Goldman Sachs | Commodities Research

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Oil Analyst

OECD Oil Demand: Structural Softness and Recession Risk

- Oil markets are torn between strong data from the East and soft data from the West, where hawkish Fed rhetoric has revived recessions fears. With OECD oil demand still 1.5mb/d below its pre-pandemic level, will it ever fully recover? And how much would a recession lower OECD demand and oil prices?
- To find out, this *Oil Analyst* estimates OECD country-level oil demand models based on GDP, Brent prices, the dollar, and weather. We find that a 1.0% rise in OECD real GDP boosts OECD oil demand by 1.0% or 0.5mb/d, but also estimate a structural downward trend in oil demand for a given level of GDP. We find only modestly negative demand effects from higher oil prices or a stronger dollar.
- Assuming OECD GDP growth of 1.3% in 2023 and incorporating soft Q1 data, we nudge down our forecasts for OECD annual average demand growth in 2023 to -0.5mb/d (vs -0.2 previously), and -0.1mb/d in 2024 (vs. flat). Our model implies that OECD demand will remain well below its pre-pandemic level because the hits from the structural decline in oil intensity of GDP, and from higher oil prices and a stronger dollar outweigh the boost from GDP growth. This is consistent with the hit to trend demand after prior recessions, persistent GDP losses, and the breadth of the shortfall across products and regions.
- We expect rapid 2023 growth in non-OECD demand to sharply outweigh the moderate decline in OECD oil demand. As a result, we still expect Brent prices to grind higher to $100/bbl by December, and stay there in 2024, although softer OECD demand raises the risk that OPEC output stays lower for longer.
- If OECD GDP growth were to disappoint our baseline by 4pp annualized in 2023Q3-2024Q2 in a mild recession, then our timespreads model suggests that 2024Q2 Brent would be $16 below our baseline. Prices would fall more if a recession were deeper or longer, non-OECD demand also weakened, or if long-dated prices also sold off. However, if OECD growth beat our expectations by 2pp, then 2024Q2 Brent prices would exceed our baseline by $8/bbl.
- Central banks' response to high inflation limits the upside to OECD GDP and oil demand. However, the meaningful but still moderate $16/bbl hit to oil prices in our OECD recession scenario and our constructive GDP outlook together underscore that strong EM demand holds the key to oil prices this year.

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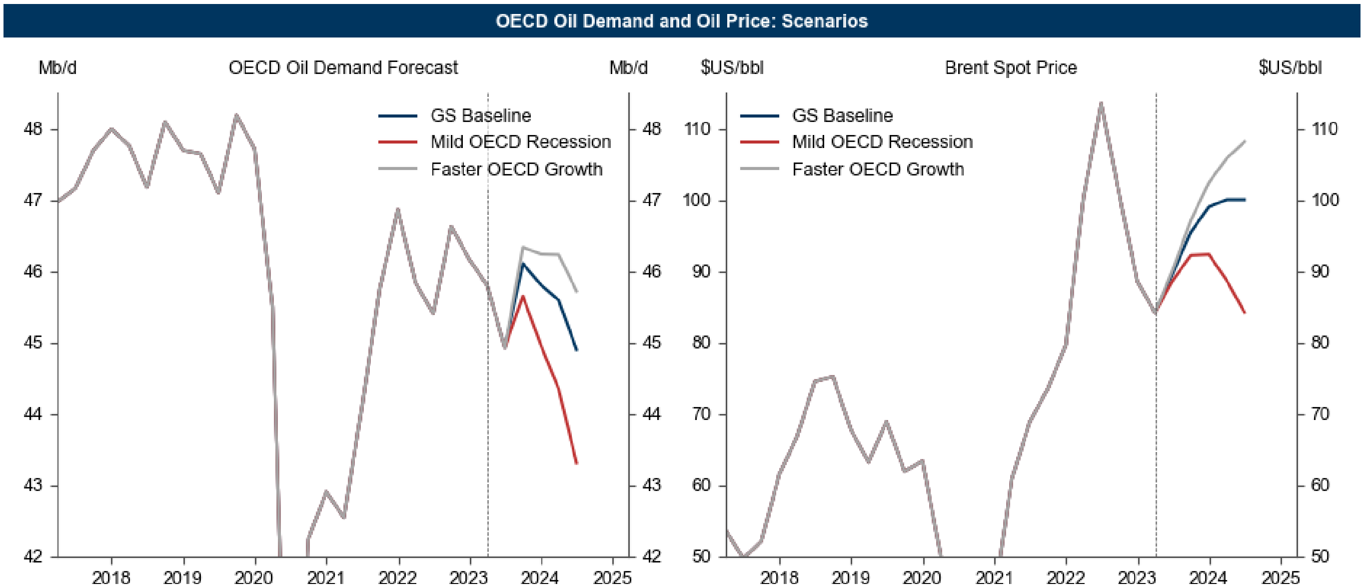
A Mild OECD Recession in 2023Q3-2024Q2 Would Lower Brent Prices by $16/bbl



OECD real GDP growth corresponds to the GS econ forecast in the GS baseline, and is 4pp annualized lower/2pp annualized higher than the baseline forecast in 2023Q3-2024Q2 in the "Mild OECD Recession"/"Faster OECD Growth" scenarios, respectively.

