Oil Analyst

Now-Cast Me if You Can

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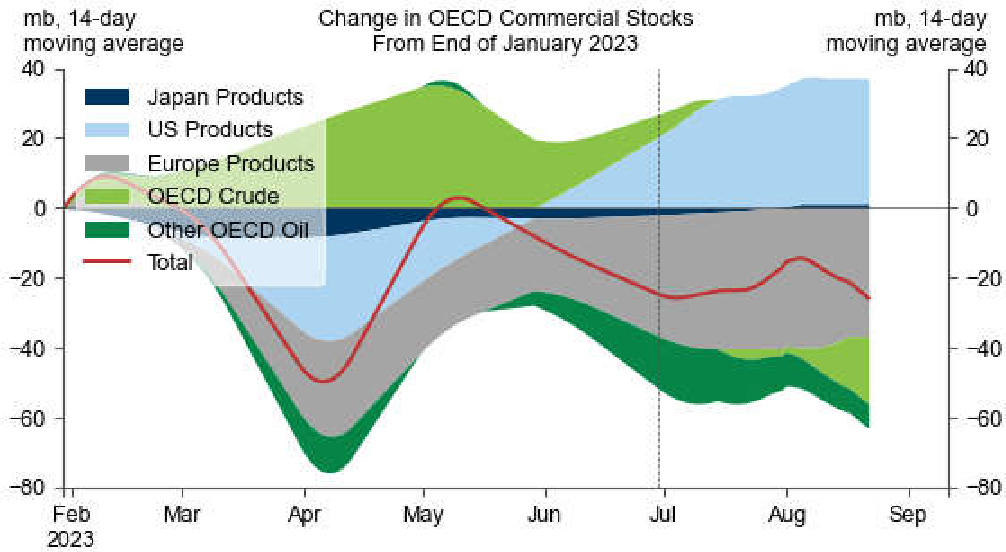
- Following a 15% July rally, oil prices continue to outperform most macro assets as the oil market is pricing sizeable deficits. Last month, we identified persistently higher-than-expected inventories as the key bearish risk to our Brent forecast of $86/bbl (December 2023) and $93/bbl (12 months ahead) because high-frequency stocks data looked elevated relative to deficit estimates and to the speed of the rally. This *Analyst* introduces a nowcast of OECD commercial stocks, and finds that this bearish risk has eased.
- We estimate the level of global oil stocks at just above 9 billion barrels, with about 2 billion of "non-trackable" barrels, all in emerging economies. Our nowcast thus focuses on the roughly 3 billion barrels of OECD landed commercial stocks—the key fundamental in our pricing framework. This daily nowcast combines timely government, satellite, and cargo-based stocks data based on their predictive content for historical IEA data.
- The risk of persistently higher-than-expected stocks has eased. For one thing, OECD landed commercial stocks fell by 15mb in June according to the latest IEA Oil Market Report. Since then, our nowcast shows roughly flat OECD commercial stocks over the past seven weeks, with an offset between OECD crude draws and US product stocks builds. Second, Kpler non-OECD landed stocks and global stocks on water have drawn sharply month-to-date by 50mb and 20mb, respectively, driven mostly by China landed stocks and Saudi stocks on water (although the uncertainty around satellite data is always significant).
- Recent risk developments to our constructive oil call have been bullish to mixed. The recent draws, and the possibility of lower-for-longer OPEC+ supply given Saudi's reiterated commitment to cuts are bullish. In contrast, the key bearish risk—a further rise in Iran supply—has grown amid reports of rising exports and of a potential US-Iran prisoner swap. Finally, China news is mixed with downside risk to GDP from the property slump but a still solid China oil demand nowcast.

OECD Crude Draws Have Recently More Than Offset Builds in US Products



The dotted line indicates the latest realized observation from the IEA (end of June).

Source: IEA, Kpler, DOE, Euroilstocks, PAJ, ARA PJK, Haver, Goldman Sachs Global Investment Research

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Oil prices rallied 15% in July as the market priced a return to deficits and as speculative positioning recovered on the market abandoning its negative US growth views. While Brent is slightly down month-to-date, it continues to outperform most other macro assets, including equities and bonds, which are dragged down by weak China activity data and an upward reassessment of US interest rates. The main reason for oil outperformance is that the oil market continues to price sizeable deficits and that positioning, which we viewed as excessively pessimistic in the spring, has recovered since.

