Boxes

1 Are the recent oil price increases set to last?

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Oil prices increased from around USD 45 per barrel at end-June 2017 to about USD 65 per barrel at the beginning of March 2018 (see Chart A). The main drivers of this increase were stronger than expected growth in global demand, the strategy adopted by the Organization of the Petroleum Exporting Countries (OPEC) and some non-OPEC countries to adjust their production – partly offset by rising US production – and geopolitical events. This box analyses these factors, based on a structural vector autoregressive (SVAR) model, and assesses whether they are likely to persist.

Chart A
Brent crude oil prices

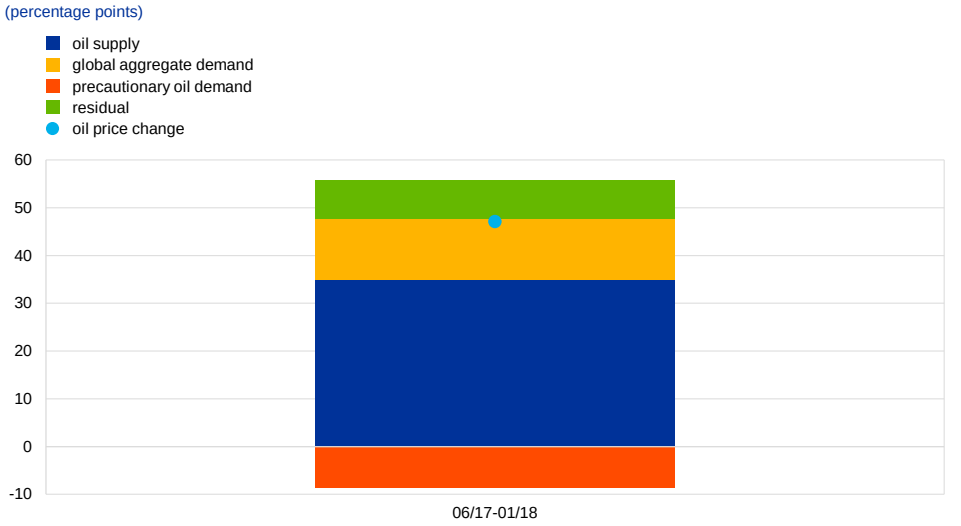
Source: Bloomberg.

Stronger than expected growth in global demand is one factor behind the increase in oil prices since mid-2017. Based on a SVAR model similar to that developed by Kilian and Murphy,[7] Chart B shows the contributions of oil supply, aggregate demand and precautionary demand for oil to the change in the price of oil since June 2017. The results indicate that global aggregate demand (yellow bar) helped to drive oil prices over the period concerned. Indeed, global growth expectations for 2017 were revised upwards in the ECB staff projections. However, the model used indicates that supply-side factors, such as the joint OPEC and non-OPEC agreement to reduce production and unexpected outages, played a more relevant role in explaining price dynamics in the second half of 2017.

7 See Kilian, L. and Murphy D., "The role of inventories and speculative trading in the global market for crude oil", *Journal of Applied Econometrics*, Volume 29, Issue 3, 2014, pp. 454-478.

Chart B

Drivers of oil prices



Sources: International Energy Agency (IEA), U.S. Energy Information Administration (US EIA) and ECB staff calculations.

A second, even more relevant factor driving the increase in oil prices is the effectiveness of the strategy adopted by OPEC and some non-OPEC countries to curb their production of oil. In November 2016, OPEC and some non-OPEC countries agreed to restrict their oil production in an effort to put a floor under oil prices. The Declaration of Cooperation initially covered the period up to June 2017 before being extended to March 2018 in May 2017 and to December 2018 in November 2017. The success of this strategy depends mainly on two factors: compliance with the agreement and the reaction of US oil production.

Compliance with the agreement was fairly strong in the second half of 2017. Chart C shows the change in oil production for OPEC countries (dark blue bars) and non-OPEC countries participating in the agreement (red bars) together with the cuts they each agreed. Compliance was stronger during the second half of 2017, thus boosting the credibility of the agreement and helping to push up oil prices. The higher rate of compliance by OPEC and non-OPEC participants over this period saw production cut by an additional 0.4 mb/d compared with the level observed between January and June 2017. Furthermore, recent developments suggest that these countries will persist with their policy of curbing production, to the end of 2018 and possibly beyond.

