

4. SPECIAL ISSUES

4.1. MEDIUM-TERM PROJECTIONS OF POTENTIAL GDP GROWTH IN TURBULENT TIMES

The large shocks that have hit the EU economy in recent years and the policy responses have increased uncertainty about future growth. The last three years have been marked by intense, mostly temporary, supply and demand shocks. To confront the negative effects of the pandemic and the war-induced disruptions, massive policy initiatives have been deployed by the EU and its Member States. These effects come on top of the pre-existing pressure on future potential economic growth from ageing and the secular slowdown of total factor productivity. Changes in the pattern of globalisation, production methods and household behaviour could also shape potential output well beyond the current decade.

This special issue analyses the extent to which projections of potential growth up to 2027 have changed in view of the various shocks affecting the EU economy. The assessment follows two approaches:

- First, based on the Commission's Spring 2023 European Economic Forecast (SF23), we compare the 5-year ahead ('T+5') projections of potential GDP growth, as estimated through the production function approach of the European Union Commonly Agreed Methodology (EUCAM), with previous forecast vintages since the Autumn 2019 Forecast (AF19).
- Second, we single out the energy crisis and quantify the impact of higher oil and gas prices on potential growth rates through the lens of a large general equilibrium model that explicitly includes energy as an imported intermediate input.

Return to pre-COVID potential output growth in the near term

Potential output growth projections up to T+5 (2027) illustrate the trajectory of potential growth if the labour, capital and total factor productivity trend growth rates that have emerged over the years running up to the end of SF23 (i.e. up to 2024) were to persist over the medium to long run. ^{(32) (33)}

In the current forecast, potential GDP growth rates for the EU are projected to remain around 1.5% during the T+2 forecast period, 2023-24 (see Graph I.4.1), after recovering from around 1.2% in the acute phase of the COVID-19 pandemic, i.e. 2020-21. After 2024, estimated potential growth rates fall, back to 1.2% by 2027. The main driver of this drop is the reduced contribution from labour input, which tapers down in 2026 and even turns negative in 2027 as the temporary increase of working-age population from people fleeing the war in Ukraine ends and demographic ageing again dominates developments in labour supply. The contribution of capital accumulation to potential GDP growth picked up in 2022 and is expected to remain

⁽³²⁾ T+5 baseline projections are calculated using a very stable methodology endorsed by the EU's Member States back in 2014 (for a technical description of the projections' methodology see Blondeau (2021), "Output Gap Estimation Using the European Union's Commonly Agreed Methodology: Vade Mecum and Manual for the EUCAM Software." *Discussion Paper 148*, European Commission). They are based on the assumption of no policy change and are by no means a forecast – they are simply a non-judgemental, rules based, extrapolation of recent developments in the key structural growth drivers for the individual Member States. A number of technical adjustments were introduced in 2020 to smoothen the overall potential output estimations given the large, but temporary, shifts in hours worked linked to the COVID-19 pandemic. By cushioning the labour market impact (in line with the widespread resort to short-time working schemes), these adjustments avoided excessively pro-cyclical movements of estimated potential growth.

⁽³³⁾ The Spring 2023 Forecast covers the period until 2024 (T+2). The standard T+5 - T+10 methodology extrapolates the T+2 results using fixed (mechanical) rules. Each component of the production function is extended by means of autoregressive processes (AR) beyond the T+2 forecast, whereby future projections are linked to historical past trends as well as to the short-term forecasts from country experts. Trend unemployment is additionally determined by long-term "anchors" in T+10, converging to a value that is determined only by structural factors. Finally, the output gap is assumed to close in T+5 (2027). The mechanical extension implies that several risks (e.g. possible long-term labour market scarring) beyond 2024 are not taken into account.

relatively elevated in the coming years, also reflecting investment related to Next Generation EU and green investment. The contribution of total factor productivity (TFP) growth is projected to recover somewhat, increasing to 0.8 pps. in 2027. ⁽³⁴⁾

