OIL ANALYST

China Petchem Oil Demand Weakness Likely Mostly Unsustainable

- The decline in China oil end-use demand has played a key role in reducing the global oil deficit and upward crude price pressure due to the Hormuz shock. While gasoline and diesel demand is likely to remain low as long as China product prices remain high, we see the decline in oil demand from the petrochemicals ("petchem") sector as much less sustainable for two reasons.
- First, nearly one-third of the Q2 weakness in China demand for oil products used in the petchem sector reversed by August.
- Second, while fuel switching (including the growing usage of electric vehicles) has driven much of the weakness in China gasoline and diesel end-use demand, we estimate only a modest contribution from feedstock switching to the weakness in China petchem oil demand.
- Using plant-level capacity and utilization data, we estimate that oil-to-coal switching explains only 19% of the Q2 hit to China petchem oil demand, and naphtha-to-ethane switching explains just 8%. The vast majority of the decline (73%) was due to lower production of petchem products, which likely largely reflected downstream destocking (and is not sustainable in the long-term) and potentially also some price-induced end-use demand destruction.

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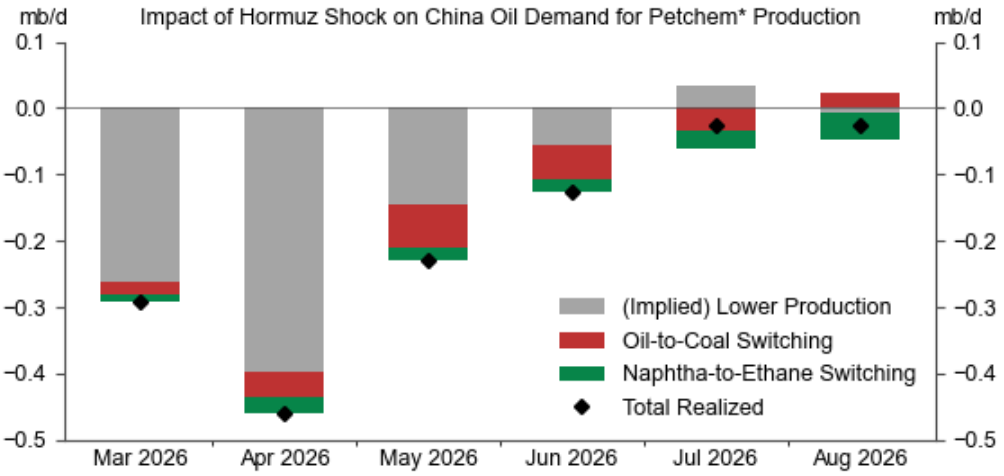
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We Estimate That 73% of the Q2 Hit to China Petchem Oil Demand Was Driven by Lower Production, With Just 19% Driven by Oil-to-Coal Switching and 8% by Naphtha-to-Ethane Switching



*Includes ethylene, propylene, and monoethylene glycol. The decline in demand in a given month is calculated relative to a counterfactual defined by taking February 2026 demand and appending detrended seasonal deviations derived from 2025 data.

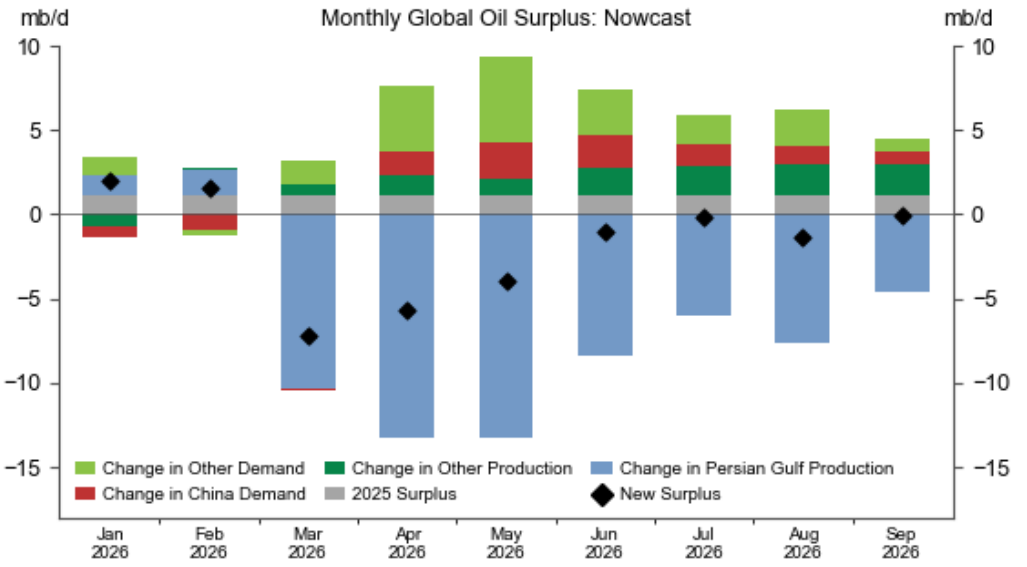
Source: Chemical Market Analytics, OilChem, Goldman Sachs Global Investment Research