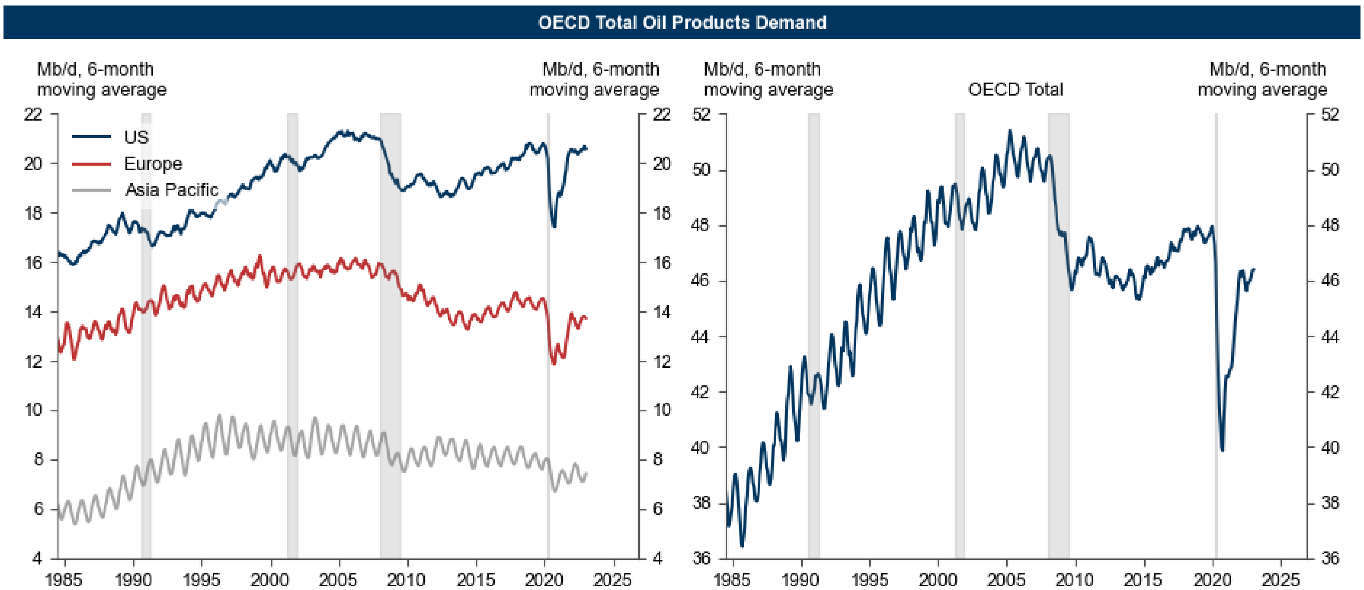
Source: IEA, Haver, Goldman Sachs Global Investment Research

OECD Oil Demand: Structural Softness and Recession Risk

Oil markets are torn between strong data from the East and soft data and recession fears from the West. On the one hand, our nowcast of China oil demand has already risen by 1.5mb/d since late November on faster-than-expected reopening, and India demand keeps setting record highs. On the other hand, OECD oil demand measures, including those from the weekly EIA reports, remain soft despite robust macro-economic activity data. Moreover, hawkish Fed and ECB rhetoric—including Powell's hint that the Fed may reaccelerate the hiking pace—has revived recession fears.

OECD oil demand remains 1.5mb/d below its 2019Q4 level and 3mb/d below its pre-pandemic trend (Exhibits 1 and 2). This *Oil Analyst* asks if OECD demand will ever fully recover. And what would OECD oil demand and oil prices be if the US and Europe entered recession, or, alternatively, reaccelerated? To find out, we build a new OECD oil demand model to forecast OECD oil demand and Brent prices under different GDP scenarios.

