4. SPECIAL ISSUE: ALTERNATIVE SCENARIOS ON THE ECONOMIC OUTLOOK

High uncertainty around the baseline forecast warrants a scenario analysis. In the context of a complex and fast-changing geopolitical and economic environment, this Special Topic assesses the potential impact of the realisation of key risks to the baseline forecast presented in this publication. The analysis proceeds in two steps. First, through the lens of an estimated macroeconomic model, it identifies the driving forces shaping past and projected output and price dynamics. Then this identification is used to define alternative scenarios in terms of the potential evolution of energy prices and supplies, trade, uncertainty, and consumer confidence.

The model captures key elements of the current macroeconomic environment. The assessment builds on the Commission's Global Multi-Country (GM) [30], which features a prominent role for energy commodities [31] in production and consumption and has been augmented to take account of the pandemic's economic implications.[32] The model estimates use a rich data set of over 30 different time series in total, including, among others, historical and forecast data from national accounts, trade data, as well as market-based expectations of gas and oil prices based on futures markets, in line with the assumptions included in the baseline forecast (see Box I.5.1).

Decomposition of the baseline forecast

The model estimates confirm the key role of soaring energy prices in fuelling inflation. Graphs I.4.1 breaks down inflation (as measured by the annual growth rate of the private consumption deflator) into its estimated main drivers.[33][34] Given the important weight of energy products in the consumption basket, the transmission of energy price shocks to the private consumption deflator is strong, fast and amplified by second-round effects stemming from higher production costs and wages. Some of these inflationary effects persist in 2023. Besides energy prices, substantial supply-side shocks also increase consumer prices, while lowering economic activity. Overall, based on the forecast baseline, these factors contribute around 3 pps. to inflation this year and more than 1 pp. in 2023 (see Graph I.4.1).

[30] The Global Multi-Country (GM) model, a macroeconomic model in the New Keynesian tradition, has been developed by DG ECFIN and the Joint Research Centre of the European Commission. The analysis considers a two-region configuration with the euro area and the rest of the world. For a detailed description of the GM model, see 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.

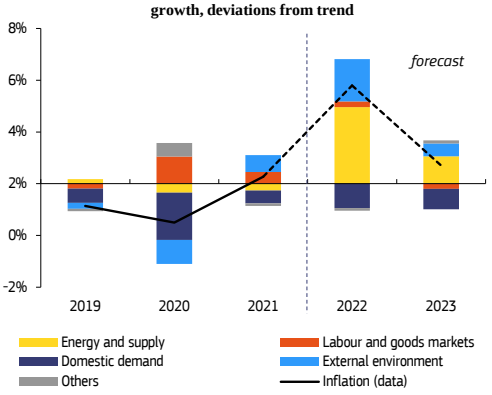
[31] The model includes energy as an imported intermediate input with limited substitutability, subject to excise duties. Higher energy prices increase production costs, which firms (partially) pass on to final consumers. It also features a direct pass-through into consumer prices. In addition, the model links the firms' gross operating surplus to investment via liquidity constraints. This channel also implies that higher energy prices negatively impact business investment.

[32] I.e; temporary `lockdown' shocks and financial constraints on business investment. See also R. Cardani, O. Croitorov, F. M. Giovannini, P. Pfeiffer, M. Ratto, and L. Vogel (2021). 'The Euro Area's Pandemic Recession: A DSGE-Based Interpretation'. ECFIN Discussion Paper No. 153. European Commission.

[33] 'Shocks' drive the deviation of the endogenous model variables from their long-run trend. The decompositions distinguish: (1) prices of energy commodities and domestic supply (productivity) disruptions; (2) labour and goods market adjustment as captured by wage and price mark-up shocks; (3) domestic demand shocks, including pandemic-specific lockdown shocks and discretionary fiscal policy; (4) shocks to world demand and international trade.