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Drivers of Decline in China Demand

The decline in China oil end-use demand has played a key role in reducing the global oil deficit and upward crude price pressure due to the Hormuz shock, offsetting over 15% of the Q2 hit to Persian Gulf production (Exhibit 1). We estimate that the fair value of crude prices based on OECD commercial stocks would have been about $15/bbl higher if China crude imports had not fallen. Given our base case assumption that Mideast output rises only gradually as shipping disruptions continue into 2027, a key question is whether China can continue to balance the market in this way. While we expect demand for gasoline and diesel to remain low as long as China product prices remain high, we see the decline in oil demand from the petrochemicals ("petchem") sector as much less sustainable for two reasons.

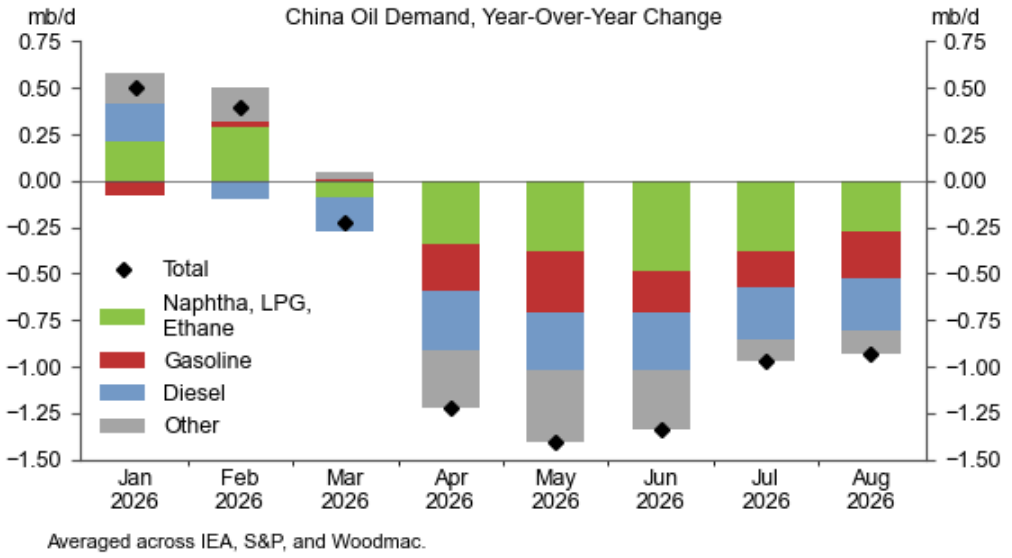
Exhibit 1: The Decline in China Oil Demand Has Helped Reduce the Global Oil Deficit Due to the Hormuz Shock



Source: Goldman Sachs Global Investment Research

First, we estimate that nearly one-third of the Q2 0.40mb/d year-over-year (YoY) decline in China demand for oil products used in the petchem sector (i.e., naphtha, LPG, and ethane) already reversed by August. In contrast, diesel and gasoline demand remain very suppressed, having only recovered by 9% and 7% from their respective Q2 YoY declines of 0.31mb/d and 0.27mb/d (Exhibit 2).

Exhibit 2: Nearly One-Third of the Q2 0.40mb/d Year-Over-Year Decline in China Demand for Oil Products Used in the Petchem Sector Reversed by August



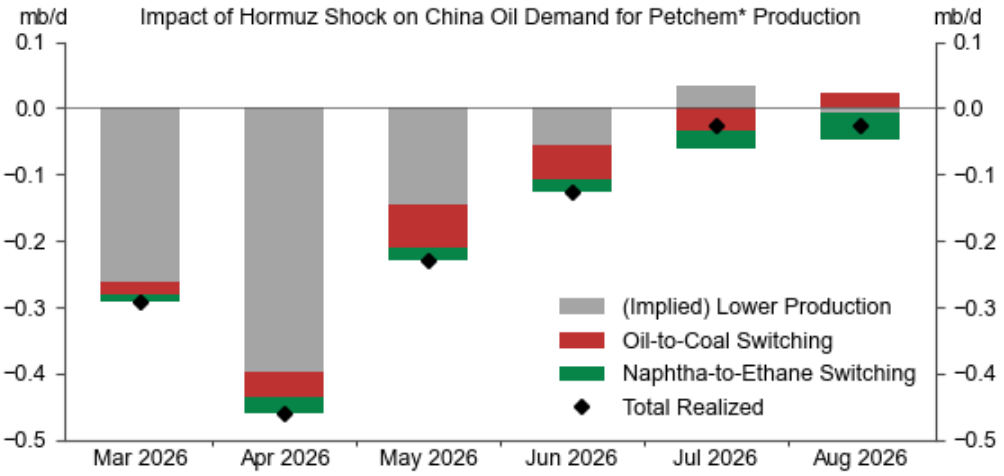
"Other" primarily includes fuel oil.

