Box 2

AN ANALYSIS OF THE GLOBAL ECONOMIC IMPACT OF THE RECENT INCREASE IN ENERGY COMMODITY PRICES

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Energy commodity prices have surged over the course of 2021. For instance, prices of natural gas have risen by 340%, coal by 80% and oil by 50% (see Chart 1). The sharp upturn in these prices appears partly attributable to demand-side factors, mainly stemming from the strong recovery in global economic activity since 2020 H2 thanks to the gradual easing of the pandemic containment measures and the vaccine roll-out.

However, various supply-side factors also appear to have contributed to the recent rise in energy commodity prices. Cases in point are the natural gas supply disruptions that have taken place in recent months (for technical and geopolitical reasons), lower coal production in China (both on environmental grounds and owing to pandemic containment measures), and the diminished supply-side capacity to respond to upturns in demand for oil and natural gas owing to the progressive reduction in investment in their extraction during recent years (see Chart 2).[1]

Looking ahead to the coming quarters, futures market prices for the main energy commodities show a clear downward trend (see Chart 1). This would essentially reflect prospects of some normalisation in their supply and demand conditions, which, in turn, would be consistent with the eminently temporary nature of many of the factors described above. In any event, those prospects are subject to enormous uncertainty, as borne out by the fact that these futures prices have been repeatedly revised upwards since the start of the year.

Against this background, this box illustrates how a bout of higher energy commodity prices can influence global economic activity and inflation, and how such impacts may be affected by the persistence of the shock. This is done using the NiGEM, a quarterly macroeconomic model that serves to simulate the impact of various shocks on the main world economies, paying due regard to the deep asymmetries and interdependencies between them.[2]

Charts 3 to 8 show the impact on GDP and consumer price inflation in the world's main economic regions that would result from a 10% increase in the price of oil, natural gas and coal when these shocks last for one year (shown as bars) or three years (shown as dots). Although these

Chart 1
COMMODITY AND FUTURES PRICES

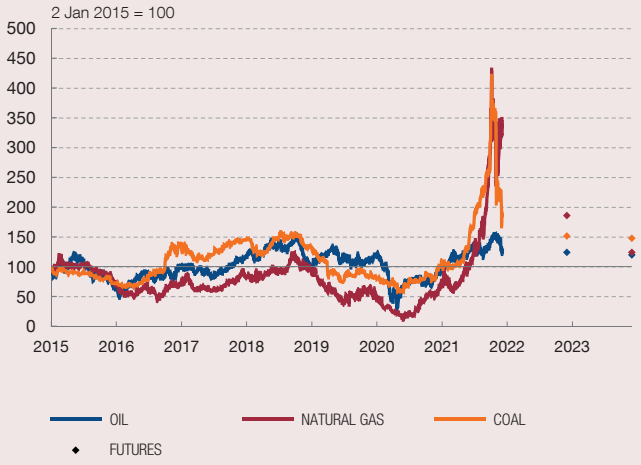
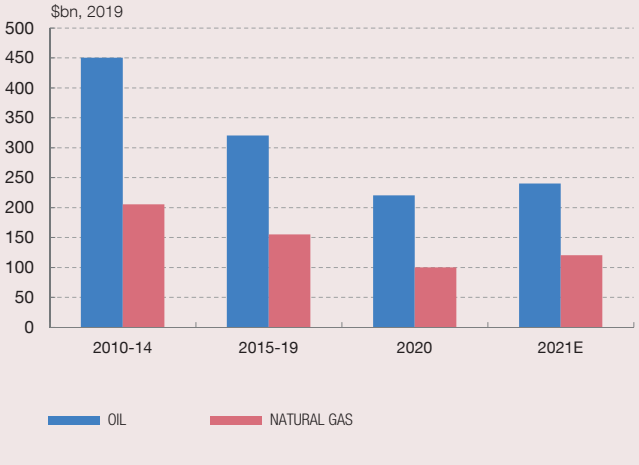


Chart 2
INVESTMENT IN EXTRACTION OF OIL AND NATURAL GAS



SOURCES: International Energy Agency and Thomson Reuters.

1 For further details on the relative contribution made by supply and demand-side factors in recent changes in euro area prices and industrial production, see I. Alonso, I. Kataryniuk and J. Martínez-Martín (2021), "The impact of supply and demand shocks on recent economic developments and prices", Box 3, "Quarterly Report on the Spanish Economy", *Economic Bulletin,* 4/2021, Banco de España.

