



Oil Price Paths in 2019: Navigating Volatile Markets

1. Introduction

In 2018, the Brent price¹ averaged at \$71/b, an increase of \$15/b from the 2017 average of \$56/b. This average price however hides wide variations over the year. After rising from \$65/b to \$74/b between December 2017 and June 2018, the second half of 2018 saw some heightened volatility and sharp price movements, reaching the high of \$86/b in October and the low of \$50/b in December. These sharp price movements reflected increased uncertainties and shifts in market fundamentals, expectations about these fundamentals, key players' behaviour and overall market sentiment. On the demand side, global oil demand growth registered another good performance averaging 1.3 mb/d in 2018, though lower by 0.2 mb/d from 2017. But there have been growing concerns about the prospects of the global economy with most of the risks tilted to the downside. Elevated trade tensions between the US and China, weaker-than-expected economic and trade indicators from China, and higher US interest rates and increased borrowing costs for emerging economies have clouded the macro outlook.

On the supply side, the US crude production exceeded all expectations, registering another strong year of growth of 1.6 mb/d to end at 11.6 mb/d, about 0.6 mb/d higher than EIA's growth projections of 1.0 mb/d in January 2018.² US shale production accounted for about 90% of the total, having registered the strongest growth on record by 1.4 mb/d to surpass the 7.0 mb/d mark. This is despite the infrastructure bottlenecks, which caused some US grades to trade at a large discount to the traditional benchmarks. While all the signals from OPEC at the start of 2018 were in favour of maintaining the OPEC+ cuts until November 2018, the US re-imposition of sanctions on Iran and fears that high oil prices could derail the global economy altered the behaviour of key players, including Saudi Arabia, which in the second half of 2018 hiked output to record levels of above 11.0 mb/d. The sharp increase in US shale and core GCC (i.e. Saudi Arabia, Kuwait and the UAE) and Russian output alongside a slowdown of the global economy contributed to the reversal of stock drawdowns in the final quarter of the year, with OECD stocks returning 9.0 mbbls above their five-year average in November. This development pushed OPEC+ in December 2018 to renegotiate and extend their agreement to cut output by 1.2 mb/d as of January 2019, in a renewed attempt to balance the market.³

In the background, the deterioration in the geopolitical scene continued to shape price outcomes. The US re-imposition of sanctions on Iran caused much uncertainty about the potential Iranian output losses and the ability of Saudi Arabia to fill the gap. Trump's tough rhetoric against OPEC's output

¹ The Brent (or oil) price in this Energy Insight refers to the Brent price benchmark expressed in real terms, deflated by the US consumer price index in December 2018 USD, unless otherwise stated.

² EIA (2018), 'Short-Term Energy Outlook', 09 January.

³ OPEC, 'The 5th OPEC and non-OPEC Ministerial Meeting concludes', Press Release, 07 December 2018.

management introduced a new dimension into the oil market and played a pivotal role in shaping market expectations and sentiment.⁴

After a sharp fall towards the end of 2018, oil prices in 2019 started on a positive note recovering some of their losses. From the low point of \$50/b reached in December 28, the daily Brent price increased by about \$10/b a month later to nearly \$60/b (as of January 28), with many analysts now expecting another year of sustained price volatility driven by a wide uncertainty pertaining to global supply and demand trends. But unlike 2017 and 2018, the woes engulfing the oil market in 2019 have now extended to the demand-side. The prospects of the global economy and its potential impact on global oil demand, as well as the ability of OPEC⁺ producers to successfully enforce the agreed or even implement future deeper cuts (if necessary) to rebalance the market in face of negative demand shocks are at the core of the current debate. Also, the unfolding geopolitical developments in Iran and Venezuela are expected to play a pivotal role in shaping oil market outcomes in 2019. There is still much ambiguity about the determination of the US administration to push Iranian oil exports down to “zero” pass the expiration of waivers in May, as recent evidence suggests that the US will be wary of squeezing Iran’s exports should oil prices jump much higher. To make matters worse, Venezuela’s production outlook in 2019 remains highly uncertain following a major escalation of the political turmoil, aggravated by a fresh round of US sanctions targeted at the country’s oil sector.

In this Energy Insight, we analyse how the oil price path could evolve in 2019 by evaluating the prevailing risks underlying the world oil market in the year ahead, using the real-time forecast scenarios of the Brent price pioneered by Baumeister and Kilian (2014)⁵ that are constructed from a structural VAR world oil market model due to Economou et al. (2017)⁶. Forecast scenarios are not predictions of what will happen, but rather modelled projections of various oil price risks conditional on certain events that are known at the time of the forecast or some other hypothetical events. In practice, such conditional forecasts allow us to assess by how many dollars per barrel the expected real price of oil would change under alternative scenarios about future oil supply and demand conditions, relative to a baseline (or unconditional) forecast where expected oil market conditions remain unchanged.⁷

Our analysis builds on a 5-variable structural VAR model of the world oil market in the tradition of Kilian and Murphy (2014)⁸, which has been extended by Economou et al. (2017) to facilitate a richer shock structure to conventional VAR oil market models, in that it accommodates the endogenous-driven interpretation of oil supply shocks from the point of view of the supply decisions of oil producers (referred to as *endogenous supply shocks*) along their exogenous-driven interpretation (referred to as *exogenous or geopolitical supply shocks*). The latter are associated with supply disruptions that are caused by exogenous geopolitical events in oil producing countries. Further, the model incorporates shocks to oil demand for immediate consumption associated with fluctuations in the global business cycle (referred to as *flow demand shocks*); shocks to stock demand arising from the forward-looking behaviour of the market participants (referred to as *speculative demand shocks*); and other idiosyncratic demand shocks that cannot be classified as one of the preceding structural shocks (referred to as *other demand shocks*).⁹ The model utilizes the real Brent price expressed in December

⁴ Farren-Price, B. and Fattouh, B. (2019). ‘Tug of War’, in *World Energy*, 15 January. Available at: https://www.aboutenergy.com/en_IT/topics/tug-war.shtml#

⁵ Baumeister, C. and Kilian, L. (2014), ‘Real-Time Analysis of Oil Price Risks Using Forecast Scenarios’, *IMF Economic Review*, 62(1), pp. 119-145.

⁶ Economou, A., Agnolucci, P., Fattouh, B. and De Lipsis, V. (2017). ‘A Structural Model of the World Oil Market: The Role of Investment Dynamics and Capacity Constraints in Explaining the Evolution of the Real Price of Oil’, OIES Energy Insight No. 23, Oxford: Oxford Institute for Energy Studies.

⁷ In other words, the baseline forecast generates expectations about the future oil price trajectory given solely the latest observations at the time of the forecast (i.e. most recent market dynamics) and that all future structural shocks are zero in expectation.

⁸ Kilian, L. and Murphy, D. P. (2014), ‘The Role of Inventories and Speculative Trading in the Global Market of Crude Oil’, *Journal of Applied Econometrics*, Vol. 29, pp. 454-478.

⁹ The latter is essentially a residual shock that escapes economic interpretation, but it implicitly represents other exogenous shifts in the demand for oil not otherwise accounted for.

2018 USD, a measure of geopolitical disruptions in OPEC crude oil production and a newly constructed index designed to capture any deviations of global oil production from the equilibrium production path that are both due to Economou (2016)¹⁰, a widely established measure of global real economic activity due to Kilian (2009)¹¹ and a proxy of changes in global oil inventories based on OECD oil stocks. The sample period extends from January 1990 to December 2018.¹²

2. A review of oil market dynamics in 2018

The market rebalancing in the second half of 2017, which was largely due to the voluntary and involuntary OPEC⁺ cuts supported by the sustained expansion of global economic activity, continued well into 2018, pushing prices higher by \$27/b or 60% between June 2017 and June 2018 and clearing over 300.0 mbbbls of the stocks overhang in the same period (see Figure 1). Paradoxically however the Brent price ended 2018 at the same level where it started in January 2017. This is, despite the doubling of OPEC oil supply disruptions relative to a year before, nearing to 3.0 mb/d, and OPEC spare capacity having dropped to a 10-year low in November just above 0.7 mb/d. This paradox can be resolved by taking into account two important factors: the weak state of the global economy in the second half of the year in conjunction with the market reversing back to an oversupply situation. In hindsight, one may argue that the premature reversal of the otherwise successful balancing act of the historic coalition of OPEC and non-OPEC producers under the Declaration of Cooperation (DOC) just months before the agreed expiration of the agreement proved very costly for the stability of the crude oil market.¹³ In reality, market fundamentals can't explain on their own the price rollercoaster in the second half of 2018 as sentiment and oil politics overshadowed oil policy, confusing the signals and aggravating price volatility.