Source: IEA, S&P, Woodmac, Goldman Sachs Global Investment Research

Second, feedstock switching has played a smaller role in explaining China oil demand weakness for petchem feedstocks than fuel switching has for gasoline and diesel. Fuel switching has driven much of the decline in demand for gasoline and diesel, primarily via higher utilization and sales penetration of electric cars/trucks, as well as switching by certain industries from diesel engines to grid power. In contrast, combining micro plant-level capacity and operating schedules data, we estimate that just 19% of the Q2 hit to China petchem oil demand can be explained by oil-to-coal switching and only 8% by naphtha-to-ethane switching. The remainder and vast majority of the decline (73%) was due to lower production of petchem products, which likely largely reflected downstream destocking (and is not sustainable in the long-term) and potentially also some price-induced end-use demand destruction (Exhibit 3).

We next review how China's petchem oil market works, before estimating the relative contributions of lower production versus feedstock switching to the reduction in China petchem oil demand.

Exhibit 3: We Estimate That 73% of the Q2 Hit to China Petchem Oil Demand Was Driven by Lower Production, With Just 19% Driven by Oil-to-Coal Switching and 8% by Naphtha-to-Ethane Switching



*Includes ethylene, propylene, and monoethylene glycol. The decline in demand in a given month is calculated relative to a counterfactual defined by taking February 2026 demand and appending detrended seasonal deviations derived from 2025 data.

Source: Chemical Market Analytics, OilChem, Goldman Sachs Global Investment Research

How Does China's Petchem Market Work?

China's petchem market is complex, featuring interwoven supply chains along which many different key intermediates ("building blocks") and end-use chemicals are produced from the same feedstocks. We focus on the supply chains of three major "building blocks" for which we have plant-level data and which involve switching pathways: ethylene, propylene, and monoethylene glycol (MEG)[1] (Exhibit 4).

- Ethylene and propylene are direct derivatives of oil or coal[2] and serve as precursors for over 60% of commercial end-use chemicals; they can be co-produced or produced separately, depending on the process[3].
- MEG is a downstream derivative of ethylene that can also be produced directly from coal.

A single plant that is designed to use oil (in the case of ethylene/propylene) or ethylene (in the case of MEG) as a feedstock cannot simply switch to using coal, and vice versa. Rather, "switching" occurs in aggregate as individual plants optimize how hard they run based on feedstock-specific margins—if oil becomes more expensive than coal, then oil-based ethylene margins drop below coal-based ones, oil-based plants run less hard, and aggregate consumption of oil declines relative to that of coal[4].

For ethylene only, a second switching pathway is also available: a large share of steam crackers can flex between using naphtha, LPG, and ethane, or some mix of the three, as their primary feedstock[5].

[1] Switching away from oil is viable for the subset of "building blocks" we focus on, but it is not fully scaled or possible for other "building blocks" that are outside the scope of our analysis (such as aromatics). Therefore, our estimates of feedstock switching (in percent terms) for ethylene, propylene, and MEG may be larger than for the entire petchem market.

