Analysis

Rising import prices are hitting the real economy

International economy | 28 October 2022 | Samu Kärkkäinen

AUTHOR



Samu Kärkkäinen
Senior Economist

The euro area is a net energy importer. In 2020 slightly over 60% of the euro area's gross available energy was imported from elsewhere. Soaring energy prices have pushed up import prices for euro area countries. This article examines some of the effects of rising import prices on the euro area economy. Empirical analysis suggests that positive import price shocks, or sudden and unexpected rises in import prices, are passed on to consumer prices quickly but have a slower impact on the real economy. Nevertheless, Member States are likely to experience differences in the size and transmission of these effects.



The euro area imports a significant share of the energy it uses

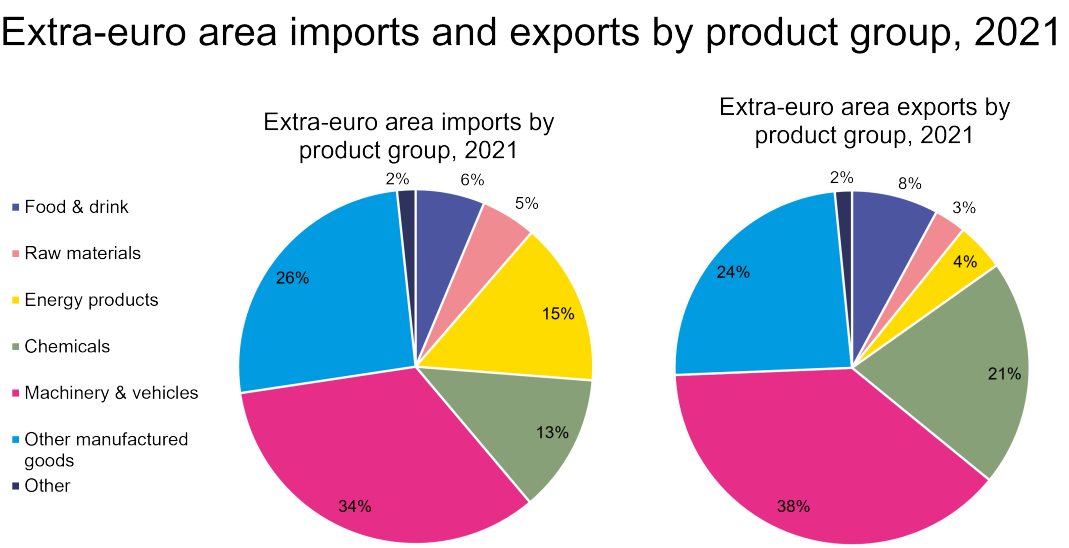
A substantial rise in energy and other commodity prices has been triggered by the demand growth and supply chain disruptions following the recovery of the economy from the COVID-19 pandemic, and by the economic fallout of Russia's invasion of Ukraine. The rise in energy prices has been especially strong. Energy raw materials in the euro area were about twice as expensive at the end of September 2022 than a year earlier as measured by the Commodity Price Index[1] compiled by HWWI, a German think tank.

The rise in energy prices has passed through to euro area consumer price inflation, which has accelerated to record highs during the past year. Price pressures are being stoked by restrictions on Russian gas imports to Europe, as well as an agreed ban on Russian crude oil imports due to enter into force later on[2].

Because fossil fuels such as oil, natural gas and coal continue to be important energy sources for electricity production, the price of electricity has surged on the back of rising energy commodity prices. Higher energy and electricity prices have an immediate bearing on the economic behaviour of businesses and households. Businesses may see their production costs rise, and if they are unable to pass this on to the prices of their final products, their profitability will decline. Households are confronted with higher energy bills, which reduces the economic resources at their disposal for spending on other consumption. What follows is a decline in aggregate demand in the economy.

A majority of energy supplies are imported in Europe and the euro area. In 2020, for example, net energy imports accounted for over 60% of all available energy ('gross available energy') in the euro area.[3] As a result, energy imports make up a substantial share of the euro area's total imports by value. In 2021 energy products accounted for 15% of the value of imports from outside the euro area ('extra-euro area imports'). By contrast, energy products accounted for only 4% of the euro area's total exports (Chart 1). Because the euro area is a net energy importer, the recent surge in energy prices might be viewed as an import price shock, which has the effect of weakening the euro area's terms of trade.[4] By comparison, the United States has been a net energy exporter since 2019, according to the Energy Information Administration, a US government statistical agency. In 2021 energy products accounted for less than 6% of US imports by value.

