Oil Analyst

Non-OPEC+ Supply: A Softer Floor

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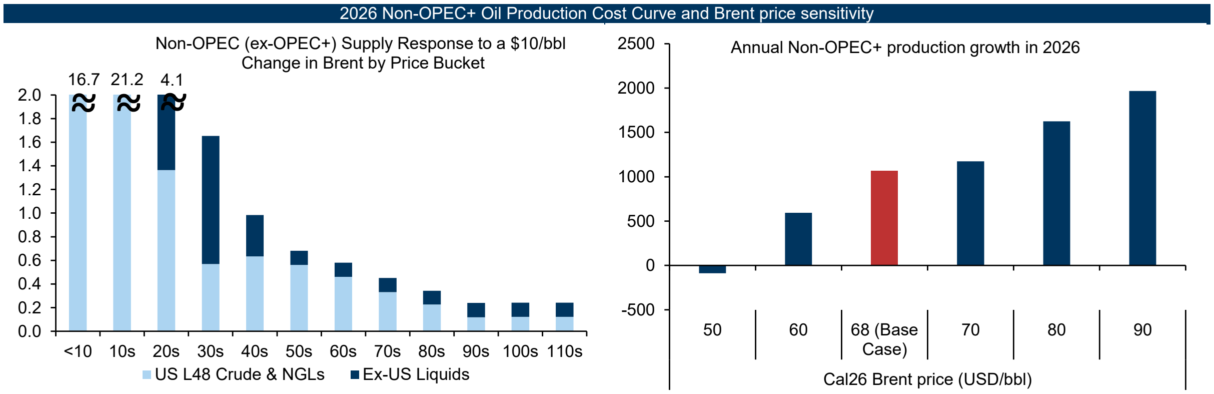
- We recently reduced our Brent price forecast and expected trading range by $5 to $65-80/bbl, following a downgrade to our US GDP growth forecast and after the decision of OPEC8+ to proceed with flexible production increases while Brent traded near $70/bbl. However, with recession risks rising and elevated spare capacity, medium term risks to our price forecast remain to the downside. To quantify this downside, we trace out the short-run non-OPEC+ supply curve.
- We find that non-OPEC+ production growth decreases by 0.3mb/d over 12 months for each $10/bbl oil price decline with Brent >$70/bbl, with this response increasing to 0.65mb/d with Brent at $50-70/bbl.
- The US drives most of this supply elasticity, where shale oil production growth decreases by 0.2mb/d over 12 months per $10/bbl price drop with Brent >$70/bbl, with this drag rising to 0.5mb/d per $10 with Brent at $50-70. The supply response jumps sharply when Brent prices fall below variable costs ($30/bbl), triggering well-head shut-ins.
- Outside of the US, the response by non-OPEC+ producers is also non-linear but smaller. Initially, higher decline rates drive the production response (0.1mb/d lower production over 12 months per $10/bbl lower crude prices when Brent is above $60/bbl) with this impact doubling as prices decline to $40-60/bbl. As prices drop further to well-head variable costs, large production shut-ins are possible.
- We estimate that 2026 non-OPEC+ supply growth would fall from 1.05mb/d to 0.6mb/d with Cal26 Brent prices at $60/bbl (vs. our $68/bbl base case), and to -0.1mb/d at $50/bbl. These negative production impacts would in turn support prices by $5 and $13/bbl, respectively, precluding further downside, and supporting our soft floor in the mid $60s below Brent.
- The non-OPEC+ supply response offers a softer price floor than OPEC+ cuts, and a market relying more on the former will tend to exhibit lower prices and higher implied volatility. These findings reinforce our focus on moderate but not extreme medium-term price downside and our recommendation for producer three-way hedges once prices recover somewhat further in the short-term.

Exhibit 1: Non-OPEC+ Supply Responds More Significantly to Prices When Prices Are Low



Non-OPEC+ excludes main non-OPEC countries in OPEC+ (Russia, Kazakhstan, Azerbaijan, Oman, Malaysia), global biofuels (incl. US ethanol), processing gains, and US Gulf crude oil. In 2025, we forecast US L48 (crude and NGLs) to amount to 18.6mb/d, with ex-US Non-OPEC+ amounting to 30.1mb/d. To find WTI-equivalent prices, subtracting $4/bbl from the Brent prices and ranges quoted will be sufficient.