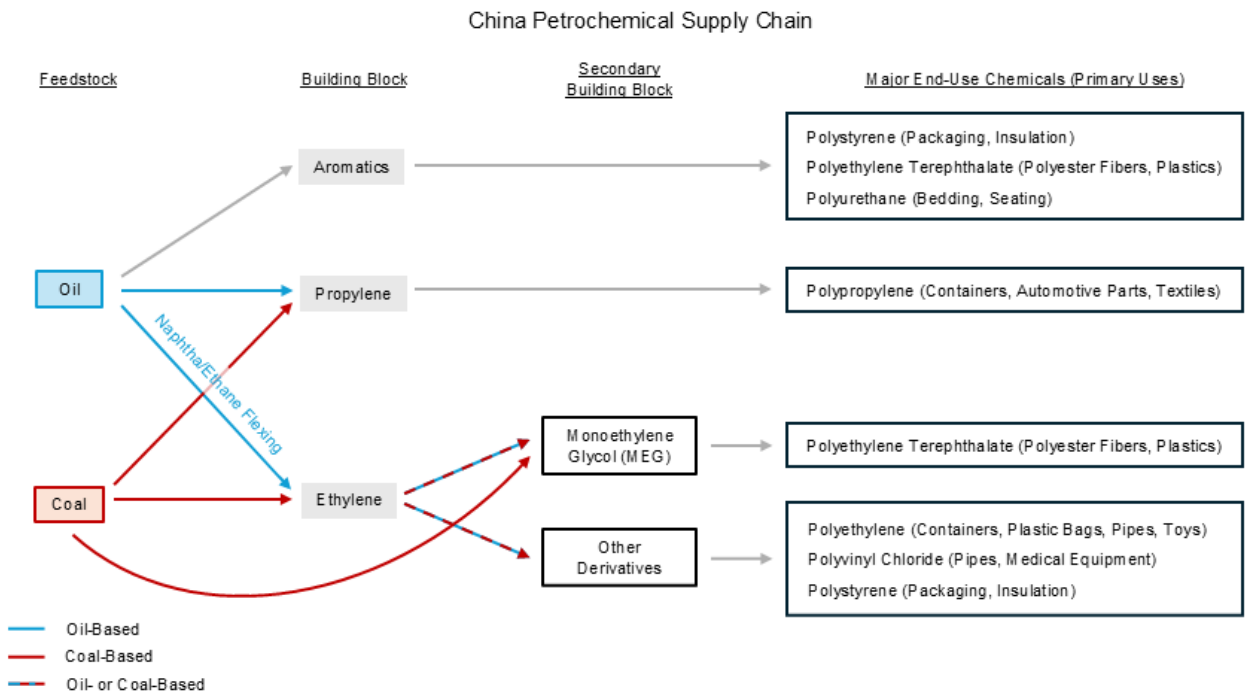
[2] Latest feedstock shares of combined ethylene and propylene production capacity are 84% for oil (LPG, ethane, naphtha, and others), 10% for coal, 5% for methanol, and 1% for other. We ignore methanol in our analysis because its implications for switching are less clear than for coal, for two reasons: (1) it comprises a significantly smaller fraction of total capacity, and (2) inland methanol-to-olefins plants use methanol produced from domestic coal reserves, while coastal plants use methanol primarily imported from the Mideast and have thus faced similar disruptions to oil-based plants.

[3] Ethylene and propylene are co-produced via LPG-/naphtha-based steam cracking and fluid catalytic cracking. Ethylene is produced on its own via ethane-based steam cracking, and propylene is produced on its own via propane dehydrogenation.

[4] "Switching" can also occur in the long-term when operators choose to build more plants that use a certain feedstock and thus change the aggregate capacity mix; however, given that it typically takes over five years to build a new petchem plant, this pathway is not relevant for our analysis.

[5] Switching between naphtha and LPG/ethane is technically possible for propylene production, but it is by far less viable than for ethylene production. Naphtha-based steam crackers produce sizable quantities of both ethylene (two-carbon olefin) and propylene (three-carbon olefin), but LPG- and ethane-based steam crackers produce lots of ethylene and little to no propylene. This is because naphtha contains longer hydrocarbons that "crack" into a heterogeneous mix of two-carbon, three-carbon, and four-plus-carbon olefins; in contrast, LPG consists of three-carbon and four-carbon chains that more readily decompose into two-carbon olefins, and ethane is a two-carbon molecule that can only break down into a two-carbon olefin.

Exhibit 4: Oil-to-Coal Switching Can Occur for Production of Ethylene, Propylene, and MEG, While Naphtha-to-Ethane Switching Can Occur for Ethylene Production Only



Arrows pointing from "Oil" that are unlabeled represent production pathways that do not involve flexing between naphtha and ethane.