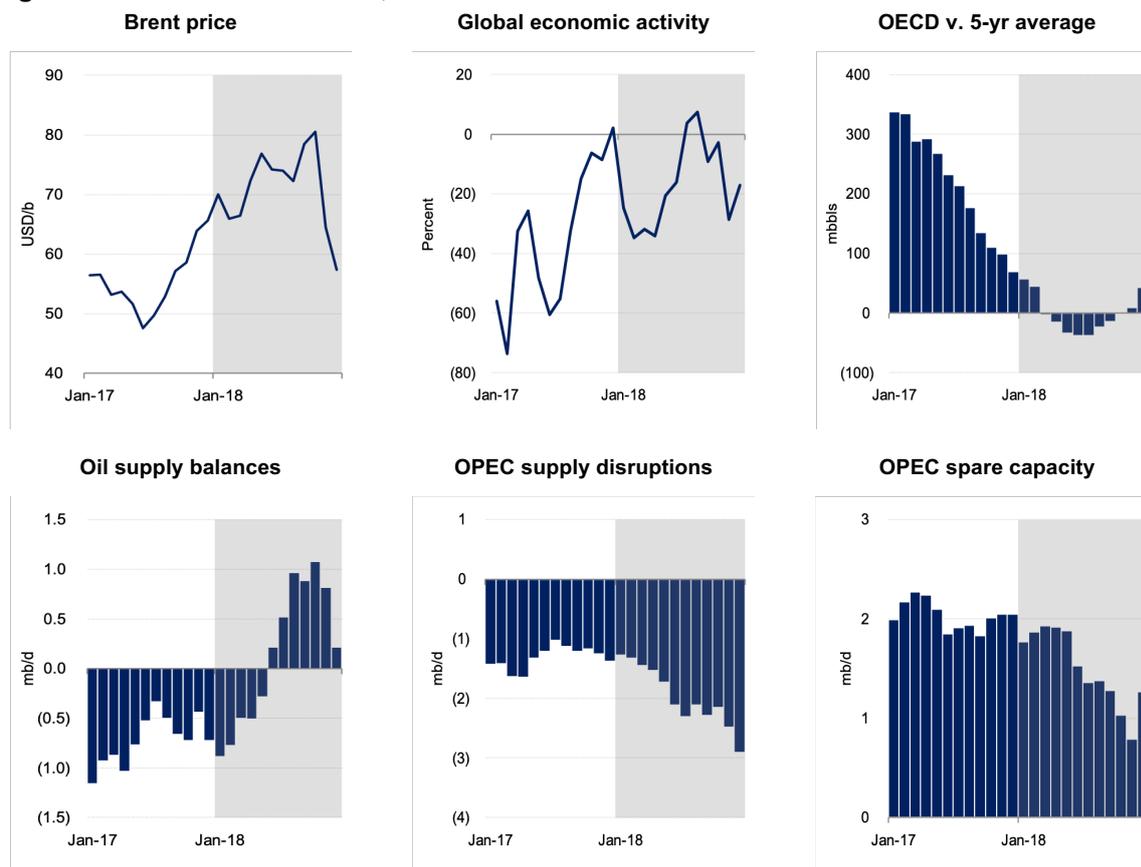
¹⁰ Economou, A. (2016), 'Oil Price Shocks: A Measure of the Exogenous and Endogenous Supply Shocks of Crude Oil', OIES Paper WPM 68, Oxford: Oxford Institute for Energy Studies.

¹¹ Kilian, L. (2009) 'Not All Oil Price Shocks Are Alike: Disentangling Demand and Supply Shocks in the Crude Oil Market', *American Economic Review*, 99(3), pp. 1053-1069.

¹² The model incorporates two-years of lags, an intercept and seasonal dummies and it is designed to identify the supply and demand shocks underlying the real oil price based on a combination of sign restrictions and bounds on the short-run price elasticity of oil supply and demand. For a review of the structural VAR model the reader is referred to Economou et al. (2017). The estimates of the responses of each model variable to each structural shock are presented in Appendix A.

¹³ For a detailed analysis of the effectiveness of the DOC see Economou, A., and Fattouh, B. (2018), '5⁺ Key Facts about the OPEC Declaration of Cooperation', *Oxford Energy Comment*, September.

Figure 1: Oil market indicators, Jan 17 – Dec 18



Notes: The global real economic activity index is due to Kilian (2009) as updated on <http://www.personal.umich.edu/~lkilian/paperlinks.html>. OECD oil liquids stock estimates are based on IEA, with preliminary estimates for December 2018. The oil supply balances index and estimates of OPEC supply disruptions are due to Economou (2016), suitably updated and extended to December 2018. OPEC spare capacity data are due to EIA.

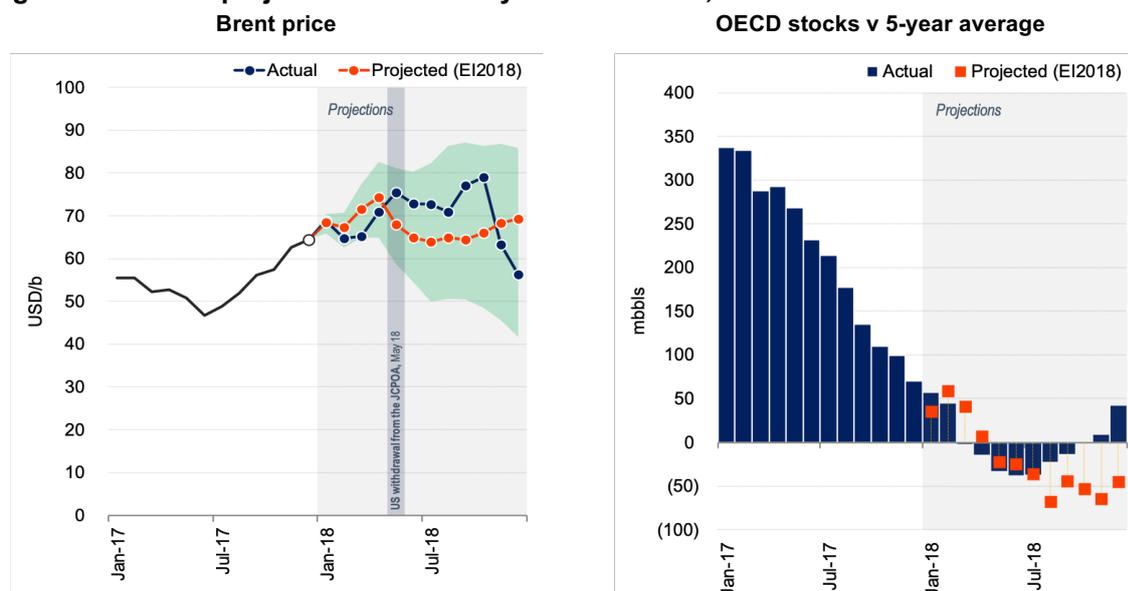
2.1. 2018 oil price in retrospect

Figure 2 shows the actual and projected evolution of the Brent price and OECD stocks in 2018 under the reference case due to Fattouh and Economou (2018a)¹⁴, referred to as *EI2018* for simplicity. This exercise is important in evaluating how our expectations a year before compare with the actual realization of the Brent price, allowing us to trace the unpredictable component in oil price and market dynamics in 2018.