Source: Goldman Sachs Global Investment Research

Non-OPEC+ Supply: A Softer Floor

We recently lowered our Brent price forecast and expected trading range by $5 to $65-80/bbl, following a downgrade to our US GDP growth forecast and after the decision of OPEC8+ to proceed with flexible production increases while Brent traded near $70/bbl. The OPEC8+ decision to raise production mechanically increases the pressure on non-OPEC+ to rationalize production to rebalance the market, which looks well supplied in both 2025 and 2026 (assuming no major supply disruptions).

Rising recession risks and elevated spare capacity skew the medium terms risks to our price forecast to the downside. To quantify this downside, we trace out the short-run non-OPEC+ supply curve. We believe producers respond most to 12-month ahead prices versus spot prices, as decisions taken now take roughly this long to significantly affect production volumes.

In the US, we previously found that shale oil (crude and NGL) production growth decreases by 0.3mb/d over 12 months per $10/bbl price drop with Brent prices >$70/bbl, but that this drag rises to 0.5mb/d per $10 with Brent in the $50-70 range. The supply response jumps sharply when Brent prices fall below variable costs ($30/bbl), triggering well-head shut-ins. While well-head shut-ins are relatively instantaneous, the typical rig-based US shale response takes more than 12 months.

The non-OPEC+ ex US supply response is also lagged and non-linear. The short-run response is driven initially by 1) higher decline rates, that 2) increase during more extreme price moves, before prices reach well-head variable costs that require 3) production shut-ins.

1) Decline Rates: The Short Cycle Response of Long-Cycle Production

The typical initial response of conventional (non-shale) non-OPEC+ producers to lower prices is to cut maintenance capital expenditures that limit underlying decline rates and allow decline rates to accelerate. According to the IEA, underlying annual natural decline rates of conventional crude projects are around 8-9% if no additional investments are made. In practice, companies limit decline rates to 4-5% by investing in field extensions, managing reservoir pressure, and enhancing oil recovery rates.

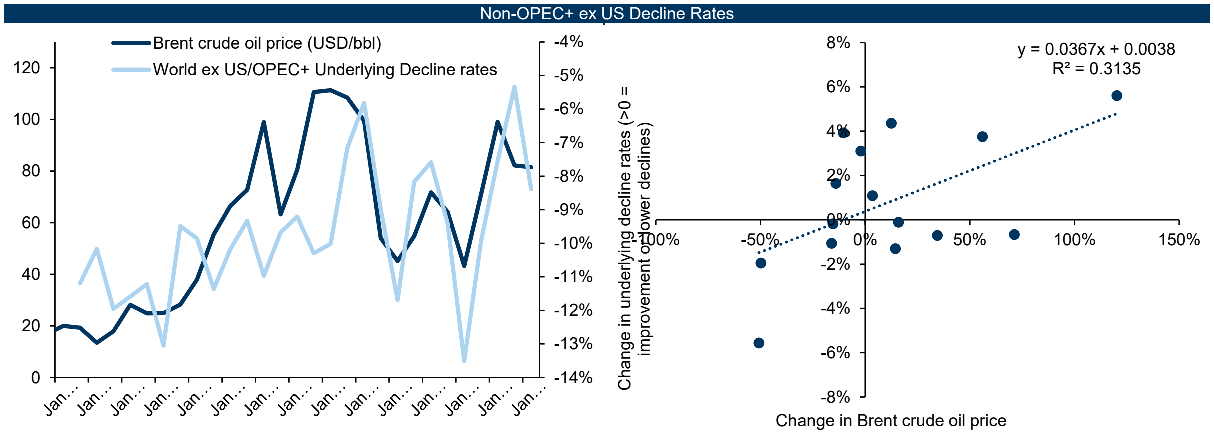
We use annual field level production data to distinguish between growing and declining (post-peak) projects for non-OPEC+ ex-US production. We measure decline rates by comparing year-over-year production for the sample of declining projects, keeping this project sample constant within each comparison year-pair but varying across comparison year-pairs.[1]

We find that decline rates are negatively related to oil prices in non-OPEC+ ex-US (Exhibit 2). This was especially clear following the Global Financial Crisis. We find a c.4% beta between prices and decline rates, meaning that a $-10/bbl (-15%) price decline

[1] The sample of projects/fields that are classified as 'post peak' changes each year. This definition ensures that the same projects are being compared in the measure year (Y) and the base year (Y-1).

results in a 0.5% increase in decline rates (Exhibit 2). Applying this to the 24mb/d declining project base for non-OPEC+ ex-US production yields a 120kb/d impact via higher declines over the next 1-2 years for Brent prices above $50/bbl.[2]

Exhibit 2: Lower Oil Prices Tend To Lead To Higher Decline Rates For Existing Declining Fields



Change in prices and decline rates use a weighted average of 1-year and 2-year changes using annual data. RHS uses 2009-2024 data.

