

French economic outlook

The contribution of macroeconomic models to simulate the effects of higher energy import prices.

Macroeconomic models have proved useful for estimating the economic impact of energy price rises resulting from the war in Ukraine, as they take into account the scattering effects of these price hikes and the resulting knock-on effects. A simulation exercise was therefore carried out using the Mésange¹ model of the French economy (Bardaji et al, 2017) and GEM, the multi-country model by Oxford Economics. This exercise is for illustrative purposes only, with assumptions made on energy prices, but which are not forecasts. In addition, the model used here does not take into account the economic policy measures put in place to limit energy price rises for households (thus the tariff shield is not modelled). Here too, the impacts obtained on GDP or consumption do not constitute a forecast for these figures, but are merely an illustration of their momentum in the specific context of the assumptions made relating to changes in energy prices and the chosen model. Finally, other consequences of the war in Ukraine, in terms of increased prices for commodities other than energy, disruption to worldwide value chains and to the financial system, and loss of confidence among economic agents, beyond their usual habits, are also not taken into account here.

The rise in energy prices is spreading to the rest of the economy, putting a strain on households' purchasing power and penalising business activity

The rise in energy prices as a result of the war in Ukraine mainly concerns imported energies (oil, gas, coal) and therefore affects the price of France's energy imports. To simulate the macroeconomic consequences, the assumption is made that from 8 March until the end

of 2022, the import prices of oil, gas and coal will hold steady at \$125 per barrel of Brent for oil, €215 per MWh for gas and €390 per tonne for coal² (► **Figure 1**). Compared to a reference scenario where these prices remain at their average January-February levels, their increase corresponds to an increase in energy import prices of around 0.8 points of quarterly GDP in Q1 and 2.5 points in Q2 and subsequent quarters. Brent and gas contribute slightly less than 40% and 60% respectively to these increases, with coal making a much smaller contribution. In addition, the prices of other commodities, especially agricultural (wheat, etc.) or minerals, are here assumed to be unchanged.

This rise in the price of energy imports acts both on supply, by making production more expensive, and on demand, by reducing households' purchasing power. This then has a negative impact on consumption (-0.1% in Q1 and -0.6% in Q2, -1.0% over the whole of 2022), which is still cushioned as households then draw on their savings. Businesses for their part face an increase in their costs, especially those whose production makes intensive use of imported energy (oil and gas). This rise in costs is passed on to their selling prices and gradually spreads through the economy, with greater losses of activity in the second half of the year. GDP is therefore likely to be affected at around -0.1% in Q1, and -0.4% in Q2. Over the whole of 2022, the simulated rise in energy prices results in an impact of -0.7% on activity (► **Figure 2**). There is also a negative impact on the trade balance, at -1.7 points of GDP, due to the increased cost of imports.

This simulation exercise of course has limitations. As mentioned previously, it does not take account of fiscal policy (especially the tariff shield) or monetary policy. Moreover, in the Mésange model, the international

¹ Modèle Économétrique de Simulation et d'Analyse Générale de l'Économie.

² With regard to oil, the assumption corresponds to the price of a barrel of Brent at €117 in March and €118 from April 2022. With regard to gas, the import price of gas was chosen to follow the dynamics of the spot price (fixed-term contracts in the Netherlands, TTF), i.e. an assumption of €208 per MWh in March and €215 from April 2022. For coal, it is also the spot price that is assumed to reflect that of the coal import price, with the selected assumption at €384 per tonne in March and €390 from April 2022.

► 1. Assumptions made for oil, gas and coal prices

Assumptions in euros	Oil (in dollars per barrel of Brent)	Gas (in euros per MWh)	Coal (in euros per tonne)
Simulated prices from 8 March	125	215	390
Reference level	92	83	151

Note: the assumptions consist in keeping the spot prices of a barrel of Brent, of gas (fixed-term contracts in the Netherlands, TTF) and coal (fixed-term contracts Rotterdam, ICE Futures) constant until the end of the year, based on their value observed on 7 March 2022. The reference scenario consists in maintaining the average prices observed in January and February 2022 throughout the year.

Source: INSEE

environment of the French economy is hypothetically assumed to be exogenous, and hence not affected by the rise in energy prices. In practice, the increase in energy prices also affects France's trading partners, depressing world demand for French products.

