Box 2

GEOPOLITICAL TENSIONS AND OIL PRICES

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Changes in oil prices are determined by supply and demand-side factors that bear on their dynamics. In recent months, for instance, the weakness in the global demand for oil, largely linked to the slowdown in China brought on by the COVID-19 crisis, has tended to depress oil prices. In addition to the dynamics stemming from cyclical fluctuations of the economy, oil prices are regularly affected by geopolitical events. A case in point are conflicts linked to the Middle East, among others. The frequency of such tensions has tended to increase since May 2018 (when the United States withdrew from the nuclear agreement),[1] with some episodes of particular intensity in late 2019 and early 2020.[2] Given the significance of the region for global oil production and exports,[3] this box analyses the hypothetical impact of new geopolitical conflicts arising in the Middle East on oil prices. It further discusses some factors that tend to mitigate this impact.

The effect a geopolitical event has on oil prices depends on the volume of output affected by the event and its duration, as well as the economic conditions under which it arises. Indeed, the main events of this type in the Middle East since 1973 differ in terms of these dimensions, and they have thus exerted heterogeneous effects on oil prices (see Chart 1).[4] Despite this heterogeneity, a common characteristic of all these events is that they have been transitory, leading to declines in output, on average, in the four months following the event, which tend to be progressively reversed by the influence of mitigating factors. These include most notably the spare capacity of other global producers, the use of inventories and the strategic reserves of certain countries.

On the basis of these characteristics, Chart 4 shows the reaction of oil prices to two hypothetical geopolitical scenarios, which differ in terms of their intensity.[5] In the less adverse, "moderate" scenario, disruption to oil production of the order of 800,000 barrels per day (bpd), i.e. 0.8% of global output, is assumed, equivalent to the combined current exports of Iran (around 300,000 bpd) and of northern Iraq (500,000 bpd) (see Chart 2). In the "adverse" scenario, the shock is considered to affect 4% of global oil output. That would be tantamount to adding to the disruption of the previous scenario another shock equivalent to the events spreading to the rest of Iraq, which is the second-ranked producer and exporter of the Organization of the Petroleum Exporting Countries (OPEC). The exercise does not consider much more extreme events, e.g. a blockade of the Strait of Hormuz,[6] a strategic channel through which almost 15 million barrels are moved every day (see Chart 3), since there are no precedents for an event of this nature.

The results of the simulations indicate that, following the event, crude oil prices would increase in the first month by a maximum amount of $38 under the adverse scenario and $6 under the moderate one. After peaking, prices would fall. Relative to the baseline scenario, the average increase in six months would stand at around $20 under the adverse scenario and at $4 under the moderate scenario (see, once more, Chart 4).

However, the results of the simulations should be taken as an upper bound to the rise in crude oil prices in such episodes. In particular, the estimates shown stem from average historical patterns, when there is actually evidence that the sensitivity of oil prices to supply and demand shocks might be lower at present, i.e. the aforementioned mitigating factors might now be acting with greater intensity. Prominent among these factors is OPEC's high spare capacity (currently estimated at 3.4 million bpd), the notable levels of global inventories and strategic reserves (equivalent to around 92 days of global output for the countries of the Organisation for Economic Co-operation and Development), and the boom, since 2011,

1 The Joint Comprehensive Plan of Action was adopted in 2015 with the aim of reducing Iran's uranium enrichment in exchange for lifting the economic sanctions on the country.

2 The oil market has recently been affected by several episodes of particular intensity, including most notably the attack on Saudi oil facilities, which temporarily affected 6% of total output last September, the siege of the US embassy in Baghdad in late 2019 and the US response to these attacks in early 2020.

3 Although the significance of the region has diminished owing to the growth of shale oil in the United States, it continues to produce 28.5% of global oil output.

4 See J. D. Hamilton (2011), *Historical oil shocks,* National Bureau of Economic Research.

5 The calculations are made using a Bayesian structural VAR model. In this model, shocks are identified by means of sign restrictions. This enables a distinction to be drawn between supply-side shocks, global demand, precautionary demand and idiosyncratic demand factors of the oil market. The model is estimated with monthly data using a sample commencing in January 1980.