Last month, we identified persistently higher-than-expected inventories as the key bearish risk to our Brent forecast of $86/bbl (December 2023) and $93/bbl (12 months ahead) because high-frequency stocks data looked elevated relative to supply- and demand based deficit estimates and relative to the speed of the rally. This *Analyst* introduces a nowcast of OECD commercial stocks—the key fundamental in our pricing framework—and finds that this bearish risk of higher-than-expected stocks has eased with the arrival of draws.

Taking Stock of Stocks

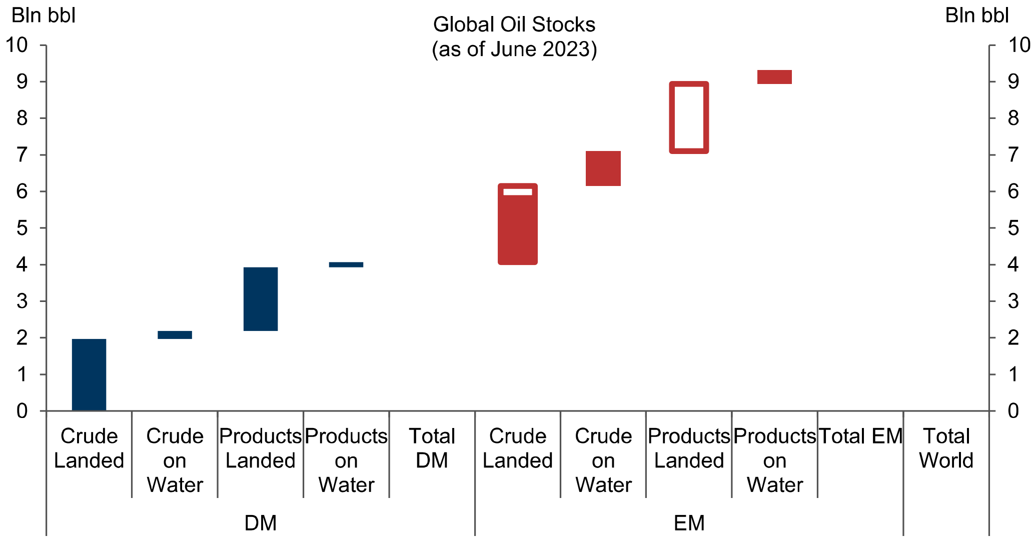
We start with an overview of the composition of global oil stocks, which consist of three major components (Exhibit 1).

The first is OECD landed oil stocks for crude and products (commercial and government stocks) as reported by national governments and the IEA.

The second component is non-OECD landed oil stocks, which have grown over the last years alongside non-OECD oil demand. However, non-OECD stocks are hard to track due to the lack of reported government data. We thus estimate crude stocks based on Kpler satellite crude stocks data, and estimate non-OECD products stocks assuming the same ratio between crude and products stocks as in the OECD (more details in Appendix).

The third and smallest component (18% of total stocks) is oil on water, which we define as floating storage and oil in transit for over 7 days.

Exhibit 1: OECD Stocks Account for Nearly Half of Landed Global Oil Stocks



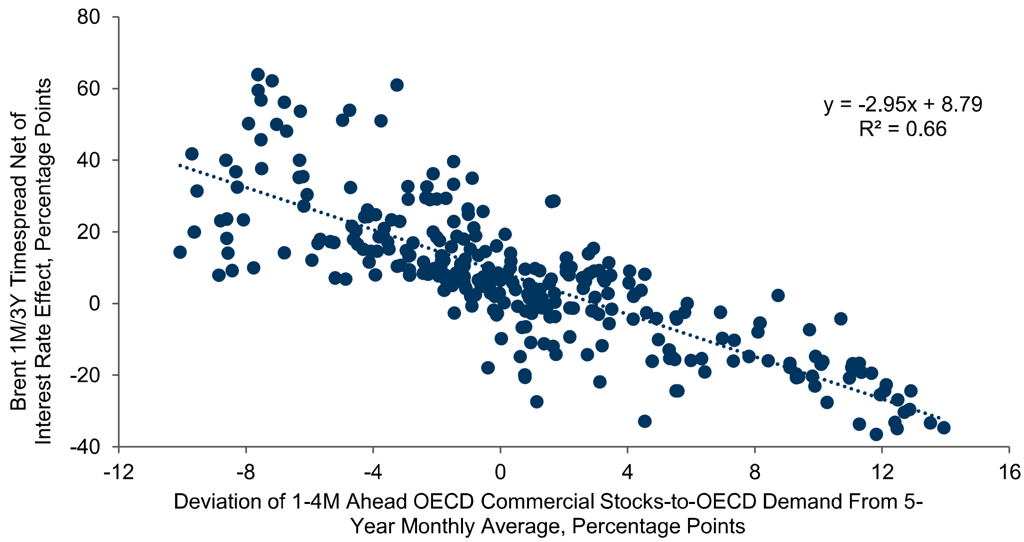
Bold bars indicate data readings, white bars indicate GS estimates of "non-trackable stocks" based on available data, and striped bars indicate aggregates.