On annual terms, our reference forecast projected that the Brent price in 2018 will average at \$67.6/b, a mere \$2/b lower from the actual realization of \$69.7/b. On a monthly basis however our reference forecast failed to predict the wide price variations in the second half of the year, although they did not exceed the projected upper and lower price band depicted by the green shaded area in the figure. Our model performed remarkably well in predicting accurately the price evolution in the first half of the year projecting an average price of \$69.1/b against the actual \$69.6/b. However, the predictions were significantly off the mark in the second half of 2018. The divergence between the two series can be traced since May 2018, when US oil politics introduced a new dimension into the oil market and played a pivotal role in shaping producers' behaviour, market expectations and sentiment.

¹⁴ Fattouh, B., and Economou, A. (2018a), 'Oil Price Paths in 2018: The Interplay between OPEC, US Shale and Supply Interruptions', OIES Energy Insight 28, February.

Figure 2: Actual v projected oil market dynamics in 2018, Jan 17 – Dec 18



	Actual	Reference (EI2018)				
Assumptions						
OPEC+ exit strategy	+ 1.6 mb/d (May – Dec 18)	+ 0.6 mb/d (Jul – Dec 18)				
US shale supply growth	+ 1.4 mb/d	+ 0.9 mb/d				
Global demand growth	+ 1.3 mb/d	+ 1.4 mb/d				
Geopolitics	Libya (AVG18)	1.0 mb/d	1.0 mb/d			
	Nigeria (AVG18)	1.6 mb/d	1.7 mb/d			
	Venezuela	- 0.4 mb/d	- 0.5 mb/d			
	Iran	- 1.0 mb/d	n/a			
		Forecast				
	2017	1Q18	2Q18	3Q18	4Q18	2018
	USD/b (in 12.2017 USD)					
Brent price						
Actual	54.5	66.2	73.1	73.5	66.2	69.7
Reference (EI2018)	--	69.1	69.1	64.4	67.8	67.6
Changes from actual						
Chg (EI2018)	--	2.9	(4.0)	(9.1)	1.6	(2.1)

Notes: Adopted by Fattouh & Economou (2018a).

Even though we anticipated a gradual reversal of the OPEC+ output cuts from July-onwards, assuming that the producers will release 0.6 mb/d back into the market (either amid concerns that higher oil prices will impact demand or due to weaker compliance), the US withdrawal from the Joint Comprehensive Plan of Action (JCPOA) in May 2018 and the announcement of the re-imposition of Iranian oil sanctions prompted an immediate output response from OPEC+ (mainly originating from the core GCC producers and Russia) that exceeded expectations by 1.0 mb/d and totaled 1.6 mb/d between May and November 2018. Saudi Arabia drastically shifted its output policy and pushed more supply into the market, reassuring oil consumers that it can preempt any output losses from Iran and

put a cap on the oil price. As those OPEC⁺ producers who could raise production followed suit, overall OPEC⁺ compliance to the DOC agreement fell below target in July 2018 and collapsed to near 35% in November 2018, technically sustained only by the involuntary cuts from Venezuela, Angola and Mexico. At the same time, as Iranian customers cut imports in the run-up to the enforcement of the US sanctions in November, Iranian production between May and December 2018 declined by 1.0 mb/d, which are not accounted for in the reference case.

In the background, escalated trade tensions between the US and several of its trade partners led to a tit-for-tar trade war between US and China. According to the IMF the direct impact of the imposed tariffs thus far on global economic growth was small, but the increased trade policy uncertainty and concerns over an impasse of the negotiations negatively impacted trade activity, manufacturing and investment, as well as weakened financial markets sentiment.¹⁵ Indicatively, provisional IMF data show that global trade growth in the fourth quarter of 2018 fell below 2017 averages and following an evenly balanced global upswing that predominated since 2017, ending-2018 global economic growth appeared to have plateaued.¹⁶ Throughout the year, these developments had a profound impact on expectations, as evident by the consecutive downward revisions of IMF's outlook for global economic growth in 2018 and 2019, from 3.9% for both years in April to 3.7% for 2018 and to 3.5% for 2019 year-end. That said, in anticipation of the Iranian oil sanctions the demand woes remained largely muted until early-November, when the US administration surprised with a U-turn of granting oil waivers that allowed Iran's major customers to continue buying around 1.1-1.2 mb/d of Iranian oil. Market expectations reversed in November/December, pushing oil prices lower with the OPEC⁺ record output hike, the weaker global economic outlook, the ease of the Iranian output losses and the explosive growth of US shale output weighing in and weakening market sentiment.

In terms of the projected evolution of OECD stocks shown in Figure 2 above, again the model projected successfully the stock withdrawn in the first half of the year, missing the actual timing of the return of OECD stocks below the average by only a month. But for the remainder of the year the aforementioned surprise changes in market dynamics led to a clear divergence between the expectations propagated by the model and the actual realization of stock changes. Indicatively, as of July 2018 the difference between the projected and realized estimates is as narrow as -2.0 mbbbls, with the former standing at -36.0 mbbbls and the latter at -38.0 mbbbls. As of August 2018, however, the two series evolve in different directions ending the year at -45.0 mbbbls below the average and 43.0 mbbbls above the average respectively. Notably, despite the fact that our failure to foresee the surprise OPEC⁺ output hike of 1.0 mb/d matches exactly the overlooked loss of Iranian supplies, our projections in the second half of the year are markedly off the realized outcomes.

This fact underscores the role of expectations and why the nature of the supply shock matters. It is well established that, on impact, stock releases help mitigate the impact of geopolitical supply disruptions on oil prices. What is less recognized is that the anticipation of a geopolitical episode and fears of a future supply shortage as a result, also trigger a large positive price response prior to the expected event by increasing the stock demand for oil, situations in which we refer to as speculative demand pressures. Equally, revisions in these expectations result in a sharp fall in oil prices. Therefore, given that our net difference between assumed and realized supply volumes in 2018 is essentially zero, the actual OECD stocks build-up after July must have been aggravated by speculative demand pressures in anticipation of the November enforcement of the US sanction on Iran. This also helps explain the counterintuitive Brent price hike by \$9/b between August and October while stocks continued to expand.¹⁷ Likewise, the revision in these expectations due to the US oil waivers must have weighed on the November/December price collapse.

¹⁵ IMF (2018), 'Challenges to Steady Growth', World Economic Outlook, October.

¹⁶ IMF (2019), 'A Weakening Global Expansion', World Economic Outlook Update, January.

¹⁷ For example, noting also the fact that our underlying assumptions in the reference case underestimated the US shale production growth in 2018 by 0.5 mb/d, assigning the difference between projected and realised OECD stock changes solely on US shale does not explain the September/October oil price spike.

2.2. Oil price drivers in 2018

Figure 3 shows by how many dollars per barrel each oil supply and demand shock contributed to the monthly changes in the Brent price at each point in 2018. As can be seen in the figure, geopolitical (or exogenous) supply disruptions exerted significant upward pressure on the Brent price throughout the entire year, adding about \$10/b between January and December. On the other hand, the positive contribution of about \$6/b on the price recovery due to the OPEC+ output cuts in the first half of the year (as reflected by the endogenous supply shocks), was offset in the second half by the reversal of the producers' output policy and the continued expansion of US shale (-\$6/b). Global demand has been less supportive in the first three quarters relative to last year but nevertheless its net contribution remained positive by almost \$1/b. During the final quarter however negative oil demand shocks exerted significant downward pressure on the oil price and accounted for \$13/b out of the cumulative \$23/b price decline in November/December.

This result is consistent with a broad business-cycle-driven shock to the demand for all industrial commodities associated with the rising trade tensions and weakened economic activity, that appears to have had reached a trough in December. The fact however that the cumulative oil price decline of 25% on average in the same period, was far steeper compared to other industrial commodities such as metals (the latter averaged near 5%) suggests that the oil price collapse must have been aggravated by additional oil-market specific factors (see Figure 4). Indeed, our results show that positive speculative demand pressures associated with increased stock demand amid fears of high losses of Iranian barrels prior the November enforcement of the US sanctions added about \$10/b to the oil price during September/October and hence, they were the primary contributors of prices jumping above \$80/b. That said, the November shift in these expectations (due to the US oil waivers) and the realization of weaker-than-expected market conditions pushed prices lower by about \$4/b and \$6/b in December, returning the Brent price in the \$50/b range. Notably, without expectations relating to the Iranian disruptions, the monthly Brent price would have averaged only at \$76/b in October, before declining to \$64/b in December, compared to the actual \$81/b and \$57/b respectively. Further, it would have nearly halved the observed price volatility in the second half of 2018 from 11% down to 6%.