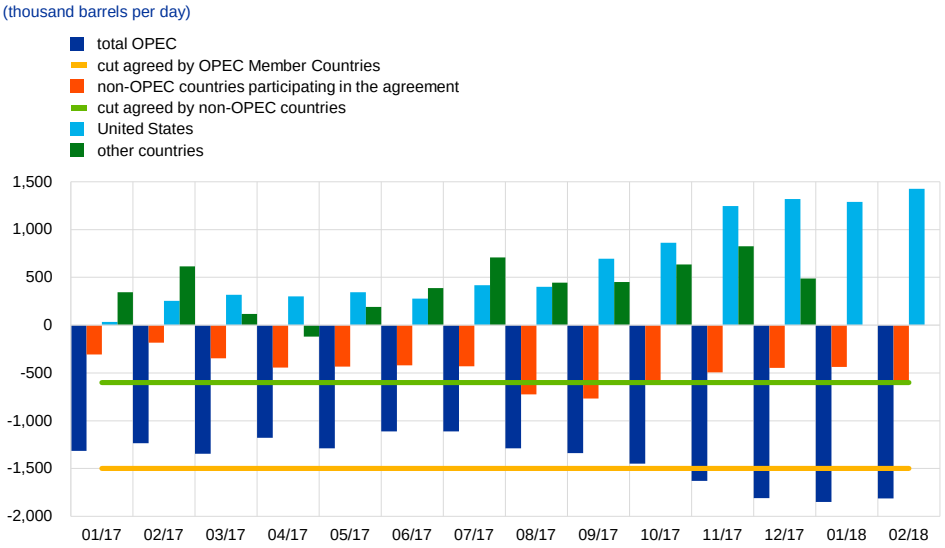
At the same time, oil production in the United States (light blue bars in Chart C) has picked up, most noticeably in the second half of 2017, partly offsetting the effect of stronger compliance with the agreement. Other countries have also increased their production since October 2016.[8] According to data from Rystad Energy, investment in the US shale oil industry rose in 2017 and is expected to continue growing over the coming years. As long as the oil price does not fall

[8] In the November 2016 agreement to cut production, October 2016 levels are used as a reference base for the adjustment of crude oil production, except for Angola, for which the baseline is September 2016.

below around USD 50 per barrel, the increase in US production is likely to prove more enduring as shale oil is profitable around this level.[9]

Chart C

Changes in oil production compared with October 2016



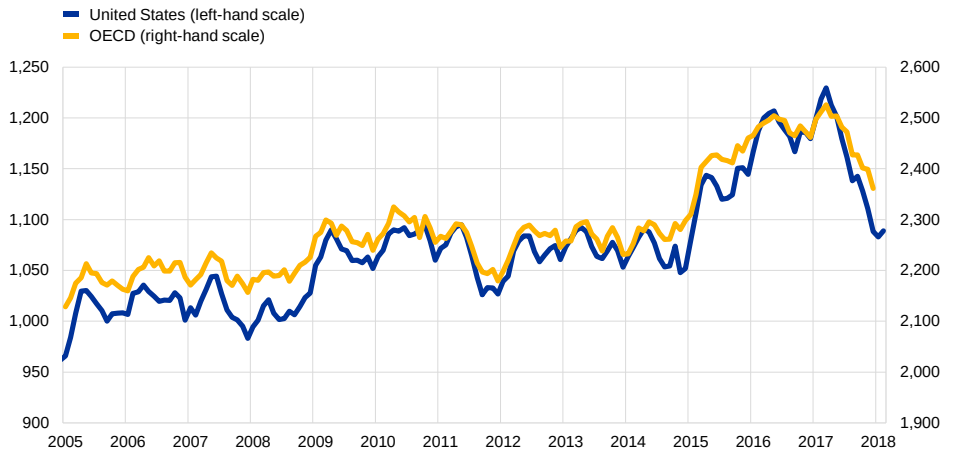
Sources: IEA and ECB staff calculations.
Note: Changes in oil production are calculated using October 2016 as a reference date as set out in the November 2016 agreement. "Other countries" refers to worldwide production excluding production in the United States and the OPEC and non-OPEC countries covered by the agreement.

