stock.
- **Large outmigration and declining labor force participation**, driven by widespread internal displacement.
- **TFP growth** is estimated to have slowed to **below 1% in 2022–2023**, due to war-related economic disruptions.

LFP and Investment Rates in the 10 years before EU accession



Average TFP Growth in the 10 years before EU accession



Source: Penn World Tables 10

Growth and Jobs Challenge: The war has led to acute labor market shortages which is now the top growth constraint to businesses

Ukraine's labor force is shrinking...

- Pre-war the working age population was shrinking due to **an aging population** and out-migration.
- This has been compounded by **out-migration** of ~6.9 million refugees, **internal displacement** of ~4.6 million and **mobilization** of ~100,000 since Feb 2022.
- **Female labor force participation remains low.** 53% in 2021, of which only 8% have become active since.

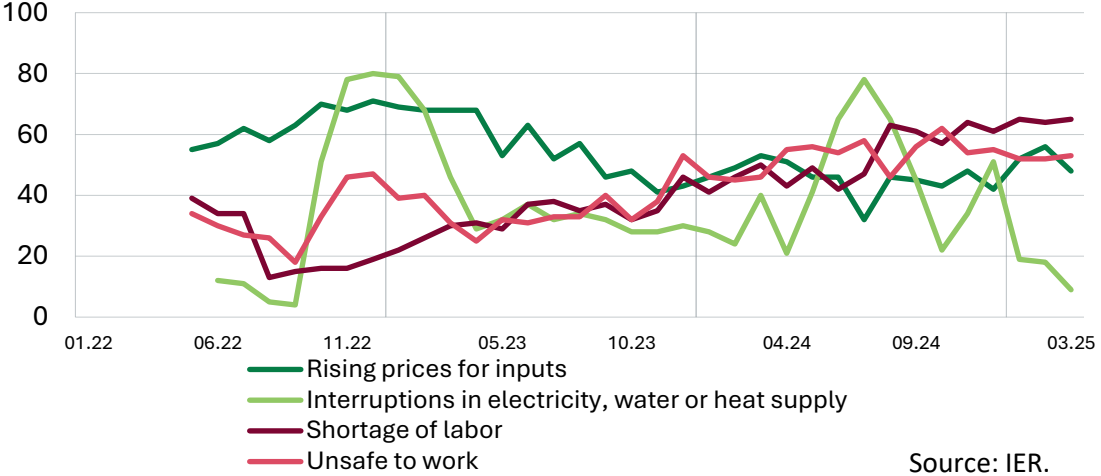
...together with labor market mismatches due to occupational and spatial shifts in economic activity during the war has led to acute labor shortages:

- **65% of businesses identify labor shortages as more binding than wartime disruptions.**
- The number of vacancies is higher than the number of jobseekers.
- Lack of skilled labor limits firm productivity increases and growth.
- World Bank evidence links war-related uncertainty causally to labor shortages.

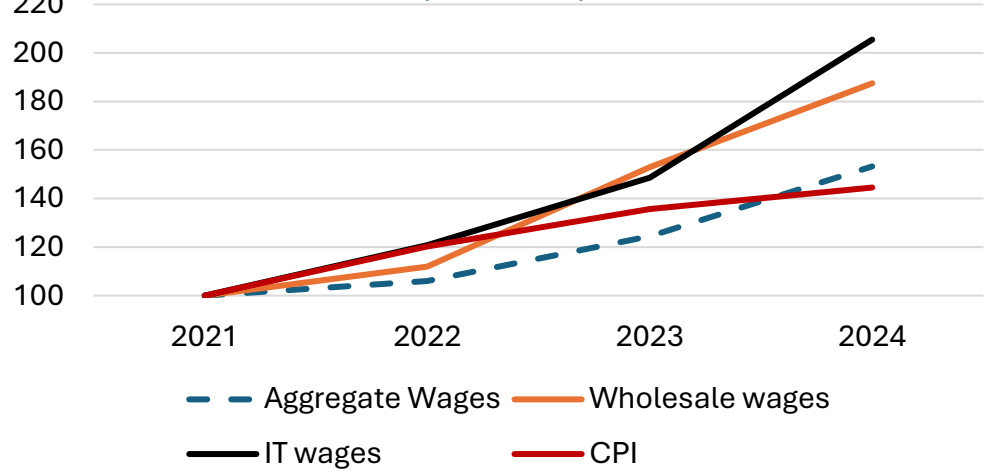
Economic impacts are being felt already:

- **Real wage growth** (esp. in skill-intensive sectors) exceeds consumer price growth, putting pressure on inflation (15.1% in April).
- Firms struggle to **expand production**, even if demand increases.

Main Obstacles to Doing Business (% of Responding Firms)



Wage and Consumer Price Index (2021 = 100)



Fiscal Sustainability Challenge: Despite maintaining robust revenue collection, wartime expenditure needs have led to large fiscal deficits and rising debt

Historically, Ukraine has been able to collect 40 to 45% of GDP in total tax and non-tax revenues (excl. grants):

- Tax revenue collection peaked at 38.9 percent of GDP in 2012 and has averaged ~35 percent of GDP since, including during the war.

These domestic revenues are insufficient to meet Ukraine's high wartime expenditure needs, resulting in fiscal deficits (excl. grants) of ~25% of GDP

- General government spending reached 71.3 percent of GDP in 2024. Tax revenues cover only half of this.
- Non-tax revenues, including profit transfers from SOEs, have been a temporary gap filler but cannot be sustained at the 2023-2024 levels.

External grants and concessional borrowing has filled the remaining gaps:

- Grants, provided primarily by the US, reached 9.2 percent of GDP in 2022 but have averaged ~6 percent of GDP since then.
- The remainder is filled by domestic and concessional external borrowing, which have increased Ukraine's debt levels.

<i>in % of GDP</i>	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025e
Revenue and Grants	42.9	44.5	43.6	40.3	42.1	38.6	39.3	40.0	39.7	41.0	36.5	49.8	54.1	54.1	50.8
Tax Revenue	38.4	38.9	37.9	35.4	35.5	33.1	34.2	34.6	34.4	35.3	33.5	34.0	32.3	34.7	37.2
Income tax	8.8	8.8	8.8	7.3	7.1	8.3	8.7	9.4	10.0	10.1	9.4	10.5	9.9	11.5	12.3
VAT	10.0	9.8	8.8	8.8	9.0	9.9	10.5	10.5	9.6	9.8	9.8	8.9	8.8	9.6	10.3
Social security contributions	12.4	13.0	13.3	11.6	9.6	5.5	6.2	6.9	7.1	7.3	6.6	8.2	7.4	7.3	7.7
Other taxes	7.2	7.3	7.0	7.7	9.8	9.4	8.8	7.7	7.8	8.0	7.7	6.4	6.2	6.3	6.9
Non-Tax Revenue	4.5	5.6	5.7	4.9	6.6	5.5	4.2	5.4	5.3	5.7	3.0	6.6	15.4	13.4	9.8
Grants	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	6.4	5.9	3.8
Expenditure	45.7	48.9	48.4	44.8	43.3	40.6	41.5	42.0	41.8	47.0	40.5	65.4	73.4	71.3	70.2
Primary Balance (after Grants)	-0.8	-2.5	-2.3	-1.2	3.0	2.1	1.6	1.3	1.1	-3.0	-1.1	-12.5	-15.5	-13.2	-14.6
Gen. Gov't Balance (after Grants)	-2.8	-4.4	-4.8	-4.5	-1.2	-2.2	-2.2	-2.0	-2.1	-6.0	-4.0	-15.6	-19.3	-17.2	-19.4
Financing:															
Net external borrowing	1.1	0.8	0.9	2.7	5.5	1.4	1.2	1.3	-0.1	2.3	2.4	10.7	16.3	15.0	16.4*
Net domestic borrowing	1.7	3.6	3.9	1.8	-4.3	0.8	1.9	0.7	2.3	3.8	1.6	5.0	3.1	2.2	3.0

*excluding amount that will be deposited

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Fiscal Sustainability Challenge: Debt sustainability supports private-sector borrowing, affordable fiscal financing, and alignment with EU fiscal rules

Public debt has nearly doubled from 49 percent of GDP in 2021 to 90 percent of GDP by end 2024.

Returning to debt sustainability during recovery is key:

- Government financing crowds out private sector borrowing and undermines a private sector-led recovery.
- High debt levels increase financing costs for the government, undermining its ability to support reconstruction and growth investments.
- Alignment with EU fiscal rules* would help the accession process.

*EU Fiscal Rules:

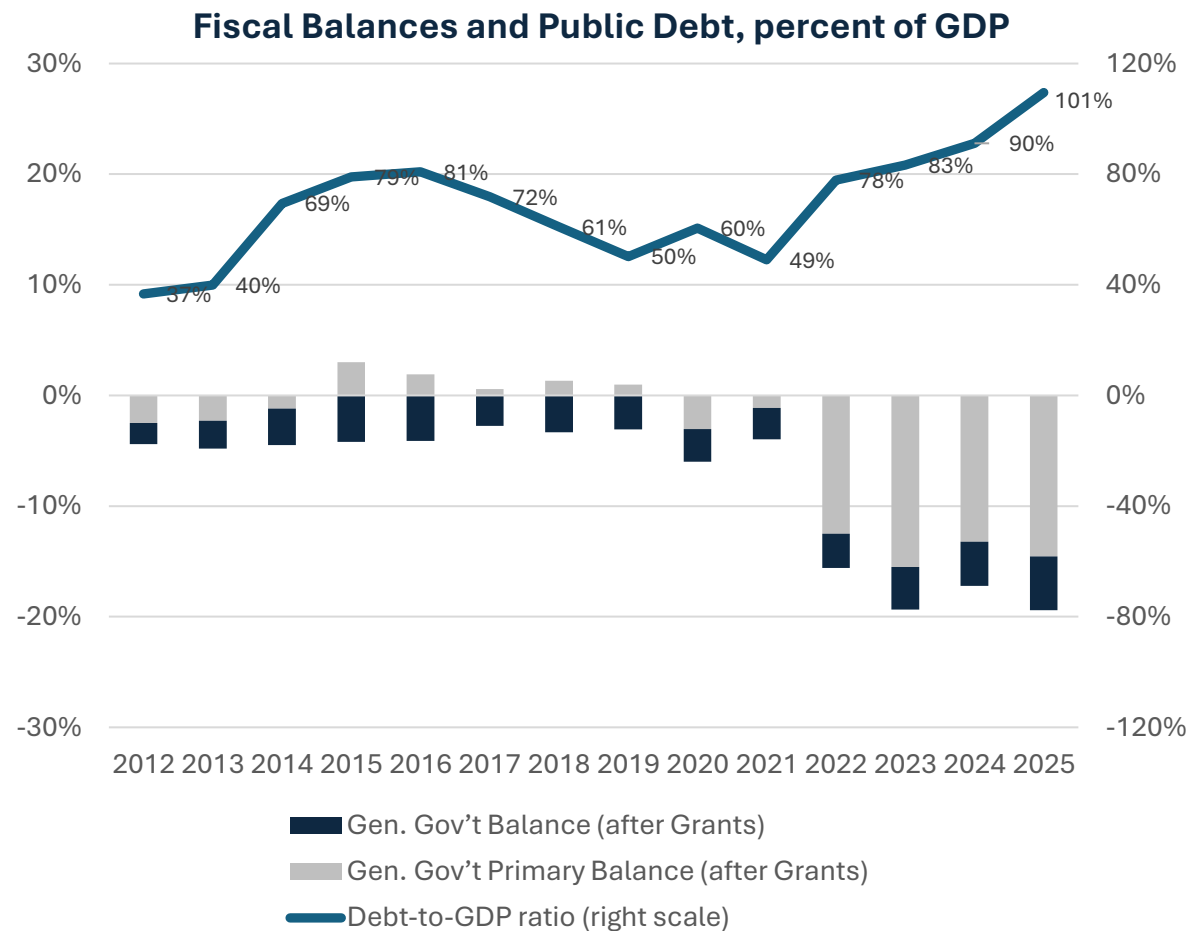
- Centered around debt sustainability
- Targets for annual debt reduction: 1% of GDP p.a. if debt > 90% of GDP; 0.5% of GDP p.a. if debt >60% of GDP but <90% of GDP

If non-compliant: Targets for “structural primary balance (SPB)” increase.