6 A blockade of the Strait of Hormuz might entail a reduction of around 10% in global production, even if the pipelines of Saudi Arabia, the United Arab Emirates and Iraq were to function at maximum capacity.

Chart 1
MAIN GEOPOLITICAL SHOCKS AND OIL PRICES (a)

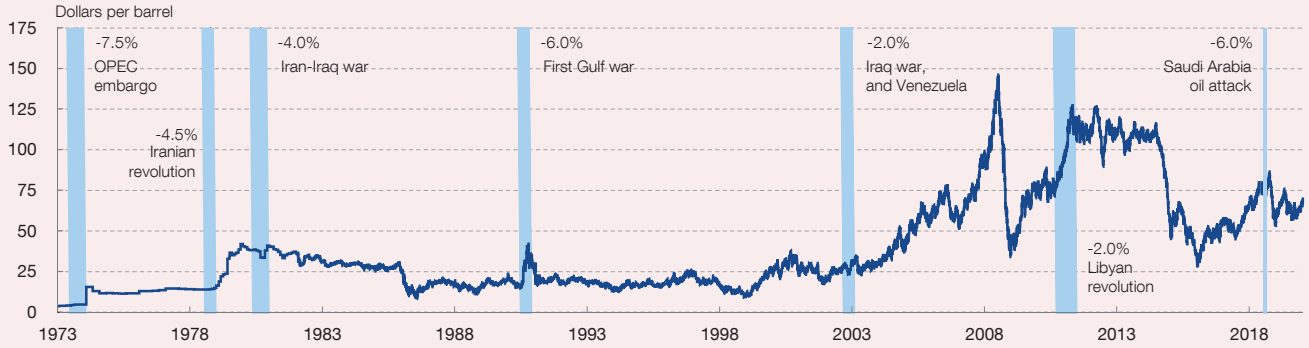


Chart 2
EXPORTS BY IRAN AND IRAQ IN 2019

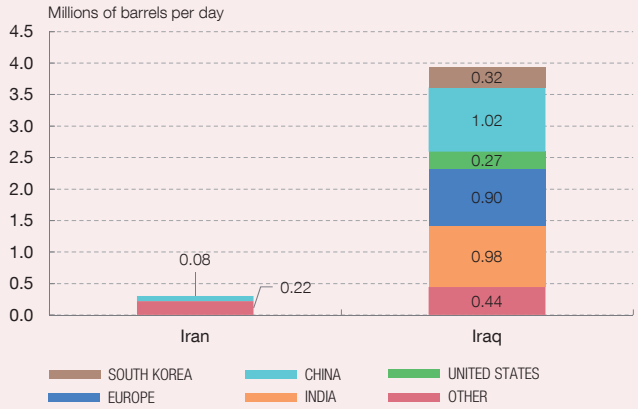


Chart 3
CRUDE OIL EXPORTS THROUGH THE STRAIT OF HORMUZ IN 2019

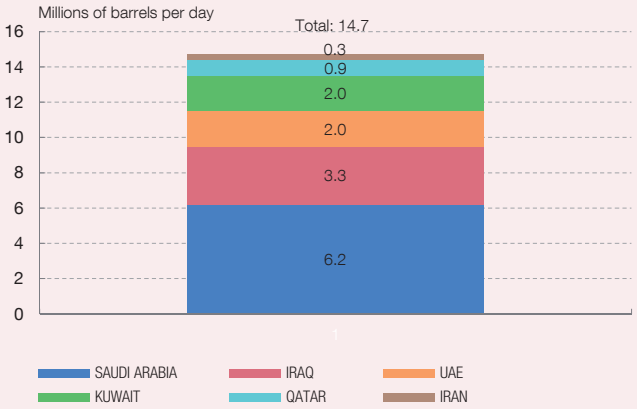


Chart 4
IMPACT OF GEOPOLITICAL SHOCK SIMULATIONS ON OIL PRICES (b)