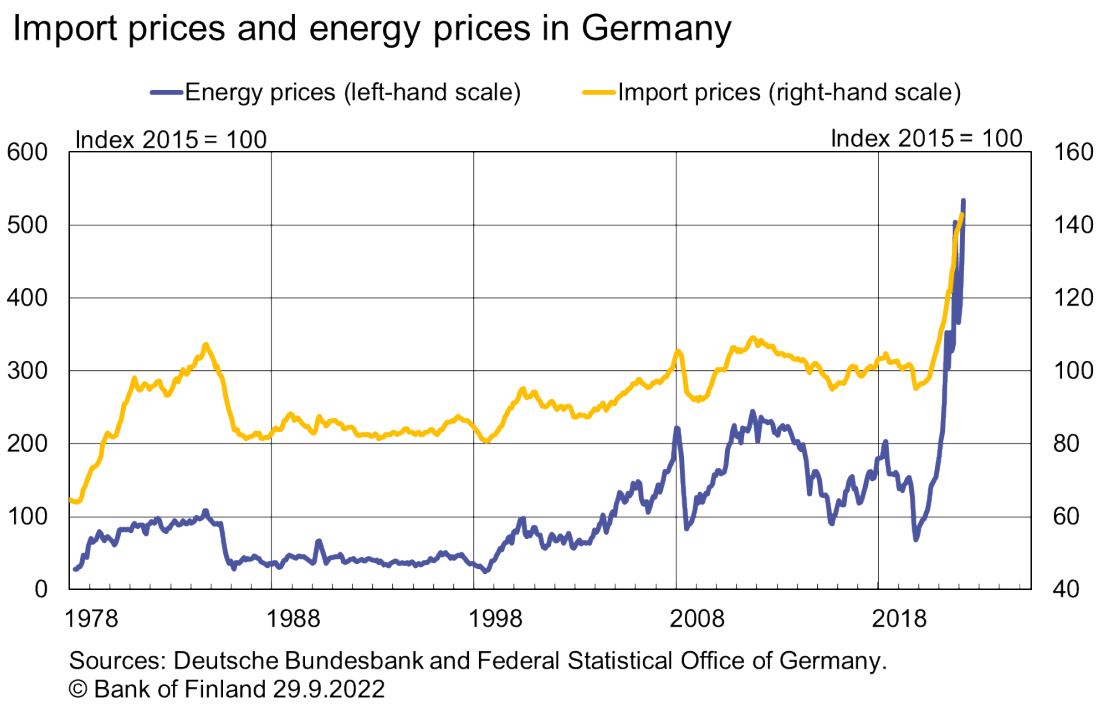
Chart 1.



Sources: Eurostat and calculations by the Bank of Finland.
© Bank of Finland 29.9.2022

Chart 2 plots the long-term time series of energy prices and import prices in Germany. These have largely moved in step with each other since the late 1970s. This is especially apparent where the two curves mark the current energy crisis, but similar patterns can also be observed at the end of the 1970s and start of the 1980s and also in the early 2000s. The correlation between the two time series is in fact strongly positive, at 0.89.

Chart 2.



