

Article

The purchasing power of GDP, UK: 2022

The impact of higher energy and commodity prices on the economy and the purchasing power of the UK.

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1 . Main points

- The impact of higher energy and commodity prices on the UK economy has recently reduced the purchasing power of the UK; as the UK is a net energy importer, its import prices have increased more than its export prices in response to the energy price shock in 2022.
- Real gross domestic income (GDI) captures the purchasing power of a country's output over goods and services in global markets, which contracted by 0.2% in the year to Quarter 3 (July to Sept) 2022, as the UK is currently experiencing its largest negative terms-of-trade effect since the mid-1970s.
- Norway has experienced the largest positive purchasing power effect over the year to Quarter 3 2022 amongst the 38 Organisation for Economic Co-operation and Development (OECD) countries; Canada and the United States are the only two G7 countries to have had positive terms-of-trade over the last year, reflecting how these countries are net energy exporters.
- European countries have experienced a negative purchasing power effect as net energy importers; Italy, Germany, and Japan experienced a larger negative terms-of-trade effect than the UK in the year to Quarter 3 2022.

2 . Background

Higher energy and commodity prices over the year up to Quarter 3 (July to Sept) 2022 help explain the real income shock facing the UK economy. Given that the UK is a net importer of goods and energy, we show that the UK has experienced a large fall in the purchasing power of UK gross domestic product (GDP) over the last year. This has welfare implications for the UK. We explain how the UK's terms-of-trade has changed over the last 50 years, including how the UK is currently experiencing its largest decline in the purchasing power of its GDP since the mid-1970s. We also show how these terms-of-trade effects have compared with other advanced economies, providing new insights into the distributional effects of these welfare changes over the year up to Quarter 3 2022.

3 . The terms-of-trade

The terms-of-trade capture the rate of exchange between internationally traded goods and services produced by one country relative to another country. They are defined as the ratio between the index of export prices and the index of import prices. This shows how many imports an economy can purchase in its currency per unit of its exports. Movements in the terms-of-trade reflect changes in:

- the international cost of factors of production
- exchange rate movements
- productivity changes between countries
- inflation rates between countries

There have been large movements in the price of goods and services over the year up to Quarter 3 (July to Sept) 2022. These include the coronavirus (COVID-19) pandemic effects on product and labour imbalances. Terms-of-trade effects are particularly relevant at times of large energy price movements, which have increased markedly over the last year, particularly gas prices, because of the conflict in Ukraine.

A change in the terms-of-trade leads to a change in the purchasing power of a country. It has an impact on how much a country can purchase, given how much it produces. A favourable terms-of-trade shows that a country can purchase more imports for a given level of exports. An unfavourable terms-of-trade happens when a country has lower purchasing power; it can buy less for a given level of exports. This has an impact on a country's national income, which is why it is relevant to understand how it affects the living standards in a country.

The UK is a net goods and energy importer, so the increase in these prices has reduced the purchasing power of the UK. The demand for energy tends to be relatively price inelastic; there is not much of a fall in the volume of demand, at first. Households and businesses will initially have to reduce their spending on non-energy goods and services, or reduce their savings in the absence of a fiscal transfer of income. This reflects the hit to real income for the UK. This might have been further compounded by the fall in the sterling exchange rate through 2022, particularly if energy transactions have been priced in dollars.

Figure 1 shows how the UK terms-of-trade have changed over the last 50 years. These movements tend to be more pronounced when there are large movements in energy and commodity prices, or the exchange rate. These include the two major oil shocks in the 1970s and the large falls in the value of sterling in 2008 and 2016.

The terms-of-trade has fallen by 6.2% over the year to Quarter 3 2022. There has been a significant increase in the price of oil and gas in 2022. Wholesale gas and electricity prices are more than double their prices from before the invasion of Ukraine. They peaked in August 2022, when they were both around three times higher than immediately before the war. Prices for crude oil have also increased sharply, from \$74 per barrel in January to a peak at \$120 per barrel in June.