Source: Woodmac, Goldman Sachs Global Investment Research

2) Accelerated Decline Rates: For More Extreme Price Moves

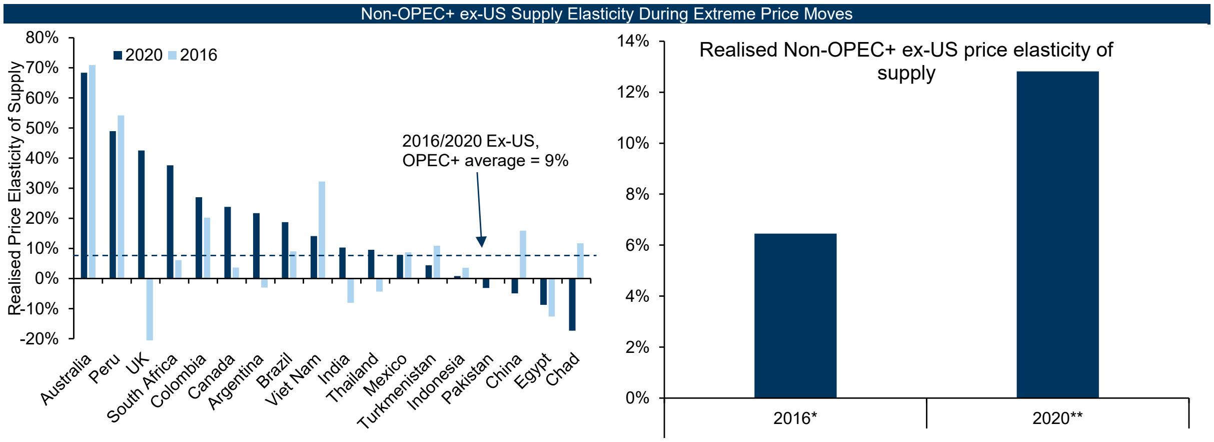
These decline rates increased notably during the more extreme price moves as firms aggressively curtailed expenditure of all forms to protect cash flows. We investigate this further by reviewing the non-OPEC+ ex-US supply response during the 2016 and 2020 oil price drops.

To analyze the price elasticities in these periods we compare realized supply figures with IEA forecasts in the prior year.[3] We find that non-OPEC+ ex-US supply exhibited a price elasticity of 6% in 2016 and 12% in 2020, 2x and 4x the average elasticity seen historically, respectively (Exhibit 3). The most price elastic countries are the highest cost, short-cycle locations (e.g. Colombia, Canada, Argentina). However, given the 2020 experience likely included some well-head shut-ins in these countries, we assume a 6% elasticity, equivalent to 0.3mb/d impact per $10/bbl oil price decline for non-OPEC+ ex-US supply for Brent prices below $50/bbl.

2 The implied price elasticity of all non-OPEC+ ex-US production (declining and non-declining) is therefore 2.5% ((0.12/30)/15%)

3 Specifically, for 2016 we compare realised data to the IEA's Jun-15 OMR which provides the first forecasts of 2016 non-OPEC supply. For 2020, we compare realised data to the IEA's Dec-19 OMR, the last one before the Covid-19 pandemic started to impact prices and balances.

Exhibit 3: Supply Elasticity Increases Around More Extreme Price Moves



2016 realised elasticity measured versus Jul-15 IEA OMR and Brent forward curve as of that date. 2020 realised elasticity measured versus Dec-19 IEA OMR and Brent forward curve as of that date.