2 The documentation for the model can be found at https://nimodel.niesr.ac.uk/.

Chart 3
IMPACT ON GDP OF AN INCREASE IN THE PRICE OF OIL:
1-YEAR SHOCK VS 3-YEAR SHOCK

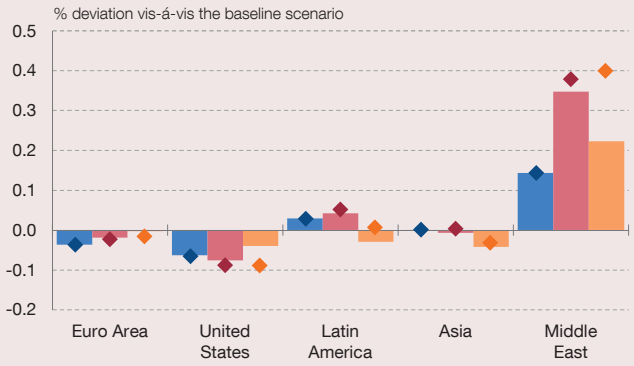


Chart 4
IMPACT ON INFLATION OF AN INCREASE IN THE PRICE OF OIL:
1-YEAR SHOCK VS 3-YEAR SHOCK

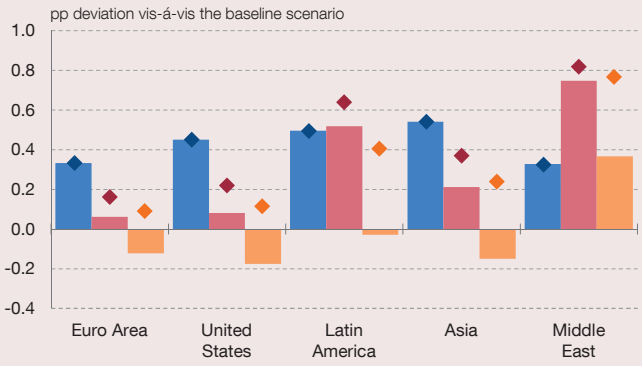


Chart 5
IMPACT ON GDP OF AN INCREASE IN THE PRICE OF NATURAL GAS:
1-YEAR SHOCK VS 3-YEAR SHOCK

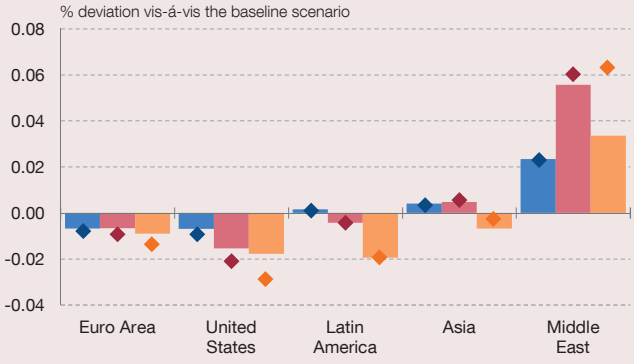


Chart 6
IMPACT ON INFLATION OF AN INCREASE IN THE PRICE OF NATURAL GAS:
1-YEAR SHOCK VS 3-YEAR SHOCK

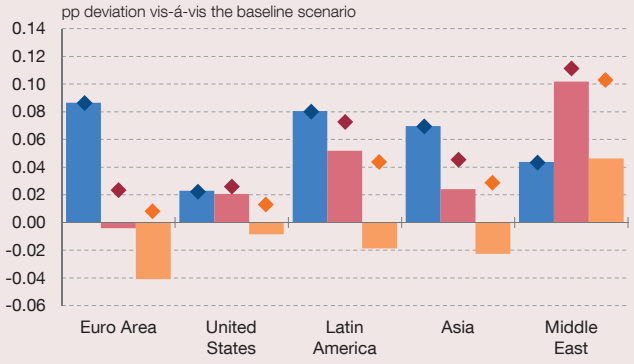


Chart 7
IMPACT ON GDP OF AN INCREASE IN THE PRICE OF COAL:
1-YEAR SHOCK VS 3-YEAR SHOCK

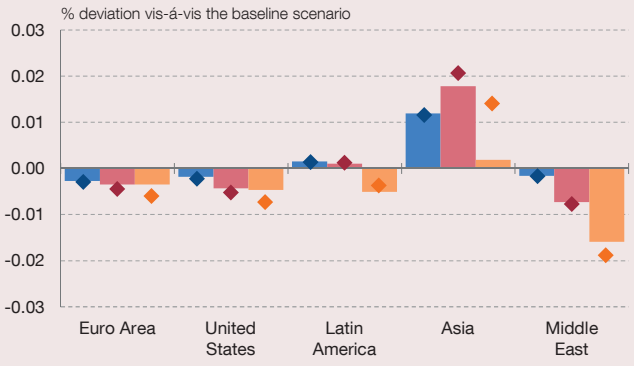
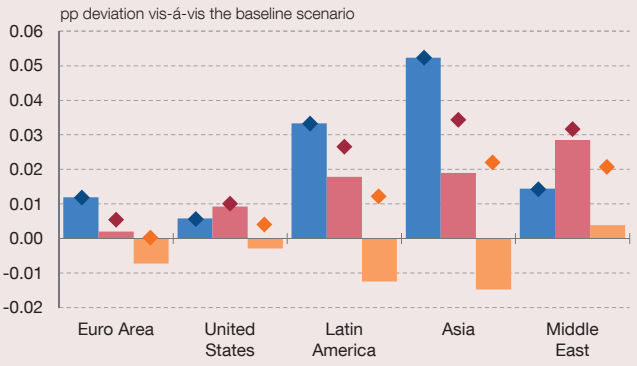


Chart 8
IMPACT ON INFLATION OF AN INCREASE IN THE PRICE OF COAL:
1-YEAR SHOCK VS 3-YEAR SHOCK



SOURCES: Simulations using the NiGEM model under the assumption that monetary policy remains exogenous and that agents' expectations are rational.

results should be approached with due caution in quantitative terms,[3] from a qualitative standpoint three main conclusions may be drawn.

First of all, the impact of rising energy commodity prices on the GDP of the world's main economies varies considerably. Thus, given that these shocks entail a redistribution of income from the countries importing such commodities to those that are net exporters, regions such as the Middle East (in the case of oil and natural gas) or certain Asian countries (in the case of coal) may find themselves considerably better off, in terms of their overall level of activity, thanks to the rise in prices. Meanwhile, these shocks have a recessionary effect in the importing economies (such as the euro area), the more so in the case of an increase in oil prices, since this input accounts for a larger relative share of their energy mix than natural gas or coal.

Second, the impact of the shocks analysed on global inflation is clearly inflationary in the short term. Indeed, in line with the simulations conducted, the rise in oil, natural gas and coal prices is likely to be passed through to consumer goods prices thanks to the higher cost of doing business and the potential second-round effects on wages.[4]