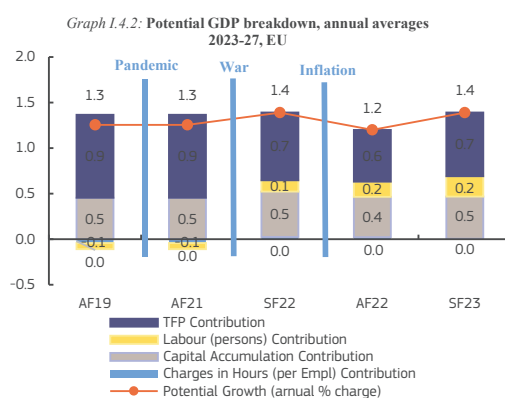
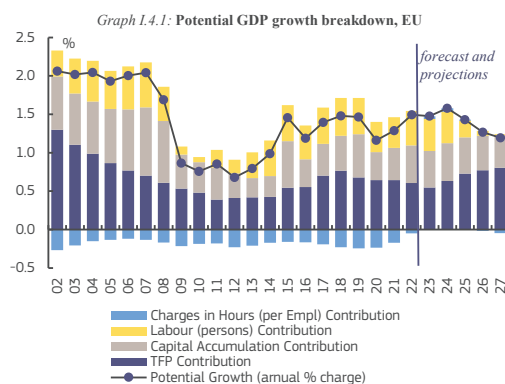
The assessment of the impact of the pandemic and of Russia's war of aggression against Ukraine (and the related policy responses) as incorporated in the SF23 projections for 2023 and 2024 also affect the 'T+5' estimated potential output. ⁽³⁵⁾

Hence, a comparison with the pre-COVID or pre-war projections can provide a rough estimate of the cumulative effects of these shocks. In this analysis, we compare the 'T+5' projections of potential GDP growth based on the SF23 with projections based on previous forecast vintages, focusing on the time span 2023–27. ⁽³⁶⁾

There are important changes in the relative contributions of production inputs to potential GDP across the forecast vintages.

Graph I.4.2 shows the annual average contributions of the production inputs for the years 2023–27. The average potential GDP growth based on the SF23, at 1.4%, is only slightly above the corresponding projection in the autumn 2019 vintage (1.3%). However, drivers differ significantly. The TFP projection is now lower (by 0.2 pps.), capturing the impact of higher energy prices and the subsequent general increase in inflation on productive capacity. ⁽³⁷⁾ Lower TFP is compensated by a higher contribution of labour, by around 0.3 pps. Increasing immigration, a buoyant labour market and recent reforms of the labour market and pension systems in some Member States have all contributed positively to labour supply, when compared with the earlier AF19 projections.

Repeating the same exercise at the level of the EU Member States reveals common trends. 15 countries out of the 27 show lower average potential growth rates for the period 2023–27 in the SF23 'T+5' projections than in the AF19 projections. The contribution of TFP has



⁽³⁴⁾ It should be noted that the TFP projections are surrounded by a high degree of uncertainty, since it is too early to predict the effects of key drivers, such as a declining trend of research productivity (see for example Bloom, N., Jones, C.I., Reenen, J. V. and Webb, M. (2020). "Are Ideas Getting Harder to Find?." *American Economic Review* 110 (4)), the enhanced digitalisation triggered by COVID-19 (see for example Döhring, B., Hristov, A., Maier, C., Röger, W. and Thum-Thysen, A. (2021). "COVID-19 acceleration in digitalisation, aggregate productivity growth and the functional income distribution." *International Economics and Economic Policy* 18), the possible effects of new technologies, or the transition to green energy networks and technologies (see for example OECD (2019). "Innovation and Business/Market Opportunities associated with Energy Transitions and a Cleaner Global Environment.").

⁽³⁵⁾ The Spring 2023 Forecast projects GDP until 2024 (T+2). These country-desk projections include the effects of the NGEU funds (incl. RRF) spent over this period. The standard T+5 – T+10 methodology extrapolates the T+2 results using fixed (mechanical) rules. Each component of the production function is extended by means of auto-regressive processes (AR) beyond the T+2 forecast, whereby future investment projections are linked to historical past trends as well as to the short-term forecasts from country experts. Several components are additionally determined by long-term "anchors" in T+10 (an example is trend unemployment which converges to a value that is determined only by structural factors). Finally, the output gap is assumed to close in T+5 (2027). The mechanical extension implies that several risks (e.g. possible long-term labour market scarring) beyond 2024 are not taken into account.