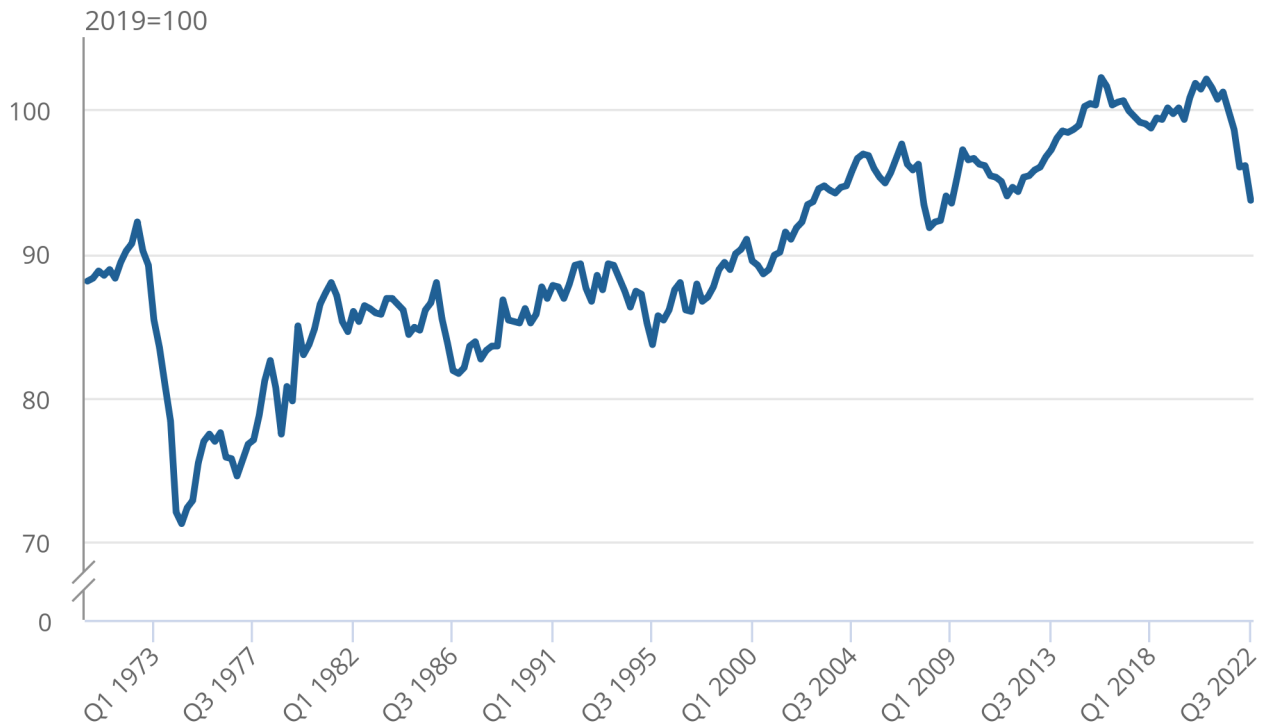
As the UK is a net energy importer, these large energy price movements explain why import prices have increased relatively more than export prices over the last year. There has also been a fall in the sterling exchange rate this year, reflecting domestic and global factors, which would have also led to a fall in the UK terms-of-trade. That said, these currency movements have not been as large as energy price movements over the year up to Quarter 3 2022.

Figure 1: There has been a recent decline in the UK terms-of-trade over the last year

Ratio of export prices to import prices, Quarter 1 (Jan to Mar) 1970 to Quarter 3 (July to Sept) 2022

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Ratio of export prices to import prices, Quarter 1 (Jan to Mar) 1970 to Quarter 3 (July to Sept) 2022



Source: Office for National Statistics (ONS)

Notes:

1. In the year to Quarter 3 (July to Sept) 2022, there was a 6.2% fall in the UK terms-of-trade. For the other G7 economies, the changes over this period have been Canada (3.6%), France (-4.4%), Germany (-6.6%), Italy (-10.4%), Japan (-11.4%) and United States (0.8%).