Source: IEA, Kpler, Goldman Sachs Global Investment Research

Taken together, we estimate the level of global oil stocks at just above 9 billion barrels, with a roughly equal split for landed oil stocks between OECD and non-OECD countries, but 80% of oil on water coming from non-OECD countries.[1] We estimate that about 2 billion barrels of landed crude and products are "non-trackable" given lower data availability, all in emerging economies. Our nowcast thus focuses on the roughly 3 billion barrels of OECD landed commercial stocks—the key fundamental in our pricing framework (Exhibit 2).

[1] We exclude NGL and feedstocks from our global oil stocks estimates, which account for about 7% of total oil stocks in the OECD. We, do, however include NGL and feedstocks in our nowcast for OECD commercial stocks.

Exhibit 2: OECD Commercials Stocks Have a Strong Negative Impact on Timespreads That We Use in Our Pricing Framework

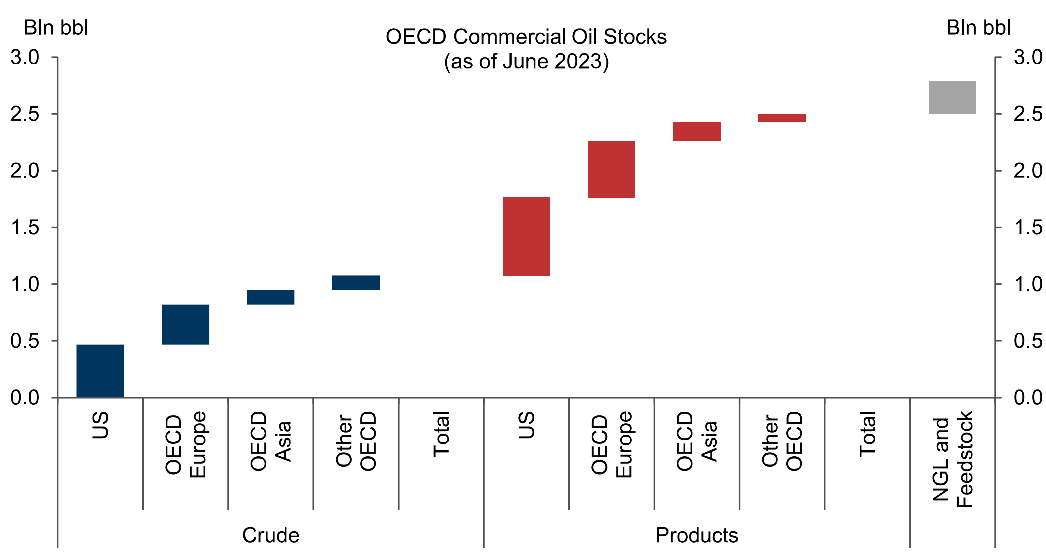


The sample is from January 1998 through March 2023.

Source: IEA, Platts, Goldman Sachs Global Investment Research

Digging deeper, 1.4 billion barrels of product stocks account for over half of OECD commercial stocks, which in turn account for 70% of total OECD oil stocks (Exhibit 3). The US is the largest holder of oil stocks, accounting for nearly half of OECD crude and products stocks.

Exhibit 3: Product Stocks Account for Over Half of 2.8 Billion Barrels of OECD Commercial Stocks