Source: Goldman Sachs Global Investment Research

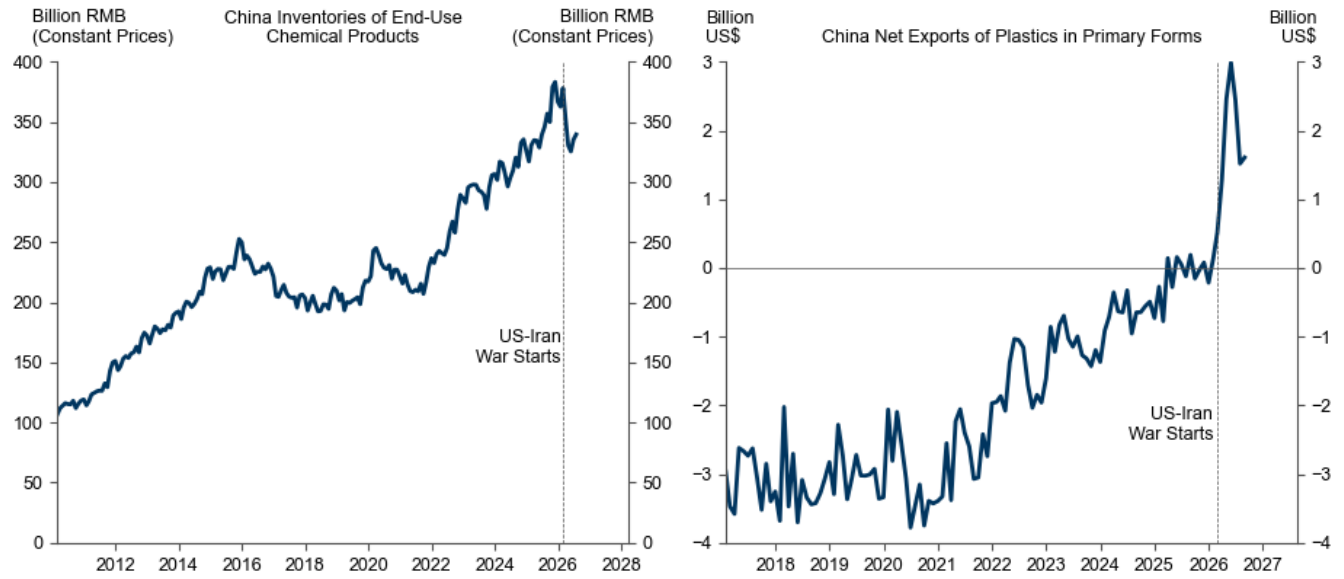
Driver #1: Lower Petchem Production (on Downstream Destocking)

The main driver of the reduction in petchem oil demand has been lower production of petchem building blocks (ethylene, propylene, and MEG), which likely largely reflected downstream destocking (and is not sustainable in the long-term) and potentially also some price-induced end-use demand destruction.

We estimate the hit to petchem production as the realized hit to Q2 oil demand for petchem feedstocks, minus the effects of the two switching pathways (oil-to-coal and naphtha-to-ethane); we find that destocking and demand destruction collectively explain 73% of the hit. Despite the fact that China has depleted 95% of its 2025 end-use chemical inventory builds since the beginning of the crisis, inventory levels remain high by historical standards (Exhibit 5). That being said, China is unlikely to continue to draw down its chemical inventories for multiple years for reasons similar to why they seek to keep their crude oil inventories elevated—to attain self-sufficiency and hedge against future supply shocks.

Destocking of chemical products such as plastics likely also allowed China to benefit from the rise in prices—consistent with its price elasticity and its stabilizing role in many commodity markets—by shifting to a net plastics exporter during the crisis[6] (Exhibit 5).

Exhibit 5: Downstream Destocking is Unsustainable in the Long-Run Given the Rapid Drawdown Over the Course of the Hormuz Crisis; Some Inventories Have Likely Been Used to Boost Exports



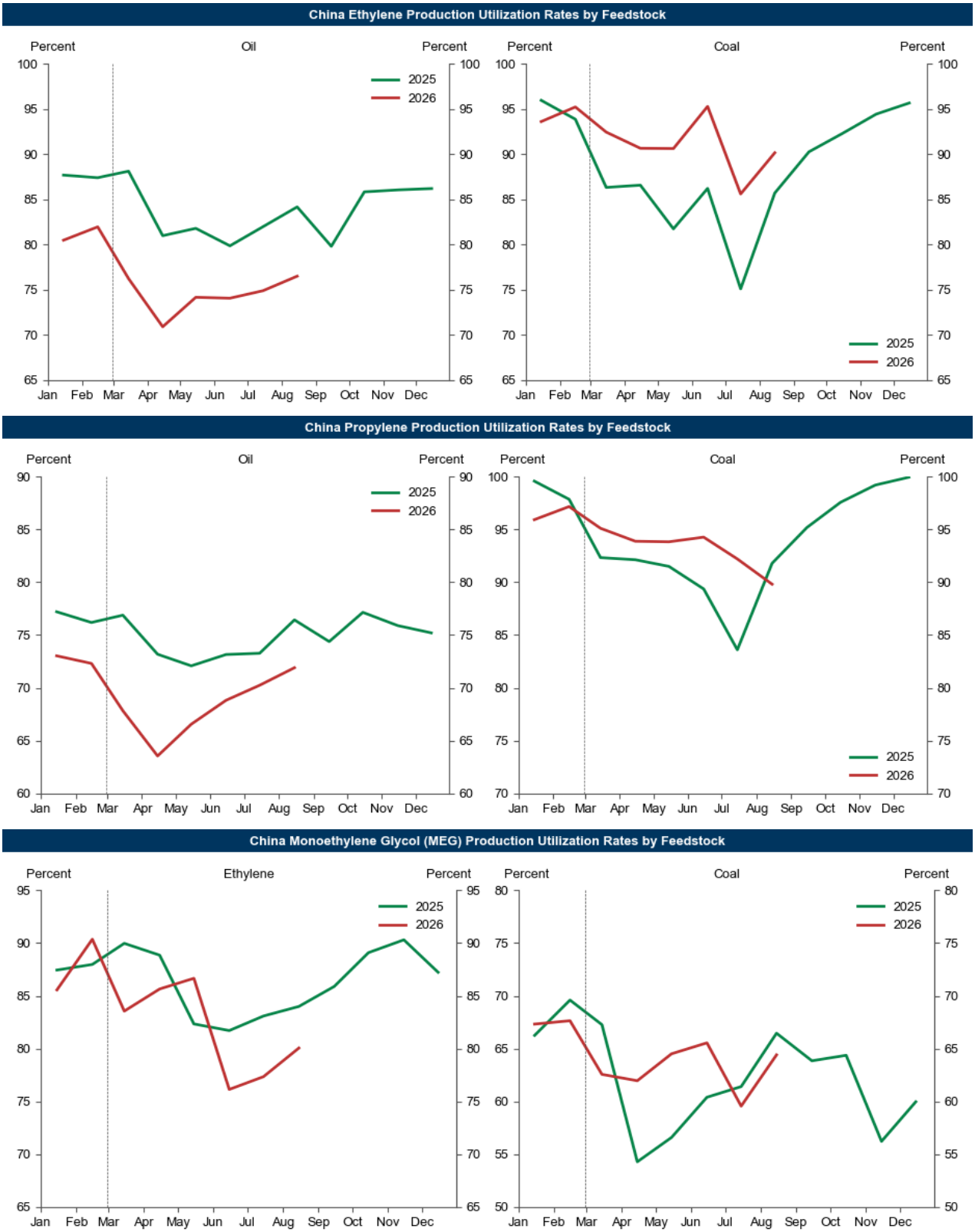
Source: National Bureau of Statistics, General Administration of Customs, Goldman Sachs Global Investment Research