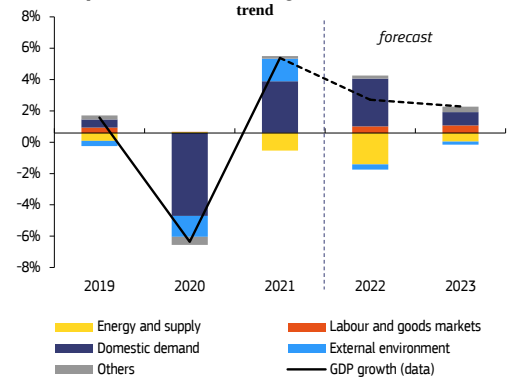
[34] In Graphs I.4.1 and I.4.2, stacked coloured bars represent contributions of groups of shocks to deviations of growth and inflation from long-term trends, indicated by dashed bold horizontal lines in both panels. Bars above (below) this line indicate positive (negative) contributions.

Graph I.4.1: **Euro area private consumption deflator growth, deviations from trend**



Sharp increases in commodity prices also erode disposable incomes and weigh on consumer spending. They additionally depress business investment and worsen the trade balance through negative terms of trade effects. Overall, according to the model estimates, higher energy prices reduce GDP growth by around 2 pps. in 2022. The impact on growth in 2023 is negligible (see Graph I.4.2).

Graph I.4.2: **Euro area real GDP growth, deviations from trend**



Domestic demand remains the main engine of growth. Despite downward revisions to private consumption and corporate investment, domestic demand continues to support growth in 2022 and 2023, even though with fading momentum. With the reopening of economies in early 2021 and improved economic sentiment, the reduction of 'forced' savings accumulated in 2020 supported the economic rebound, but this growth impulse is expected to fade this year. By contrast, the reduction in 'precautionary' saving is more gradual and supports GDP growth this year and slightly less in 2023.[35]

Pent-up demand and the easing of restrictions for contact-intensive services push inflation up. By contrast, the pre-COVID trend of persistently high savings[36] and slowdown in domestic demand weigh negatively on the forecast for inflation.

World demand and international trade are a drag on growth this year. The negative contribution of foreign factors is mostly explained by a slowdown in trade growth, some market share losses, and export price hikes in the rest of the world (possibly reflecting, amongst others, supply-chain bottlenecks). The impact of the latter on euro area inflation also increases, notably this year.

Risk scenarios

Two alternative scenarios shed light on the impact of the realisation of key downside risks to the baseline forecast. Table I.4.1 summarises the scenarios' specifications through several key channels related to energy commodities, trade, business and consumer sentiment, and financing conditions. The scenarios do not include economic policy responses to the shocks beyond the workings of automatic stabilisers and the monetary policy reaction. For the latter, the modelling allows for an (endogenous) exit from the effective lower bound. The shocks are assumed to materialise in the second quarter of 2022 and to play out with some persistence.

A first, *adverse* scenario is mainly characterised by oil and gas prices 25% above the baseline assumptions over the forecast horizon. The size of the price shock is motivated by the price volatility observed between February and March. The stagflationary forces triggered by this price

[35] For a detailed analysis on the role of demand shocks, see European Commission (2021a), `The role of savings in determining the recovery path', in European Economic Forecast: Spring 2021, Special Issue 4.1'. Institutional Paper 149, pp. 45-48.

[36] On pre-COVID factors through the lens of the GM model, see, for example, European Commission (2018), `Drivers of the euro area recovery - evidence from an estimated model' in European Economic Forecast: Spring 2018, Box 1.3'. Institutional Paper 77, pp. 64-67.

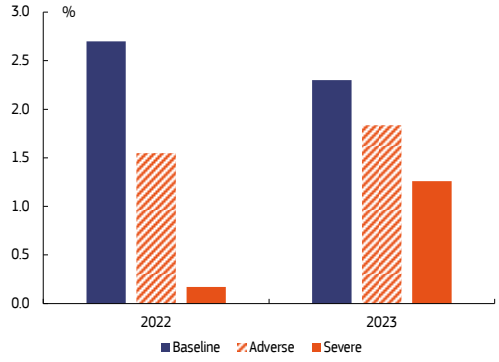
increase are assumed to curtail global demand, as expressed by a relative decline in rest-of-the-world GDP by 1%, and exacerbate supply chain bottlenecks for non-energy goods and services, as captured by a stylised shock to rest-of-the-world export prices. In addition, higher risk premia raise financing costs for firms, weighing on investment. For consumers, adverse confidence effects further weigh on private consumption.