⁽³⁶⁾ For the previous forecast vintages, the comparison uses the T+6, T+7 or T+8 projections.

⁽³⁷⁾ TFP is generally interpreted as the efficient use of capital and labour. However, as a residual in the production function it also captures factors not entering elsewhere. In the subsequent section, we will attempt to disentangle the impact of the energy price shock using a model in which energy is explicit.

diminished for a large majority of countries. Many of the Member States featuring the largest reductions in the TFP contribution are among the countries most exposed to the economic impact of the war in Ukraine, given trade links and the degree of energy dependency from Russia, as reported in the vulnerability matrix of the Spring 2022 Forecast.⁽³⁸⁾ In contrast, labour contributions in the SF23 have improved in most Member States.

A theory-grounded structural macroeconomic model allows one to single out the impact of individual shocks and to quantify their impact on potential GDP growth.

A model-based assessment of the energy price shock

This section takes a step further by isolating the impact of energy price shocks on the euro area's potential output growth. The previous section assessed the cumulative impact of the pandemic and energy price shocks on potential growth. The Global Multi-Country model (GM), an estimated Dynamic Stochastic General Equilibrium (DSGE) model of the euro area, allows to single out the impact of the energy crisis on potential GDP growth rates.⁽³⁹⁾

The potential output and output gap calculations of the GM model are broadly in line with the European Union Commonly Agreed Methodology. In particular, the GM model also follows the production function method in that it depends on technology, labour and capital inputs.⁽⁴⁰⁾ Yet, key differences remain. Importantly, potential labour in the two models is estimated using different approaches. The GM model employs a structural general equilibrium model, estimated using Bayesian techniques⁽⁴¹⁾, while EUCAM uses a combination of structural and more mechanical univariate models. Unlike the EUCAM, the GM model also explicitly includes observed and expected prices for oil and natural gas⁽⁴²⁾ and models energy as an imported intermediate input with limited substitutability.

Graph I.4.3 shows that the output gap estimates, a business cycle indicator expressed as the deviation of actual from potential output, based on the EUCAM and GM model display a similar pattern over time. After the Great Financial Crisis (2008-09), the GM estimate turned positive in the same year as the EUCAM estimate, although the former shows a slightly more positive profile that starts before the COVID-19 crisis. Both estimates show a significant drop during the pandemic and then a quick recovery in subsequent years.

⁽³⁸⁾ European Commission (2022). "European Economic Forecast, Spring 2022", *Institutional Paper* 173, Box 1.2.2.

⁽³⁹⁾ The Global Multi-Country (GM) DSGE model has been developed by DG ECFIN and the Joint Research Centre of the European Commission. A detailed description of the GM model can be found in: Albonico, A., L. Calès, R. Cardani, O. Croitorov, F. Di Dio, F. Ferroni, M. Giovannini, S. Hohberger, B. Pataracchia, F. Pericoli, P. Pfeiffer, R. Raciborski, M. Ratto, W. Roeger and L. Vogel (2019). "The Global Multi-Country Model (GM): an Estimated DSGE Model for the Euro Area Countries." *ECFIN Discussion Paper No. 102*, European Commission.

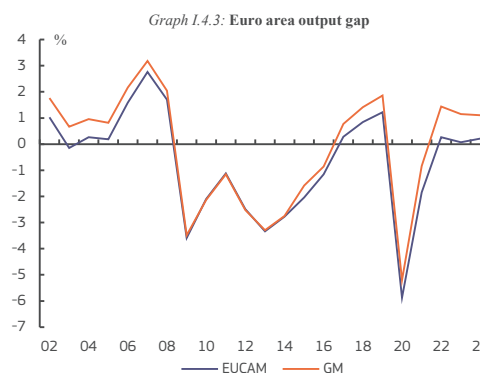
⁽⁴⁰⁾ The assumed production function in GM includes fixed costs and public capital as a separate productivity-enhancing input. Public capital represents a small share of total capital, therefore playing a relatively small role in total production and the accumulation of total capital is broadly more in line with the EUCAM specifications. The depreciation rate in the capital accumulation functions is constant.

⁽⁴¹⁾ Potential labour input equals the amount of hours worked in the absence of nominal and real wage rigidity as in J. Galí (2011). "The return of the wage Phillips Curve." *Journal of European Economic Association* 9 (3).