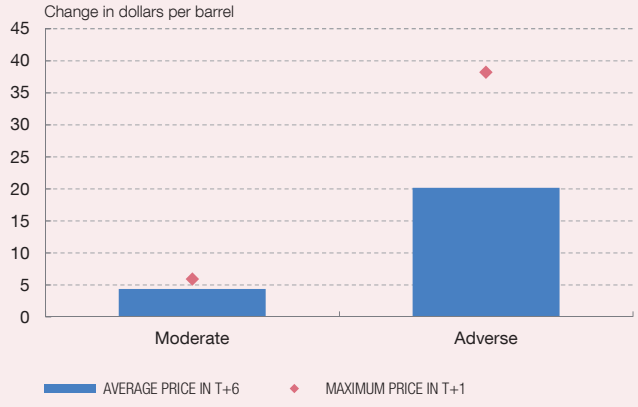
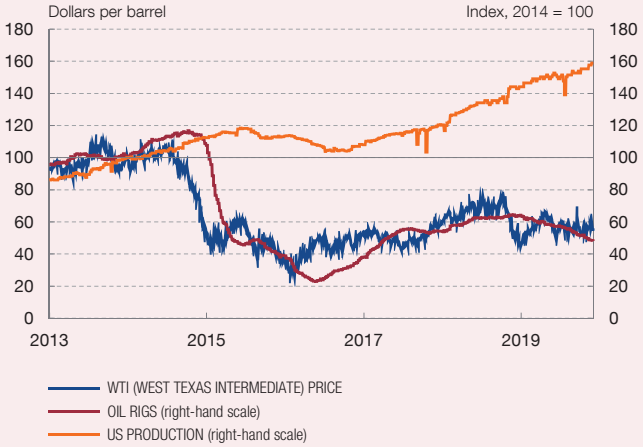


Chart 5
UNITED STATES: WTI PRICE, NUMBER OF OIL RIGS AND PRODUCTION



SOURCES: International Energy Agency, Thomson Reuters and Banco de España.

a The figure reflects the maximum fall in total oil production during the geopolitical shock indicated by Hamilton (2011), except for the Iranian revolution and the Saudi Arabia oil attack, which were estimated in-house. The duration of the shocks varies significantly, as shown by the width of the events (blue bands).
b Considering a temporary drop in production of 0.8 million and 4 million barrels per day in the moderate and adverse scenarios, respectively. The shock recedes gradually over 4 months.

in shale oil production in the United States, which has converted this country into the leading world producer, ahead of Saudi Arabia and of Russia. In particular, this latter factor has been playing a growing role in oil price trends in the past decade.[7] Compared with traditional crude oil production, the investment period and time to maturity of shale oil is much shorter, allowing supply to react swiftly to shocks that tend to raise crude prices. This makes supply fairly elastic in the medium term[8] and is conducive to price stability. Hence, price increases tend to go hand in hand with the rapid drilling of new wells in less than six months (see Chart 5). Moreover, the productivity of North American producers has increased considerably since late 2015.[9]

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7 For further information, see D. Santabárbara (2017), "The oil market: recent developments and outlook", Analytical Article, *Economic Bulletin,* 3/2017, Banco de España.

8 A model developed by the Congressional Budget Office (CBO) to estimate shale oil production in the United States shows that, although supply is inelastic in the short term, it is fairly elastic after two years (M. Lasky (2016), *The Outlook for US Production of Shale Oil,* Congressional Budget Office).

9 As a result, fewer wells are needed to maintain production. Extraction in the first month of operation has doubled since 2007 and the rise in production persists throughout their life cycle. See R. Decker, A. Flaaen, and M. Tito (2016). *Unraveling the Oil Conundrum: Productivity Improvements and Cost Declines in the US Shale Oil Industry,* FEDS Notes, Washington, Board of Governors of the Federal Reserve System, 22 March.