Source: IEA, Goldman Sachs Global Investment Research

Nowcasting OECD Commercial Stocks

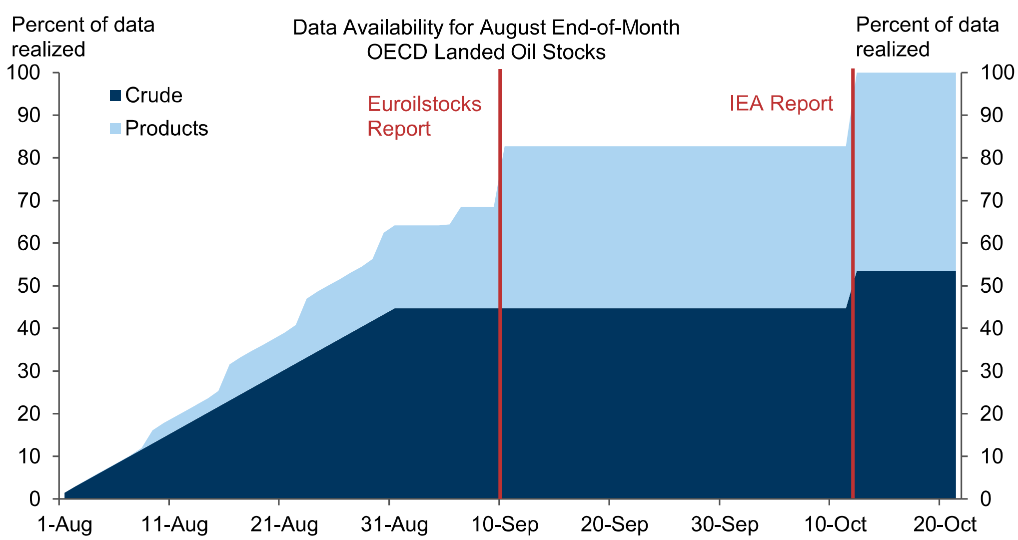
While IEA OECD stocks data have a comprehensive coverage, they come with a two-month lag. We therefore build a nowcast of OECD landed commercial stocks that tracks builds and draws by region in real time.

This daily nowcast combines timely government, satellite, and cargo-based stocks data based on their predictive content for IEA historical data. For OECD crude stocks, we use daily Kpler satellite data that track about 86% of landed crude stocks.

Tracking product stocks via satellites is more challenging because product thanks have fixed roofs. We therefore use weekly government agencies' and cargo-based data from the DOE, PAJ, and ARA PJK to estimate landed product stocks in the US, Japan, and Netherlands and Belgium, respectively. We also use monthly Euroilstocks reports that are reported one month ahead of IEA Oil Market Reports (OMR) and cover 16 European countries.

Exhibit 4 shows the release time of the stocks data for August. While we get a complete coverage only with the October OMR, about 2/3 of the underlying data are available by the end of August. Moreover, data coverage will jump to over 80% with the early September Euroilstocks report.

Exhibit 4: While the IEA OECD Stocks Release Comes With a 2-Month Lag, 2/3 of the Data Is Already Available by the End of the Month



Source: IEA, Kpler, Euroilstocks, DOE, PAJ, ARA PJK, Haver, Goldman Sachs Global Investment Research

Our nowcasting model consists of several region- and product-specific models, which regress IEA monthly historical data on high frequency stocks measures.[2] We model monthly changes in OECD commercial stocks components using relevant high-frequency stocks and trade data, seasonality, Covid effects, and lagged stock changes for products (see the Appendix for the full methodology). The models predict

[2] We build separate models for OECD landed crude oil, US products, Japan products, EU products, Netherlands and Belgium products, EU products excluding Netherlands and Belgium, OECD products excluding EU, and NGL and feedstocks.

oil stocks changes well, and the timely stocks measures are all highly statistically significant (Exhibit 5).

Exhibit 5: Our Nowcasting Model Uses Timely High-Frequency Data on Components of OECD Stocks