Exchange rate movements reflect views on the economic outlook of a country relative to the global economy, including the effects of uncertainty. There have been two large falls in the UK exchange rate over the last 20 years. The first was a fall of 25% from its peak to trough at the time of the global financial crisis in 2008-09. The second was a fall of around 15% at the time of the EU referendum in 2016. These episodes have been captured by a decline in the terms-of-trade. If imports are priced in a foreign currency, then there would be higher import prices, all else the same. However, these are easily surpassed by the fall seen in the 1970s, reflecting the first oil price shock in 1973 and 1974, and higher prices between 1973 and 1975.

In the last 20 years, there were large increases in energy prices in 2008 and 2011. Amidst high global demand, Organization of the Petroleum Exporting Countries (OPEC) producers had not raised their oil production quotas, while there was reduced crude oil output from non-OPEC producers. This was coupled with geo-political tensions in the oil-producing countries of Venezuela, Iraq, and Nigeria. That said, oil prices fell by over 50% in the second half of 2014, responding to negative demand and positive supply shocks, which led to an improvement in the UK terms-of-trade.

4 . Recent movements in import prices

The UK was a net importer of all types of goods in 2021, particularly machinery and transport equipment and fuels. The UK also imports a high level of food products. The relative price changes of these goods have the largest impact on the UK's terms-of-trade, given that the UK imports relatively more of these types of goods.

Figure 2 shows that the price of goods imports has increased by 26% in the year to Quarter 3 (July to Sept) 2022. It also shows how the underlying trend of import price inflation has picked up over the last year. The increase in the price of fuel goods has been driving import goods price inflation over this period, which reflects the effects of higher wholesale gas prices over 2022. These fuel price changes explain over three-fifths of the increase in goods imports prices over the last year.

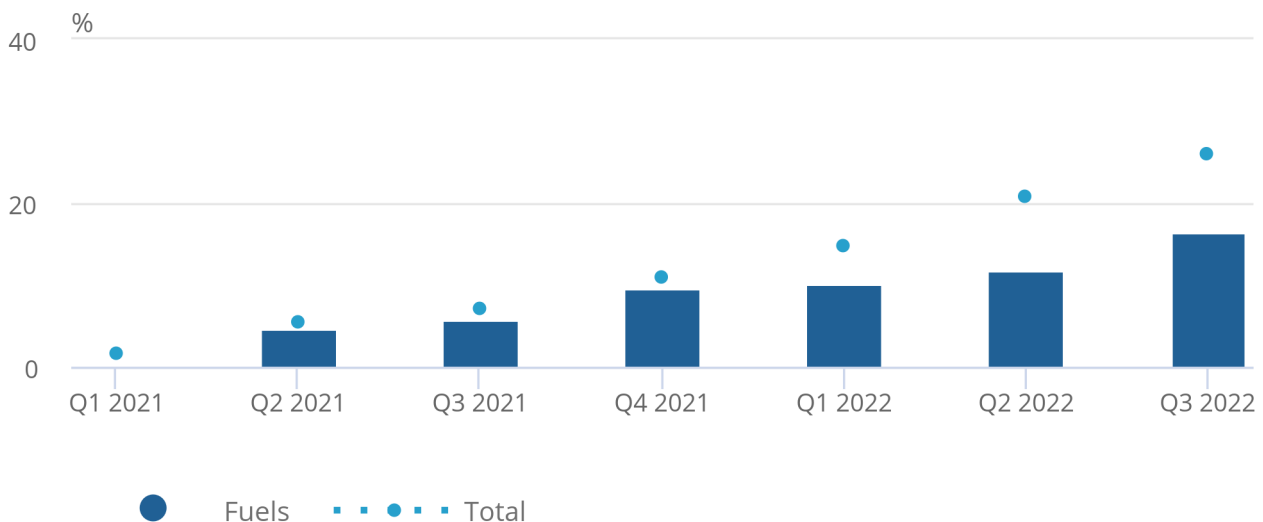
Energy prices tend to be an important factor in producer price inflation, which have direct and indirect impacts on costs for most businesses. This explains some of the broader price pressures, as reflected by the increase in the contributions of the price of other non-fuel goods, where higher energy prices are also contributing to higher costs of production for many goods. For instance, there has been a noticeable increase in the price of machinery and transport equipment imports over the year to Quarter 3 2022.