Figure 3: Drivers of the Brent price in 2018

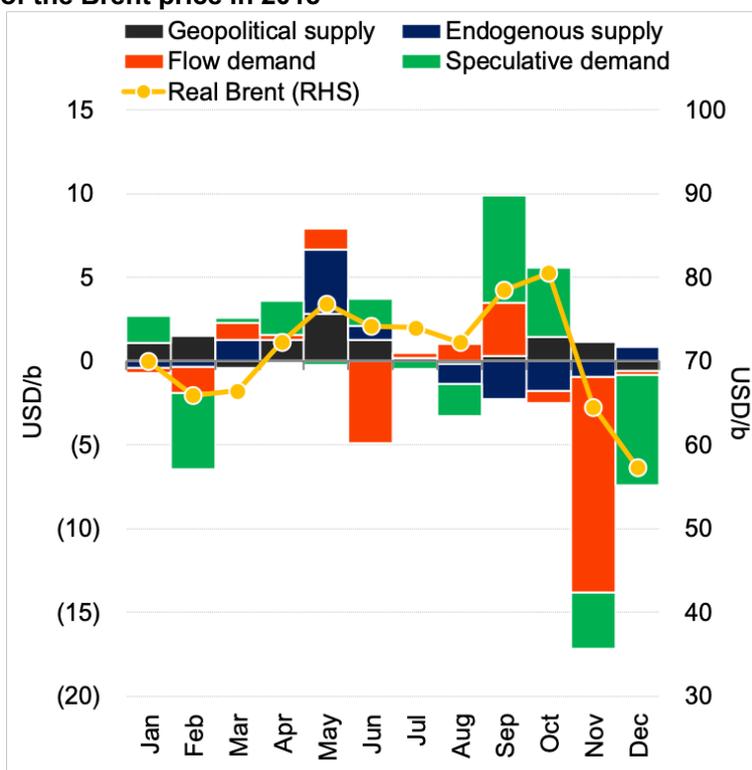
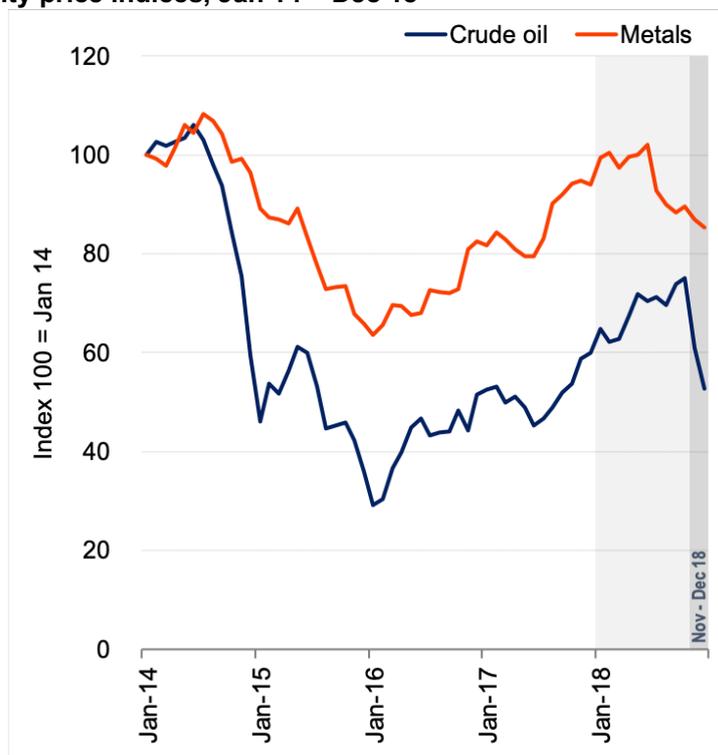


Figure 4: Commodity price indices, Jan 14 – Dec 18



Notes: Crude oil index includes Brent, WTI and Dubai. Metals index includes aluminum (27%), copper (38%), iron ore (19%), lead (2%), nickel (8%), tin (2%) and zinc (2%). Data are compiled by the World Bank.

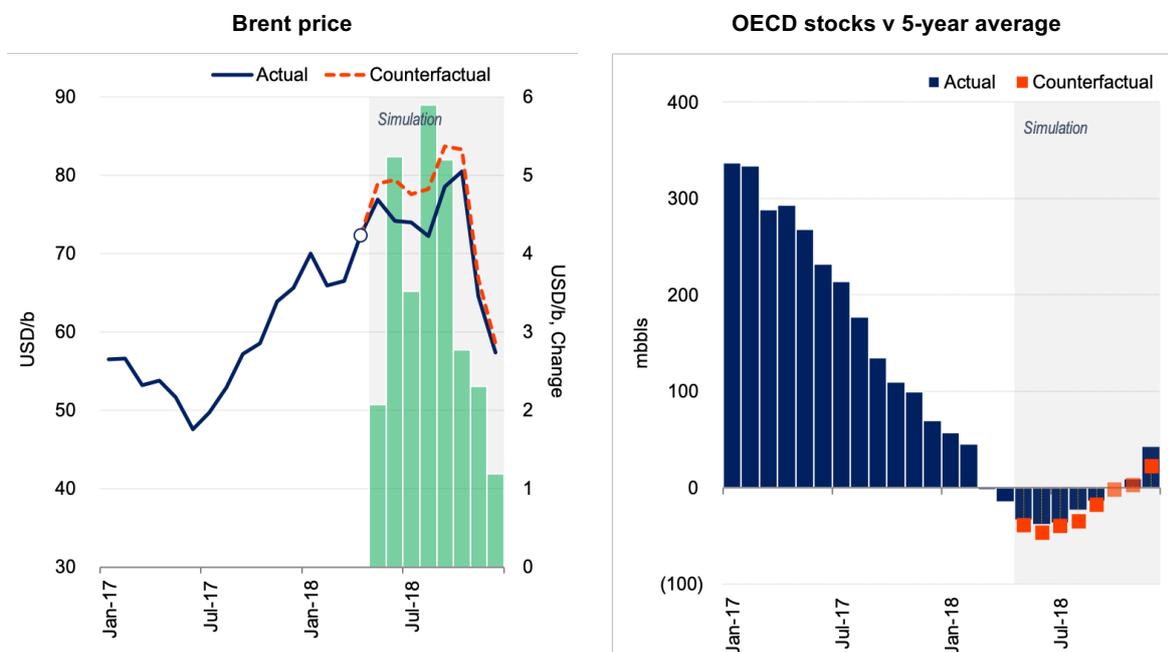
2.3. Could OPEC+ have prevented the price collapse?

An important question arising is whether the conflicted OPEC output policy that resulted in several U-turns throughout the year was in fact costly for the stability of the crude oil market. Figure 5 answers this question by comparing the actual and counterfactual (*what-if*) evolution of the Brent price and OECD stocks after May 2018, had Saudi Arabia, Russia and the rest oil exporters that increased output since May did not and instead stood by their pledged targets in line with the DOC output cut agreement. Under this counterfactual scenario, global crude production growth in 2018 would have been lower by 1.0 mb/d on a year ago (to 1.2 mb/d), compared to the actual growth of 2.2 mb/d. Results show that between May and October 2018, the Brent price would have averaged at \$80/b, \$4/b higher than the actual \$76/b, and by December it would have still collapsed below \$60/b only \$2/b above the actual \$57/b. On annual terms, had the OPEC+ producers did not ramp-up their output since May, the Brent price in 2018 would have averaged at \$73/b, a mere \$2/b higher than the actual \$71/b. In terms of the evolution of OECD stocks under the counterfactual scenario, again the OPEC+ output cutbacks would have not prevented the stock overhang year-end, but the stock build-up would have been relatively slower and only half the actual observed exceeding the average in December by 22.0 mbbls compared to the actual 43.0 mbbls.