SPB = (Cyclically adjusted general government revenues **minus** General government expenditure net of one-off items (e.g. bank recapitalization)) / Potential GDP

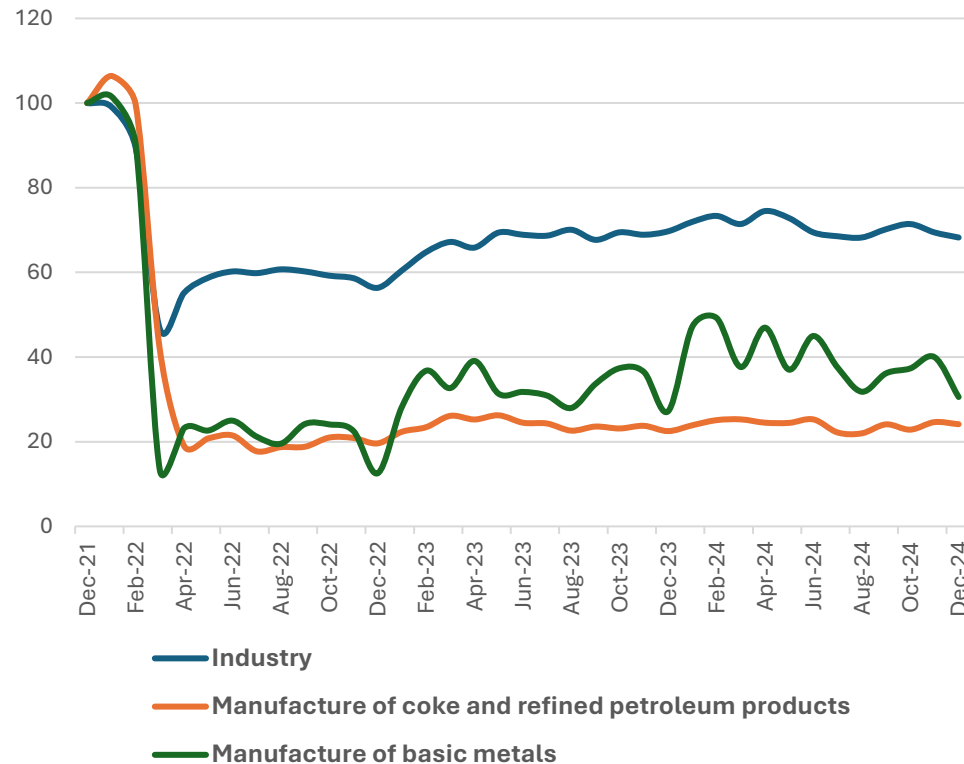
Two ways to meet SPB targets:

- Fiscal adjustment (numerator)
- Increasing economic potential (denominator)

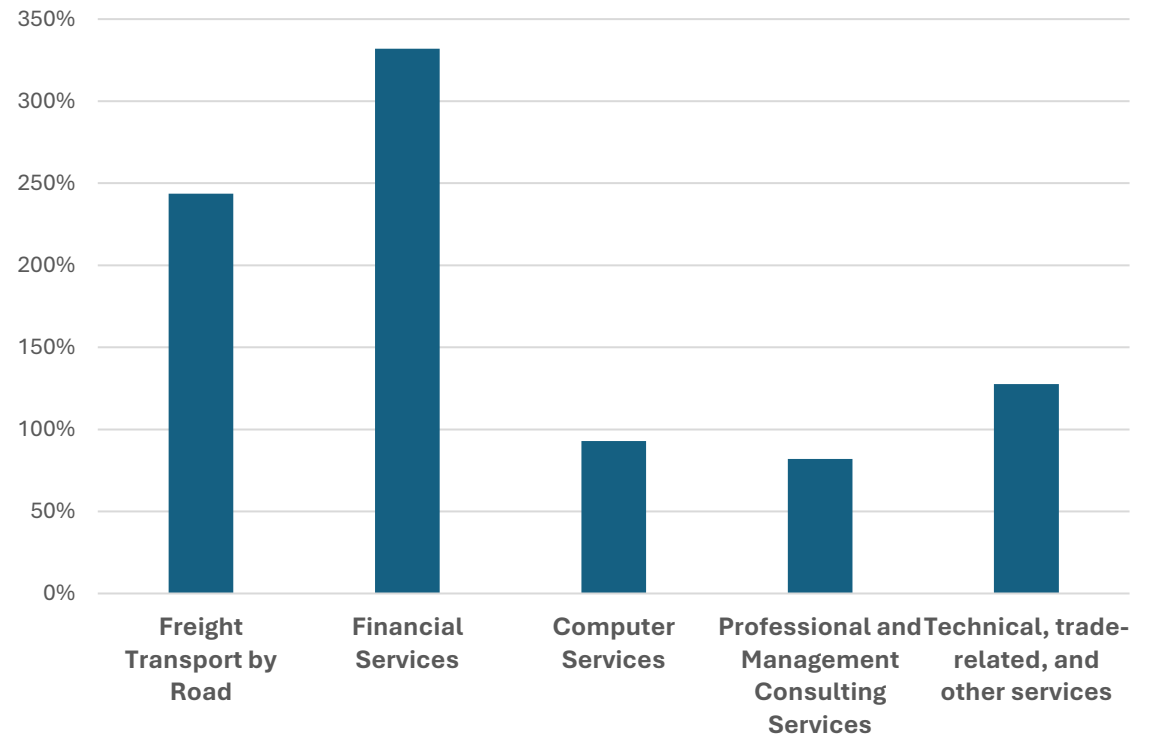


Opportunities: The war has disrupted the “old economy” of heavy industries, but newer higher-tech sectors (IT, financial services) were resilient...

**Index of industrial production since February 2022
(December 2021 = 100)**



Export earnings of service sectors in 2024 (percent of 2021 USD value)



Source: State Statistics Service, World Bank staff calculations

Opportunities:...and brought Ukraine closer to Europe through increased trade. The EU accession process now serves as a strong anchor for structural reforms.

Ukraine has taken significant steps towards EU integration and accession:

- Association agreement (incl. Deep and Comprehensive Free Trade Agreement) in 2014, application for membership and candidate status in 2022, opened negotiations in 2023, launch of screening process in 2024, completed screening in 2025. Updated DCFTA in 2025.

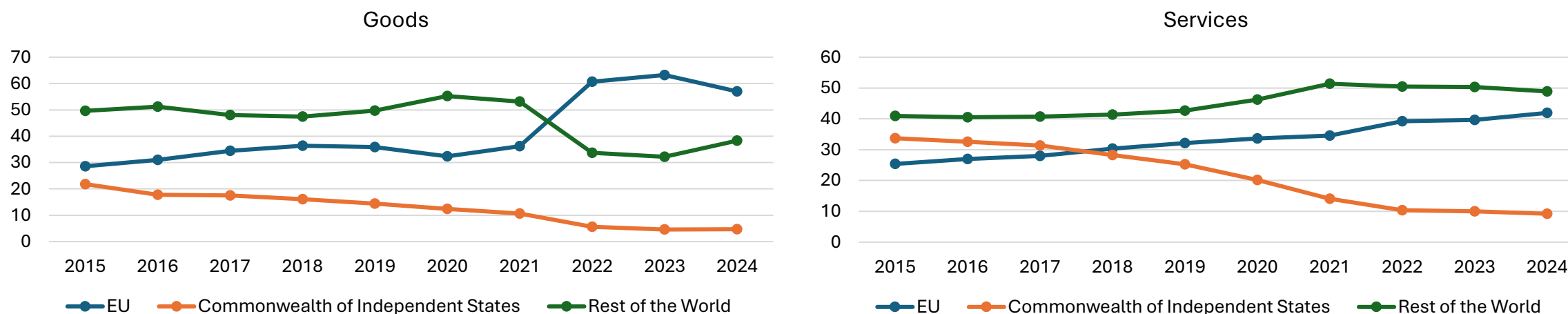
This was accompanied by a reorientation of trade:

- Since 2014, Ukraine's trade has shifted from the East to the West, making the EU its main trading partner for goods and services, accounting for 52 percent of total trade turnover in 2024.

EU integration and accession presents a double opportunity:

- Further integration **into EU markets** can expand export opportunities for **existing capabilities**.
- Structural reforms to align with EU Aquis can **expand export capabilities** that allow to expand market shares **globally** as well as accelerate transformation to a market-based economy and improve productivity.

Destinations for Ukrainian Exports, by Country Groups (% of Total Exports)



Source: NBU data, World Bank staff calculations. Notes: The Commonwealth of Independent States includes Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, and Uzbekistan.

3. What would it take?

Growth Drivers to achieve a private sector-led economic recovery and job creation



UkraineInvest GUIDE:

REBUILDING UKRAINE WITH THE PRIVATE SECTOR

— June 2025

Source: <https://ukraineinvest.gov.ua/en/guide/>



EU convergence within 15 years is possible if Ukraine accelerates its fundamental growth drivers

Ukraine's previous growth is insufficient for rapid EU convergence:

- Ukraine's GDP p.c. growth (2016-2021, constant USD): **2.5% p.a.**
- EU's GDP p.c. growth (2016-2021, constant USD): **1.5% p.a.**
- Ukraine's GDP p.c. in 2024: **12.5% of EU average**
- **Reaching 25% of EU average (Poland in 2004) would take 30 years**

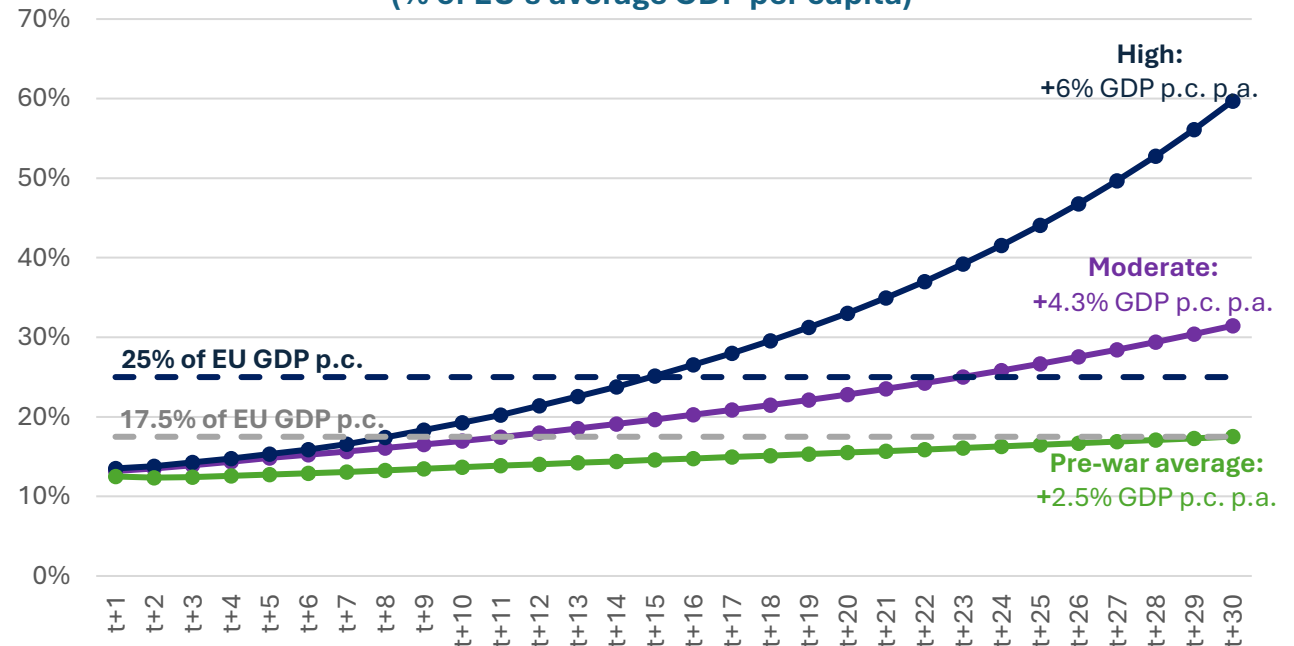
Faster convergence (23 years with moderate and 15 years with high reform effort) requires a *strong* improvement in growth drivers