Figure 2: The increase in the price of fuel goods has driven goods import inflation over the last year

Contribution of fuel import price changes to change in goods imports prices, Quarter 1 (Jan to Mar) 2021 to Quarter 3 (July to Sept) 2022

Figure 2: The increase in the price of fuel goods has driven goods import inflation over the last year

Contribution of fuel import price changes to change in goods imports prices, Quarter 1 (Jan to Mar) 2021 to Quarter 3 (July to Sept) 2022



Source: Office for National Statistics (ONS)

Notes:

1. Contribution of standard international trade classification revision 3 (SITC 3) (fuels) to the quarter-on-quarter-a-year-age change in goods import prices.

For all goods commodities, import prices over the year up to Quarter 3 2022 have increased at a faster rate than in the years leading up to the coronavirus (COVID-19) pandemic. This has been particularly the case for:

- food and live animals
- crude materials
- fuels
- animal and vegetable oils and fats
- chemicals.

There have also been variations in import price increases within these commodity types. This has shown how specific types of goods commodities have been exposed to supply disruptions, particularly in food and energy. This also includes the indirect effects of these higher input costs on production processes.

For example, fuel import prices have more than doubled over 2022. There has been around a 180% increase in gas import prices in the year to Quarter 3 2022, while electricity import prices are around 35% higher than a year ago. Likewise, the import price of food and live animals is around 25% higher than a year ago, with dairy products and eggs having the most significant price increases (56%). Amongst chemicals, the highest import price increase was for fertilisers.

5 . Real gross domestic income (GDI)

The effect of a change in the terms-of-trade is on the purchasing power of a country. Real gross domestic product (GDP) measures the volume of goods and services produced by a country. However, by adjusting this measure to reflect movements in the terms-of-trade, real GDI describes the purchasing power of a country's output over goods and services in global markets. This concept of real GDI is more connected to the notion of welfare. This is highly relevant for an open economy, such as the UK, given recent developments in the global economy, like the large increases in energy and commodity prices and exchange rate volatility.

Real GDI is a measure that adjusts real GDP to reflect changes in purchasing power resulting from movements in the terms-of-trade. In the US national income and product accounts (NIPA), this measure is referred to as command GDP or command-basis GDP. The measurement of the terms-of-trade effect concerns the deflation of the trade balance:

$$T = \text{terms-of-trade effect} = \left(\frac{X}{P} - \frac{X}{PX} \right) - \left(\frac{M}{P} - \frac{M}{PM} \right)$$

Where:

- X is nominal exports deflated by the export deflator PX
- M is nominal imports deflated by the imports deflator PM
- P is some other general deflator

The general deflator that is typically chosen by national statistical institutes (NSI) is the import deflator, in which case the terms-of-trade effect simplifies to:

$$T = \text{terms-of-trade effect} = \frac{X}{PM} - \frac{X}{PX}$$

An improvement in the terms-of-trade happens when export prices increase relative to import prices. This would have no impact on real GDP, where exports and imports have been deflated by their own price indices. However, real GDI will increase, because exports are being deflated by the relatively lower import price index. The purchasing power of domestic output is now higher because the same volume of exports can now be used to purchase a higher volume of imports. A deterioration in the terms-of-trade, where all else is held constant, has the opposite effect. The purchasing power of domestic output is diminished, as the same volume of exports can now be used to purchase a lower volume of imports. Real GDI falls relative to real GDP, with a negative impact on welfare, despite the volume of domestic output being unchanged.