Source: IEA, Goldman Sachs Global Investment Research

3) Well-Head Shut-Ins: A Firmer Floor For Non-OPEC+ ex-US Supply

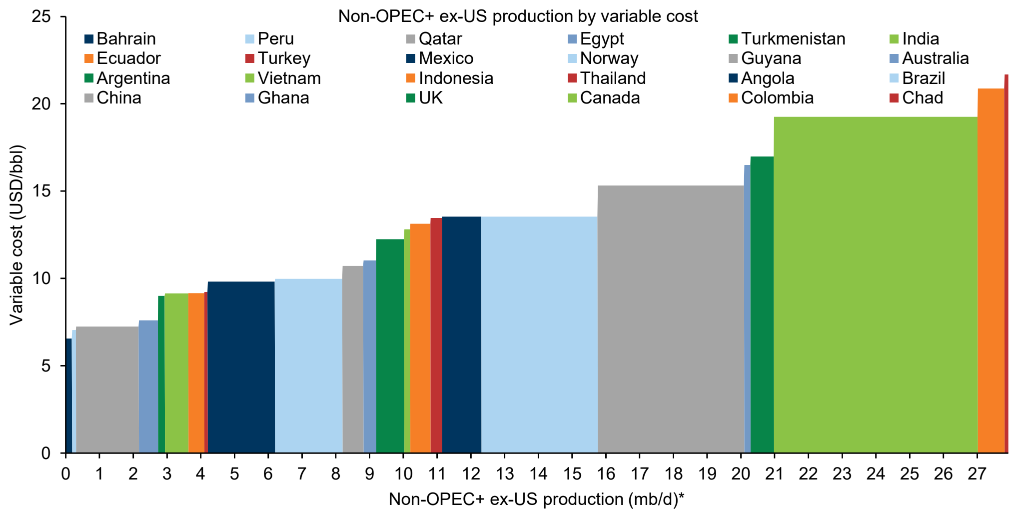
As prices fall even further towards well-head variable costs (cash costs), operators can shut-in production (turning wells off at the well-head) to avoid negative operational cash flows. This rapid process at low prices creates a much firmer floor for crude oil pricing than the slow-moving process of accelerated decline rates.

Exhibit 4 shows the non-OPEC+ ex-US variable cost curve, with cash costs for non-OPEC+ ex-US production only becoming relevant below $25/bbl Brent. The highest variable cost locations - namely Canada, Colombia, China - have large shares of higher cost unconventional supply (heavy oils, shales) with somewhat higher cash costs than the country average.[4]

[4] The US average variable cost is $22/bbl with 75% of production in a $15-35/bbl Brent range. Due its short-cycle nature, US shale defines the right tail of the non-OPEC+ variable cost distribution.

Exhibit 4: Well-Head Shut-Ins Rise Significantly When Brent Prices Fall Below $20/bbl

Non-OPEC+ ex-US oil production by variable cost



Non-OPEC+ ex-US excludes main non-OPEC countries in OPEC+ (Russia, Kazakhstan, Azerbaijan, Oman, Malaysia), global biofuels (inc. US ethanol), processing gains, and US Gulf crude oil. This chart only includes countries with production over 0.1 mb/d and is shown as a country-level average. We utilise the field level cost curve for our full non-OPEC+ ex-US supply response analysis.

Source: Wood Mackenzie, Goldman Sachs Global Investment Research

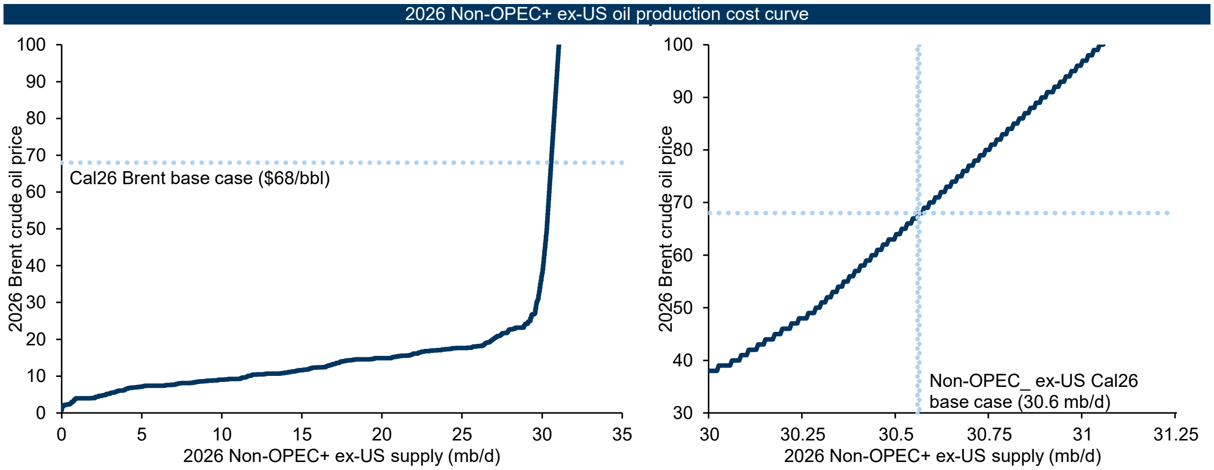
Intersecting the decline rate analysis above with the above cash cost distribution for non-OPEC+ ex-US countries allows us to form the short-run non-OPEC+ ex-US supply curve (Exhibit 5).