1. **Significantly faster annual productivity (TFP) growth:** Gradual convergence from 1.3% pre-war average to 3.3% (more than 2x) in the moderate-reform scenario and 5% (more than 3x) in the high-reform scenario.
2. **Conducive labor dynamics: Positive net migration** (1.9 million in the moderate-reform, 3.1 million in the high-reform scenario), **lower unemployment, increased labor force participation, and improved demographic dynamics.**
3. **Significant increase in annual investment (particularly private)** from 16% of GDP (pre-war average) to just below 30% during reconstruction, converging to a steady state of 19% in the moderate-reform scenario and 24% in the high-reform scenario.

Average growth rates from t+1 to t+15 in constant USD:

- **Moderate:** GDP grows **3.8% p.a.**, GDP per capita grows **4.3% p.a.**
- **High:** GDP grows **5.9% p.a.**, GDP per capita grows **6.0% p.a.**
- **Pre-war:** GDP grows **1.9% p.a.**, GDP per capita grows **2.5% p.a.**

Ukraine's GDP per capita under different reform scenarios
(% of EU's average GDP per capita)



Note: The growth figures are in constant USD and assume 5% deflator growth and 5% depreciation per year.

Labor Force/ Employed Population

Moderate growth - moderate reform effort

- 2.3% population growth in two years driven by refugee return; then decline by about 0.8% per year
 - Refugee return: 800K in t+1, 500K in t+2, 200K in t+3, 100K per year until t+7. 60% of refugees are of working age. 20% of returning male refugees of working age enter the labor force.
- Labor force participation rate returns to 2016-2021 level of 62% in t+1, reaches 63.8% by t+3, and increases by 0.1 p.p. per year thereafter
 - Female participation rate drives growth: increases by 9 p.p. to 58.6% by t+3
 - Gradual demobilization: 50K in t+1, 100K in t+2, 150K per year until t+5; 70% of demobilized population joins the labor force
 - Female participation rate increases significantly until t+3, driving the increase in the overall participation rate. Male participation rate increases from 68.4% to 72.7% by t+7 and remains constant thereafter.
- Unemployment rate: Decreases to 7% in t+1; then decreases by 0.1 p.p. until t+6 and by 0.15 p.p. thereafter

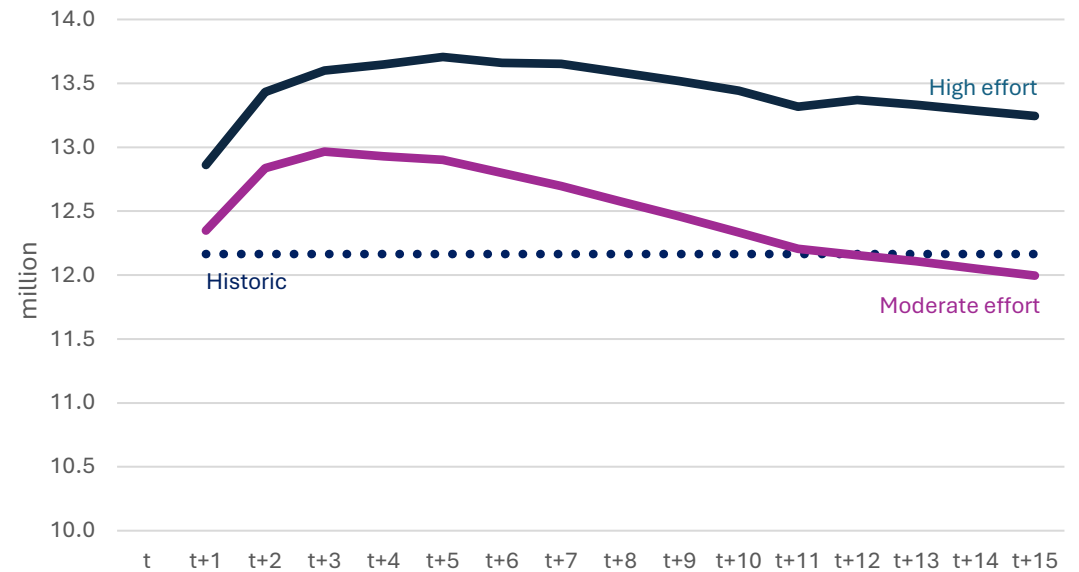
High growth - high reform effort

- Larger refugee return and demobilization drives 4.9% population growth in two years; then relative stabilization until t+7, followed by decline of about 0.7% per year
 - Refugee return: 1.6M in t+1, 500K in t+2, 200K from t+3 until t+7. 60% of refugees are of working age in t+1, 80% are of working age from t+2 onwards. On average 50% of returning male refugees of working age enter the labor force.
- Labor force participation rate increases to 63% in t+1, is 1 p.p. higher than in moderate scenario until t+7 and 1-2 p.p. higher thereafter
 - Female participation rate increases by 11 p.p. to 61% by t+2, driving the increase in the overall participation rate. Male participation rate increases from 68.3% to 70.8% by t+7 and remains constant thereafter.
 - Demobilization: same as in moderate scenario, but 90% of veterans join the labor force
- Unemployment rate: Decreases to 6.7% in t+1; then decreases by 0.1 p.p. until t+3 and by 0.2 p.p. thereafter

Historic levels

- Stable population at 41 million (Jan 1, 2022)
- Average 2016-2021 participation rate: 62.4%
- Average 2016-2021 unemployment rate: 9.2%

Labor Force / Employed Population, millions



Historic: 2016-2021 average labor force participation and employment rate applied to projected working-age population for t+1

Annual Total Factor Productivity (TFP) growth

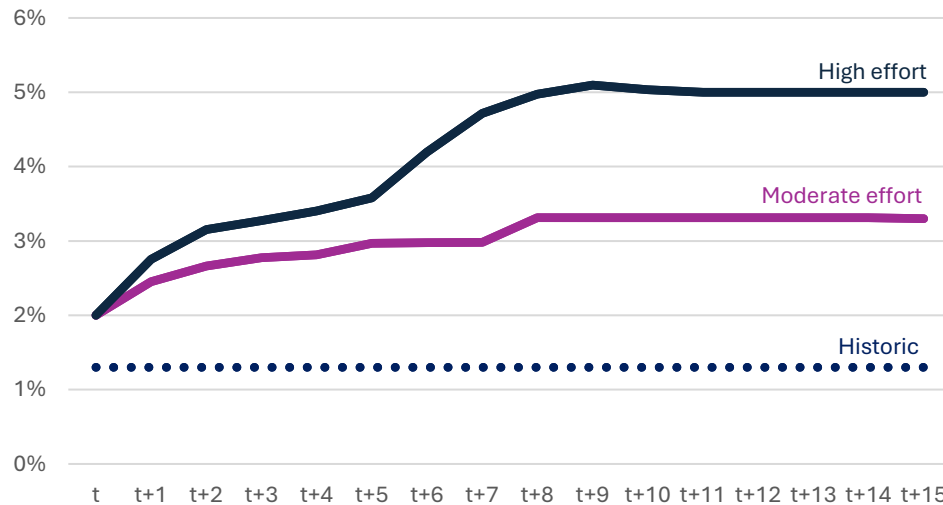
TFP growth measures how efficiently Ukraine uses labor and physical capital in generating economic output (GDP).

Moderate effort: TFP growth of 2.5% in t+1, then gradual increase (with some fluctuations) to a steady state of 3.3% by t+8, approximately doubling of recent pre-war TFP growth to lowest EU peer (Romania)

High effort: Initial rapid catch-up TFP growth to 2.8% in t+1 and more than 3% in t+2, then gradual increase to a steady state of 5% by t+8, more than tripling of recent pre-war TFP growth to Baltic levels peers (Estonia, slightly higher than Latvia and Lithuania)

Historic: Average 2015-2019 growth in TFP: 1.3%

TFP Growth



Annual Investment Rates (public and private)

Includes public and private investment. Note private investment will comprise 75-80% of total investment over 10 years as public capital expenditures will be fiscally constrained.

Moderate effort: Steady state of 19% of GDP reached in t+7 (5.5% public and 13.5% private)

High effort: Steady state of 24% of GDP reached in t+8 (5.5% public and 18.5% private)

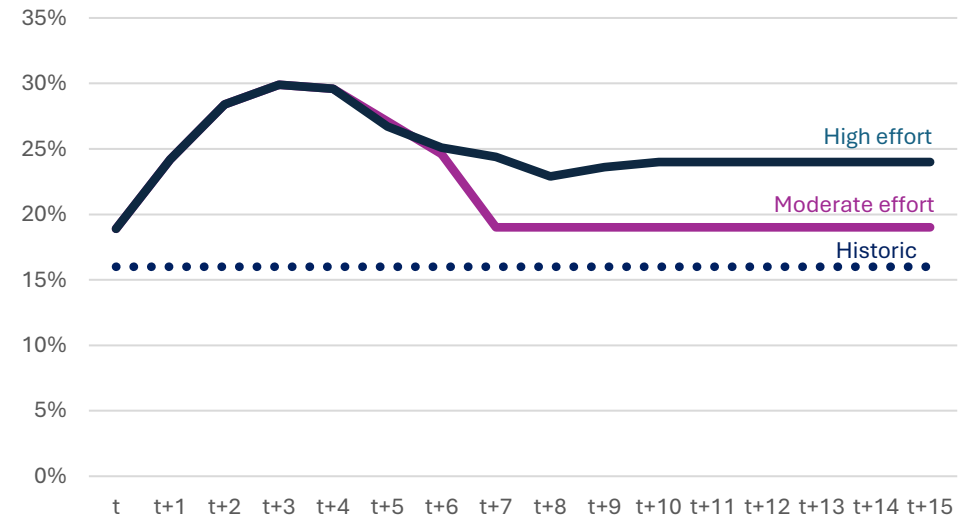
Historic: Average 2016-2021 investment rate: 16% of GDP

Investment profile drivers:

- **Ramp up of reconstruction investments** (+500bn of RDNA4 needs over 10 years*), starting at 12.4% of GDP in t, ramping up to 25% in t+3 and t+4, and then starts to ramp down.
- **Ramp up of growth-enhancing investments** (250bn over 10 years). In the high effort scenario, starts at 6.5% of GDP in t, remain constant in USD terms until t+5, and then increases and becomes higher than reconstruction investments and more than 10% of GDP by t+8.
- Consistent with a transition of growth drivers from **reconstruction** to **endogenous investment and productivity driven growth** between t+5 and t+8