6 . The impact of the 2022 energy price shock on the purchasing power on the UK and Organisation for Economic Co-operation and Development (OECD) countries

The impact on a country's purchasing power is captured by the difference between the change in real gross domestic income (GDI) and the change in real gross domestic product (GDP). Positive values indicate a positive welfare effect, as it would show that the purchasing power of real GDP is higher. Negative values indicate a negative welfare effect, as it would show that the purchasing power of real GDP is lower.

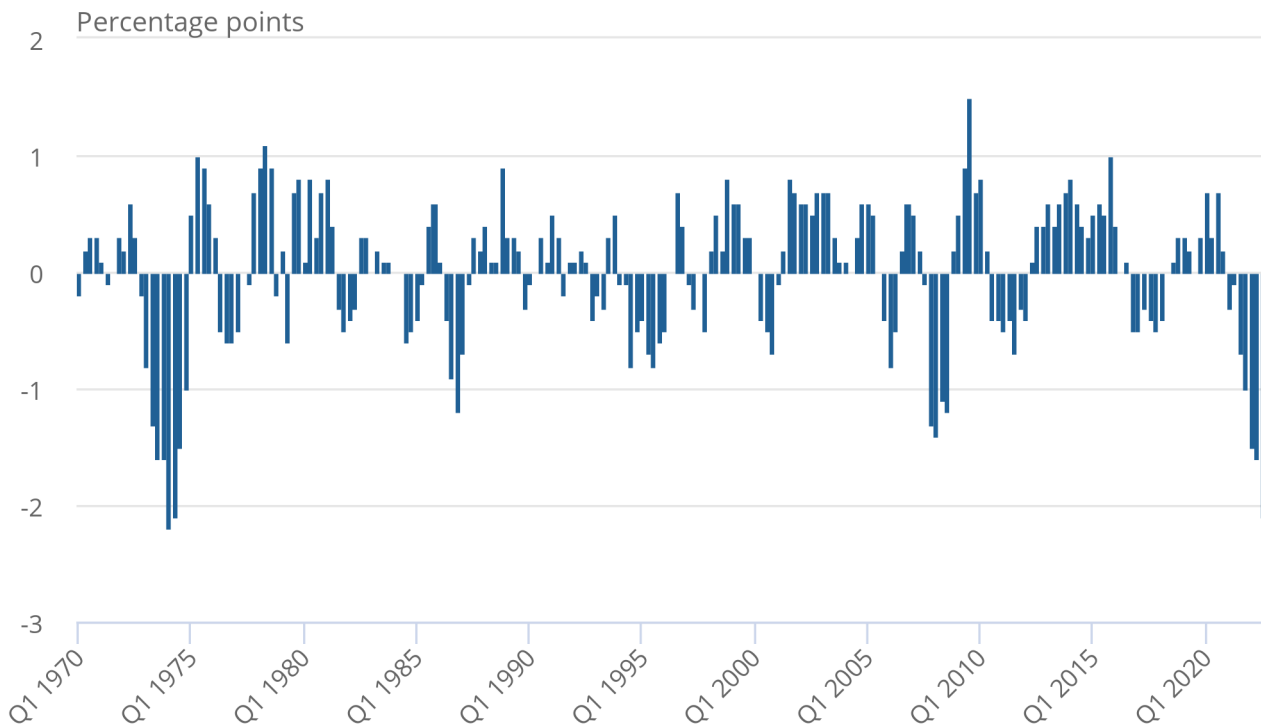
Real GDP expanded by 1.9% in the year to Quarter 3 (July to Sept) 2022. However, real GDI contracted by 0.2%, which shows the UK experienced a negative terms-of-trade effect in response to the recent energy price shock. That is, there was a decline in how much a unit of UK GDP can purchase on global markets. Figure 3 shows how real GDI has compared with real GDP over the last 50 years. This shows that the UK is currently experiencing its largest negative terms-of-trade effect since the mid-1970s at the time of the first oil price shock.