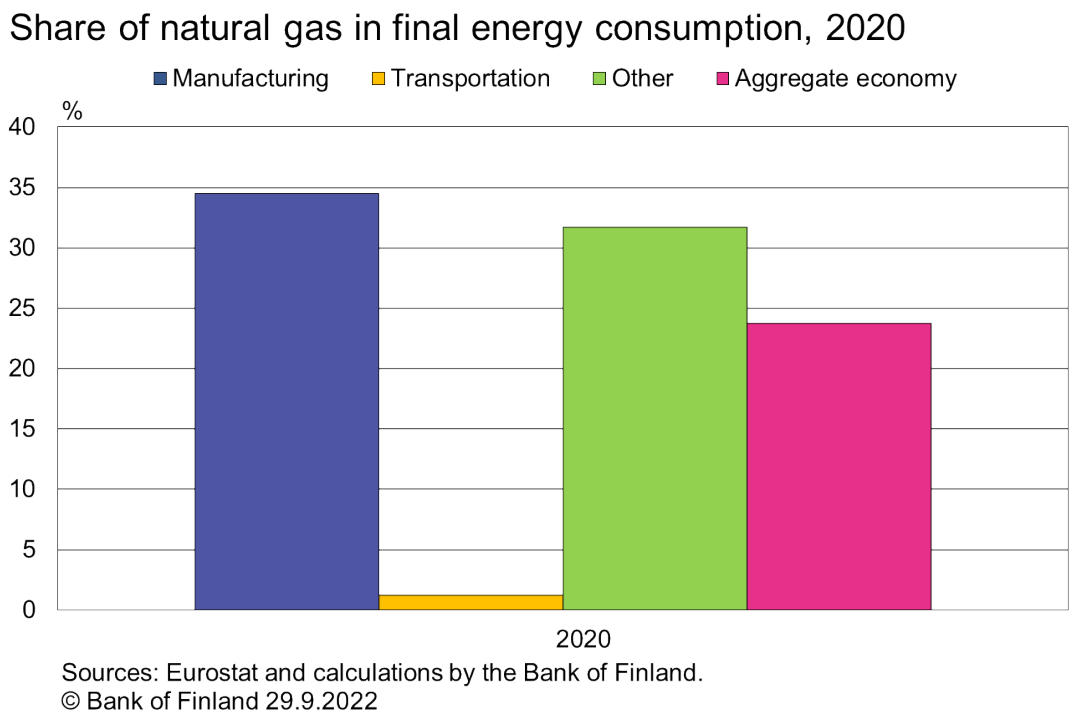
As Chart 2 illustrates, energy price surges are nothing new. In 2008, the price of Brent crude reached as much as about USD 145 per barrel. In the current energy crisis, the price of crude oil peaked in early March 2022 at about USD 130 per barrel, but by September 2022 had fallen back roughly to the pre-war level. The price of natural gas, in contrast, has seen an unprecedented rise during the current crisis. ICE Dutch TFF natural gas futures reached as much as EUR 226 per megawatt hour in early 2022. As summer approached, the price returned to pre-war levels, before rebounding during late summer on account of the uncertainties surrounding Russian gas deliveries. During the early autumn the price of natural gas fluctuated sharply.

In addition to energy products, the prices of other commodities also rose after Russia began its invasion, but they have since steadied. What sets the current situation apart from earlier episodes of price rises is the severity of the rise in import prices and especially the surge in natural gas and coal prices. In the run up to the global financial crisis, euro area import prices[5] rose by about 8% between the first quarter of 2007 and third quarter of 2008. Now, import prices rose by about 23% between the first quarter of 2021 and the second quarter of the current year.

Higher natural gas prices have an immediate impact on European households as gas is used for heating homes in many countries. In 2020, natural gas accounted for about 35% of the euro area household sector's final energy consumption. In addition, natural gas is an important input in the euro area's manufacturing industry, as Chart 3 illustrates. Natural gas accounted for slightly below

25% of the aggregate economy's final energy consumption in 2020, and in the manufacturing industry the corresponding share was about 35%.