[6] Increases in exports volumes, declines in import volumes, and price changes could all drive increases in nominal net exports. We estimated previously that the rise in China's net exports of plastic and plastic articles in 2026Q2 versus 2025Q4 reflected a 17% drop in import volumes and a 14% rise in export volumes.

Driver #2: Moderate Oil-to-Coal Switching

We find that across ethylene, propylene, and MEG, utilization rates of oil-based plants fell and remain well below their seasonal norms, which likely reflects operators' decisions to bring maintenance forward and/or reduce runs as oil prices spiked and oil-based margins worsened. Simultaneously, utilization rates of coal-based plants jumped above seasonal norms early in the crisis before reducing or closing the gap in July and August, which is likely evidence that maintenance was pushed off in order to keep runs high but still had to be done eventually (Exhibit 6).

Exhibit 6: Utilization Rates of Oil-Based Plants Remain Well Below Their Seasonal Norms; Those of Coal-Based Plants Were Elevated Early in the Conflict Before Moderating More Recently



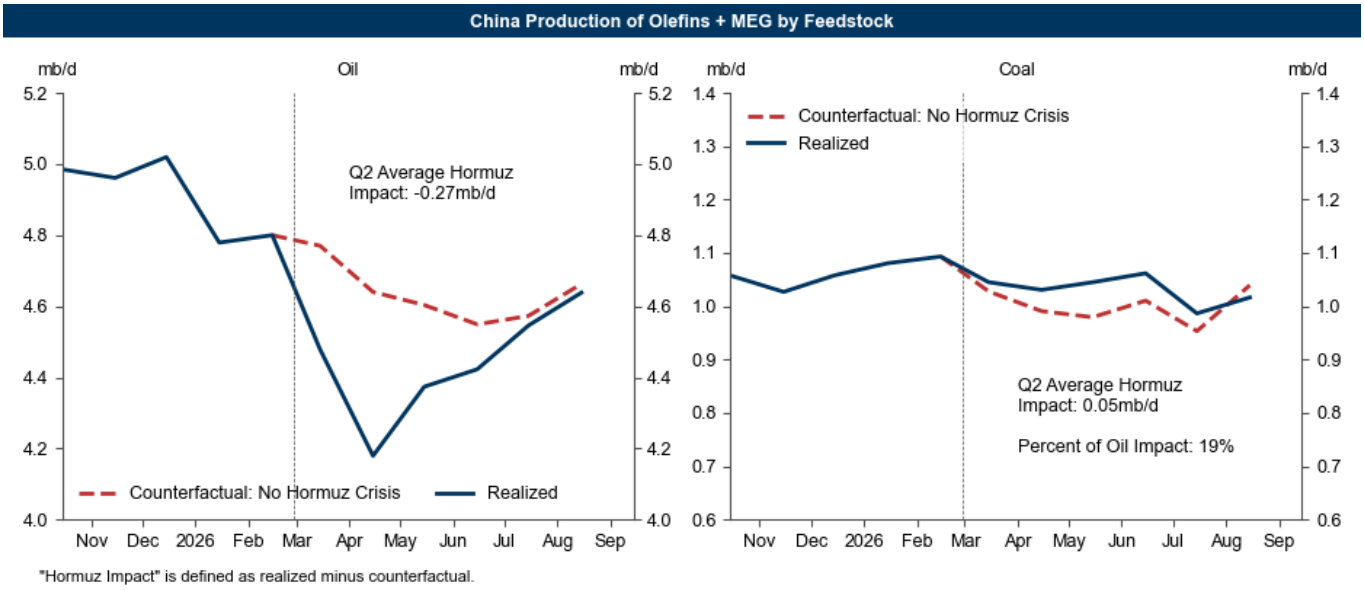
"Oil" includes naphtha, LPG, ethane, and vacuum gas oil.

