

Energy expenditures have surged, posing challenges for policymakers

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The estimated ratio of energy expenditures to GDP in OECD economies surged in 2022. The prices of oil, natural gas, electricity and coal had already risen strongly during 2021, and soared further after Russia's invasion of Ukraine in February 2022. Even though by the end of 2022 prices had fallen well below their intra-year highs, for the year as a whole all four energy components contributed to the estimated increase in the OECD-wide expenditure-to-GDP ratio relative to 2021: $2\frac{1}{2}$ percentage points of GDP for electricity, $2\frac{1}{4}$ for crude oil and oil products, 2 for natural gas and 1 for coal.

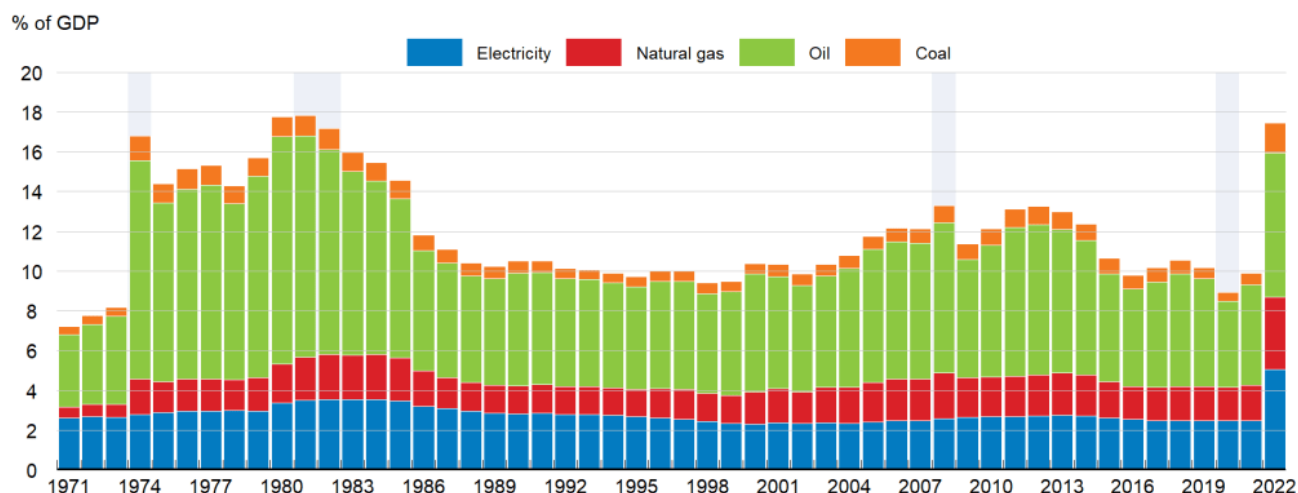
It is possible that the 2022 energy-expenditure estimates are somewhat overstated. First, full-year volumes are not yet known and are assumed to be equal to the average of 2019 and 2021 (leaving out the COVID-affected year of 2020). However, in some cases, such as gas and electricity consumption in Europe, high prices have been curtailing consumption in recent months. Moreover, end-user prices for 2022 are not yet available and have therefore been proxied by wholesale prices. To the extent that retail prices have been held down by government policies and/or that industrial users buy energy under long-term price contracts, actual end-user prices and expenditure may have risen by less than suggested by wholesale prices. Nonetheless, it is clear that expenditures on energy as a proportion of GDP will have risen rapidly, and to a high level, in 2022, both in the OECD as a whole and in the typical economy.

Experience suggests that this represents a warning about the potential risk of recession in OECD economies in 2023. Over the past 50 years, the share of incomes in OECD economies taken up by energy expenditures has been closely related to the incidence of economic downturns (Figure 1). As shown in the latest OECD Economic Outlook (OECD, 2022), end-use expenditures on energy in the OECD have been high and rising whenever an OECD-wide recession has occurred since 1970, with the sole exception of the pandemic-affected year of 2020. There were surges in energy expenditures during the first (1973-74) and second (1979-80) oil crises in many countries, both of which preceded an OECD-wide recession, while the global financial crisis occurred at the culmination of an upward trend in energy expenditures that began in the early-2000s, reaching 13% in 2008. The surge in energy expenditures seen in 2022 is thus a cause for concern.

The association between energy expenditures and the economic cycle is readily explicable: with energy an important input for firms, a rise in energy prices may represent an adverse supply shock, lowering output and raising the price level. At the same time, higher energy prices erode the purchasing power of households. While there are winners from higher energy prices, their propensity to spend their windfalls is typically low (Cookson et al., 2022), so that the net effect on aggregate demand is negative.

Figure 1. Periods of high energy expenditures are often associated with a recession

Estimated energy end-use expenditures for the OECD economies



Note: Recessions (shaded areas) correspond to years in which there were at least two quarters of negative GDP growth for the OECD aggregate. Estimates of the level of energy expenditure, computed as end-use prices in local currency multiplied by volumes consumed, are produced at the country level for 29 OECD countries. GDP shares are aggregated using moving GDP weights in PPP terms. End-use prices include taxes. Prices, which start in 1978 in the IEA database, were backcast to 1971 using the Brent price for oil, prices for coal products and natural gas and the rate of increase of the electricity price in the US CPI for electricity. Prices are extended to 2022 using the growth rate of reference prices converted in local currency (average of observed 2022 data compared to 2021): Brent for oil, ICE Newcastle futures for coal, and wholesale prices for electricity and natural gas (available for 25 and 27 OECD countries, respectively).