The persistent decline in inventories (see Chart D) suggests that oil markets are becoming tighter, putting further upward pressure on oil prices and explaining why the futures curve has shifted into backwardation. When inventories are low, the convenience yield (i.e. the benefit of storing oil) is high, causing the spot price, all else being equal, to rise relative to the futures price. This means that in a backwardation scenario the slope of the futures curve tends to be steeper when inventories are low. The crucial role played by inventories explains why markets react so strongly to surprises in inventory data, especially in the United States. For instance, if inventories decline more than the markets anticipate, prices tend to increase owing to expectations of a rebalancing in the market, as occurred in the fourth quarter of 2017.

[9] According to micro data from Rystad Energy, the average break-even price of US shale oil production is close to USD 50.

Chart D

Inventories



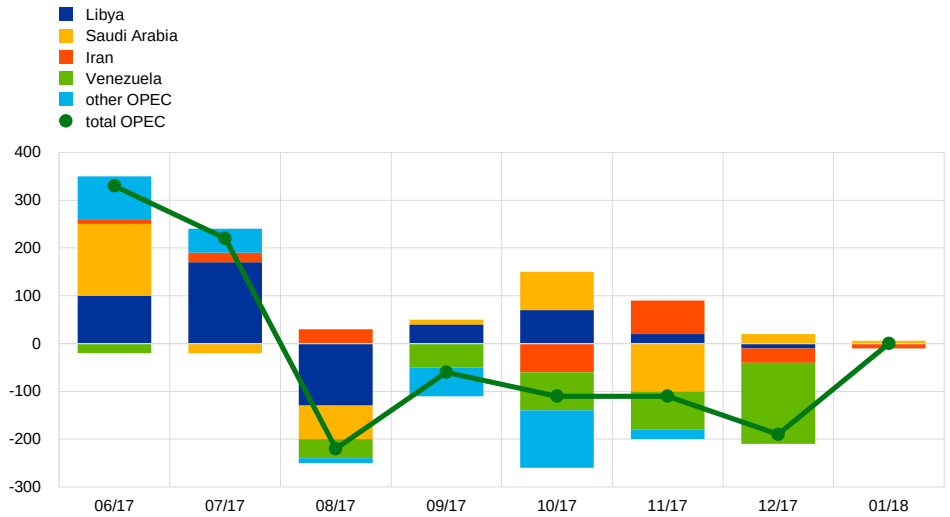
Sources: IEA and US EIA.

Turning to the third factor affecting prices, a number of geopolitical events and production outages occurred in the second half of 2017 that helped to push up oil prices. Political turmoil in Venezuela, together with a deteriorating oil network and the imposition of US financial sanctions, led to a further decline of around 0.4 mb/d in the country's production of oil in the second half of 2017 (see Chart E). Iran was also affected by political unrest in December. While this episode was short-lived, and its impact on production was marginal, it raised concerns about the possibility of the United States taking a tougher political stance on Iran and re-imposing sanctions in the medium term. In addition, summer maintenance work reduced oil production in Russia, Mexico and the North Sea. Finally, a pipeline explosion in Libya led to a reduction of 0.1 mb/d in oil production for one week in December, while the closure of the Forties pipeline in the North Sea for repairs reduced oil supply by about 0.25 mb/d from mid-December to mid-January. These geopolitical factors and production outages, most of which are presumably temporary in nature, are reflected in the positive contribution of oil supply to the increase in oil prices shown in Chart B. Looking ahead, the uncertain geopolitical situations in Venezuela and Iran may affect oil prices and cause volatility to spike slightly in the short term.

Chart E

OPEC oil production

(monthly change in thousand barrels per day)



Sources: IEA and ECB staff calculations.

Overall, while some of the drivers of the oil price increase since mid-2017 appear to be temporary in nature, other factors are expected to have more lasting effects, in particular shale oil production and the agreement reached by OPEC and non-OPEC producers to tighten the market. Oil prices declined slightly in February as temporary factors, such as the shutdown of pipelines and political unrest in Iran, receded. An unexpected increase in US crude oil inventories and an upward revision of projected US crude oil production for the next few years have cast doubt on the ability of demand to keep pace with increasing supply. Against this background, the success of OPEC's strategy will depend on not only the commitment of its members, which proved to be pretty strong over the second half of 2017, but also the speed with which oil production in non-participating countries reacts. In particular, this concerns the United States, where the average break-even price is around USD 50 per barrel.