⁽⁴²⁾ The GM model is a structural macro-model in the New-Keynesian tradition with microeconomic foundations derived from utility and profit optimisation and including frictions in goods, labour and financial markets. The model is tightly linked to economic data comprising more than 30 historical times series from national accounts (such as GDP, consumption, price deflators, etc), trade data and uses European Commission's forecasts for 2023-24 for a large subset of them, as well as market-based expectations for energy goods like gas and Brent oil. The driving forces (shocks) that would fit these data will also predict the unobserved variables such as the total hours trend.

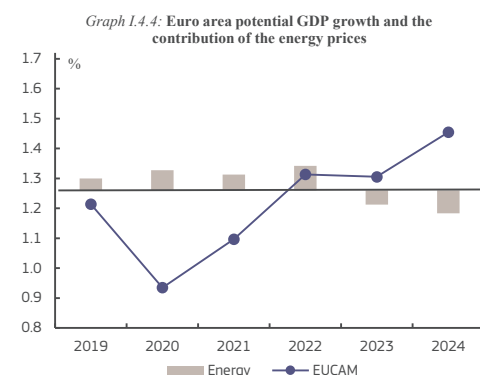
Energy prices affect potential growth through capital accumulation and medium-term labour market dynamics.⁽⁴³⁾

Higher production costs due to higher energy prices can pressure liquidity-constrained firms to cut investment. Moreover, energy prices significantly impact households' disposable income, reducing demand for goods and services. These effects directly and indirectly slow down capital stock accumulation. The impact of energy shocks on medium-term labour market dynamics depends on structural features such as the speed of real wage adjustment. Energy price increases bring down real wages due to the delayed adjustment of nominal wages. However, in the medium term, workers and trade unions renegotiate the wages in order to compensate for the lost real income, due to some "real wage rigidity".⁽⁴⁴⁾ In the GM, such "real wage rigidities" prevent workers' remuneration to fall below their reservation wage. Along with households' desire to maintain relatively stable consumption levels⁽⁴⁵⁾, higher energy prices can prompt a moderate increase in labour force participation rates – depending on the degree of real wage rigidities or the strength of consumption smoothing.⁽⁴⁶⁾ Given that the capital accumulation channel builds up more slowly, this labour supply channel might dominate. In the medium run, however, the negative impact from decreased investment and a smaller capital stock dominates.



Significant increases in energy prices in 2022, especially for gas, have reversed the positive trend of energy prices contribution on potential growth coming from lower prices before and during the COVID-19 crisis.

Graph I.4.4 shows the slow build-up of the positive impact of energy price shocks (grey bars) lasting until 2022.⁽⁴⁷⁾ Based on the external assumptions and GM model estimates of the SF23, this trend was overturned following the dramatic increase in gas and oil prices. According to the model, the loss in real income has slightly increased potential output in 2022 via increased labour force participation. However, in the subsequent years, the capital accumulation channel dominates and the negative impact of higher energy prices on domestic demand and business activity reduces potential GDP growth cumulatively in 2023 and 2024 by 0.15%. As energy prices remain above historical levels over the forecast horizon, despite the ongoing significant decrease from the 2022 peak, the negative impact of energy on potential growth is further amplified in 2024.



⁽⁴³⁾ Energy prices can also affect the total factor productivity trend. However, this channel is absent in the GM model as trend productivity growth is assumed to be exogenous. To avoid further departures from the EUCAM potential output, the latter is observed with a measurement error using EUCAM TFP trend estimates.

⁽⁴⁴⁾ The degree of households' bargaining power is captured by the historically estimated real wage rigidities.

⁽⁴⁵⁾ Formally, in the model, high estimated habit formation in consumers' preferences imply preferences to smooth consumption over time.

⁽⁴⁶⁾ For further discussion of the importance of real wage rigidities in the transmission of negative supply shocks, see also F. Nucci and M. Riggi (2018). "Labor force participation, wage rigidities, and inflation." *Journal of Macroeconomics* 55, 1. Cairo, S. Fujita and C. Morales-Jimenez (2022). "The cyclicality of labor force participation flows: The role of labor supply elasticities and wage rigidity." *Review of Economic Dynamics* 43, and O. Blanchard and J. Galí (2010). "The macroeconomic effects of oil price shocks: Why are the 2000s so different from the 1970s?" *NBER Chapter in International Dimensions of Monetary Policy*.