These results have conflicting interpretations. First, there is clear indication that the market was in need of additional barrels in the run up to the second half of the year, regardless of the nature of the underlying shock (i.e. driven by supply disruptions, by higher oil demand for immediate consumption or by higher storage demand). By increasing supplies, for example, Saudi Arabia (followed by Russia and the rest GCC producers) succeeded in keeping a cap on the oil price on a monthly basis below the \$80/b range. But the nature of the oil shock matters. The fact that the shock was only temporary, driven by market expectations about an oil shock that never happened and not by fundamentals, meant that any revision in these expectations would have triggered a sharp price correction. Moreso,

the deterioration of the global economy in the final quarter amid record levels of output was bound to push prices even lower.

Figure 5: Actual v counterfactual Brent price and OECD stocks outcomes, Jan 17 – Dec 18



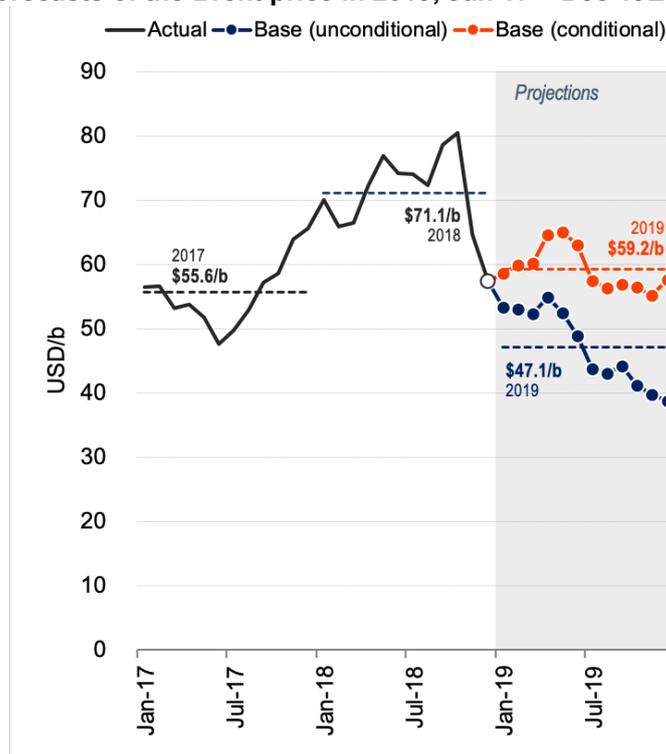
3. Oil price risks in 2019

Turning into 2019, Figure 6 presents the monthly Brent price in 2017 and 2018 along the baseline forecasts starting as of January 2019 and extending for the remainder of the year.

- The *unconditional baseline forecast* predicts the out-of-sample expected change in the oil price based on all available real-time information at the time of the forecast (December 2018), conditional on the assumption that there is no change in the expected oil supply and demand conditions.
- The *conditional baseline forecast* takes into account the OPEC+ production cuts amid 100% compliance for the entire year and the expected growth of the global economy by 3.5% in 2019, all else remaining equal.

As can be seen in the figure, the unconditional baseline forecast predicts that the November/December 2018 decline in the Brent price momentarily halts in the first quarter of the year near \$53/b on average, before retreating towards the low-\$40/b in the following quarters and ending the year close to \$40/b. The forecast projects an annual average Brent price for 2019 of \$47/b, \$24/b lower than a year ago. Upon a closer examination of the underlying supply-demand dynamics driving the unconditional forecast (as they are propagated by the model), we observe that the expected sharp price fall arises due to the explosive growth of OPEC and non-OPEC crude production that carries forward from 2018 (at 2.4 mb/d y-o-y in 2019) confronted by a relative plateau of global activity, that deteriorates further in the second half of the year. These projections are consistent with widespread concerns of weakening supply-demand conditions that risen in late-2018 and hint that the renewed commitment in December by OPEC+ to stabilize the market is both timely and justified. The question this time around is whether the producers can replicate the success of 2017/18, provided that the DOC has never been tested under unfavourable market conditions.

Figure 6: Baseline forecasts of the Brent price in 2019, Jan 17 – Dec 19E



	2017	2018	Forecast				2019
			1Q19	2Q19	3Q19	4Q19	
USD/b (in 12.2018 USD)							
Brent price							
Baseline (unconditional)	55.6	71.1	52.9	52.1	43.7	39.9	47.1
Baseline (conditional)	55.6	71.1	59.5	64.2	56.9	56.4	59.2
Changes from baseline (unconditional)							
Chg (BASE conditional)	--	--	6.7	12.1	13.2	16.5	12.1

3.1. Balance of risks

Figure 7 depicts the balance of risks to the baseline forecast in 2019. The figure evaluates the risks inherent in 2019 using forecast scenarios that represent individual oil supply and demand shocks corresponding to a given risk scenario and assess how sensitive changes in the Brent price are to each structural shock relative to the baseline forecast. We identify four main scenarios as the key risks underlying the oil price outlook in 2019:

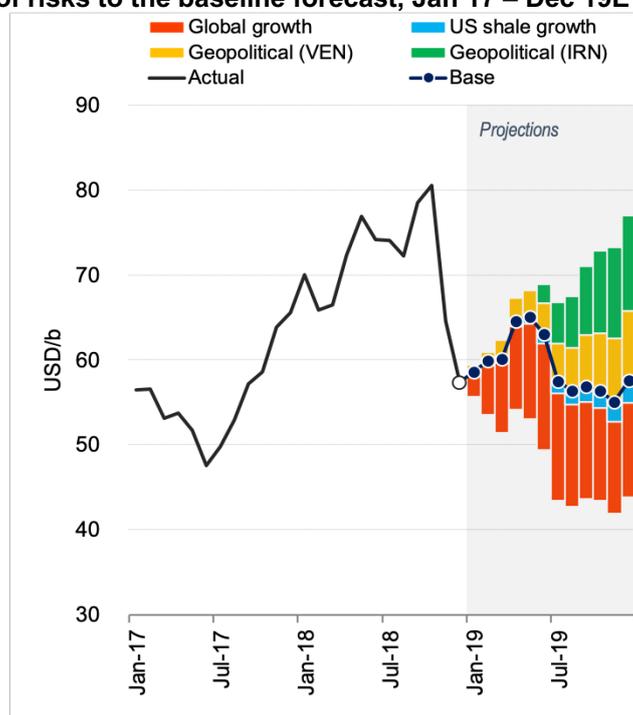
- *Geopolitical risk (Iran):* The potential loss of over 0.5 mb/d of Iranian output in the second half of the year, upon the expiration of the US oil waivers as of May. The decline in Iranian production follows the same trajectory as it did in 2012.
- *Geopolitical risk (Venezuela):* The continued deterioration of the Venezuelan output by 0.4 mb/d to 0.85 mb/d in 2019, as the country goes into deeper crisis and the US sanctions take full effect.
- *US shale growth risk:* The surprise growth of US shale production by an additional 0.3 mb/d to end 1.4 mb/d higher than a year ago. That is an upward revision from the expected growth of 1.1 mb/d due to the baseline forecast.

- *Global growth risk*: The further contraction of global growth in 2019 by 0.3%, down to 3.2% from 3.5%, reflecting weaker performance in emerging economies notably China, the impact from the negative effects of a potential impasse of the US-China trade negotiations on the macro outlook and concerns about tightening financial conditions in advanced economies.

The balance of risks to the baseline forecast in 2019 is mostly tilted to the downside, with the potential for upside surprises mostly confined in the second half of the year.