The short-run cost curve is very inelastic (steep) for most price levels, but this price response increases exponentially once prices start to encroach upon well-head variable costs. Given fixed costs to stopping and restarting production and lags in decision-making, we believe 3-6 months forward prices matter more than current spot prices for shutting in wells today.[5]

[5] This is a shorter time horizon than for decline rates and US shale, where the impacts on production are more lagged. Our analysis, by looking at annual price changes as well as changes in the forward Brent strip across different dates approximates this forward-looking process.

Exhibit 5: Non-OPEC ex-US Supply Is Very Inelastic, But The Response Increases Exponentially At Lower Oil Prices

Non-OPEC+ ex-US 2025 supply curve (LHS) and marginal price elasticity of supply (RHS)



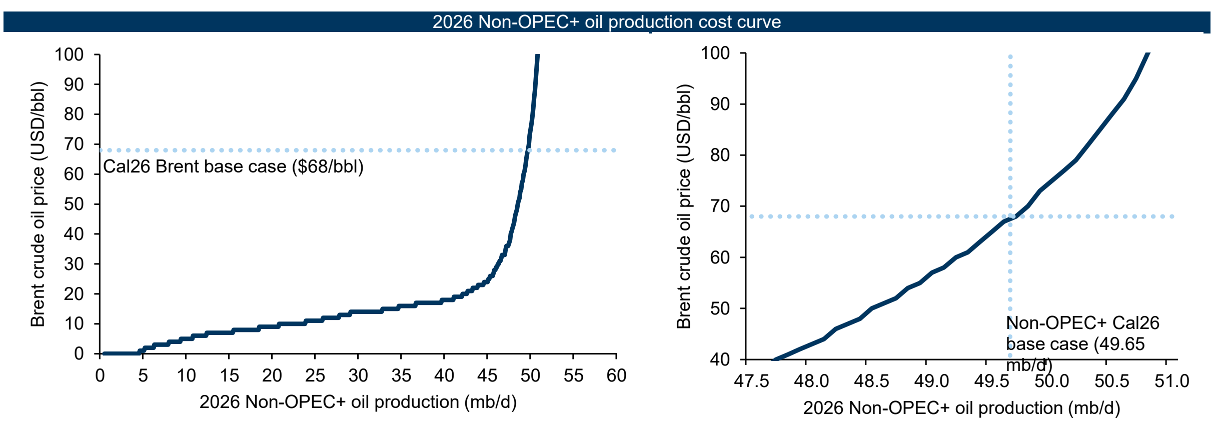
Excludes main Non-OPEC countries in OPEC+ (Russia, Kazakhstan, Azerbaijan, Oman, Malaysia), ex-US biofuels, and processing gains.

Source: Woodmac, Goldman Sachs Global Investment Research

Tracing Out The Short-Run Non-OPEC+ Supply Curve

Combining this Non-OPEC+ ex-US short-term supply curve with our prior work on the US Lower 48 (crude and NGL) we can create the short-run total Non-OPEC+ supply curve (Exhibit 6).

Exhibit 6: Our Non-OPEC+ Oil Supply Curve Remains Steep Unless Prices Are Very Low



Excludes main Non-OPEC countries in OPEC+ (Russia, Kazakhstan, Azerbaijan, Oman, Malaysia), global biofuels (inc. US ethanol), processing gains, and US Gulf crude oil.