⁽⁴⁷⁾ In Graph 4, the solid blue line shows the EUCAM estimated potential output growth. The grey bars show the contribution of the energy shock to potential GDP growth from the long-run trend (average) growth. Bars above (below) the horizontal axis indicate positive (negative) contributions in a given year.

The model-based potential output estimates are stylised and considerable uncertainty surrounds this analysis. Hence, there are several caveats to keep in mind. First, comparing the EUCAM results from Autumn 2021 and Spring 2022, a significant proportion of the negative impact on potential output shows up as a TFP effect. By contrast, the GM model does not feature a pass-through of various economic drivers on production technology and, therefore, it remains silent on the impact of energy shocks on trend TFP. Second, energy prices have exhibited large swings in the last year and are still surrounded by considerable uncertainty as regards its future magnitude and persistence. Adverse macroeconomic effects also heavily depend on substitution possibilities to reduce the demand of imported fossil fuels. ⁽⁴⁸⁾

4.2. THE NEW CANDIDATE COUNTRIES INCLUDED IN THE FORECAST

Ukraine and Moldova were granted candidate status for EU membership by the European Council in June 2022 ⁽⁴⁹⁾. Bosnia and Herzegovina followed suit in December 2022. This special issue provides an overview of the structural features, recent performance of and outlook for these three economies. The challenges related to statistical gaps and, in the specific case of Ukraine, to assessing economic developments for a country at war, warrant a more qualitative approach to forecasting than that applied in the European Commission's economic forecasts. As from autumn 2023, when the three countries will be fully integrated in the European Commission's enlargement-related workstreams, the intention is to publish detailed forecasts as for the other candidate countries (the war situation in Ukraine permitting). ⁽⁵⁰⁾

4.2.1. UKRAINE

Ukraine is a lower middle-income country of more than 40 million people. In 2021, GDP per capita stood at 29.3% of the EU average in terms of purchasing power parity (PPP). Ukraine's economic development had been held back by a somewhat uneven implementation of structural reforms across different areas, reflecting persistent lack of political consensus, regular interference from vested interests, a high degree of corruption, chronically low levels of investment, and territorial disputes also linked to the 2014 illegal annexation of Crimea by Russia. It must be underscored that while this section is based primarily on pre-war data, the tremendous shock of the war is set to fundamentally transform Ukraine's economy, making its monitoring and forecasting subject to strong uncertainties. At the same time, the country has demonstrated remarkable resilience during the war, and efforts towards joining the EU, having been granted candidate country status on 23 June 2022, should improve prospects for Ukraine.

Compared to the EU average, the Ukrainian economy is less diversified and with a large imprint of the state in the economy. A large share of its value added comes from agriculture (12%, EU average: 1.3%), low-tech manufacturing (12%) and mining (8%). With more than 3,500 state-owned enterprises, accounting for one tenth of output and about 18% of employment, the state footprint in Ukraine is considerable. The country's generally weak growth fundamentals are reflected in its relatively low ranking in the Global Competitiveness Index (rank 84 compared to ranks 51 to 62 for the three worst-performing EU Member States).

In the years before the war, the Ukrainian economy had progressively increased trade with the EU. Exports in goods and services as a share of GDP had contracted by almost a quarter

⁽⁴⁸⁾ The analysis uses historically estimated parameters for the elasticity of substitution between energy and other inputs, approximately 0.4 for both consumption and production inputs. A sensitivity analysis shows that the adverse impact could be larger if further substitution proves more difficult.

⁽⁴⁹⁾ See [European Council conclusions of 23 June 2022](#) and [European Council conclusions of 15 December 2022](#).

⁽⁵⁰⁾ The forecasts for Ukraine and Moldova presented in this publication refer to the territories under the control of the national authorities, in line with the approach followed by the national statistical authorities. In practice, this means that for Ukraine the data, as well as the forecast, exclude the illegally-annexed Crimea, the city of Sevastopol and a part of the non-government controlled areas of the Donetsk and Luhansk regions. As regards to Moldova, the data and the forecast exclude the Transnistria region.