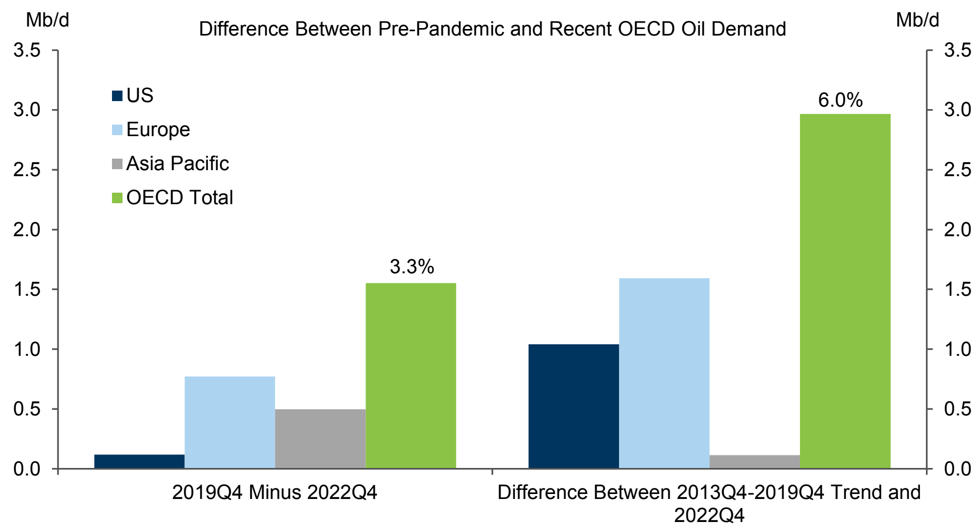
Exhibit 1: OECD Oil Demand Remains 1.5mb/d Below Its 2019Q4 Level…



Grey bars indicate US NBER recession.

Source: IEA, Goldman Sachs Global Investment Research

Exhibit 2: … and 3mb/d Below Its Pre-Pandemic Trend



Source: IEA, Goldman Sachs Global Investment Research

Modeling OECD Demand

We start by building models for the quarterly growth rate of total oil demand excluding jet fuel for 19 OECD countries.[1] Our explanatory variables are quarterly GDP growth, Brent price growth, changes in the bilateral exchange rate vs. the dollar (outside of the US), changes in weather (captured by HDD and CDD), and momentum. We estimate elasticities of oil demand to these fundamentals in a 2000-2022 sample, controlling for pandemic and quarter fixed effects, which capture seasonality.[2] The resulting bottom-up model predicts OECD oil demand growth quite well, even during the pandemic (Exhibit 9 in Appendix).[3]

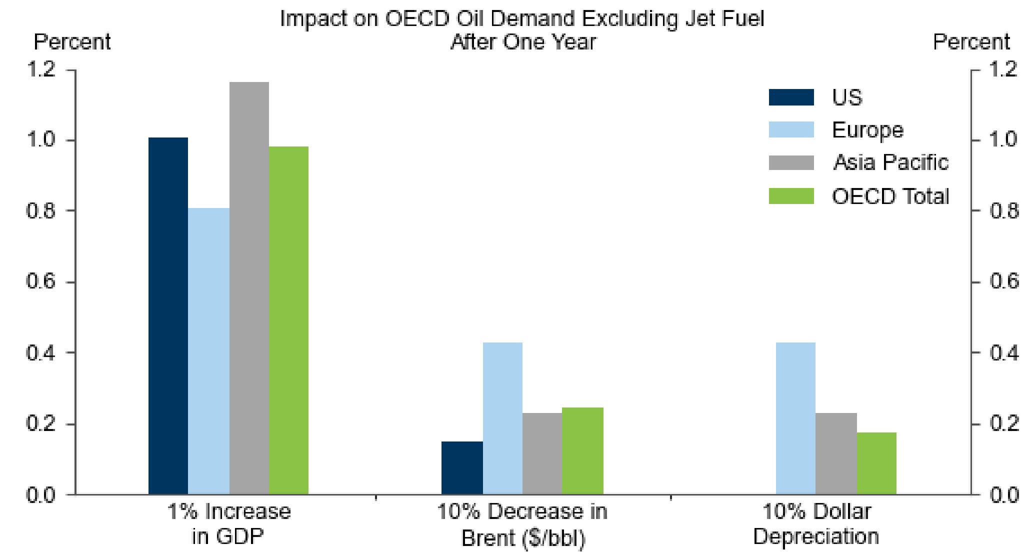
Our model shows that GDP growth is the key driver of OECD oil demand but also estimate a structural downward trend in oil demand for a given level of GDP. We find that a 1.0% rise in real GDP boosts OECD oil demand by 1.0% (or 0.5mb/d) one year after the shock, with a stronger effect of 1.2% in OECD Asia and a more moderate effect of 0.8% in Europe (Exhibit 3). We estimate only modestly negative demand effects from higher oil prices or a stronger dollar. Specifically, we estimate that a 10% increase in Brent and a 10% appreciation in the dollar decrease OECD oil demand by just above 0.2% and just below 0.2%, respectively, and that these effects are twice larger in Europe.