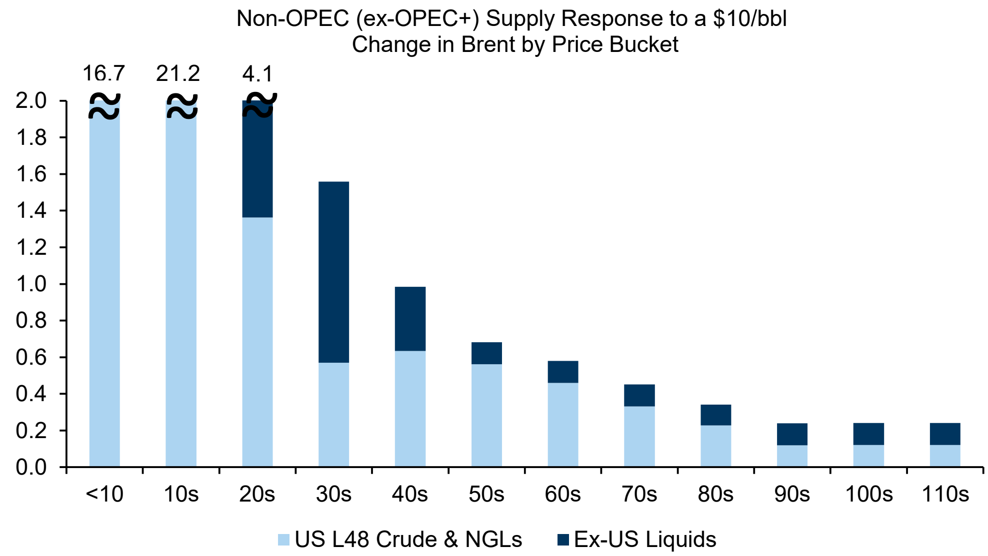
Source: Wood Mackenzie, Goldman Sachs Global Investment Research

Similar to the US, we find that the response of non-OPEC+ ex-US producers is also non-linear but generally weaker.

Initially, the production response is defined by higher decline rates (0.12mb/d lower production over 12 months per $10/bbl lower crude prices when Brent is above $60/bbl) with this impact doubling as price moves become more extreme (0.25mb/d per $10/bbl when Brent is $40-60/bbl). As prices approach well-head variable costs, significant production shut-ins are possible, amounting to almost 1mb/d when Brent is in the $30s, and increasing exponentially below this level (Exhibit 7).

Aggregating this with our US oil supply elasticities, we find that non-OPEC+ production growth decreases by 0.3mb/d over 12 months for each $10/bbl oil price decline with Brent >$70/bbl. This price response increases to 0.63mb/d when forward Brent prices are $50-70/bbl, 1.25mb/d when prices are $30-50/bbl, and significantly higher still at even lower prices.[6]

Exhibit 7: Non-OPEC Supply Response Increases Below $70/bbl Brent, Jumps Significantly Below $30/bbl Brent



Excludes main Non-OPEC countries in OPEC+ (Russia, Kazakhstan, Azerbaijan, Oman, Malaysia), global biofuels (inc. US ethanol), processing gains, and US Gulf crude oil.

Source: Wood Mackenzie, Goldman Sachs Global Investment Research

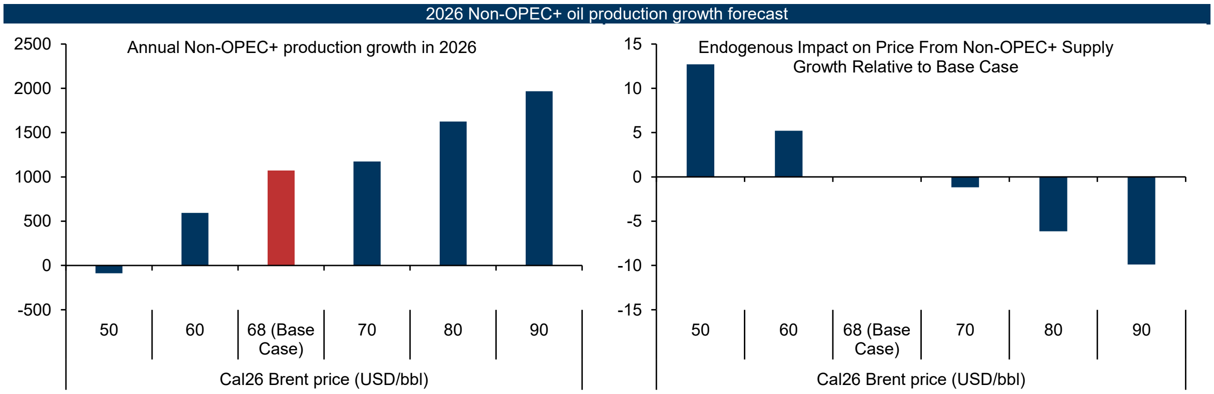
Non-OPEC Supply: A Key Potential Rebalancing Mechanism

We next analyze the stabilizing impact on prices from lower non-OPEC+ production in lower price scenarios using our new short-run supply curve.