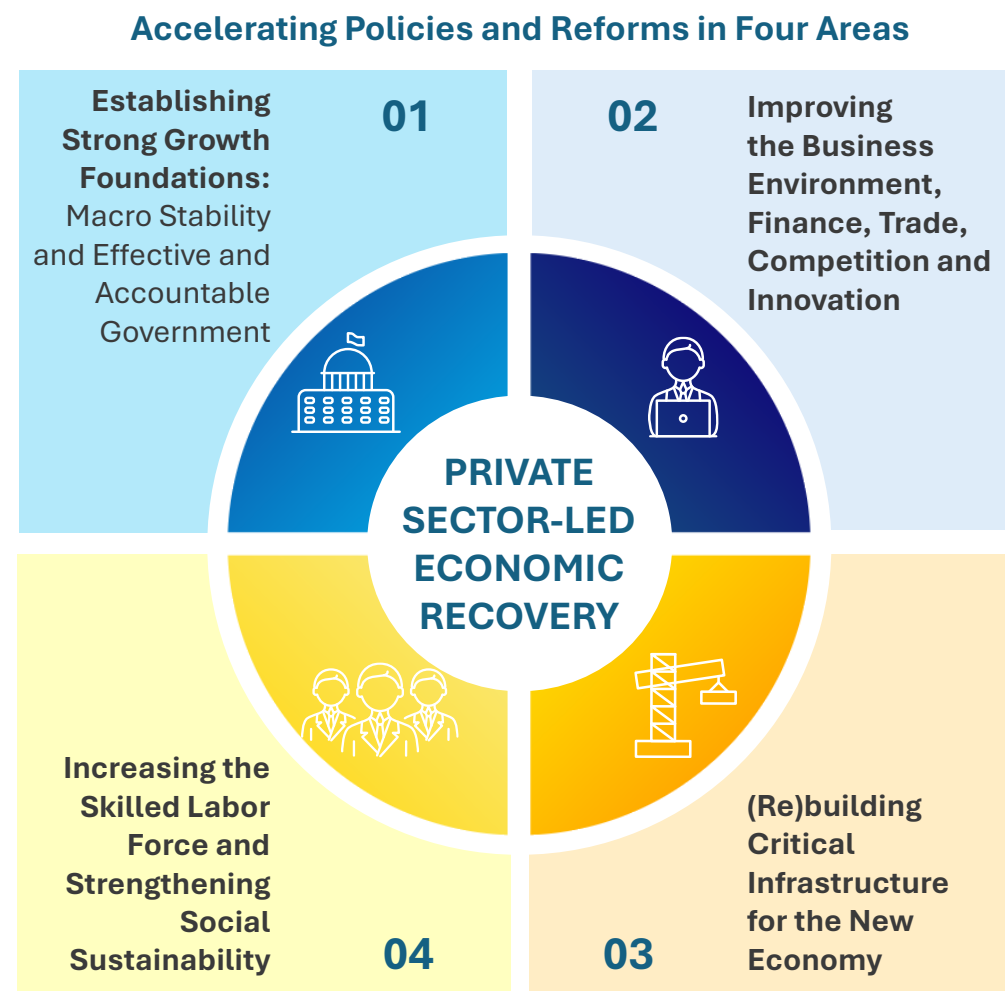
*Rapid Damage Needs Assessment 4, Feb 2025, assesses reconstruction needs of USD 524bn over 10 years. While the majority of this would be capex, some current expenditures for recovery programs are included.

Investment Rate



What would it take? What are the policy levers to improve growth drivers and support a private sector-led economic recovery and job creation?

- **A comprehensive Government package of policies, reforms and programs** across macro-governance, business, infrastructure and social areas will be necessary to increase productivity growth, labor supply and capital investments (especially by the private sector).
- **The stronger the reform effort, the higher the growth dividend** – as illustrated by the moderate and high reform effort scenarios. There are no standalone magic bullets; rather there are complementarities and multiplier effects from enacting a comprehensive set of reforms. *Implementing the package of policies and reforms proposed in this document would be consistent with the high growth scenario, with any reduced reform effort moving the growth trajectory towards the moderate growth scenario.*
- **Actions would need to start immediately and be sustained:**
 - **Starting now, even before the war ends**, implementing existing reform commitments or impactful reforms that are feasible to do under current security conditions without waiting for a ceasefire;
 - **In year 1 post ceasefire**, bold actions to restore confidence in the private sector and the public, to stabilize and revive the economy, and to establish strong foundations for recovery and reconstruction;
 - **In year 2 to 5 post ceasefire**, sustained implementation is needed to ensure that the bold actions translate into results.
- **Policies and reforms should align with/build on existing GoU plans and reform commitments** inc. the EU Ukraine Plan, and IMF and WBG programs (as per the Reform Matrix). **Those existing reform commitments - many of which are highlighted in the UEF - should be met even if the war continues.**
- **Impactful reforms which are not existing commitments**, but that are feasible to do under current security conditions could also be done without waiting for post war.



FOR DETAILS OF THE POLICY LEVERS AND KEY INTERVENTIONS UNDER EACH AREA PLEASE SEE POLICY PACKAGE COMPONENT

4. What would it take?

Restoring fiscal and debt sustainability with minimal growth and social impacts



Source: <https://eu4pfm.com.ua/>

A Stable Macro Environment Is a Pre-Condition for Growth

High and rising public debt can crowd out private investment, create macroeconomic uncertainty, and raise borrowing costs.

- Reinhart and Rogoff (2010) find that **advanced economies with debt-to-GDP ratios above 90% experienced average real GDP growth of 1.7%, compared with 3.0% for countries below that threshold.**
- Cecchetti, Mohanty, and Zampolli (2011) estimate that **each 10 percentage-point increase in government debt above 85% of GDP is associated with a reduction in growth of about 0.1 percentage points per year.**
- Kumar and Woo (2010) find that a **10-point increase in the debt-to-GDP ratio is linked to a 0.2 percentage-point decline** in subsequent annual growth in GDP per capita.

This implies that a growth-consistent debt-to-GDP ratio should achieve:

- 1) **Debt < 90% of GDP by t+15**
- 2) **Debt-to-GDP ratio peaks by t+6**

Status Quo and Debt-Stabilizing Fiscal Scenarios

Starting Point: Sufficient defense spending and a stable macroeconomic environment are necessary conditions for growth acceleration

→ The fiscal scenarios show whether a chosen combination of taxes and spending is consistent with macro stability and growth

Pre-determined/Fixed in all scenarios: Defense*; Capital Expenditures (Capex); Interest; State Administration (excl. Defense); Firm and SOE Subsidies; Non-Tax Revenue; Grants/Financing*

Two main fiscal policy choice variables: Social Spending and Tax Revenue

*Details provided on next slide.

Fiscal Scenario I. Status Quo i.e. no fiscal consolidation efforts post war beyond automatic adjustments



Unsustainable Debt Trajectory even under High Growth Scenario:

- **Fiscal Deficit:** Up to 16% of GDP (in t+2)
- **Debt:** >130% of GDP

→ Debt trajectory is inconsistent with stable macro environment

Fiscal Scenario II. Medium-term fiscal consolidation through sustainable choice of social expenditure and tax revenue

Assumes a **balanced fiscal consolidation** with moderate tax revenue collection (in high growth scenario: average of 37% of GDP in first 10 years, only slightly higher than pre-war) and moderate social spending (in high growth scenario: average of 15.5% of GDP in first 10 years).



Stabilizes Debt Trajectory by t+6 under Medium and High Growth Scenario:

- **Fiscal Deficit:** 2.9% of GDP (High) and 2.6% of GDP (Moderate) in t+10
- **Debt:** <90% of GDP by t+15

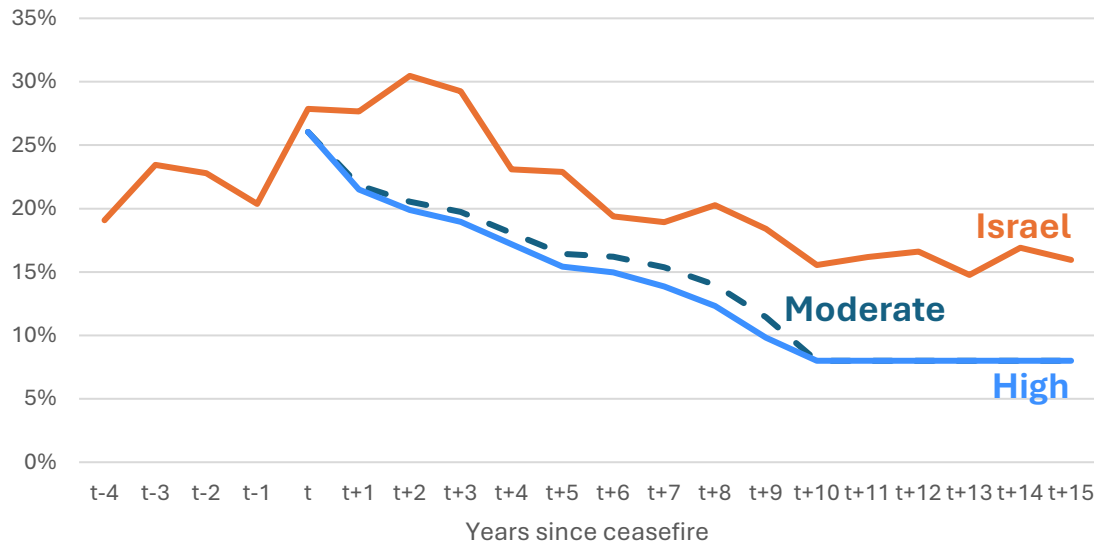
→ Generates a stable macro environment to enable growth

Defense expenditure during a prolonged ceasefire (all fiscal scenarios)

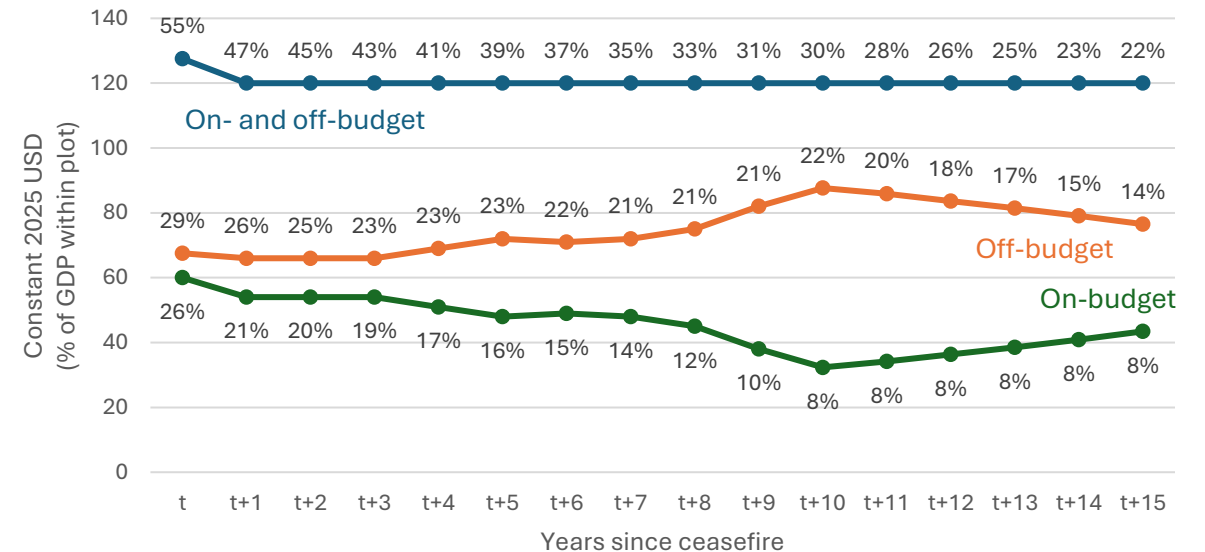
Defense Expenditure Assumptions:

- **Assuming ceasefire takes effect** in year t (2026) but that **security risks remain** which weigh on investment and require additional efforts for de-risking and **continued high defense expenditures**.
- **Total defense spending** (in-kind and on budget) amounts to USD 120 billion (in constant 2025 USD terms) per year throughout the projection period (GOU assumption) for all growth scenarios.
- **On-budget defense spending as a % of GDP starts to gradually decline to steady state of 8% by t+10 to enable a medium-term fiscal consolidation.** Any more on-budget defense spending would crowd out other core spending and is inconsistent with a medium-term fiscal consolidation.
- **Off-budget defense spending makes up the difference** between total defense spending and on-budget defense spending.