[1] Our country models cover 93% of OECD oil demand, and include the US, Japan, South Korea, Canada, the UK, Germany, France, Italy, Spain, Sweden, Norway, Poland, Czech Republic, Australia, New Zealand, Mexico, Chile, Turkey, Israel. We project oil demand in the rest of the OECD based the forecast of these larger countries.

[2] The pandemic quarter fixed effects cover 2020Q2, 2020Q3, and 2021Q2.

[3] We estimate regional aggregates as the oil demand weighted sum of country-level estimates.

Exhibit 3: GDP Growth Is the Key Driver of OECD Oil Demand Growth (Excluding Jet Fuel), Moving One-For-One



Source: IEA, OAG, Haver, Bloomberg, Goldman Sachs Global Investment Research

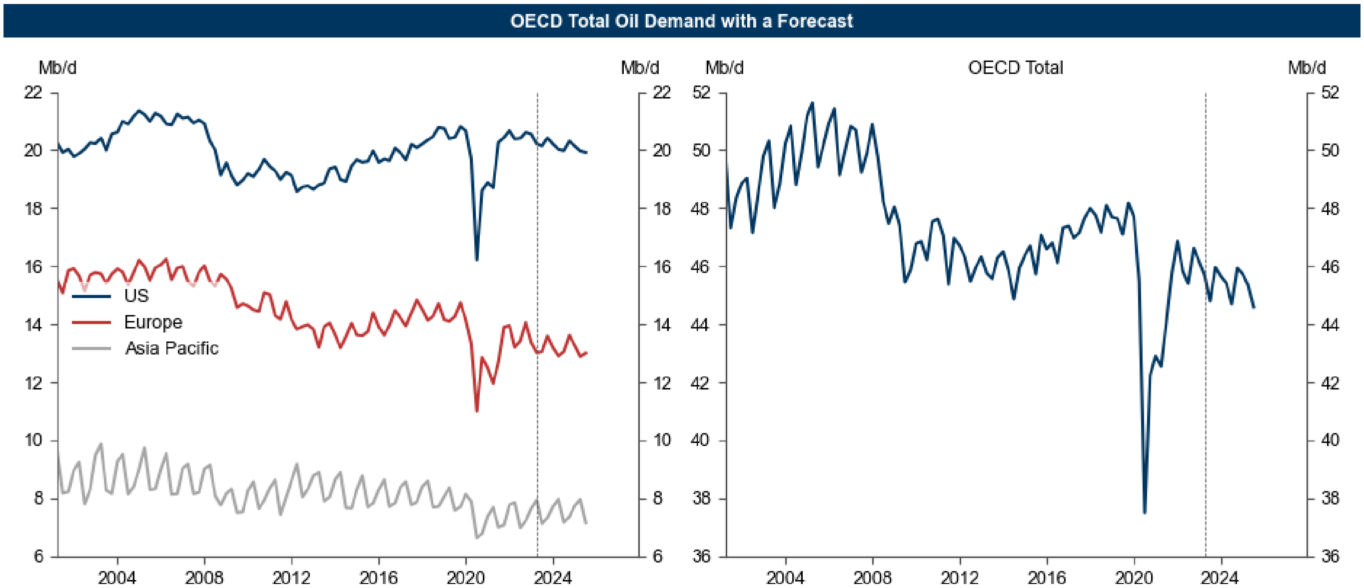
Baseline: Moderate Decline in OECD Demand

We forecast OECD oil demand in four steps.

First, we use our bottom-up model to forecast oil demand excluding jet fuel for OECD countries and regions based on our GS GDP, FX, and Brent forecasts and assuming seasonally average temperatures. Crucially, we incorporate the above consensus forecast of still moderate OECD GDP growth of 1.3% in 2023. Second, we incorporate released demand estimates for January and February in countries where available, including the US, to initiate our 2023Q1 quarterly forecasts. Third, we add our jet fuel forecasts based on scheduled flights, the post-pandemic recovery pace, and a longer-run positive trend in air travel. Fourth, we use our equity analysts' projections of electric vehicles (EVs) adoption, with every 1million rise in the stock of EVs reducing oil demand by 20kb/d.

Exhibit 4 shows our forecasts. We have nudged down our forecasts for OECD annual average demand growth in 2023 to -0.5mb/d (vs. -0.2 previously), and -0.1mb/d in 2024 (vs. flat previously). Across regions, we expect 2023 oil demand to decline by 0.3mb/d in Europe, by 0.2mb/d in the US, but edge up in OECD Asia Pacific by 0.1mb/d.