- On the downside, a weaker-than-expected expansion of the global economy, which is the most pronounced risk throughout, can cause oil prices to plunge by \$10/b on annual terms relative to the baseline case and suppress prices in the mid-\$40/b for most of 2019. The negative impact on prices from another year of an unanticipated strong performance of US shale production, is by comparison limited to \$1.5/b and extends mostly in the second half as pipeline capacity constraints are resolved.
- On the upside, the potential of geopolitical supply disruptions from Iran and Venezuela risk pushing prices well above \$65/b on a monthly basis, adding to the annual average about \$4/b each. The potential of both these risks materializing increases the likelihood of prices shooting well above \$70/b ending-2019. Provisionally, the balance of risks places a floor under the 2019 average baseline price at \$48/b and a cap at \$68/b. On a monthly basis, this range widens to \$44/b at the lower-end and to \$77/b at the higher-end of the risks balance.

Figure 7: Balance of risks to the baseline forecast, Jan 17 – Dec 19E



	Assumptions		AVG 2019	Net Impact
	2019	Chg f/ BASE	USD/b (in 12.2018 USD)	
Brent price				
Baseline	n/a	n/a	59.2	--
Geopolitical risk (IRN)	2.3 mb/d	- 0.5 mb/d	63.6	4.4
Geopolitical risk (VEN)	0.85 mb/d	- 0.4 mb/d	63.5	4.2
US shale growth risk	1.4 mb/d	+ 0.3 mb/d	58.0	(1.3)
Global growth risk	3.2%	- 0.3 %	49.3	(10.0)

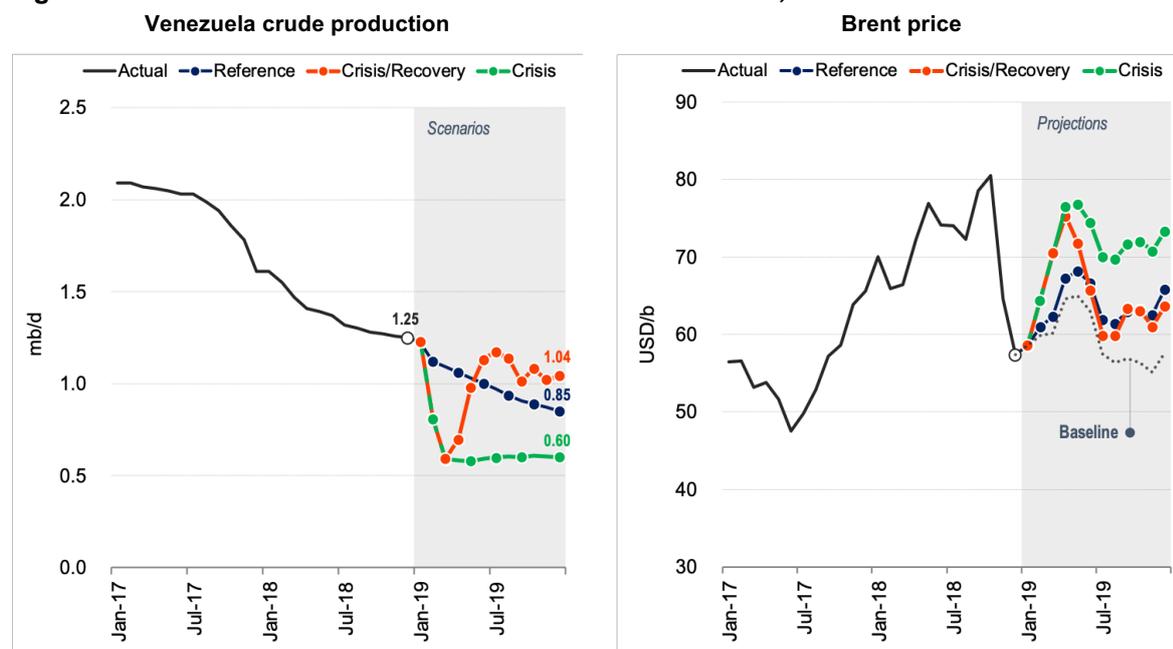
3.2. The Venezuela crisis

Given the high vulnerability of Venezuela's oil sector to the risk of the crisis escalating further, especially as other countries join the US to take further actions or the social unrest turns into conflict, we lay out two additional crisis scenarios to our base case presented above. Both of these scenarios imply a structural change in the political situation in the country within the first quarter of the year. Regardless of the political outcome, many analysts suggest that the window of opportunity for change is small and if the current crisis remains unresolved as we progress through the year then the likelihood of a recovery or maintaining Venezuelan production at current levels decreases sharply. The scenarios are laid out as follows:

- The *Reference scenario*: This is the base case in which Venezuelan output slips by 0.4 mb/d in 2019.
- The *Crisis/Recovery scenario*: This scenario emulates the fallout and recovery of Venezuelan output in the aftermath of the 2002 Venezuela Crisis by considering the m-o-m percent change in production in the first twelve months of the episode. The Venezuelan output is expected to decline sharply by 0.63 mb/d in the first quarter, from 1.25 mb/d to 0.59 mb/d, before gradually recovering to 1.1 mb/d in the following quarter and settles for the remainder of the year at that level.
- The *Crisis scenario*: As before, in this scenario the Venezuela output collapses in the first quarter by 0.63 mb/d, but production is unable to recover and stays around 0.6 mb/d, as the technical and financial challenges fracture the upside potential of a fast recovery.

Figure 8, which charts the evolution of the Brent price in 2019 under these scenarios, all else remaining equal, shows that the risks of the Venezuelan output collapsing are expected to impact significantly prices in the first quarter relative to the reference case, adding more than \$8/b on a monthly basis and pushing quarterly prices higher close to \$65/b on average (\$4/b higher than the reference scenario). The price momentum is expected to carry forward in the second quarter under both scenarios, but in the Crisis/Recovery scenario, the production rebound is expected to offset around \$5/b relative to the Crisis case, in which prices jump above \$75/b. The oil price is expected to ease significantly in the second half of the year as the Venezuelan output recovers towards 1.0 mb/d and settle in the low-\$60/b, about \$1/b lower than the reference case. That said, in the event that production fails to recover, the oil price is expected to hover around \$73/b for the remainder of the year, trading about \$10/b higher than the recovery case. On annual terms, the Crisis/Recovery scenario is expected to add on average \$1/b to the reference case in 2019 and the Crisis scenario to average \$7/b higher, with oil prices trading into the \$70/b range all else remaining equal.

Figure 8: Venezuela crisis scenarios to the baseline forecast, Jan 17 – Dec 19E



	2017	2018	Forecasts				2019
			1Q19	2Q19	3Q18	4Q19	
USD/b (in 12.2018 USD)							

Brent price

Reference	55.6	71.1	60.6	67.4	62.1	63.8	63.5
Crisis / Recovery	--	--	64.5	70.9	61.0	62.6	64.7
Crisis	--	--	64.5	75.9	70.5	72.0	70.7

	2017	2018	Forecasts				2019
			1Q19	2Q19	3Q18	4Q19	
USD/b (in 12.2018 USD)							