We estimate that 2026 non-OPEC+ supply growth would fall from 1.05mb/d to 0.6mb/d with Cal26 Brent prices at $60/bbl (vs. our $68 base case), for instance in the case of weaker demand due to further tariff escalation, and would fall further to -0.1mb/d at $50/bbl. These negative production impacts would in turn support prices by $5 and $13/bbl, respectively, precluding further downside, and supporting our soft floor in the mid $60s below Brent (Exhibit 8).

6 To be clear, we believe these prices to refer to the forward strip more than spot prices, as such the elasticities to spot prices will be less. A simple regression of 12m Brent prices on spot prices over the last 10 years gives a beta of 70%.

Exhibit 8: Non-OPEC Supply Responds Nonlinearly to Lower Prices
Price sensitivity of 2026 non-OPEC+ supply growth forecasts



Excludes main Non-OPEC countries in OPEC+ (Russia, Kazakhstan, Azerbaijan, Oman, Malaysia), global biofuels (inc. US ethanol), processing gains, and US Gulf crude oil.

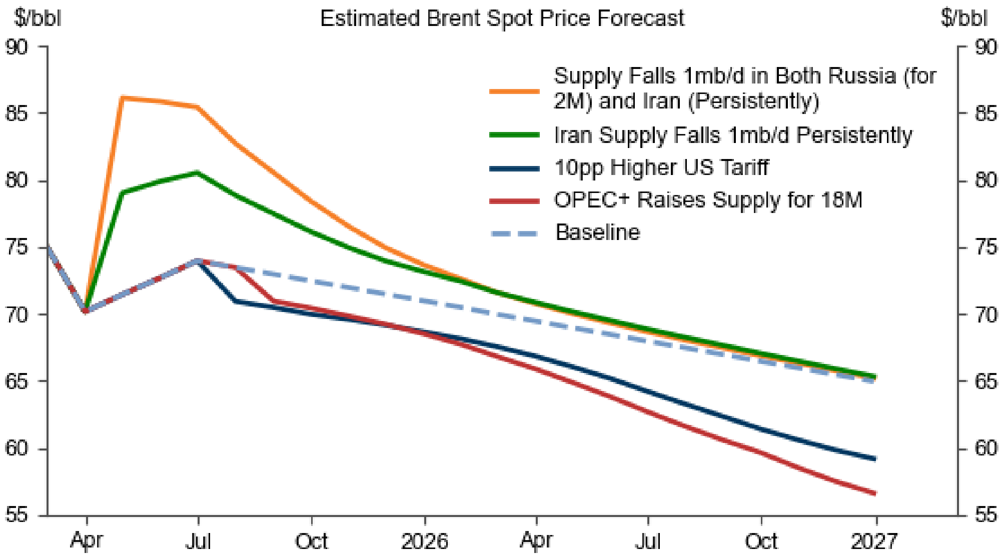
Source: Goldman Sachs Global Investment Research

Endogenising the Non-OPEC+ response

We take account of this feedback loop between prices, non-OPEC+ supply, and global demand when analyzing price risks around our base case, allowing us to simulate the price impact of scenarios (Exhibit 9). The supply response is more lagged and stronger at lower prices, while the demand response is relatively instantaneous and stronger at higher prices, as income effects become more important.

The non-OPEC+ supply response offers a softer price floor than OPEC+ cuts, and a market relying more on the former will tend to exhibit lower prices and higher implied volatility. These findings reinforce our focus on moderate but not extreme downside risk to medium-term prices and our recommendation for producer three-way hedges once prices recover somewhat further in the short-term.

Exhibit 9: Our Risk Framework Incorporates Supply Feedback Loops



We assume that the risk premium jumps to the 90th percentile of its historical distribution from 1995 if Iran supply falls 1mb/d persistently and to the 97th percentile if additionally Russia supply falls by 1mb/d for 2 months. We assume that the risk premium drops to the 40th percentile if the US imposes a 10% universal tariff and to the 45th percentile if OPEC+ raises supply for 18 months.

Source: Goldman Sachs Global Investment Research

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Reg AC

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