Figure 3: The UK is currently experiencing its largest negative terms-of-trade effect since the mid-1970s

Percentage point difference in four-quarter growth rates of UK real GDI and real GDP, Quarter 1 (Jan to Mar) 1970 to Quarter 3 (July to Sept) 2022

Figure 3: The UK is currently experiencing its largest negative terms-of-trade effect since the mid-1970s

Percentage point difference in four-quarter growth rates of UK real GDI and real GDP, Quarter 1 (Jan to Mar) 1970 to Quarter 3 (July to Sept) 2022



Source: Office for National Statistics (ONS)

Notes:

1. We look at the four-quarter change in real gross domestic product (GDP) and real gross domestic income (GDI) as a proxy of the underlying trend.
2. Positive values indicate a positive welfare effect, where the change in real GDI is higher than the change in real GDP. Negative values indicate a negative welfare effect, where the change in real GDI is lower than the change in real GDP.

Given the recent trends in global inflation over the year up to Quarter 3 2022, all open economies have experienced a change in their purchasing power through this terms-of-trade effect. However, the impact on a country is dependent on whether it is a net exporter or importer of those commodities that have experienced large price changes. We have produced comparable estimates of real GDI for the OECD countries, which captures the distribution of these welfare effects.

Figure 4 shows that 11 of these 37 OECD countries have had a positive impact on their purchasing power over the year up to Quarter 3 2022. Norway has experienced the largest positive terms-of-trade effect, reflecting how much of its exports comprise of oil. Canada and the United States are the only countries in the G7 to have had a positive terms-of-trade effect over this period, who are also net energy exporters.

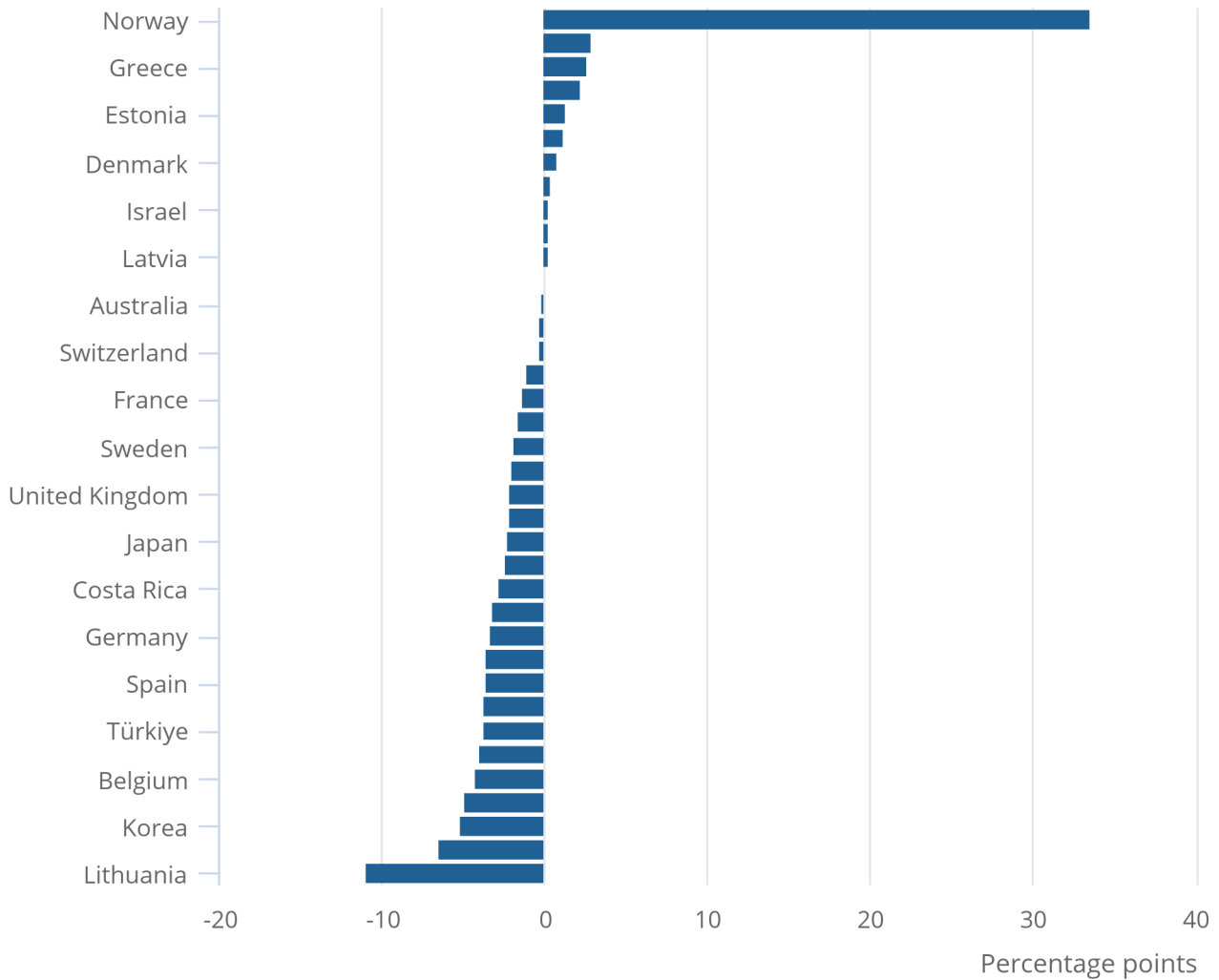
In contrast, 26 of these 37 OECD countries have had a negative impact on their purchasing power over the year up to Quarter 3 2022. Many European countries have experienced a hit on real GDI as net energy importers. Of the G7 economies, Italy, Germany, and Japan have experienced a larger negative terms-of-trade effect than the UK over the last year. Lithuania has experienced the largest decline in its purchasing power over this period, of the OECD countries.