On-budget defense spending (% of GDP)



Defense Spending (High Growth Scenario)



In the case of Israel, year t corresponds to 1973, the year of the Yom Kippur War.
Source: SIPRI Military Expenditure Database and World Bank calculations

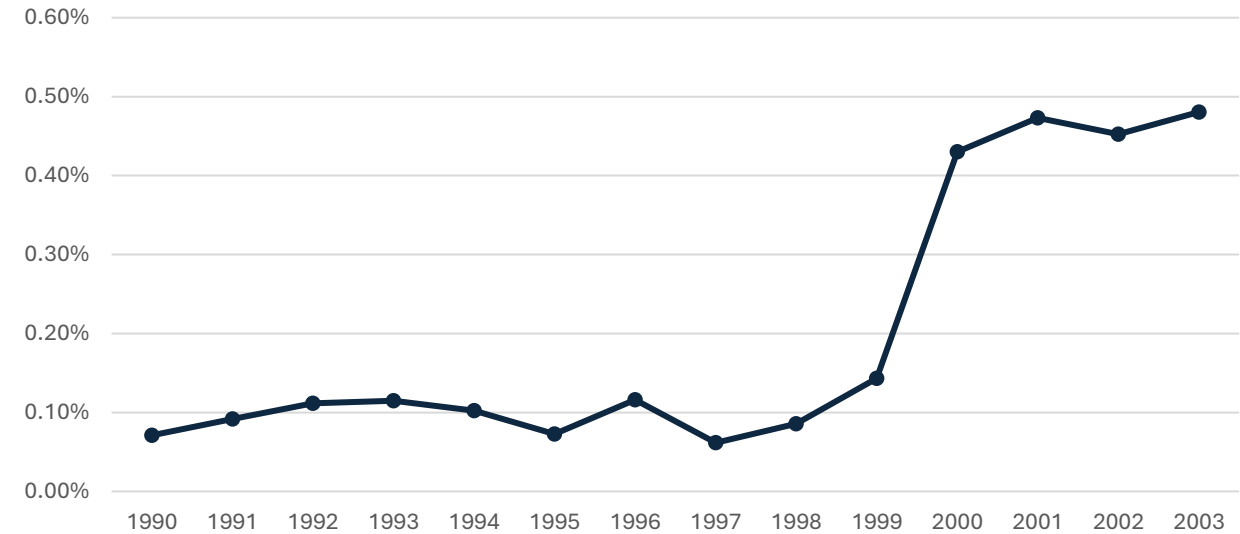
Assumptions on financing (all fiscal scenarios)

Financing in the fiscal scenarios is divided into four buckets:

1. **Reparation Loans:** USD 20bn in t and t+1.
2. **EU MFF:** USD 16bn p.a. from t+2 to t+8 in 0% interest loans.
3. **Pre-Accession Grants*:** 1% of GDP in grants p.a. (more than Poland received – see figure).
4. **Borrowing:** Assumption that a mix of external and domestic debt will **fully cover the remaining financing needs** at an average effective interest rate of 5.5% (2024 value) i.e., no borrowing constraints.

*The scenarios do not contain an explicit assumption on the specific timing of EU accession between t and t+15 but in the UEF moderate and high growth scenarios and policy levers are consistent with increased EU market integration and alignment with EU acquis.

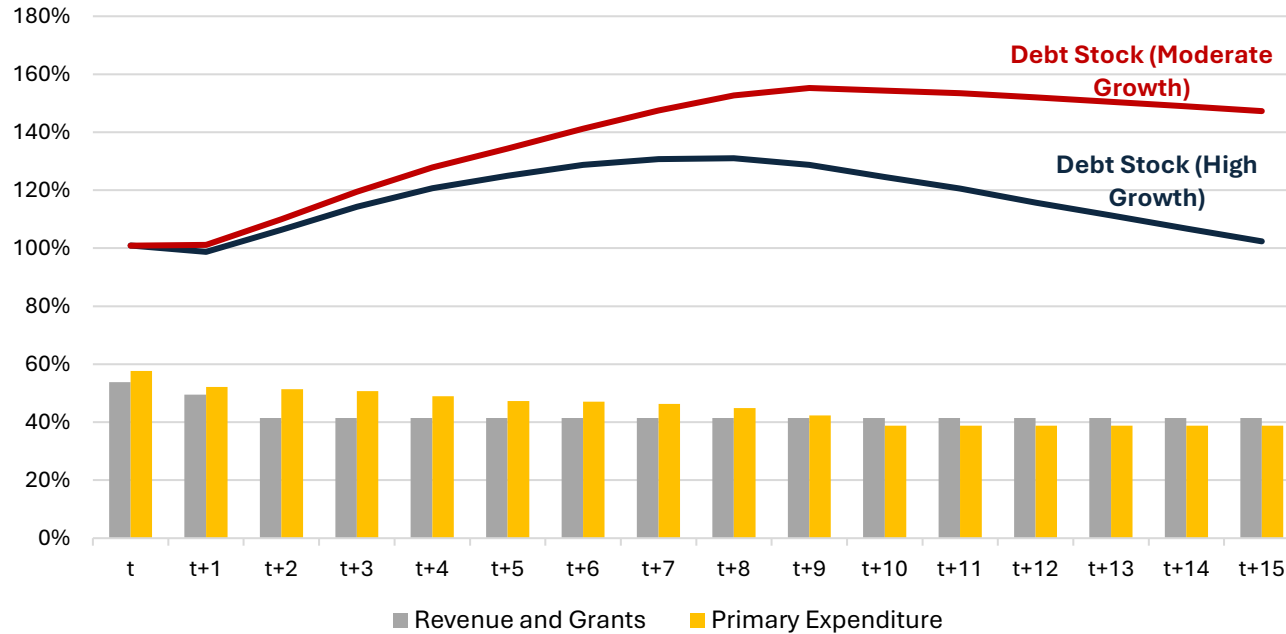
EU Pre-Accession Grants Received by Poland (% of GDP)



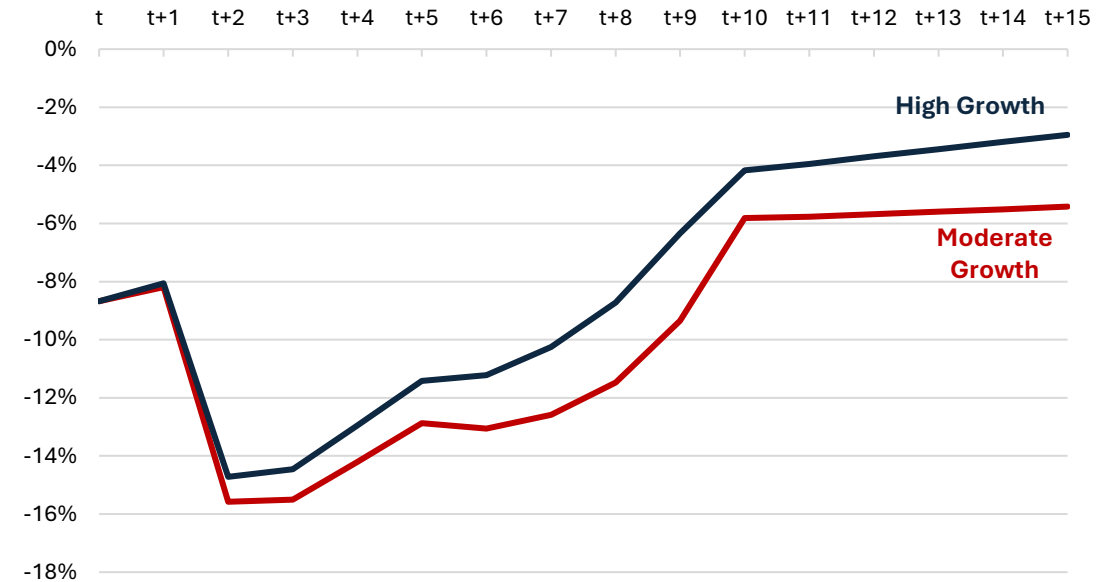
Source: World Bank calculations based on Oczkowska, Monica and Michal Myck (2025), "Towards European Union membership: Poland's EU pre-accession funds and infrastructure development". *FREE Policy Briefs*.

Fiscal Scenario 1 Status Quo is inconsistent with a growth-enabling macro environment

Debt, Revenue, and Primary Expenditure (% of GDP)