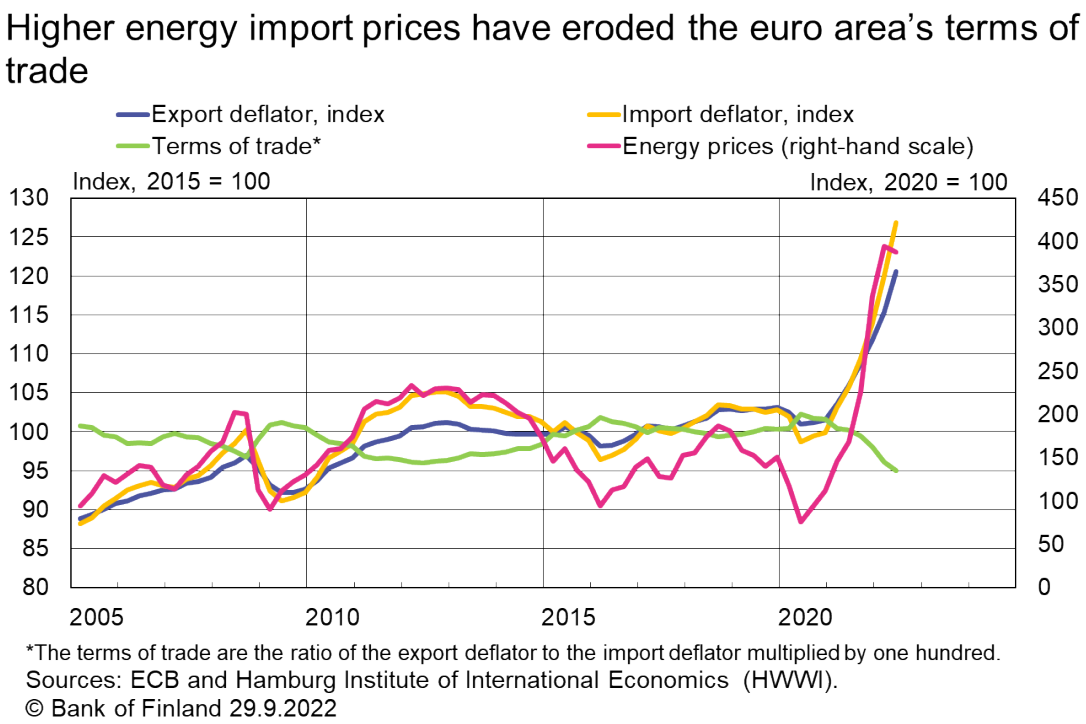
Chart 3.



Terms of trade weakened by import price shock

The rise in energy prices, originating from outside the euro area and covering different energy sources, has passed through to euro area consumer price inflation, which is now at record highs. Both import and export prices have increased on the back of more expensive energy imports, but import prices have risen the fastest. Consequently, the euro area's terms of trade have deteriorated, as is illustrated in Chart 4.

Chart 4.



A deterioration in the terms of trade diminishes the euro area's purchasing power, as a smaller number of imports can be purchased with a given number of exports compared with before. Therefore, the terms of trade – whose fluctuations are driven by import prices – may well play a significant role in shaping the business cycle.

Terms of trade shocks are commonly considered to be a significant driver of the business cycle especially in emerging and developing economies. However, the research literature on the topic is somewhat inconclusive. Slightly older research, based on theoretical business cycle models, finds that terms of trade shocks explain a significant proportion of fluctuations in real GDP (Mendoza, 1995; Kose, 2002). On the other hand, recent empirical research draws a different conclusion, with terms of trade shocks only having a limited ability to explain fluctuations in real GDP (Schmitt-Grohe and Uribe, 2018). In one study, Gulan et al. (2021) look at the role played in Finland's 1990s recession by the collapse of Finnish-Soviet trade following the dissolution of the Soviet Union, and find that the decline in Finland's terms of trade did not play a major role in the contraction of Finnish real GDP; rather, the decline in real GDP is better explained by the collapse of Soviet demand. Furthermore, the collapse of Finland's trade with its eastern neighbour does not alone explain the 1990s recession, as financial market shocks also played a crucial role.

What are the macroeconomic effects of rising import prices?

Import prices have behaved very similarly across almost all of the euro area Member States in recent years (Chart 5). In the 1990s and early 2000s, import price movements still exhibited even large differences between countries, but price movements have been broadly similar in the years following the euro area sovereign debt crisis.

The effects of import price fluctuations on the economy can be evaluated empirically. In the following, an econometric model is introduced to estimate the effects of a positive import price shock in the euro area.[6] The model estimates the degree to which a given import price shock affects euro area real GDP and consumer price inflation and also the time it takes for the effects to materialise.

Chart 5.