Exhibit 4: We Forecast OECD Demand Declines of 0.5mb/d in 2023 and 0.1mb/d in 2024



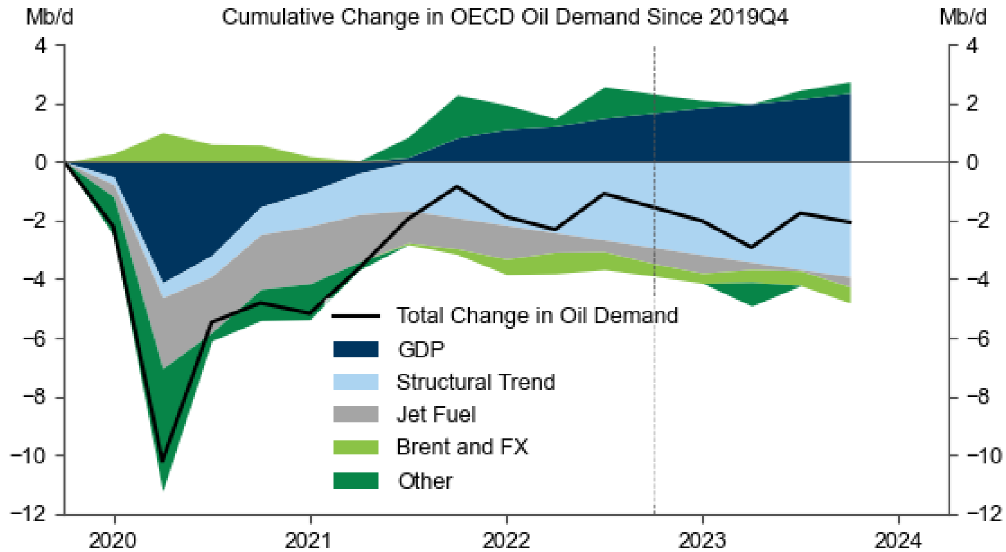
Source: IEA, OAG, Haver, Bloomberg, Goldman Sachs Global Investment Research

Despite a moderate 0.5mb/d decline in OECD oil demand to 45.5mb/d (annual average) in 2023, we still expect Brent prices to grind higher to $100/bbl by December, and stay there in 2024. The key driver is that rapid growth in non-OECD demand outweighs the moderate decline in OECD oil demand and modest non-OPEC supply increases due to very limited spare capacity, which should push the market back to deficits from June onwards. This OECD demand downgrade, however, does raise the risk that OPEC keeps its output lower for longer, and does not reverse the October cut in 2023H2.

Drivers of Soft OECD Demand

Why does our model predict that OECD demand will remain well below its pre-pandemic level? The reason is that the demand hits from the structural decline in oil intensity of GDP (roughly captured by our model's intercept, shown in light blue in Exhibit 5) and from higher oil prices and a stronger dollar are likely to continue to outweigh the boost from GDP growth (in dark blue).

Exhibit 5: The Hit to Oil Demand From the Structural Decline in Oil Intensity Outweighs the Boost From GDP Growth



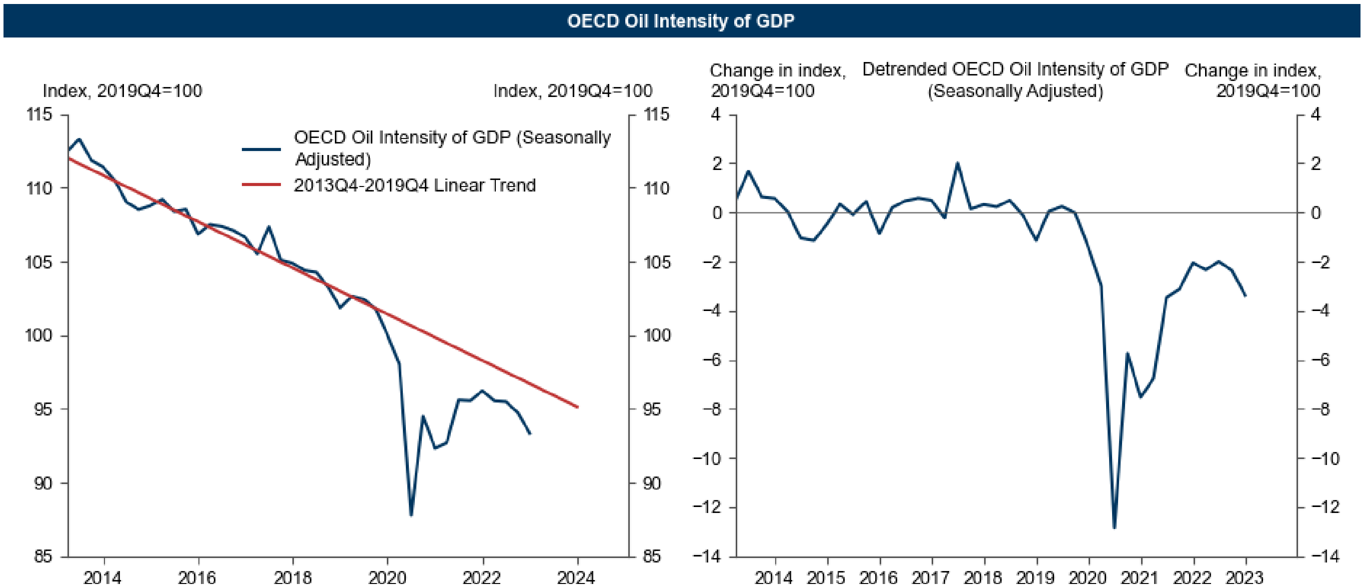
"Other" includes weather, seasonality, momentum, pandemic effects, EVs, and the residual. The "Structural Trend" corresponds to the contribution from the intercept in our quarterly growth model.