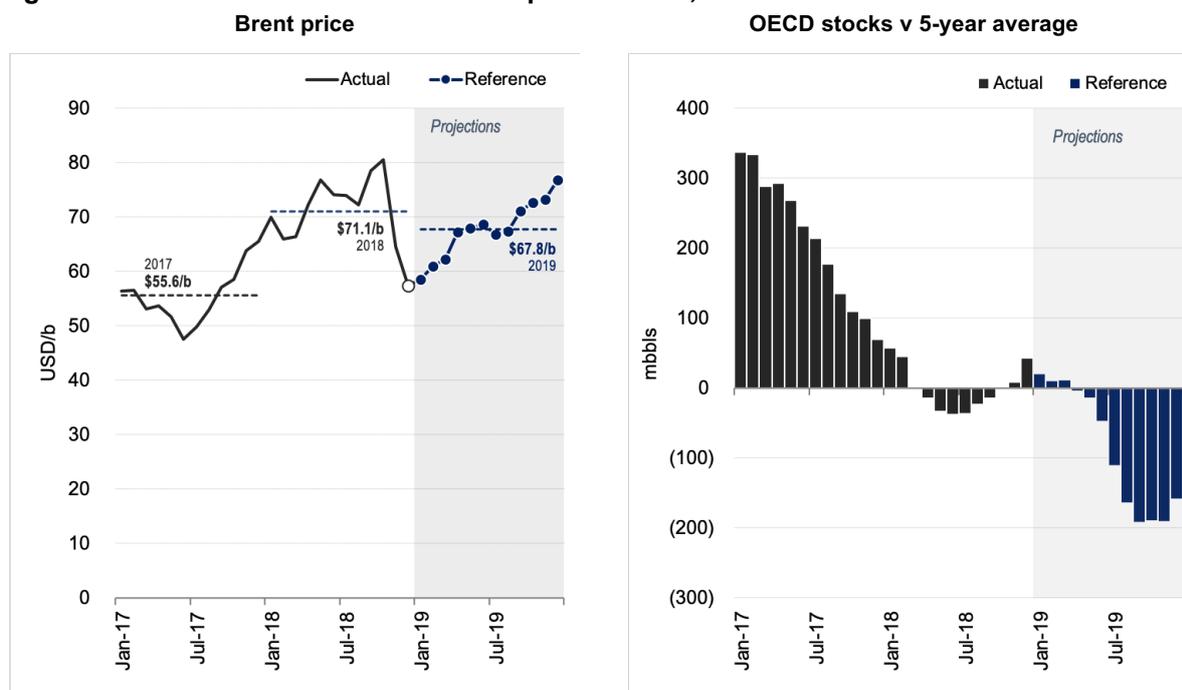
Changes from Reference

Crisis / Recovery	--	--	3.9	3.5	(1.1)	(1.3)	1.2
Crisis	--	--	3.9	8.5	8.4	8.2	7.2

4. Oil price paths in 2019

Figure 9 presents our *reference forecast* of the Brent price for 2019, alongside the projected evolution of the OECD stocks as propagated by the model under our prevailing assumptions. The latter depict, to the best of our knowledge, how the underlying oil supply and demand dynamics are expected to unfold in 2019. The reference case assumes that OPEC+ enforce the December 2018 output cut agreement throughout the year, maintaining 100% compliance to their pledged target of 1.2 mb/d; US shale production grows by 1.1 mb/d; the global economy expands by 3.5% on a year ago; Venezuelan output continues to slip by 0.4 mb/d; and Iranian production declines by 0.5 mb/d from May-onwards, as the US waivers allow some buyers to resume imports in the first quarter of the year.

Figure 9: Reference forecast of the Brent price in 2019, Jan 17 – Dec 19E



Reference assumption in 2019

Assumptions

OPEC+ supply management	- 1.27 mb/d (enforced throughout 2019 at 100% compliance)
US shale supply growth	+ 1.1 mb/d
Global economic growth	+ 3.5 p.c.
Geopolitics	Iran - 0.5 mb/d (as of May 2019)
	Venezuela - 0.4 mb/d

	2017	2018	Forecast				2019
			1Q19	2Q19	3Q18	4Q19	
	USD/b (in 12.2018 USD)						

Brent price							
Reference	55.6	71.1	60.6	67.9	68.4	74.3	67.8

Changes of the Brent price							
Chg (q/q, y/y)	--	15.5	(6.9)	7.3	0.5	5.8	(3.3)

As Figure 9 shows, the Brent price in 2019 is expected to average at \$68/b, \$3/b lower than a year ago. The Brent price is expected to rise just above \$60/b in the first quarter before picking up in April by \$5/b on average and hover around \$68/b for two consecutive quarters. In the final quarter, the monthly price is expected to exceed \$70/b for the first time in 2019, to end the year at \$76/b about \$20/b higher than December 2018. OECD stocks are expected to persist above their 5-year average in the first quarter, although at a declining trajectory towards the average, before reversing below the average in April. Stocks are expected to be drawn significantly in the second half of the year due to the continued OPEC+ output cutbacks in conjunction with the supply disruptions in Iran and Venezuela, that combined with supportive demand are expected to clear over 200.0 mmbbls in 2019.

By November 2019, OECD stocks are expected to decline to a new 5-year low of 2706.0 mmbbls, which was last seen back in December 2014.

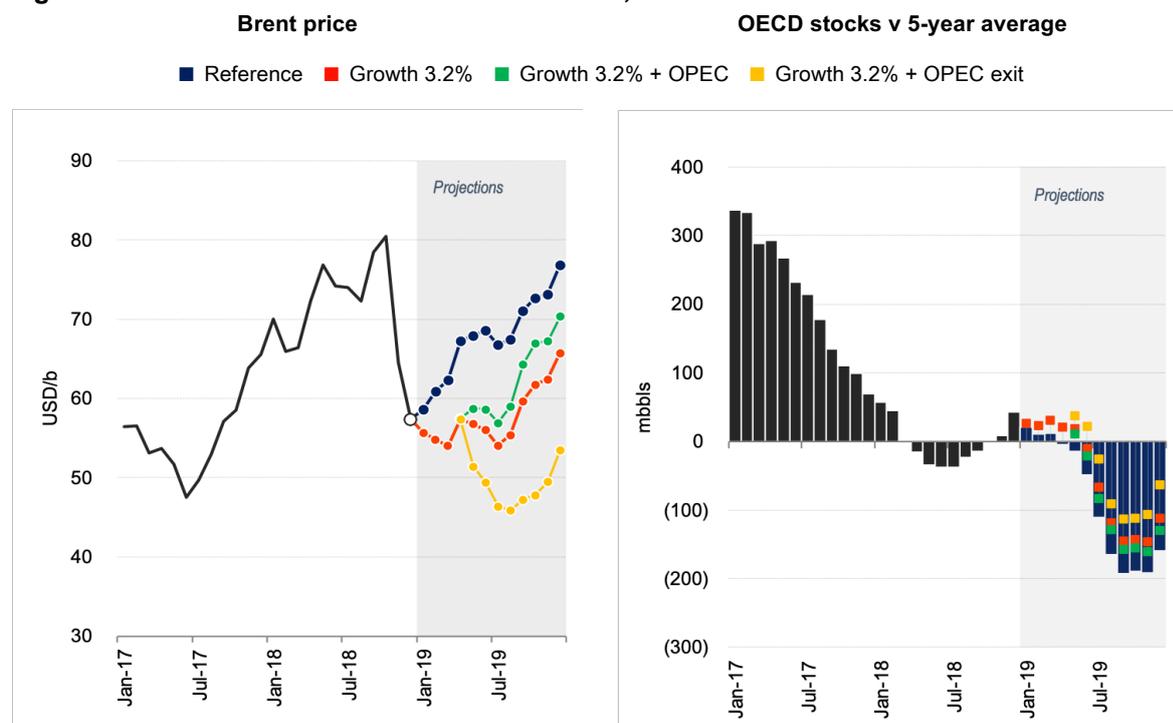
Our reference forecast suggests that the oil market in 2019 is set to return to a balanced mode. However, there are some potential risks. First, our reference assumptions assume that Saudi Arabia maintains its current output policy throughout the year. Many in the market however are skeptical as to whether Saudi Arabia can sustain its output policy independent of external pressures. The influence of such external factors did play a role in shaping Saudi Arabia's oil policy in 2018, but views that these will dictate Saudi oil policy in 2019 and that they are the most important or only factors in shaping Saudi output decisions are misguided. In 2018, Saudi Arabia faced hard choices and some unique circumstances, which may not necessarily be repeated in 2019 (US mid-term elections, market's doubts about the Kingdom's ability to hike production above 11 mb/d, fears that high oil prices will accelerate the global economic slowdown). In effect, Saudi Arabia was trying to play a balancing act between multiple objectives and to keep the oil price within a narrow band. The record budget announced by Saudi Arabia in big part to stimulate the domestic economy and private sector, implies that domestic factors and the need for higher revenues will be important in shaping oil policy in 2019. Also, the unpredictability of the US administration witnessed in 2018 and ambiguous signals from the US regarding the Iranian waiver policy, as well as the increasing difficulties in reaching the renewed output cut agreement with other producers in December 2018 will make Saudi Arabia more cautious in reversing its oil policy this time around.