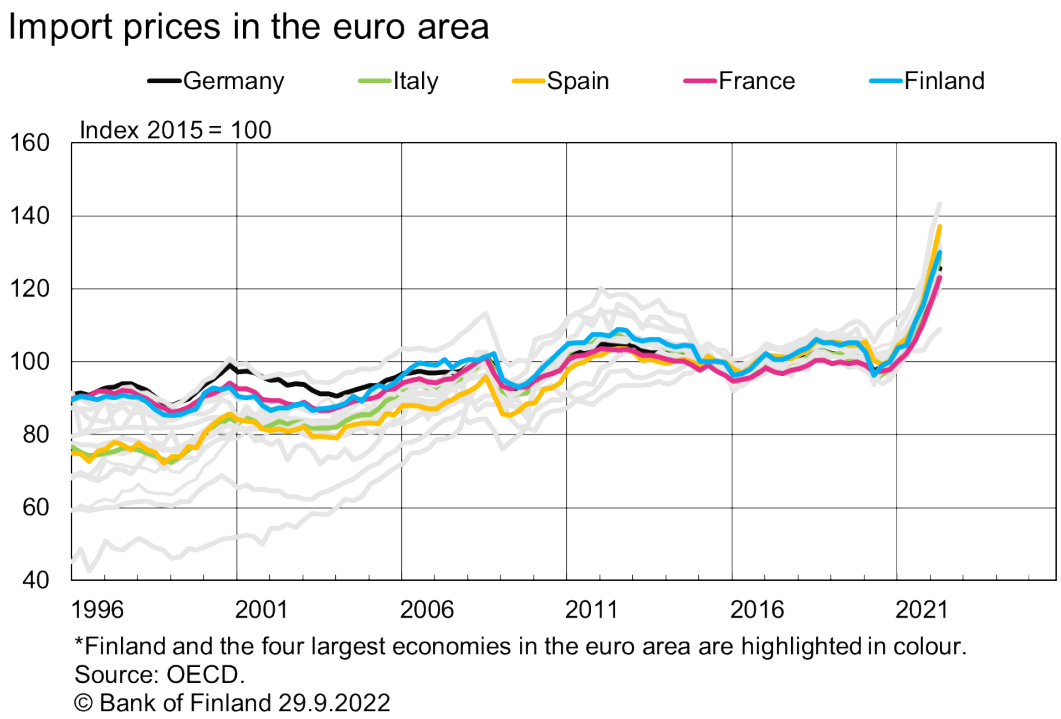
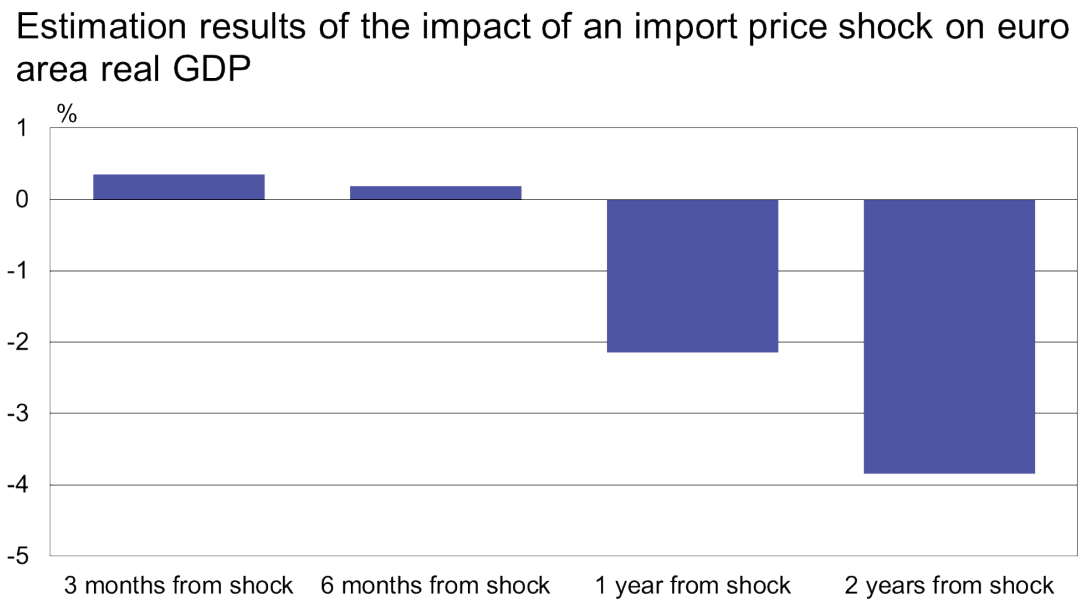


Chart 6.



The import price shock has been scaled such that it equals the observed rise in import prices between the fourth quarter of 2021 and second quarter of 2022.
Source: Calculations by the Bank of Finland.
© Bank of Finland 29.9.2022

Chart 6 presents the estimated impulse responses of real GDP to a sudden rise in import prices in the euro area.[7] The latest available observation in the time series for the euro area import deflator is from the second quarter of 2022. Between the fourth quarter of 2021 and the second quarter of 2022, the import deflator rose by about 11%. The real GDP effects presented in Chart 6 are therefore responses to an import price shock scaled at about 11%. The model predicts that a rise in import prices pushes down real GDP, but this effect materialises after a lag of about one year following the price shock.