Figure 4: Net energy exporters like Norway, the United States, and Canada have had a positive terms-of-trade effect over the last year, while much of Europe saw a fall in its purchasing power

International comparisons of the four-quarter change in real GDI and real GDP, Quarter 3 (July to Sept) 2022

Figure 4: Net energy exporters like Norway, the United States, and Canada have had a positive terms-of-trade effect over the last year, while much of Europe saw a fall in its purchasing power

International comparisons of the four-quarter change in real GDI and real GDP, Quarter 3 (July to Sept) 2022



Source: Organisation for Economic Co-operation and Development (OECD)

Notes:

1. All international figures are correct as of 9 January 2023.
2. Figures for Mexico are not available.

The impact of higher energy and commodity prices has reduced the purchasing power of the UK in the last year. The implications of the terms-of-trade effect is that there is an unavoidable hit to UK real national income, causing a decline in living standards. The size and persistence of this terms-of-trade effect will depend on how these prices evolve over the coming years and how much of a net energy importer the UK continues to be. We will continue to track these movements to understand the welfare effect of these changes in the price of traded goods and services, including how real GDI and real GDP evolve for the UK and other countries.

7 . Glossary

Gross domestic product (GDP)

A measure of the economic activity produced by a country. There are three approaches used to measure GDP: the output approach, the expenditure approach, and the income approach.

The GDP deflator

A measure of general inflation in the domestic economy.

Terms-of-trade

The ratio of export prices to import prices

8 . Data sources and quality

For more information on how gross domestic product (GDP) data are gathered and measured, see our [GDP quarterly national accounts, UK: July to September 2022 bulletin](#).

9 . Related links

[GDP quarterly national accounts, UK: July to September 2022](#)

Bulletin | Released 22 December 2022

Revised quarterly estimate of gross domestic product (GDP) for the UK. Uses additional data to provide a more precise indication of economic growth than the first estimate.

[UK trade: November 2022](#)

Bulletin | Released 13 January 2023

Total value of UK exports and imports of goods and services in current prices, chained volume measures and implied deflators.

10 . Cite this article

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