Another important implication is the fact that unlike 2017, the OPEC+ balancing act behind the price recovery in 2019 is expected to be supported to a larger extent by geopolitical supply disruptions and to a lesser extent by favourable demand conditions. This fact makes the oil market rebalancing in 2019 increasingly volatile and much more complicated, than in the previous years. Geopolitical episodes are largely unpredictable and can lead to larger- or smaller-than-expected supply gaps, for which it is extremely difficult to form accurate expectations. As witnessed in 2018, market expectations in such cases and shifts in these expectations can confuse the signals and aggravate price volatility that in turn can lead to oil producers over- or under-balancing the market. Moreover, the fact that the mounting risks to the geopolitical context are associated with oil producing countries within the coalition of producers that embarked on the balancing effort (i.e. Venezuela and Iran), can raise significant barriers against negotiating a renewed agreement along the way or even in enforcing the current agreement, as well as in general it complicates the producer-producer relations that are important to manage the DOC.

Finally, the rising downside risks clouding the prospects of global demand mean that any response from OPEC and Saudi Arabia to fill the supply gap due to a geopolitical episode must be viewed with extreme caution, as any downward revision in global demand will be met with the market entering into a downward spiral anew, pushing prices lower and the stocks back in excess.

To highlight the importance of global growth prospects, we consider the *global economic downturn* case in which global growth in 2019 weakens to 3.2%, relative to the 3.5% in the reference forecast. Figure 10 shows that the reference price in the first half of the year is expected to lose all its momentum, remaining subdued in the mid-\$50/b (see Growth 3.2%). The price will accelerate again entering the second half and hike towards \$65/b year-end. The annual price will average \$10/b lower than the reference case at \$58/b compared to \$68/b respectively. OPEC+ and Saudi Arabia will find it extremely difficult to lift prices in the first half, even if they decide to deepen their cuts in May by 1.8 mb/d, but the geopolitical pressures in the second half soften the blow and they are expected to push prices well into \$60/b (see Growth 3.2% + OPEC). Annually, the price ends at \$60/b on average, \$8/b lower than the reference case. In the event that OPEC+ and in particular Saudi Arabia decides to reverse its output cuts as of May, recognizing that any gains from the current policy are only temporary and short-lived, the reference price will slide into the high-\$40/b in the first half of 2019, before recovering in the second half only to \$53/b (see Growth 3.2% + OPEC exit). The price is expected to end lower for the year by \$17/b relative to the reference price just above \$50/b. It is important to note that the return of the OPEC+ barrels back into the market offsets the tighter supplies in the second half, weakening significantly the price momentum.

Figure 10: Global economic downturn scenarios, Jan 17 – Dec 19E



	2017	2018	AVG 2019	Chg f/ REF
USD/b (in 12.2018 USD)				
Brent price				
Reference	55.6	71.1	67.8	--
Growth 3.2%			57.8	(10.0)
Growth 3.2% + OPEC (+0.48 mb/d)			60.4	(7.4)
Growth 3.2% + OPEC exit			51.1	(16.7)

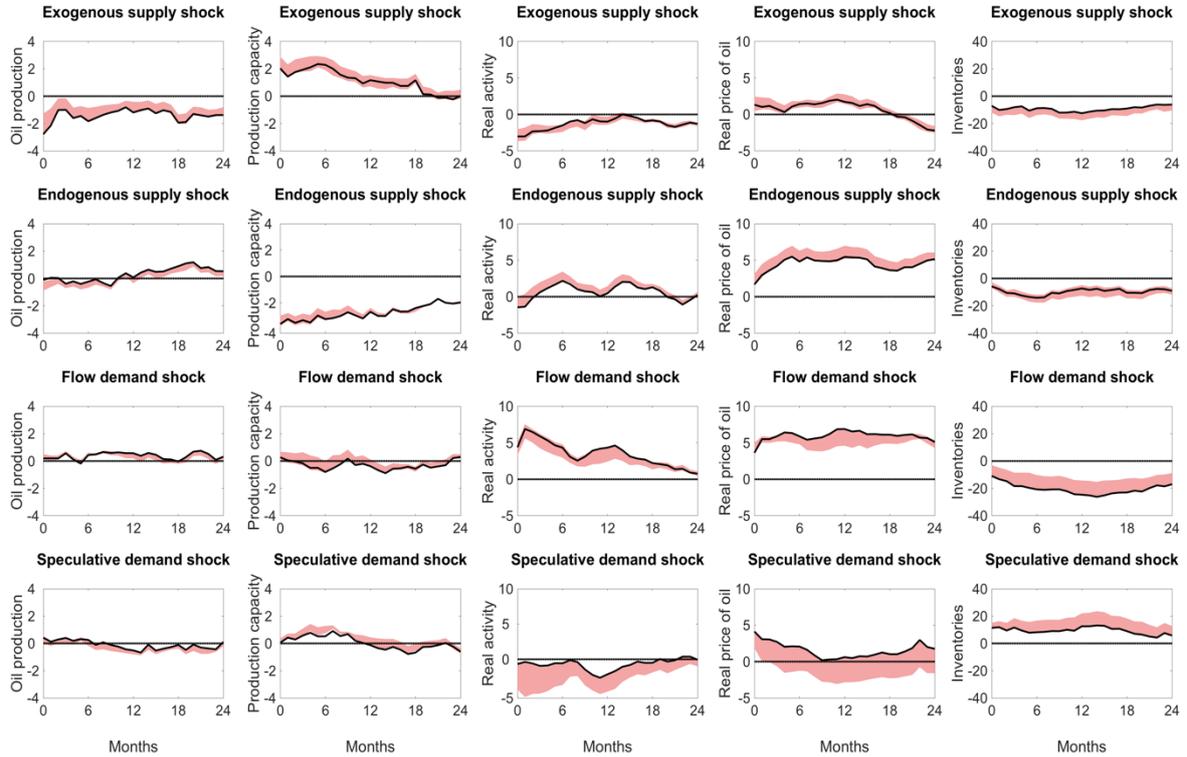
5. Conclusions

Based on our reference forecast, the OPEC+ output cut of 1.2 mb/d, the high potential of supply losses from Iran and Venezuela and global oil demand growth of 1.4 mb/d amid a healthy expansion of global growth by 3.5% will achieve balance in 2019. That said, a balanced market is consistent with a wide range of prices and until the substantial uncertainty around the market dynamics in the year ahead is resolved, oil prices will continue to be under pressure. On the supply side, Iran and Venezuela constitute important supply risks. Also Saudi Arabia behaviour is key to balancing the market and shaping price outcomes in 2019. So far this year, Saudi Arabia has been sending strong and clear signals of its determination to cut output and reverse the recent build up in stocks. Sending clear and unambiguous signals to reassert control of the market expectations is a key priority for the kingdom after a difficult year in 2018 in which Saudi Arabia tried to manage the price within a narrow band amidst large uncertainties and political constraints, but with limited success. The widely held view in the market that Saudi Arabia would eventually reverse its current output policy and increase production under US pressure is rather misguided. In 2018, Saudi Arabia faced hard choices and unique circumstances, which may not necessarily be repeated in 2019. Ambiguous signals from the US regarding renewal of waivers will make Saudi Arabia more cautious to reverse its current output cuts.

But the biggest uncertainty surrounding the oil market in 2019 originates from the demand side and this will influence Saudi Arabia's choices. The balance of risks shows that most of the price risks are on the downside and originate from a potential slowdown in the global economy. If those downside risks do materialise, Saudi Arabia will face a difficult choice: It has to cut output further to support prices or abandon its efforts to balance the market as cutting output in face of such a shock will result in short-lived price gains and lower revenues. Although the probability of the latter scenario is low, the market should not rule out such a downside risk.

Appendix A

Figure A1: Responses of the 5-variable SVAR model variables to each of the structural shocks



Notes: The red area indicates the corresponding pointwise 68% posterior error bands. All structural shocks have been normalised such that they imply an increase in the real price of oil.