Chart 7, in turn, presents the estimated impulse responses of consumer price inflation[8] to a positive import price shock in the euro area. The shock is again scaled such that it corresponds with the recent surge in import prices in the euro area. In contrast with the impact on real GDP, a rise in import prices appears to pass through to inflation very quickly. The model has no mechanism whereby high inflation could be passed on to wages and inflation expectations, so the results may well underestimate the duration of the inflationary episode.

The import price shock appears to have a permanent impact on the other variables. Based on the estimation results, real GDP and consumer prices remain shifted from their starting level even a full decade after the shock. On the other hand, estimates of long-term effects are subject to significant uncertainty.

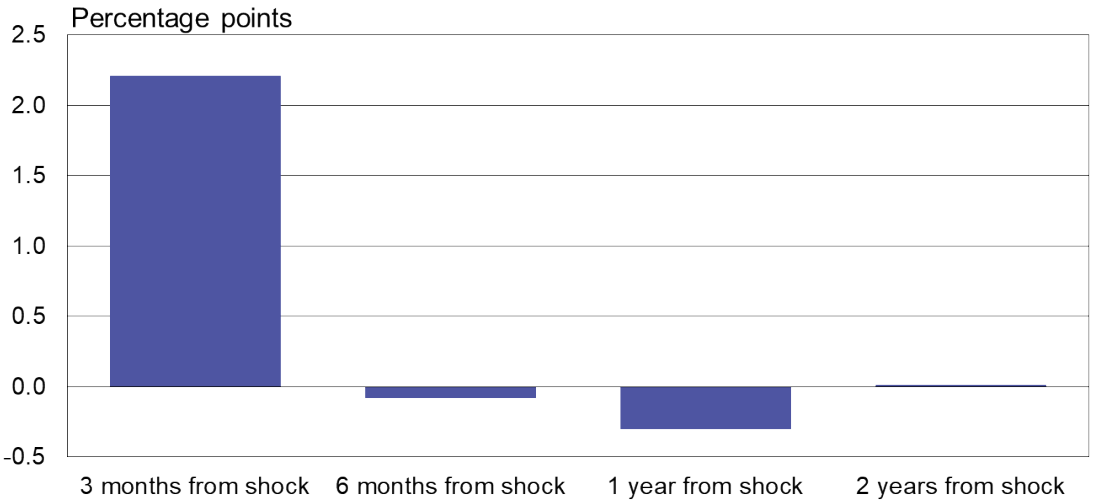
Impact assessments are subject to uncertainty

The estimation results outlined above are only indicative, and the actual effects may differ substantially from those presented here. The applied model is highly simplified and is not able to take into account all of the channels through which an import price shock might be passed on to consumer prices and the real economy. In addition, the model assumes linearity, and it is not at all clear how well a linear model can capture the effects of a price shock of the magnitude recently seen in the euro area. By way of comparison, the ECB, in its September interim forecast, revised downwards its estimate for euro area real GDP growth for 2022 by 1.1 percentage points from its December 2021 macroeconomic projections, published before Russia's war in Ukraine. Similarly, the estimate for real GDP growth in 2023 was revised downwards by 2 percentage points. The ECB revised its projections of consumer price inflation upwards by 4.9 and 3.7 percentage points for 2022 and 2023, respectively. Shocks comparable to the current one have only occurred rarely in Europe, which makes estimating the effects even harder. For example, the rise in the price of natural gas – an all-important commodity for Europe – has been unusually strong.

The estimation results are also subject to other uncertainties. Among these, the exceptional nature of the shock increases the risk of financial market disturbances, which, if they materialise, could result in a sharper contraction in real GDP than estimated. Such second-round effects are not captured by the model. Neither are policy measures that are able to mitigate the impact of the shock.

Chart 7.

Estimation results of the impact of an import price shock on euro area consumer price inflation



The import price shock has been scaled such that it equals the observed rise in import prices between the fourth quarter of 2021 and second quarter of 2022.
Source: Calculations by the Bank of Finland.
© Bank of Finland 29.9.2022

Energy import dependency varies among euro area countries

The modelled inflation and growth effects presented in this article are based only on a surge in import prices. However, in the current environment, adverse economic effects may also stem from energy availability constraints if Europe's import embargoes or action by Russia result in Europe's energy requirements not being met at current consumption levels. This might lead to energy rationing. In addition, fluctuations in import prices may affect different countries differently.