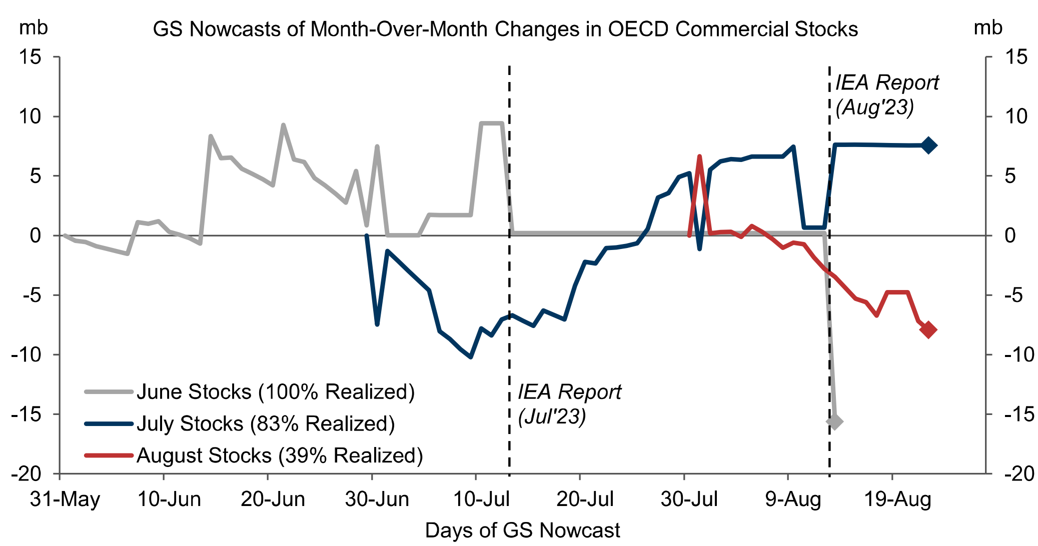
Target Variable of Interest (LHS)		Predicting Regressor (RHS)	Coefficient	P-value	R-square	Number of obs.
IEA crude commercial stocks: OECD		Kpler OECD crude stocks	0.43	0.00	0.65	77
IEA products commercial stocks:	US	DOE products stocks (excl SPR)	0.75	0.00	0.72	398
	EU	Euroilstocks EU products stocks	0.83	0.00	0.73	226
	Netherlands and Belgium	ARA products stocks	0.87	0.00	0.29	231
	Japan	PAJ products stocks	0.50	0.00	0.68	211
	EU excl. Netherlands and Belgium	Kpler products net imports to EU excl. Netherlands and Belgium	0.16	0.08	0.56	87

Note: LHS and RHS variables are measured in month-over-month changes in mb. Our models includes monthly fixed effects, Covid controls, and a lag of the target variable of interest.

Source: IEA, Kpler, Euroilstocks, PAJ, ARA PJK, DOE, Haver, Goldman Sachs Global Investment Research

We then build our nowcast combining the predicted daily changes in stocks and the most recent IEA end-of-month stocks level. Our nowcast evolves daily as new data come in, and is sensitive to new IEA OMR releases that affect the base level, predicted daily draws/builds (via the momentum term), and the full realized value of the stocks (Exhibit 6).[3]

Exhibit 6: Our Nowcast Evolves Daily as New Data Come In



Source: IEA, Kpler, DOE, Euroilstocks, PAJ, ARA PJK, Haver, Goldman Sachs Global Investment Research

[3] For instance, the most recent OMR delivered the first full reading for June stocks (-15mb draw from May) but also turned our nearly balanced nowcast for July into a moderate build (+8mb from June).

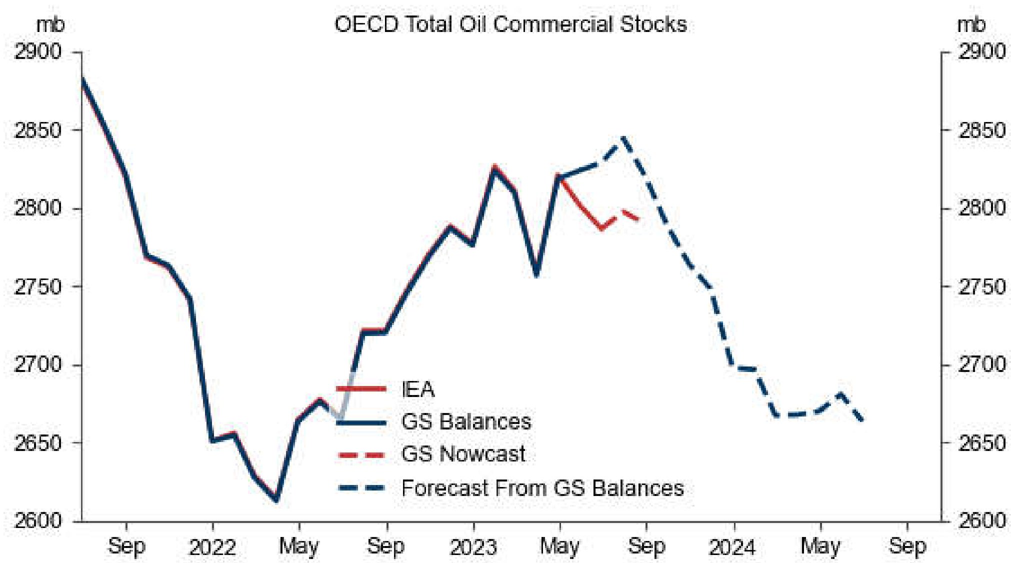
Draws Have Arrived

Exhibit 7 shows our end-of-month nowcast of OECD commercial stocks, and implies that the bearish risk of persistently higher-than-expected stocks has eased since last month.