Source: IEA, OAG, Haver, Bloomberg, Goldman Sachs Global Investment Research

Our forecast that OECD oil demand will remain well below its pre-pandemic trend is also consistent with three stylized facts.

First, prior recessions, especially the 2008 financial crisis, have tended to weigh on the oil demand trend (Exhibit 1). Second, this hit reflects persistent GDP losses (as our economists forecast below potential OECD growth given the overheating), and likely some persistent declines in the oil intensity of GDP—the number of barrels consumed per unit of output—relative to its declining pre-pandemic trend. In fact, the oil intensity of OECD GDP declined further below its pre-pandemic trend last year as the manufacturing sector cooled (Exhibit 6).

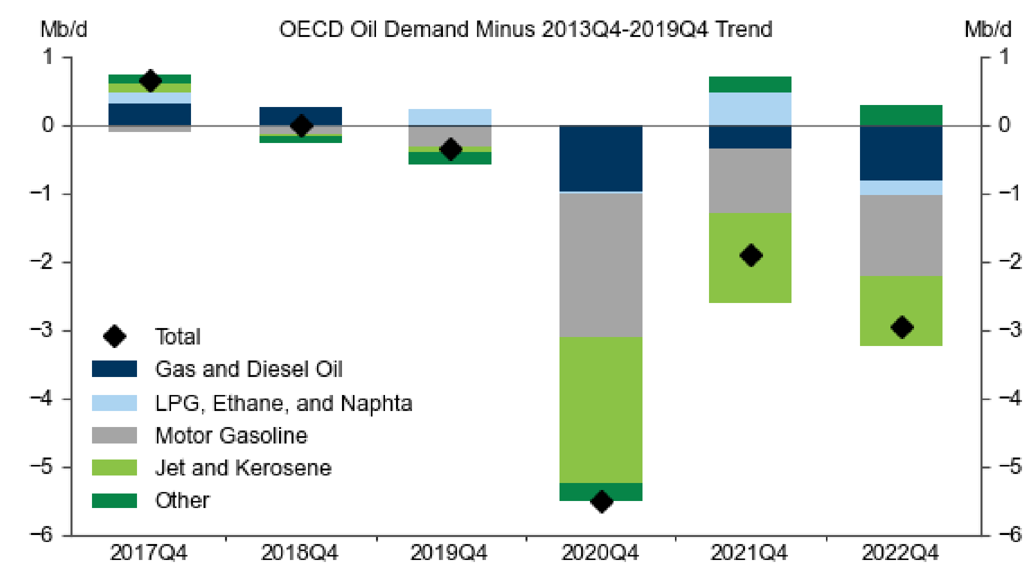
Exhibit 6: The Oil Intensity of OECD GDP Edged Down Further Below Its Pre-Pandemic Trend in 2022



Source: IEA, Haver, Goldman Sachs Global Investment Research

Third, the shortfall is broad-based across regions (Exhibit 2) and across oil products (Exhibit 7). While jet and gasoline drove the initial pandemic drop in oil demand, the recent softness also includes the industry- and petrochemical exposed gas and diesel oil as well as the LPG, ethane, and naphtha categories.[4]

Exhibit 7: The Shortfall in Demand Is Fairly Broad-Based Across Products



Source: IEA, Goldman Sachs Global Investment Research

This broad-based structural drag on OECD oil demand implies that the downward trend will likely persist. In fact, we now estimate trend OECD annual oil demand growth—when GDP grows at its potential 1.5% rate, and when oil prices, the dollar, and jet fuel

4 LPG and gas/diesel oil, jet fuel, and motor gasoline each account for roughly 1/3 of the 1.5mb/d pre-pandemic gap (Exhibit 10 in Appendix).

demand are stable—of -0.2mb/d, with over 2/3 of the negative contribution from Europe.