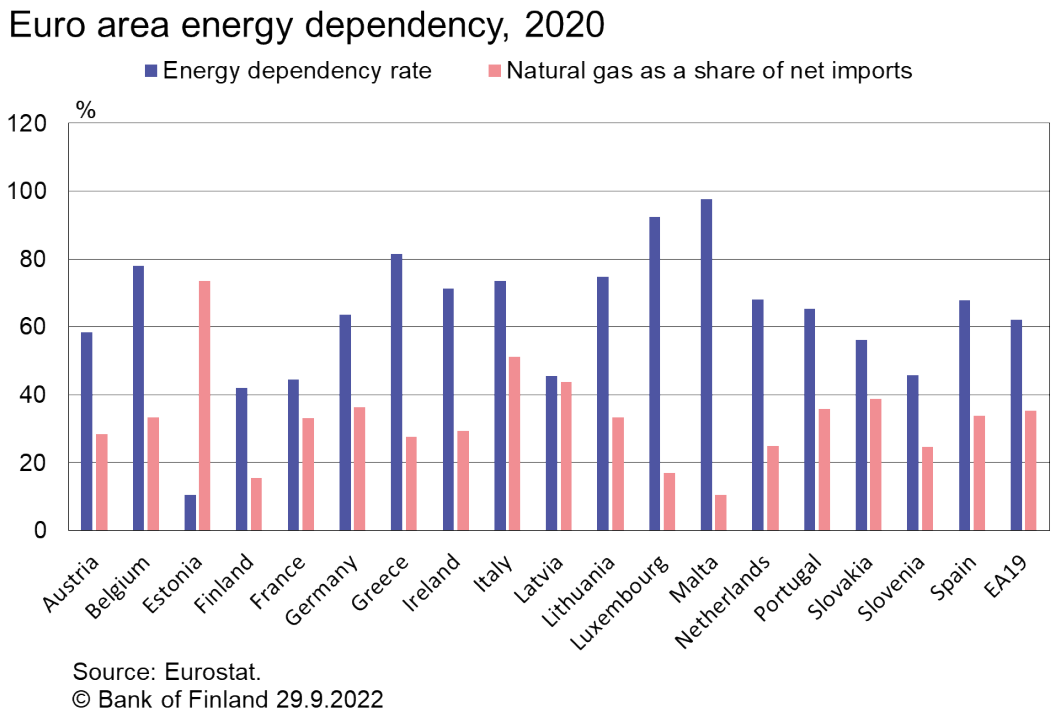
When Russia invaded Ukraine, many economic analysts and institutions began publishing assessments of the war's economic effects in Europe. The most significant economic consequence has to do with the cessation of Russian energy imports and the subsequent sharp rise in energy prices and, by extension, import prices. The spotlight in the political and academic debate has especially been fixed on Germany, where natural gas is a particularly important source of energy.

According to Bachmann et al. (2022a), abandoning Russian energy imports could result in a 0.5%–3.0% shortfall in German real GDP over the short term. Similar estimates were also obtained in a revised assessment by the same authors (Bachmann et al., 2022b). The Deutsche Bundesbank, Germany's central bank, estimates that the impact could even be significantly larger. It notes that energy rationing resulting from a full embargo on Russian energy imports, together with the other economic effects of the war, would cause a loss of 1.5% in German real GDP in

2022 and 6.75% in 2023 relative to its baseline forecast without the embargo (Deutsche Bundesbank, 2022). In a recent assessment, the International Monetary Fund (IMF) estimates that the ending of natural gas imports could result in a loss of 0.4%–2.8% in German real GDP over the course of a year depending on the model and assumptions used (Di Bella et al., 2022).