Source: Chemical Market Analytics, Goldman Sachs Global Investment Research

However, oil-to-coal switching was more limited than utilization rates alone suggest, for two reasons. First, China has approximately five times less coal-to-chemicals capacity compared to oil-to-chemicals capacity. Second, coal-to-ethylene and coal-to-propylene plants were already running very hard prior to the war, with utilization rates averaging 89% and 94% in 2025, respectively, meaning that they had limited room to increase meaningfully further.

We estimate that oil-to-coal switching contributed to 19% of the Q2 decline in petchem oil demand. We define oil-to-coal switching as the increase in coal demand divided by the decrease in oil demand, both relative to a "no Hormuz crisis" counterfactual[7]. We find that in Q2, petchem oil demand was 0.27mb/d below what it would have been, while coal demand was 0.05mb/d higher (Exhibit 7).

Exhibit 7: In Q2, Petchem Oil Demand Was 0.27mb/d Below Seasonal Norms, While Coal Demand Was 0.05mb/d Higher, Corresponding to 19% Switching



"Oil" includes naphtha, LPG, ethane, and vacuum gas oil.

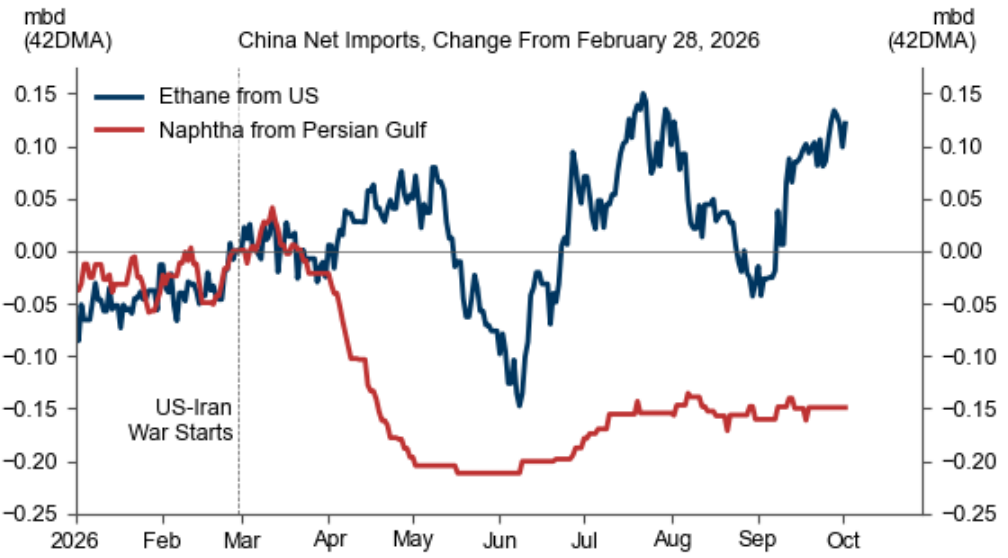
Source: Chemical Market Analytics, OilChem, Goldman Sachs Global Investment Research

[7] The "no Hormuz crisis" counterfactual for oil and coal demand is defined by taking February 2026 demand levels and appending 2025 detrended monthly changes. This ensures that the counterfactual accounts for seasonality but not the capacity ramp-up unique to 2025.

Driver #3: Limited Naphtha-to-Ethane Switching

When naphtha supply from the Persian Gulf remained disrupted, China began to import more ethane from the US to enable steam crackers with flexing capacity to switch from naphtha to ethane, with net imports reaching their (first) all-time high in April (Exhibit 8). As a result, the share of ethane in total oil-based ethylene production increased by 4 percentage points from late February to late August (and equivalently, the share of naphtha declined by 4 percentage points)[8] (Exhibit 9).