Source: International Energy Agency; OECD Economic Outlook 112 database; US Energy Information Administration; Japanese Power; German Federal Network Agency (SMARD); Korea Electric Power Statistics Information System; Canada Independent Electricity System Operator; and OECD calculations.

There are, however, some differences with previous episodes of sharp increases in energy expenditure. First, past surges in the expenditure-to-GDP ratio were mostly driven by oil, while this time the contributions are more evenly spread across energy sources. If the link to economic activity is stronger for oil than for the other energy components, this might mean that the negative growth impact is smaller than for past energy expenditure shocks of similar size. The impact on

particular countries will also differ from the past depending on their endowments of the various energy components: for example, net exporters of natural gas, including the United States, are likely to suffer less of a negative impact from the current energy price spike than in the past.

Second, because the market for oil (as well as coal) is much more global than those for electricity and gas, the incidence of the OECD-wide energy price increase is more regionally focussed than in the past, with most European economies particularly severely affected. The recession signal may therefore turn out to be more regional than global on this occasion.

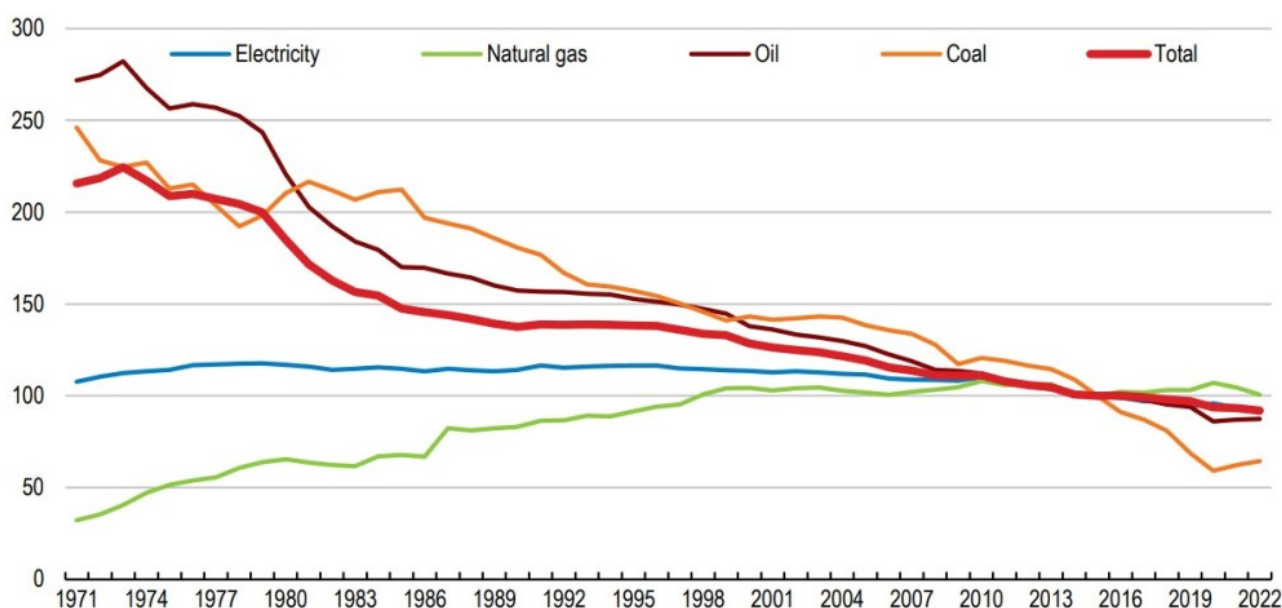
Finally, the energy intensity of OECD economies (defined as energy consumed per unit of GDP) has trended down over the past five decades (Figure 2), reflecting rising energy efficiency. A large part of this downtrend is driven by oil and coal; the use of natural gas intensified until the end of the 1990s, when it stabilised, while electricity intensity has remained relatively constant. The downtrend in energy intensity is often masked by swings in the relative price of energy. For example, energy intensity fell by nearly 15% from the mid-1990s to the early 2000s, but energy expenditures remained roughly stable in relation to GDP because of an offsetting increase in the relative (weighted) price of energy. And the spike in the expenditure-to-GDP ratio in 2022, reflecting the unprecedented rises in some energy prices, obscures the ongoing decline in energy intensity. To the extent that OECD economies have become less energy intensive, the impact of an energy price shock on output may be expected to be smaller than in the past.

Bearing these differences in mind, the latest OECD Economic Outlook projections do not show a global or OECD-wide recession in 2023. A sharp slowdown is, however, expected in Europe – GDP growth for the euro area is projected to decline from 3.3% in 2022 to 0.5% in 2023, with quarterly output

declines projected in several European countries. In addition, the Economic Outlook points to a range of downside risks, including the risk that the impact of lower energy imports to Europe from Russia is more severe than expected.

Figure 2. Energy intensity has declined, especially for oil and coal

Energy volume consumed per unit of real GDP, index, 2015=100



Note: OECD aggregate computed using energy intensity for 33 OECD countries weighted by GDP (PPP).

Source: OECD Economic Outlook 112 database; International Energy Agency.

References:

OECD (2022), *OECD Economic Outlook*, Volume 2022 Issue 2, OECD Publishing, Paris.

Cookson, J., E. Gilje and R. Heimer (2022), "Shake Shocked: Cash Windfalls and Household Debt Repayment", *Journal of Financial Economics*, Vol. 146, Issue 3.