The magnitude of the effects will largely be determined by how effectively and how quickly Russian energy imports can be substituted with alternative supplies and energy sources. There could be significant differences in this regard between different countries in the euro area. What is key here is the degree to which a country is energy independent. The euro area's overall energy dependency rate, defined as net energy imports divided by gross available energy, exceeded 60% in 2020, but there are significant differences in energy dependency rates between countries (Chart 8). In Estonia, net energy imports accounted for only 10% of the country's gross available energy in 2020, whereas in Luxembourg the dependency rate stood at over 90%. Among the major euro area economies, Germany, Italy and Spain all had a dependency rate of over 60%, and natural gas accounted for the greatest share of net energy imports in Italy (51%) and Germany (37%). Finland ranked as one of the most energy independent economies in the euro area in 2020, together with France.

Chart 8.



The surge in import prices caused by the energy crisis is diminishing the purchasing power of households and affecting households unequally. Generally speaking, low income households are

the hardest hit by the price rises, as their energy bills take up a larger share of their income than is the case for higher earners. The IMF has estimated[9] that for the poorest 20% of households in euro area countries, the biggest relative rise in living costs will be in Estonia and the smallest in France.

Higher prices will themselves influence consumer behaviour and act as an incentive to reduce energy consumption, but it remains likely that fiscal policies will be needed in the euro area to protect the livelihoods of those most vulnerable in society. This will set new challenges for the sustainability of public finances in euro area Member States.

References

Bachmann, R., Baqaee, D., Bayer, C., Kuhn, M., Löschel, A., Moll, B., Peichl, A., Pittel, K. & Schularick, M. (2022a) What if? The economic effects for Germany of a stop of energy imports from Russia. EconPol Policy Report 36.

Bachmann, R., Baqaee, D., Bayer, C., Löschel, A., Kuhn, M., McWilliams, B., Peichl, A., Pittel, K., Schularick, M. & Zachmann, G. (2022b) How it can be done. ECONtribute Policy Brief No. 034.

Deutsche Bundesbank (2022) Monthly Report, June 2022.

Di Bella, G., Flanagan, M. J., Foda, K., Maslova, S., Pienkowski, A., Stuermer, M. & Toscani, F. G. (2022) Natural Gas in Europe: The Potential Impact of Disruptions to Supply. IMF Working Papers, No. 2022/145.

Gulan, A., Haavio, M. & Kilponen, J. (2021) Can large trade shocks cause crises? The case of the Finnish–Soviet trade collapse. Journal of International Economics, 131, 103480.

Kose, M. A. (2002) Explaining business cycles in small open economies: How much do world prices matter? Journal of International Economics, 56(2), 299–327.

Mendoza, E. G. (1995) The terms of trade, the real exchange rate, and economic fluctuations. International Economic Review, 101–137.

Schmitt-Grohé, S. & Uribe, M. (2018) How important are terms-of-trade shocks? International Economic Review, 59(1), 85–111.

Notes

1. The energy raw materials included in the index are crude oil, natural gas and coal. ↑
2. An embargo on Russian crude oil will enter into force in December 2022 and an embargo on ↑

refined oil products in February 2023.

3. Source: Energy balances - Energy - Eurostat (europa.eu). ↑
4. The terms of trade are defined as the ratio between a country's (or economic area's) export prices and its import prices. A decline in the terms of trade means that a country is able to purchase fewer imports in exchange for one unit of exports. ↑
5. In this article a rise (or a decline) in import prices is measured in terms of a rise (or a decline) in the import deflator. The import deflator is an index that is used when expressing a change in the nominal value of imports as a change in the real value of imports. It is thus a measure of the extent of inflation in import prices. ↑
6. The results are obtained from a vector autoregressive model, a standard methodology for modelling the dynamics of and causal relationships between macroeconomic variables. The modelling is based on quarterly data for the period Q2 1999 to Q4 2019. All variables are in first differences except for the trade balance, which is expressed as a ratio relative to GDP. Import and export prices are expressed in terms of import and export deflators. The variables are set in the following order: world GDP, import prices, export prices, trade balance (relative to GDP), GDP, private consumption, investment, real effective exchange rate, and consumer price inflation. The model's shocks are identified recursively based on a Cholesky decomposition. ↑
7. It should be stressed that the results presented here are only point estimates. As such, the size and direction of the effects are subject to uncertainty. ↑
8. Here, consumer price inflation is defined as the quarterly change in the euro area's Harmonised Index of Consumer Prices (HICP). ↑
9. See How Europe Can Protect the Poor from Surging Energy Prices – IMF Blog. ↑

Keywords

economy, energy crisis, euro area, import, inflation, prices