The global nature of the shock accentuates the impact

Using a multi-country macroeconomic model, GEM (*Global Economic Model*), developed by Oxford Economics, the economic consequences of the rise in energy prices can be estimated by taking into account the effects of international closure associated mainly with trade.³ The assumption of rising energy import prices is similar to that considered previously. Unlike the oil and coal markets, the gas market is essentially regional, with the majority of gas trade going through physical pipelines, while the transport of liquefied natural gas is even more marginal. The simulated rise in the price of gas therefore

only concerns Europe, and the price of gas in the United States in particular is not directly affected.

In addition to the mechanisms described above, the shock results in a decline in world demand for French products (of around 1% year-on-year, compared to a situation with energy prices stable at their January-February average). For the French economy, the impact of higher energy prices amounts to almost -1% on GDP, for the year as a whole (► **Figure 2**). The difference in dynamics between the Mésange simulation and that from Oxford Economics may reflect modelling decisions specific to each model. However, the downturn in world demand for French products negatively accentuates the impact of the shock on activity and on the trade balance, compared to that estimated above using the Mésange model.

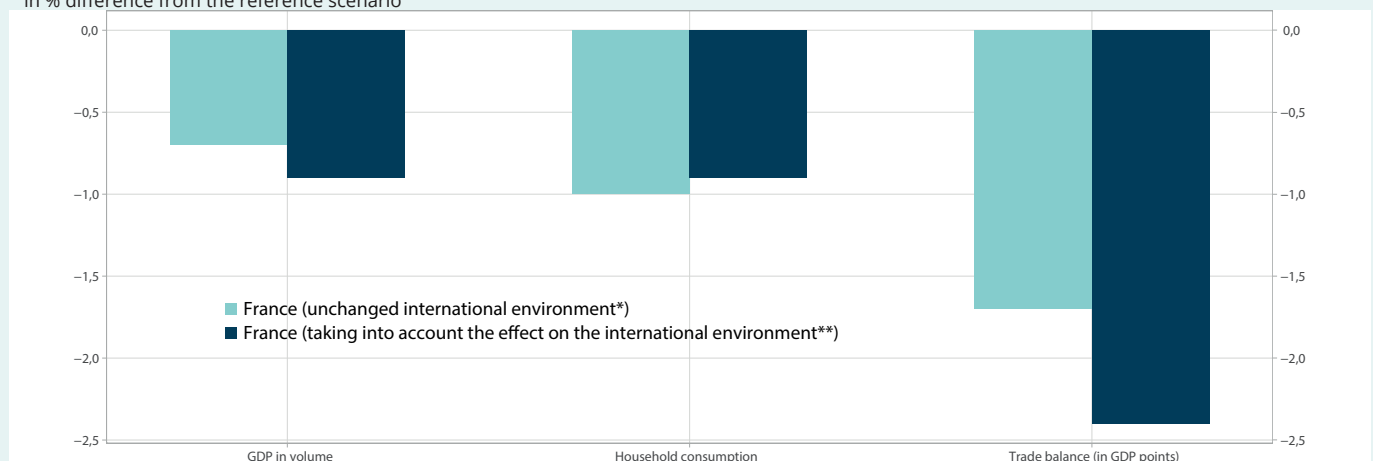
Note that, as before, this exercise is for illustrative purposes only, and does not take into account economic policy reactions in the different countries. ●

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³ The decline in exports to the combat zone or the consequences of supply chain disruptions are not taken into account in this exercise, which illustrates the consequences only of higher energy prices.

► 2. Impact of higher energy prices (oil, gas, coal) with the Mésange model of the French economy and the multi-country Oxford Economics model, for the whole of 2022

in % difference from the reference scenario



* Mésange model (INSEE-DG Trésor)

** multi-country Oxford Economics model

Note: simulation carried out without taking into account economic policy responses (notably the tariff shield).

Source: modèle Mésange (Insee-DG Trésor), Oxford Economics Global Economic Model, INSEE calculations

Bibliography

INSEE: J. Bardaji, B. Campagne, M.-B. Khder, Q. Lafféter et O. Simon - DG Trésor : A.-S. Dufernez, C. Élezaar, P. Leblanc, E. Masson et H. Partouche, (2017) "The MESANGE macroeconometric model: re-estimation and innovations", Document de travail, n° G2017/04, INSEE, May 2017.

Oxford Economics, (2019) The Oxford Global Economic Model. ●