The scale of this pass-through depends on a broad range of factors.[5] Thus, for example, a price shock affecting such commodities tends to be more inflationary over the projection horizon in economies that, as net exporters of such inputs, also experience an expansionary effect on activity.[6] Similarly, an increase in the price of a particular commodity tends to be more inflationary in economies in which this input accounts for a greater relative share of the energy mix. This factor would explain, for instance, why the inflationary impact of rising coal prices in the majority of the world's main economies (which depend little on this commodity for their energy) is far smaller than that of a comparable shock to the price of oil or gas.

Third, even where a rise in energy commodity prices is merely transitory (e.g. over one year), the impact on GDP and inflation is relatively long-lasting. Moreover, this impact tends to be more pronounced and enduring the longer the shock persists (e.g. over three years). This outcome can essentially be explained by the fact that, by distorting the cost of doing business for companies and the disposable income of households at the moment of impact, such shocks also condition the future consumption and investment of these agents, and their impact on overall economic activity may therefore be felt beyond the duration of the shock itself.

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3 This is because, for example, the model captures the energy mix of the different countries assessed in stylised form only, the shocks are not calibrated to the magnitude of the energy commodity price upturns that have actually taken place in recent quarters, and monetary policy is considered exogenous in the simulations.

4 Such rises may also be passed through in other ways. For instance, a rise in the price of natural gas also exerts a degree of upward pressure on the price of electricity on Europe's wholesale markets, given their current marginal pricing model. Nonetheless, the extent to which this upward pressure on electricity prices is passed through to consumers is not the same for all economies, thanks in large part to the cross-border differences in retail pricing.

5 Alongside the factors mentioned in the text, the cross-border differences in how energy commodities are taxed also help explain why inflation in certain economies is more affected by the rising cost of such inputs than in other regions.

6 By way of example, while the inflationary effect in a year in which oil prices increase is similar in the Middle East (a net exporter of this input) and the euro area (a net importer), the rise in inflation is significantly higher in the Middle East over the following two years.