OECD Draws

For one thing, OECD landed commercial stocks fell by 15mb in June according to the latest IEA Oil Market Report, which mechanically lowers our July and August nowcast *levels*. As a result, our August nowcast for OECD commercial stocks is now 30mb below our balances estimates from a month ago, implying $2/bbl of upside risk to our end-of-year $86/Brent forecast.

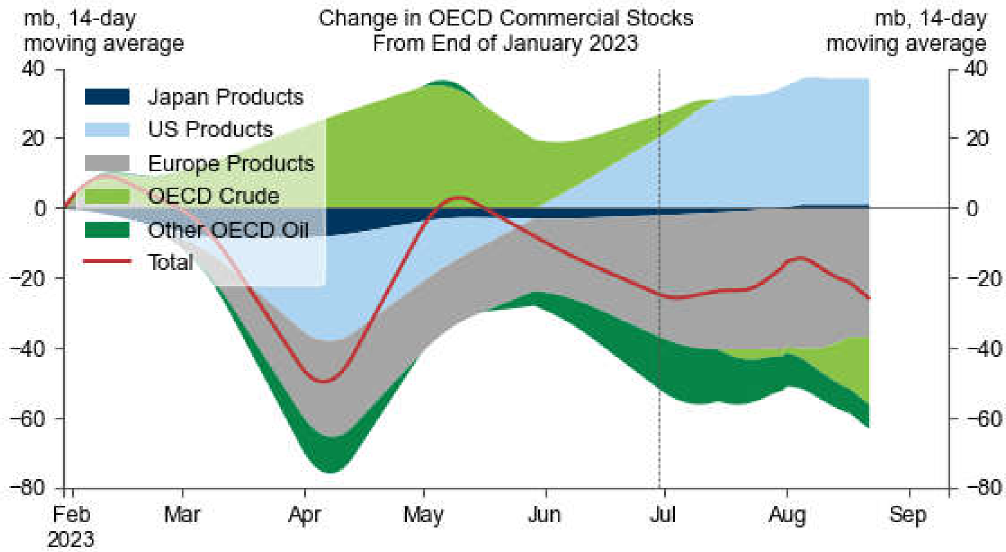
Exhibit 7: The Sharp Drop in June IEA OECD Commercial Stocks Implies Lower Stock Levels in July and August



Source: IEA, Kpler, DOE, Euroilstocks, PAJ, ARA PJK, Haver, Goldman Sachs Global Investment Research

Looking more into the stocks *changes* since June, our nowcast shows roughly flat OECD commercial stocks over the past seven weeks, as we estimate an +11mb monthly build in July and a -7mb month-to-date draw in August. The builds are concentrated in US products (over +15mb since June) as propane and other LPGs have been building above seasonal norms. On the other hand, US and Asia crude stocks have drown drawn substantially on higher refinery runs (-21mb and -11mb since the end of June, respectively).

Exhibit 8: OECD Crude Draws Have Recently More Than Offset Builds in US Products



The dotted line indicates the latest realized observation from IEA (end of June).

Source: IEA, Kpler, DOE, Euroilstocks, PAJ, ARA PJK, Haver, Goldman Sachs Global Investment Research