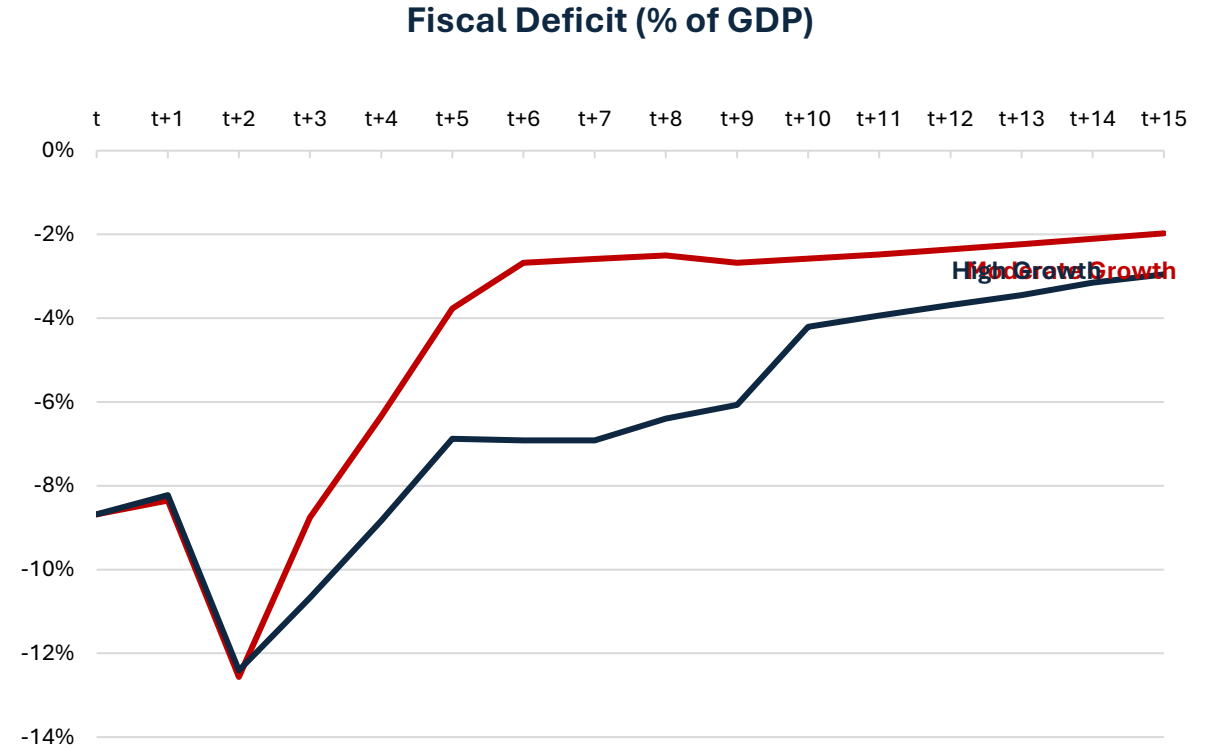
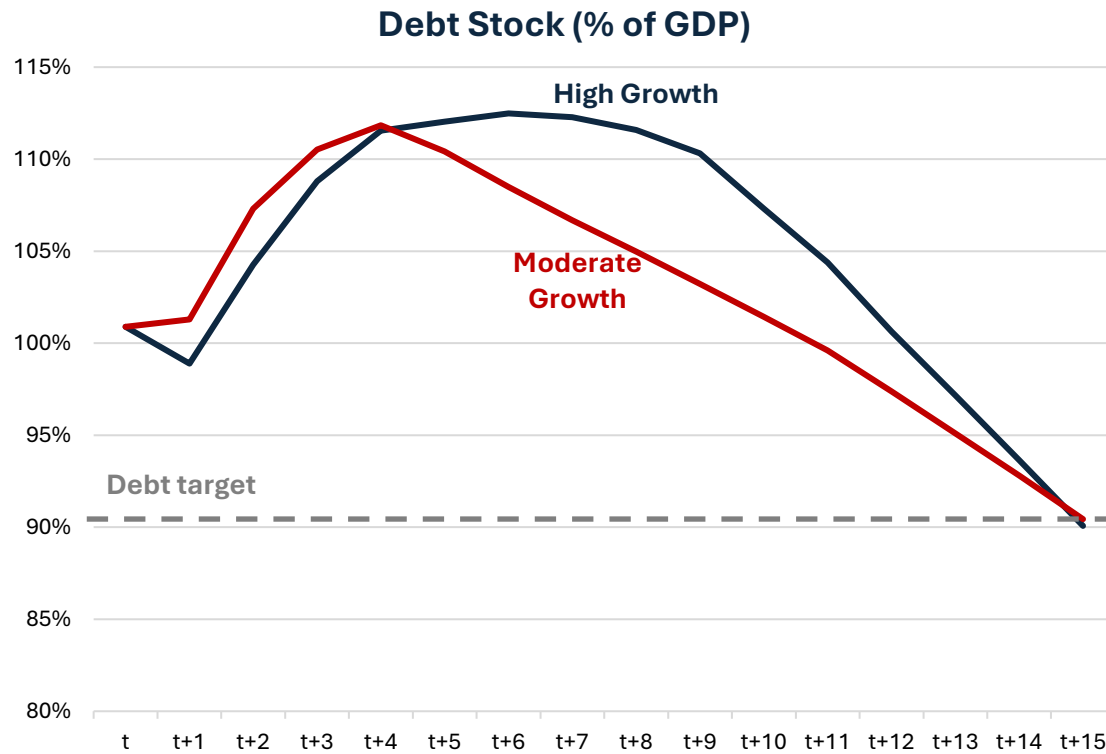


Fiscal Deficit (% of GDP)



- The fiscal deficit decreases slightly from t to t+1 (lower primary deficit at same level of grant receipts) but then increases substantially from t+1 to t+2 as EU reparation loan grants are replaced by external borrowing.
- From t+3, the deficit narrows gradually as reduced on-budget defense expenditure leads to fiscal consolidation.
- **Initially, debt increases rapidly (to 155% of GDP in t+9 under moderate growth and 131% of GDP in t+8 under high growth), as both the fiscal deficit and interest expenditures rise.**
- **Debt (as a share of GDP) then starts decreasing but remains above 100% of GDP in both scenarios.**

Fiscal Scenario II Medium-term Fiscal Consolidation stabilizes debt and contains the fiscal deficit



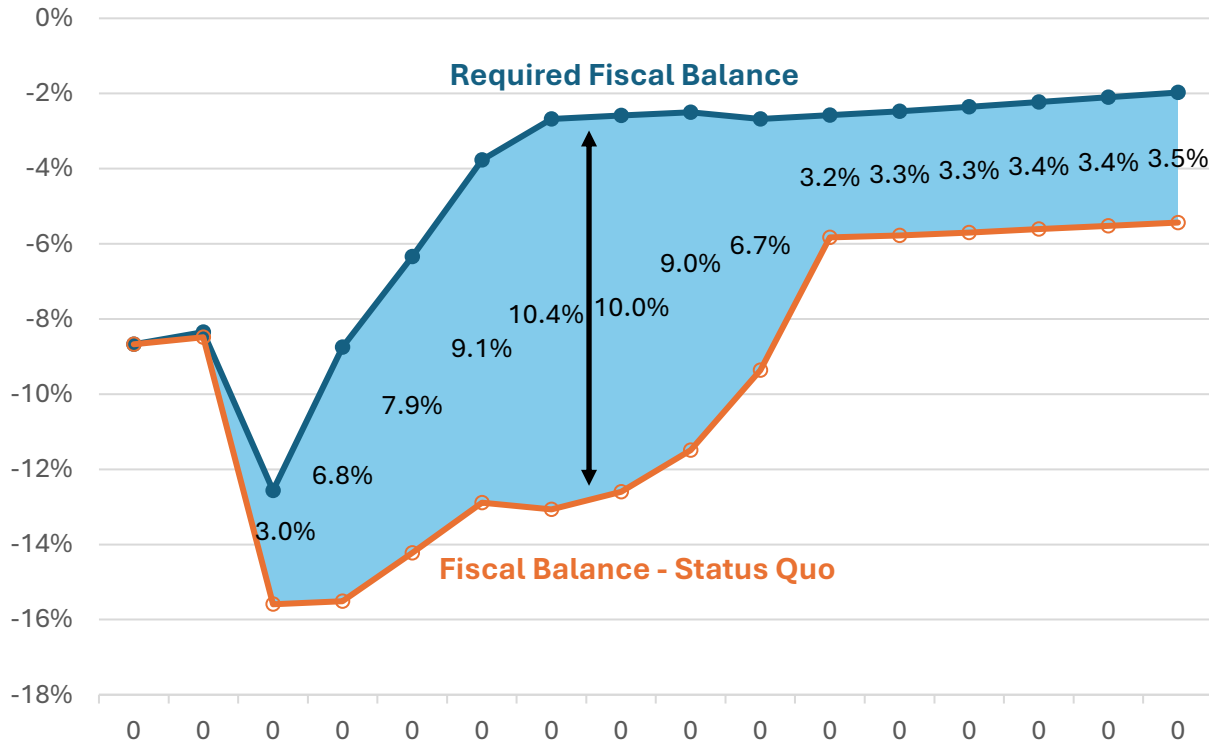
- The fiscal deficit increase in t+2 is smaller than in the Status Quo scenario: up to 12.6% vs up to 15.6%
- Under Moderate Growth, the deficit narrows relatively steeply
- Debt (as a share of GDP) peaks at 112% on t+4 under Moderate Growth and t+6 under High Growth
- **Debt (as a share of GDP) then decreases to the debt target of 90% by t+15 for Moderate Growth and High Growth Scenario**

What fiscal adjustment would be needed to restore sustainability? (1/2)

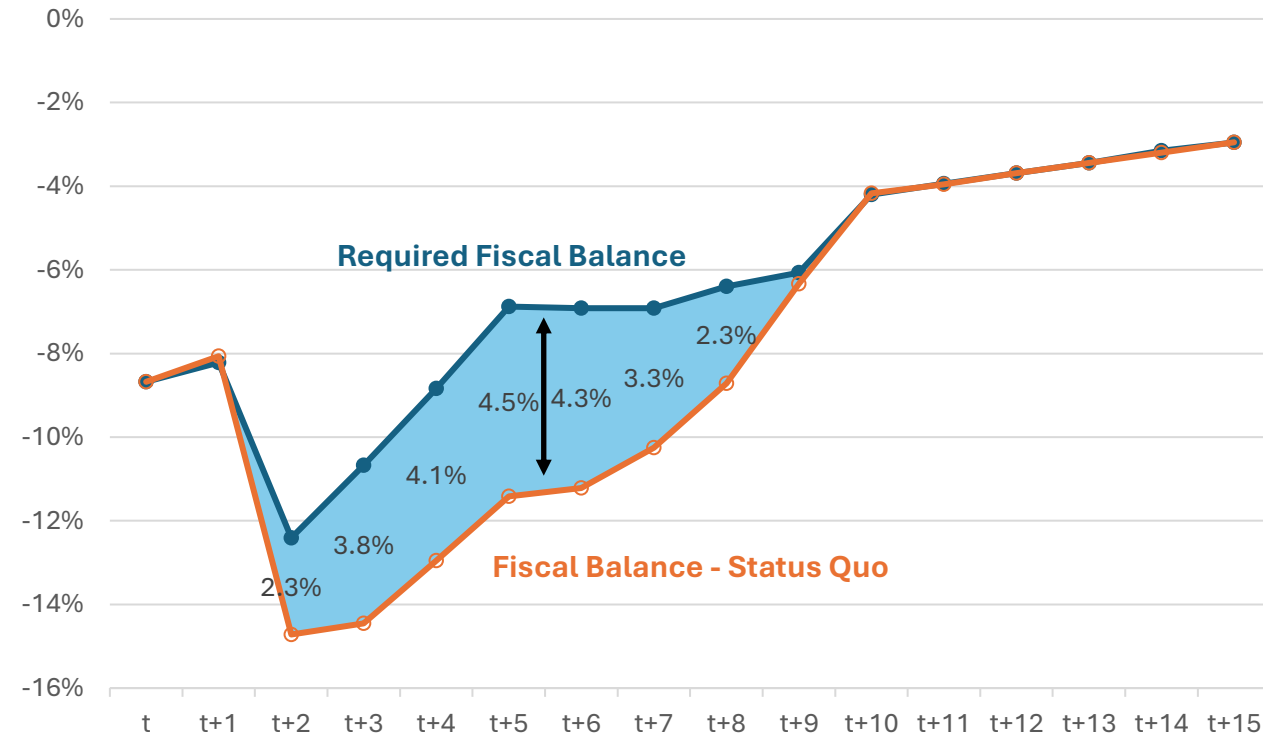
Requirements:

- 1) Debt < 90% of GDP by t+15.
- 2) Debt-to-GDP ratio peaks by t+6.