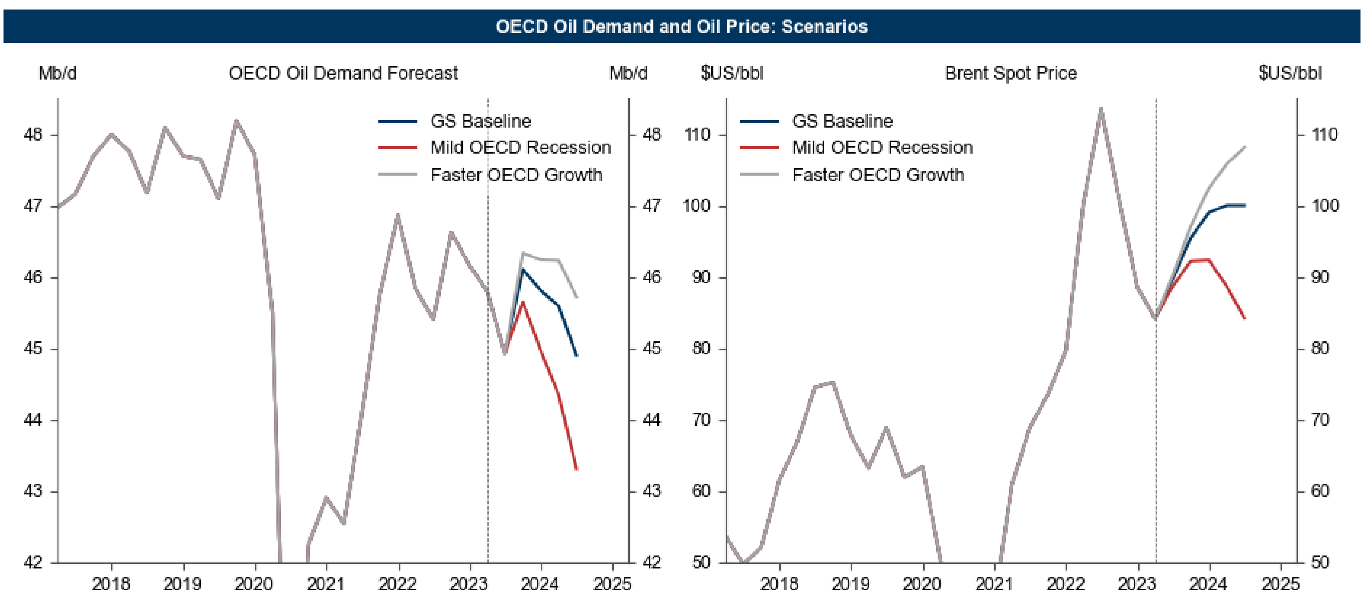
Risk Scenarios

We next assess the risks to our baseline forecast that Brent will grind higher to $100/bbl by December from potential surprises in OECD demand. We consider a mild recession scenario and a reacceleration scenario using our GS Brent pricing framework, which relates timespreads and the level of OECD commercial inventories.

In the mild recession scenario, we assume that OECD real GDP growth disappoints our baseline by 4pp (annualized) in 2023Q3-2024Q2 and declines to -2.3% annualized, on average, over this period. In this scenario, oil demand declines by 0.8mb/d and 1.3mb/d in 2023 and 2024, respectively. Assuming that the rest of our balances are unchanged, we estimate that Brent prices would be $16 below our baseline by 2024Q2 (at $84/bbl). Prices would fall more if a recession were deeper or longer, non-OECD demand or positioning also weakened, or if long-dated prices also sold off, although OPEC may also cut output in response to the demand hit.

In contrast, if OECD GDP growth were to beat our expectations by 2pp (annualized) over this period, then firmer demand would push up Brent prices by $8/bbl above our baseline, and reach $108/bbl by 2024Q2 (Exhibit 8).

Exhibit 8: A Mild OECD Recession in 2023Q3-2024Q2 Would Decrease Oil Demand by 1mb/d on Average Over This Period and Lower Brent Prices by $16/bbl



OECD real GDP growth corresponds to the GS econ forecasts in the GS baseline, and is 4pp annualized lower/2pp annualized higher in 2023Q3-2024Q2 in the "Mild OECD Recession"/"Faster OECD Growth" scenarios, respectively.