Exhibit 8: When Naphtha Supply From the Persian Gulf Remained Disrupted, China Imports of Ethane from the US Picked Up to Facilitate Naphtha-to-Ethane Switching for Ethylene Production



Source: Kpler, Goldman Sachs Global Investment Research

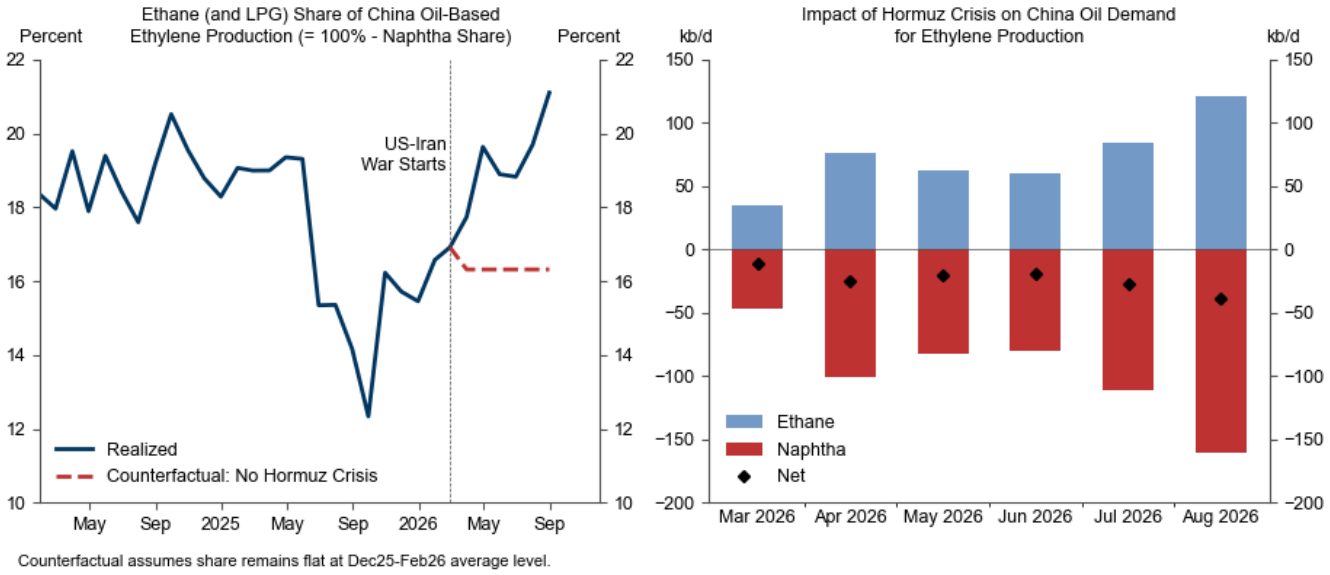
We estimate that naphtha-to-ethane switching contributed to 8% of the 0.27mb/d Q2 decline in petchem oil demand. We define naphtha-to-ethane switching as the decline in naphtha consumption minus the increase in ethane consumption, both relative to a "no Hormuz crisis" counterfactual[9]. Given that one barrel of ethane yields over 30% more ethylene than one barrel of naphtha does[10], the Q2 decline in naphtha usage (0.09mb/d) more than offset the increase in ethane usage (0.07mb/d), resulting in 0.02mb/d of switching.

[8] The increase in the share of ethane in total oil-based ethylene production was large relative to the starting level but modest in percentage point terms. This is likely due to a combination of factors: (1) only a subset (around 60%) of steam crackers have the ability to flex at all, (2) it is unfavorable to completely switch away from naphtha cracking because, unlike ethane cracking, it co-produces propylene and other valuable building blocks, and (3) US ethane exports have been highly constrained, with the largest port exporting record high volumes in August and operating significantly above its nameplate capacity.

[9] The "no Hormuz crisis" counterfactual for naphtha and ethane demand is defined such t ethane shares of production remained flat at their respective December 2025 – February 2 pre-war) levels.

[10] We use feedstock-to-ethylene yields of 80% for ethane (i.e., 1 metric ton of ethane yield ethylene) and 30% for naphtha, and volume-to-mass ratios of 17.6 barrels/metric ton for e barrels/metric ton for naphtha. We calculate that 22 barrels of ethane vs 29 barrels of nap produce 1 metric ton of ethylene.

Exhibit 9: Given That a Barrel of Ethane Yields 30% More Ethylene Than a Barrel of Naphtha, the Decline in Naphtha Usage from Switching Has More Than Offset the Increase in Ethane Usage



Counterfactual assumes share remains flat at Dec25-Feb26 average level.

We assume that 100% of the increase in ethane and LPG share of China oil-based ethylene production can be attributed to an increase in the ethane share because LPG was not a viable alternative to naphtha during this crisis. We do not consider LPG-to-ethane switching because LPG is a much smaller feedstock than naphtha for steam crackers.

Source: Chemical Market Analytics, OilChem, Goldman Sachs Global Investment Research