**Required Fiscal Adjustment (% of GDP)
Moderate Scenario**



**Required Fiscal Adjustment (% of GDP)
High Growth Scenario**



- (1) Higher growth enables a smaller fiscal adjustment as the economy can support a larger fiscal deficit
- (2) Transition from reparation loan grants to MFF loans in t+2 (2028) triggers adjustment need
- (3) Under moderate growth, needed fiscal adjustment is considerable

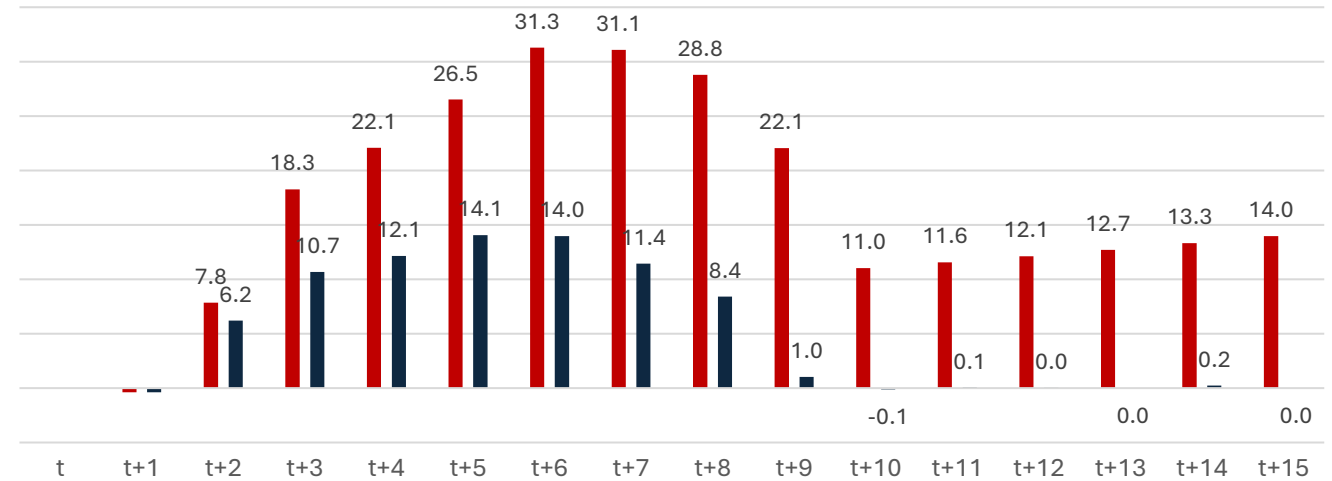
What fiscal adjustment would be needed to restore sustainability? (2/2)

Fiscal adjustment needs are substantial:

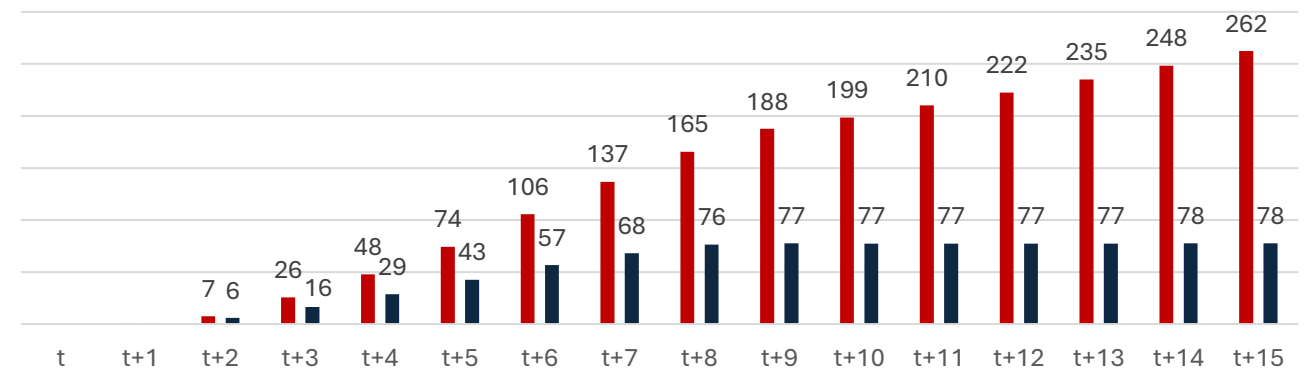
- **Moderate Growth:** US\$262 billion cumulative, growing until t+15.
- **High Growth:** US\$78 billion cumulative, growing mostly until t+8.

→ Higher growth shortens the adjustment horizon and reduces cumulative fiscal adjustment needs BUT...does not eliminate the need to do a fiscal adjustment

Fiscal Adjustment Needed (USD Bn.)



Cumulative Fiscal Adjustment Needed (USD Bn.)



■ Moderate ■ High

Summary of Fiscal Figures

Moderate Growth

	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8	t+9	t+10	t+11	t+12	t+13	t+14	t+15	T to T+9 (2026-2035)
Grants (% of GDP)	10.4%	9.1%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Grants (USD Bn.)	24.0	22.4	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4.1	70
Net fiscal financing for the deficit (% of GDP)	8.7%	8.4%	12.6%	8.8%	6.3%	3.8%	2.7%	2.6%	2.5%	2.7%	2.6%	2.5%	2.4%	2.2%	2.1%	2.0%	
Net fiscal financing for the deficit (USD Bn.)	20.0	20.6	32.7	23.7	17.8	11.0	8.1	8.0	8.0	8.9	8.8	8.7	8.6	8.4	8.2	8.0	159
Savings or external grant needs to achieve sustainability vis-à-vis status quo (% of GDP)	0.0%	0.0%	3.0%	6.7%	7.9%	9.1%	10.4%	10.0%	9.0%	6.7%	3.2%	3.3%	3.3%	3.4%	3.4%	3.4%	
Savings or external grant needs to achieve sustainability vis-à-vis status quo (USD Bn.)	0.0	0.0	7.8	18.3	22.1	26.5	31.3	31.1	28.8	22.1	11.0	11.6	12.1	12.7	13.3	14.0	188

High Growth

	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8	t+9	t+10	t+11	t+12	t+13	t+14	t+15	T to T+9 (2026-2035)
Grants (% of GDP)	10.4%	9.2%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Grants (USD Bn.)	24.0	23.0	2.7	2.8	2.9	3.1	3.2	3.4	3.6	3.8	4.0	4.3	4.5	4.8	5.1	5.4	73
Net fiscal financing for the deficit (% of GDP)	8.7%	8.2%	12.4%	10.7%	8.8%	6.9%	6.9%	6.9%	6.4%	6.1%	4.2%	3.9%	3.7%	3.4%	3.1%	3.0%	
Net fiscal financing for the deficit (USD Bn.)	20.0	20.8	33.3	30.1	26.1	21.3	22.5	23.7	23.1	23.2	17.0	16.8	16.7	16.6	16.1	16.1	244
Savings or external grant needs to achieve sustainability vis-à-vis status quo (% of GDP)	0.0%	0.0%	2.3%	3.8%	4.1%	4.5%	4.3%	3.3%	2.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Savings or external grant needs to achieve sustainability vis-à-vis status quo (USD Bn.)	0.0	0.0	6.2	10.7	12.1	14.1	14.0	11.4	8.4	1.0	-0.1	0.1	0.0	0.0	0.2	0.0	78

Without additional external grants, the fiscal adjustment needs to trade off taxes with social spending (moderate growth)

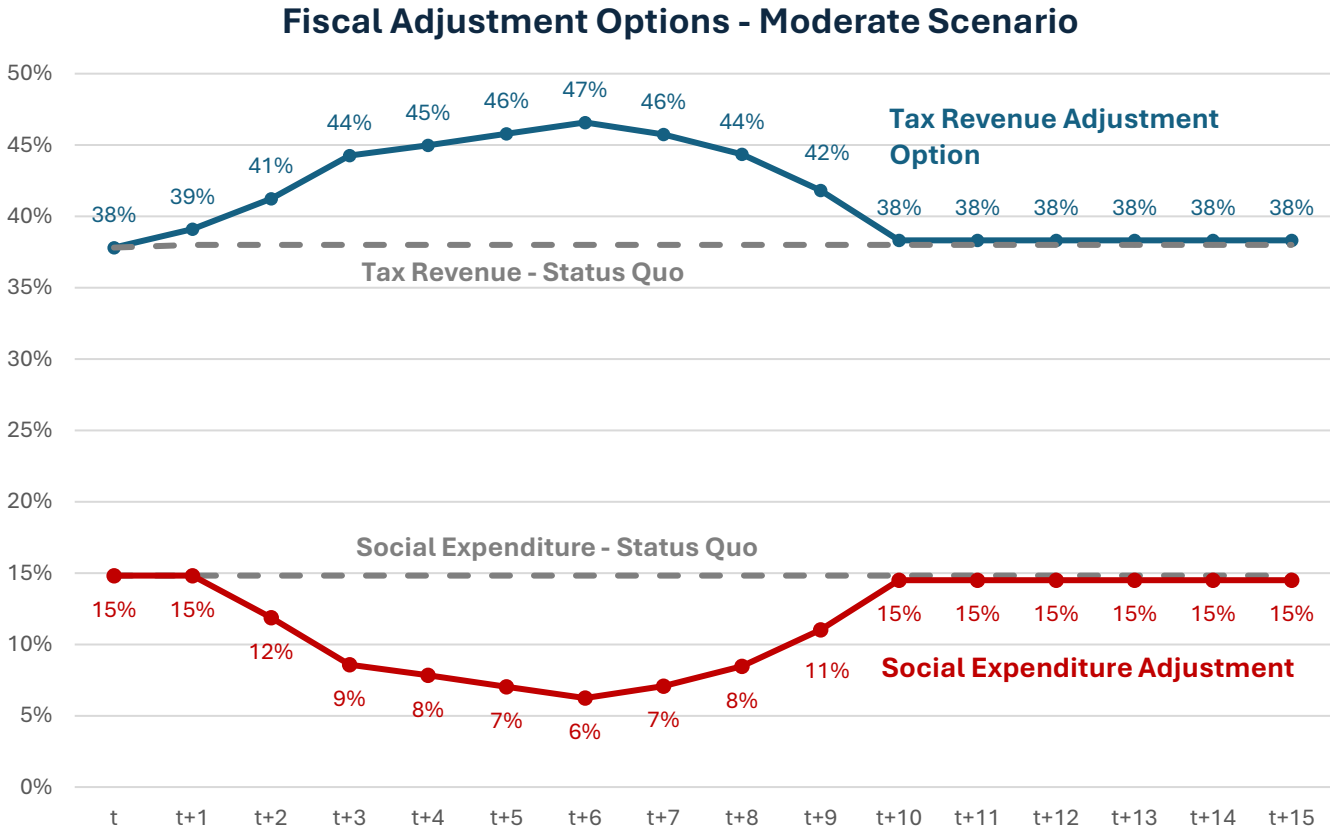
Fiscal consolidation requires reducing the fiscal deficit by choosing between two extremes:

- (1) **Fixing Social Expenditure:** Maintaining social spending at current levels requires temporarily increasing tax-to-GDP ratios to 47% of GDP.
- (2) **Fixing Tax Revenue:** Maintaining tax revenue at the current level requires temporarily decreasing social expenditure to 6% of GDP.

In practice, optimal policy would be to strike a middle ground:

- **Meeting high social needs** means that reducing social expenditure to 6% of GDP will be inconsistent with social sustainability so that...
- ...**tax revenue** will have to increase (e.g. by broadening the tax base).

The exact choice of social spending and tax revenue is the policy articulation of a new “social contract”.