A *severe scenario* considers large-scale disruptions to natural gas imports from Russia. [37] Compared to the adverse scenario, the energy supply disruptions are assumed to be associated with further increases in risk premia and negative confidence effects.

The severe scenario reflects the limited substitution possibilities in the short run. Gas imports are special because their delivery depends very much on specific infrastructure – pipelines and LNG terminals – and other producer countries cannot increase their deliveries fast enough to compensate fully for a stop of imports from Russia. As a result, the short-run adjustment to such a large shock can be extremely costly. It is also qualitatively different from adjustments to commodity price fluctuations like the one assumed in the adverse scenario. The model captures the high costs for short-run adjustment by assuming a very low elasticity of substitution between gas and other production inputs. [38]

In the adverse scenario, the increase in energy prices strengthens stagflationary forces. Annual GDP growth rates for 2022 and 2023 are estimated to be 1¼ and ½ pps. below the projections in the baseline forecast, respectively. Inflation is estimated to stand ¾ and ½ pps. above the forecast baseline in 2022 and 2023, respectively (see Graphs I.4.3 and I.4.4). The growth slowdown in the rest of the world translates into a reduction in euro area exports by a similar magnitude, while supply chain disruptions and higher rest-of-the-world export prices further depress economic activity. Each of the two factors shaves off around ½ pps. of GDP growth in 2022. Higher gas and oil prices are also the main drivers behind the impact on inflation (around +¾ pps. each year). However, the mix of foreign demand and supply shocks, i.e. reduced external demand and intensified supply chain bottlenecks, implies a relatively neutral impact on inflation since upside and downside pressures compensate. Finally, confidence effects and financial markets risk premia further reduce household consumption, business investment and real GDP, while mildly reducing inflationary pressures in 2023.

Graph I.4.3: **Real GDP growth rates across scenarios, euro area**



A sharp reduction in gas supplies from Russia would imply a substantial deterioration of the economic outlook. In the *severe scenario*, and under the assumption of limited substitution, the lack of gas supplies by Russia, coupled with the assumed oil price increase, reduces GDP growth by an additional 1½ pps. in 2022 and by around ¾ pps. in 2023,

(37) A growing body of analyses has estimated the effects of a sudden stop of gas supply on European economies. For a seminal study on Germany, see Bachmann R., D. Baqaee, C. Bayer, M. Kuhn, B. Moll, A. Peichl, K. Pittel and M. Schularick (2022): `What if? The Economic Effects for Germany of a Stop of Energy Imports from Russia', ECONtribute Policy Brief, no 28/2022. For a survey (and further estimates), see also Berger, E., S. Bialek, N. Garnadt, V. Grimm, L. Other, L. Salzmann, M. Schnitzer, A. Truger, and V. Wieland (2022), 'A potential sudden stop of energy imports from Russia: Effects on energy security and economic output in Germany and the EU', German Council of Economic Experts. Working Paper 01/2022.

(38) The model distinguishes household and business demand for natural gas. The severe scenario calibrates the parameters governing the elasticities between gas and other inputs to 0.08 (households) and 0.12 (firms). Due to frictions and monopolistic competition in the model, the very short-run substitution is even more limited. Technically, a price shock triggers a reduction in gas volume by up to -40%, coupled with prolonged difficulties in accessing alternatives (50% of the volume decline remains after 2½ years). These assumptions are conservative in the sense that substitution on world markets could be faster or has already occurred to some extent.

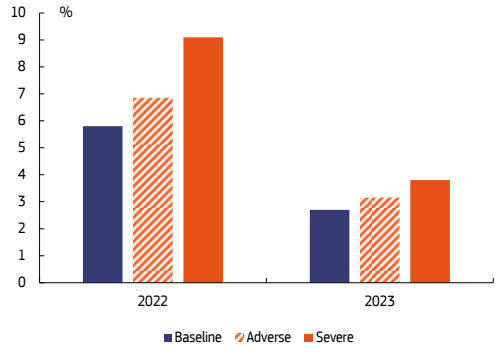
Table I.4.1:

Specification of alternative scenarios

Channel	Scenario	
	Adverse	Severe
Energy commodities		
Oil and gas prices	An increase by 25% compared to the baseline assumption this year and next	Sudden stop of gas supply from Russia: with only partial substitution possibilities *Oil* prices as in the adverse scenario
External environment		
Global activity and trade exposure: Lower exports to Russia and broader weakening of foreign demand	Rest-of-the-world GDP falls by an additional 1% (broadly in line with IMF World Economic Outlook risk scenario)	Same as adverse scenario
Supply chains and logistics	Persistently higher rest-of-the-world export prices decrease euro area imports by 1%, reflecting further economic fragmentation	Same as adverse
Uncertainty and confidence		
Confidence: negative shock to households' spending	A 1 std. deviation (persistent) shock affecting households' intertemporal consumption decisions (based on the estimated historical shock series, implying a reduction in private consumption growth by around 0.3-0.4 pps. each year)	Twice as large as in the adverse scenario (2 std. deviation shock)
Risk premia: Cost of funding for firms up due to less favourable outlook	Persistent increase in risk premium (by 50 bps)	Persistent increase in risk premium (by 100 bps)
Other assumptions		
Policy	No additional policy response besides automatic stabilisers, monetary policy's interest rate rule	Same as adverse

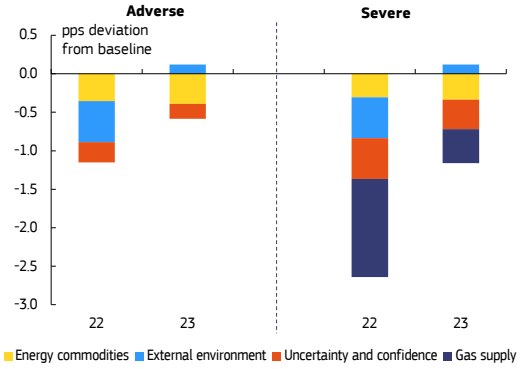
compared to the forecast baseline. Taking all channels together, the severe scenario implies GDP growth rates of around 2½ and 1 pps. below the forecast baseline in 2022 and 2023, respectively. Inflation is substantially higher in 2022 and 2023 relative to the baseline scenario: 3 pps. in 2022 and more than 1 pp. in 2023 above the baseline projection. Consequently, this year's inflation rate would be just above 9%, as shown in Graphs I.4.5 and I.4.6.

Graph I.4.4: **Inflation rates across scenarios, euro area**

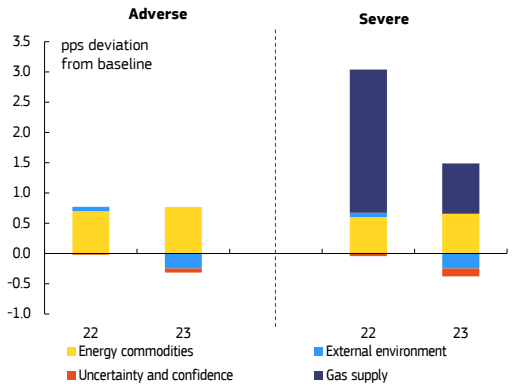


In both scenarios, euro area GDP contracts on a quarterly basis in 2022. The output reduction implied by the adverse and severe scenarios thus implies negative quarter-on-quarter growth on average in the last three quarters of 2022.

Graph I.4.5: **Drivers of real GDP growth**



Graph I.4.6: **Drivers of inflation**



This scenario analysis usefully complements the forecast narrative, but important limitations remain. Like other model-based assessments, these simulations are subject to an unusual degree of uncertainty

at this juncture. This caveat is especially true for the *severe scenario*, which, by sketching unprecedented extreme shocks, pushes the macroeconomic model beyond the ground for which it was designed. In particular, the macroeconomic effects greatly depend on assumed and highly uncertain substitution possibilities, as well as on the timing and persistence of the disruption. Beyond the risks explicitly addressed in the stylised simulations, additional disruptions could come from non-energy imports such as metals, fertilisers and food imports, as well as from more extreme supply chain bottlenecks. Moreover, the scenarios are run for the euro area as a whole, whereas European countries are set to be affected to different degrees. A key determinant is the different dependence on energy commodities and Russian gas. Finally, all simulations assume that the scenarios' additional shocks hit the economy in the second quarter of this year and will gradually fade over time.