Source: IEA, OAG, Haver, Bloomberg, Goldman Sachs Global Investment Research

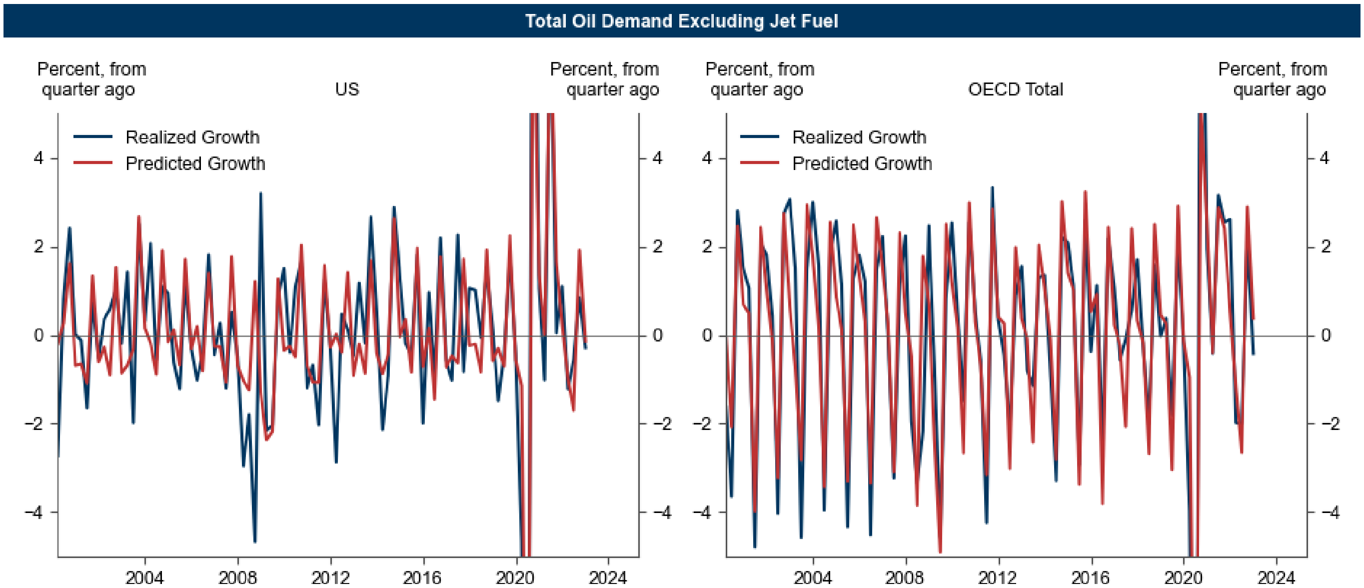
Overall, we see limited upside to OECD oil demand because still elevated core inflation would likely lead the Fed and ECB to prevent any sharp reacceleration in growth above potential. However, the meaningful but still moderate $16/bbl hit to oil prices under our mild OECD recession scenario and our constructive near-term GDP outlook together underscore that EM demand is likely to hold the key to oil prices this year.

Yulia Zhestkova Grigsby

Daan Struyven

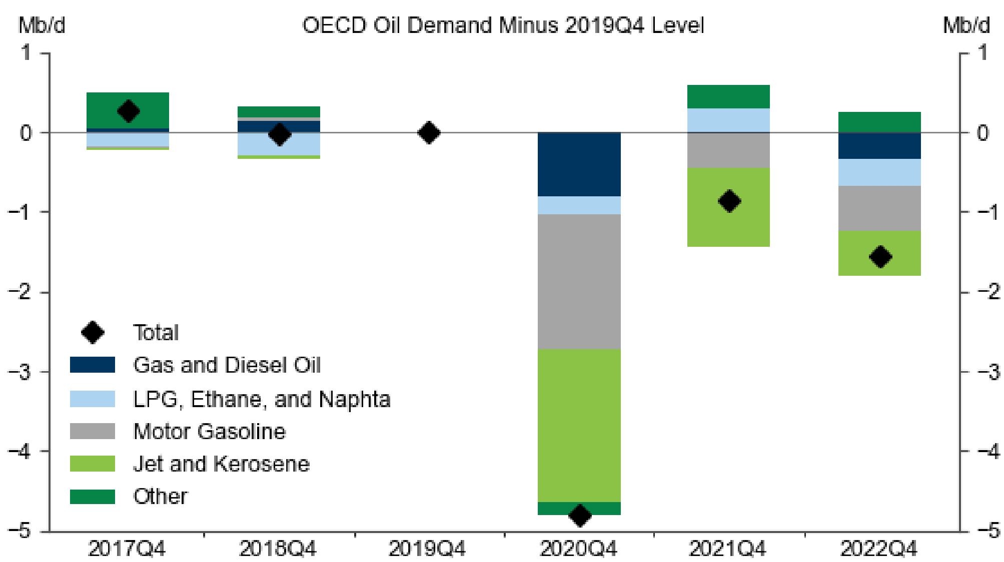
Appendix

Exhibit 9: Our Bottom-Up Model Fits OECD Oil Demand Growth Quite Well



Source: IEA, OAG, Haver, Bloomberg, Goldman Sachs Global Investment Research

Exhibit 10: Mobility-Related Oil Products Were the Main Driver of the Pandemic Oil Demand Weakness



Source: IEA, Goldman Sachs Global Investment Research

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