Without additional external grants, the fiscal adjustment needs to trade off taxes with social spending (high growth)

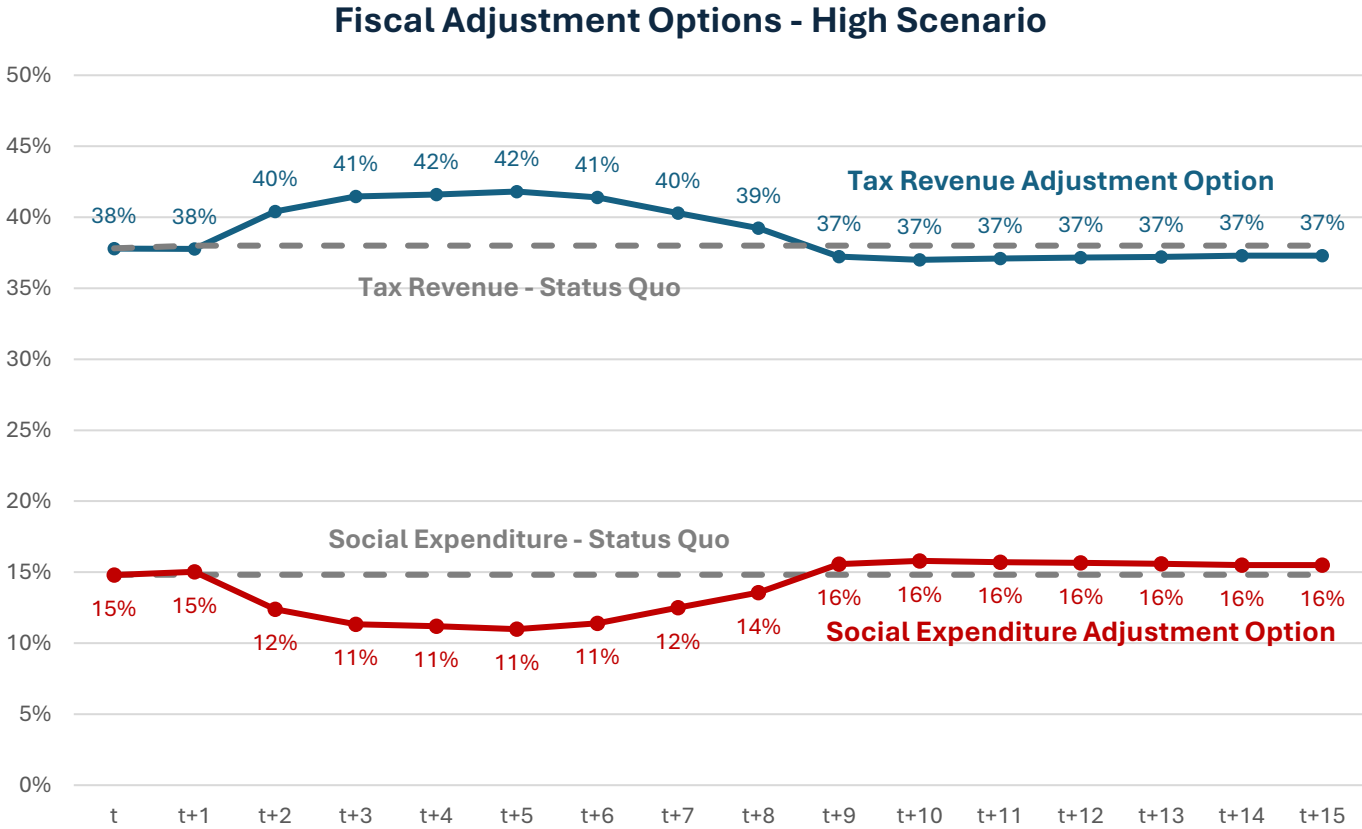
Fiscal consolidation requires reducing the fiscal deficit by choosing between two extremes:

- (1) Fixing Social Expenditure:** Maintaining social spending at current levels requires temporarily increasing tax-to-GDP ratios to 41.8% of GDP.
- (2) Fixing Tax Revenue:** Maintaining tax revenue at the current level requires temporarily decreasing social expenditure to 11% of GDP.

In practice, optimal policy would be to strike a middle ground:

- Meeting high social needs means that reducing social expenditure to 11% of GDP will be inconsistent with social sustainability so that...
- ...tax revenue will have to increase (e.g. by broadening the tax base).

The exact choice of social spending and tax revenue is the policy articulation of a new “social contract”.



Fiscal Scenarios (Status Quo and Fiscal Consolidation) under Moderate Growth

Early fiscal adjustment pays dividends:

- Early adjustment **contains interest payments** (5.7% of GDP vs 8.6% under status quo in t+9).
- This makes room for **reversing adjustment after a lengthy period**: social spending and tax revenue are the same as in the status quo by t+15 while having restored debt sustainability.

	2021	2024	2026	t+4 (2030)		t+9 (2035)	
				Status Quo	Balanced Fiscal Consolidation	Status Quo	Balanced Fiscal Consolidation
<i>(% of GDP)</i>							
Revenue and Grants	36.5%	54.1%	53.8%	41.5%	45.0%	41.5%	43.4%
Tax Revenue	33.5%	34.7%	37.8%	38.0%	41.5%	38.0%	39.9%
Non-Tax Revenue	3.0%	13.4%	5.6%	2.5%	2.5%	2.5%	2.5%
Grants	0.0%	5.9%	10.4%	1.0%	1.0%	1.0%	1.0%
Expenditure and Net Lending	40.5%	71.3%	62.5%	55.8%	51.3%	50.9%	46.1%
State Administration (excl. Defense)	16.0%	10.2%	4.8%	5.0%	5.0%	5.0%	5.0%
Defense, Public Order, Justice, Security (excl. in-kind)	2.4%	30.1%	26.0%	18.2%	18.2%	11.5%	11.5%
Social Transfers	13.3%	14.8%	14.8%	14.8%	11.3%	14.8%	12.9%
Subsidies to Corporations	2.1%	6.9%	7.6%	5.0%	5.0%	5.0%	5.0%
Interest	2.8%	4.0%	4.8%	6.8%	5.8%	8.6%	5.7%
Capital Expenditure	3.8%	5.4%	3.9%	5.5%	5.5%	5.5%	5.5%
Other	0.1%	-0.1%	0.5%	0.5%	0.5%	0.5%	0.5%
Fiscal Balance	-4.0%	-17.2%	-8.7%	-14.3%	-6.3%	-9.4%	-2.7%

Fiscal Scenarios (Status Quo and Fiscal Consolidation) under High Growth Scenario

Early fiscal adjustment pays dividends:

- Early adjustment **contains interest payments** (6.1% of GDP vs 7.1% under status quo in t+9).
- This makes room for reversing the **fiscal adjustment relatively quickly: higher social expenditure** relative to status quo and **lower tax burden** relative to status quo by t+9.
- A detailed fiscal comparison showing the **range of adjustment options** is available in the annex.

	2021	2024	2026	t+4 (2030)		t+9 (2035)	
				Status Quo	Balanced Fiscal Consolidation	Status Quo	Balanced Fiscal Consolidation
<i>(% of GDP)</i>							
Revenue and Grants	36.5%	54.1%	53.8%	41.5%	43.3%	41.5%	41.1%
Tax Revenue	33.5%	34.7%	37.8%	38.0%	39.8%	38.0%	37.6%
Non-Tax Revenue	3.0%	13.4%	5.6%	2.5%	2.5%	2.5%	2.5%
Grants	0.0%	5.9%	10.4%	1.0%	1.0%	1.0%	1.0%
Expenditure and Net Lending	40.5%	71.3%	62.5%	54.5%	52.1%	47.8%	47.2%
State Administration (excl. Defense)	16.0%	10.2%	4.8%	5.0%	5.0%	5.0%	5.0%
Defense, Public Order, Justice, Security (excl. in-kind)	2.4%	30.1%	26.0%	17.3%	17.3%	9.9%	9.9%
Social Transfers	13.3%	14.8%	14.8%	14.8%	13.0%	14.8%	15.2%
Subsidies to Corporations	2.1%	6.9%	7.6%	5.0%	5.0%	5.0%	5.0%
Interest	2.8%	4.0%	4.8%	6.3%	5.8%	7.1%	6.1%
Capital Expenditure	3.8%	5.4%	3.9%	5.5%	5.5%	5.5%	5.5%
Other	0.1%	-0.1%	0.5%	0.5%	0.5%	0.5%	0.5%
Fiscal Balance	-4.0%	-17.2%	-8.7%	-13.0%	-8.8%	-6.3%	-6.1%

What would it take? Revenue policy levers for the fiscal adjustment that can balance growth, social, and fiscal impact (and support de-shadowing)

Fiscal adjustment options exist that achieve both a fiscal and a growth dividend (see Table) by reducing capital misallocation and informality, creating a level playing field and increasing labor supply.

Potential Policy Lever	Estimated Potential Fiscal Impact (Higher Revenues)	Social and distributional impacts*	Economic efficiency/ Growth impacts*
VAT rate increase	<ul style="list-style-type: none"> 1.8% of GDP per 2 pp initial increase in VAT rate 0.5% of GDP increase per every 1 pp increase afterwards 	2	2
Progressive income tax – new top income tax rate	<ul style="list-style-type: none"> 0.3% of GDP per 5 pp initial rate increase for top income up to 0.7% of GDP in steady state 	1	1 Increases labor supply, reduces informality
Reforms of the simplified tax regime , starting with tightening eligibility criteria	<ul style="list-style-type: none"> 3-5% of GDP in steady state, if it supports the formalization of the economy i.e. <i>de-shadowing the economy</i> 	2	1 Increases labor supply, reduces informality, encourages firm growth
Reduction in corporate income tax expenditures	<ul style="list-style-type: none"> 1% of GDP in steady state 	1	1 Reduces capital misallocation
Faster EU alignment of excise rates	<ul style="list-style-type: none"> 0.7% of GDP in steady state 	2	2
Environmental/carbon taxes	<ul style="list-style-type: none"> 0.5% of GDP in steady state 	2	1 Mitigates adverse environmental/societal costs
Tax and customs administration reforms: <ul style="list-style-type: none"> Measures in the National Revenue Strategy Implementation of Customs and BES reforms already enacted Plus broader law enforcement measures to shrink the shadow economy	<ul style="list-style-type: none"> > 2-3% of GDP per in steady state <i>Difficult to estimate fiscal impacts of de-shadowing the economy. Note that the size of the economy which is untaxed or taxed at rates below official rates is estimated at 20 to 30% of GDP.</i>	1	1 Reduces informality and creates a level playing field.
Total of all Policy Levers	c.a. 12% of GDP		

* Where 1- not distortive with potential positive efficiency and growth effects; 2- minimal impact or can be mitigated; 3 – distortive and may have adverse growth effects

Note: Steady state refers to the year the impacts stabilize during the simulation period (t+1 to t+15)

What would it take? Expenditure policy levers for the fiscal adjustment that can balance growth, social, and fiscal impact (and support de-shadowing)

Fiscal adjustment options exist that achieve both a fiscal and a growth dividend (see Table) by reducing distortions and informality, encouraging private investment and increasing labor supply.

Potential Policy Lever (excluding defense and capital expenditures)	Estimated Potential Fiscal Impact (Expenditure Savings)	Social and distributional impacts*	Economic efficiency/ Growth impacts*
Higher tariffs/lower energy subsidies through energy price liberalization (PSOs and Energy Subsidy consolidation)	<ul style="list-style-type: none"> 4% of GDP gross and 2% of GDP net of higher HUS spending to mitigate social impacts 	2	1 Reduces distortions and encourages private investment
Reduction of private sector subsidies through better targeting	<ul style="list-style-type: none"> 0.1% of GDP 	1	1 Reduces misallocation
Pension reforms , including alignment of social security contributions with benefits, which increases incentives to be in formal jobs and reduces deficit of the PFU	<ul style="list-style-type: none"> 1-3% of GDP in steady state, through formalization of the economy i.e. <i>de-shadowing the economy</i> 	1	1 Increases labor supply and reduces informality
Reforms of social assistance programs to improve efficiency, targeting and fairness, while expanding to support veterans in a fiscally sustainable manner	<ul style="list-style-type: none"> 1% of GDP in steady state 	1	1 Increases labor supply
Right-sizing the civilian state	<ul style="list-style-type: none"> 1.5% of GDP in steady state 	2	2 Frees up labor
Optimization of education institution networks	<ul style="list-style-type: none"> 1% of GDP in steady state 	2	2 Improved learning outcomes
Total of all Policy Levers	up to 9% of GDP		

* Where 1- not distortive with potential positive efficiency and growth effects; 2- minimal impact or can be mitigated; 3 – distortive and may have adverse growth effects

Note: Steady state refers to the year the impacts stabilize during the simulation period (t+1 to t+15)