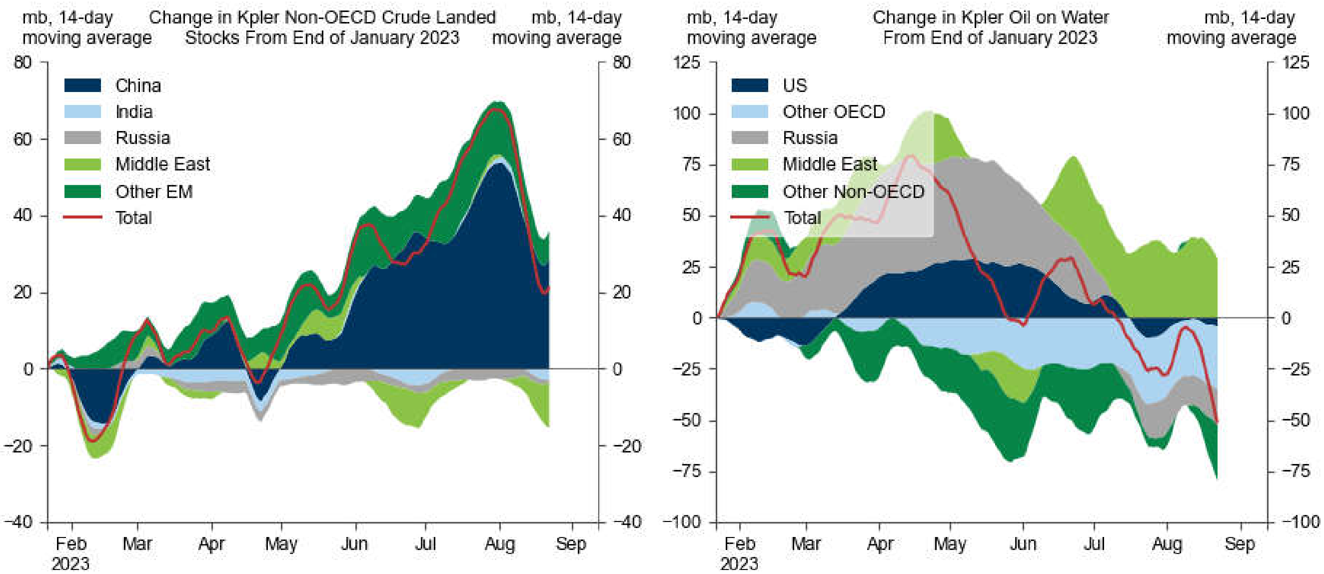
Kpler Non-OECD and Water Draws

While our oil stocks nowcast focuses on OECD landed commercial stocks given better data availability, the other two components of global stocks have drawn substantially this month based on Kpler data.

Kpler non-OECD landed stocks have drawn sharply by 50mb month-to-date, largely driven by China.[4] Over this period, Kpler global stocks on water have drawn by 20mb, driven by Saudi Arabia (Exhibit 9). Taken together with our OECD landed stocks nowcast, this implies an 80mb month-to-date draw in global oil stocks (excluding EM products). While these Kpler data are very timely, measuring EM and oil on water stocks data at a high frequency is inherently challenging, implying significant uncertainty around these estimates.

[4] Kpler data can be revised significantly within three days of the initial release. The large draws we report here are now outside of this (initial) revision window.

Exhibit 9: Non-OECD Landed Stocks Drew by 50mb Month-to-Date, Mainly Driven by China



We report the Kpler regional split by origin.

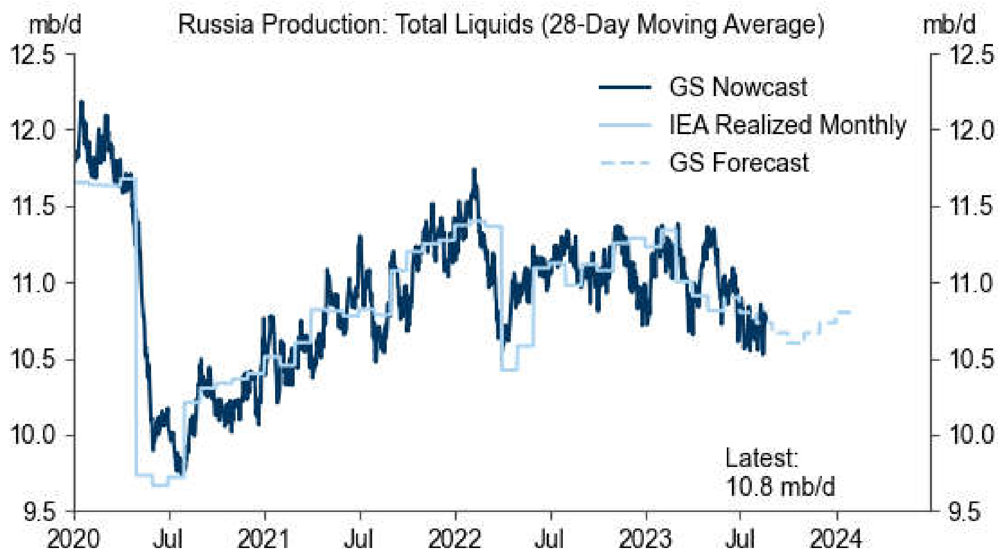
Source: Kpler, Goldman Sachs Global Investment Research

Bullish to Mixed Risk Developments

On net, the risk developments to our constructive December 2023 oil call of $86/bbl have been bullish-to-mixed over the past month. The bullish developments are:

- **The arrival of inventory draws** (see above).
- **Signals of strong OPEC+ supply discipline:** The key bullish risk—lower-for-longer OPEC+ supply—has grown with the fall in our Russia supply nowcast, and Saudi's reiterated commitment to cuts and apparent willingness to extend and even deepen cuts. As Exhibit 10 shows, our Russia supply nowcast keeps grinding lower this month, and is now slightly below our forecast of 10.7mb/d average liquids production for the rest of the year. We still assume that Saudi Arabia tapers its 1mb/d extra production cut to 500kb/d in October, but Saudi production could well stay its current low 9mb/d level for longer if Saudi Arabia envisions a more aggressive price target.
- **Increased Black Sea tensions:** Recent Black Sea drone attacks highlight the risk to Russia commodity exports. Russia exports about 1.7mb/d of seaborne oil through the Black Sea (excluding the Caspian Pipeline Consortium).

Exhibit 10: Our Russia Supply Nowcast Keeps Edging Down This Month



Source: IEA, Petro-Logistics, Kpler, Industrial Info Resources, Goldman Sachs Global Investment Research

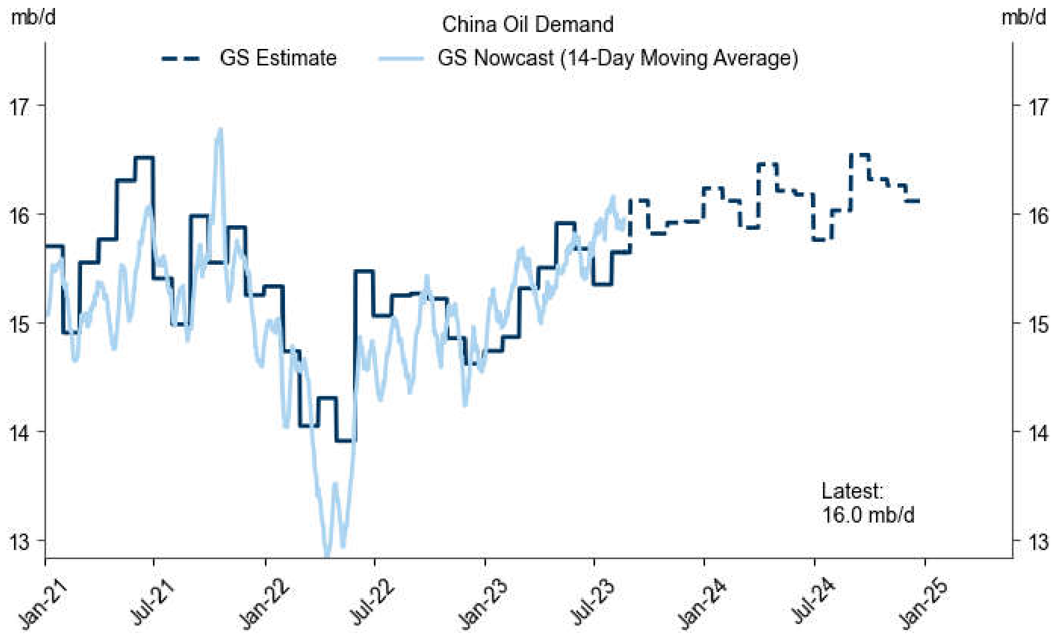
In contrast, the other key bearish risk—a further rise in Iran supply—has grown.

This risk has grown with media reports of a potential US-Iran prisoner swap, and a TankerTrackers estimate that Iran exports of crude and condensates during the first 20 days of August have surged by over 500kb/d to 2.2mb/d.

Finally, China demand news is mixed.

On the one hand, downside risk to our economists' 2023 GDP growth forecast of 5.4% has grown given the ongoing property slump and the inability of only marginal policy easing to restore confidence. On the other hand, our China oil demand forecast has been solid this summer, approaching 16mb/d, and exceeding our July and August forecasts by about 500kb/d each. This disconnect likely reflects that the weakness in China macro data is quite concentrated outside the oil-intensive services sector, and that China international jet demand is still recovering.

Exhibit 11: China Demand Remains Solid Despite the Recent Weakness in Economic Data



Source: IEA, ICIS, Oilchem, Bloomberg, Industrial Info Resources, Kpler, Goldman Sachs Global Investment Research

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Daan Struyven

Appendix

Estimating the Composition of Global Oil Stocks

1. We use June readings from IEA August Monthly Oil Data Service release for OECD landed crude and products stocks. We use Kpler end of June readings of floating storage and oil with over 7 days of floating for OECD and non-OECD crude and products oil on water stocks.
2. We estimate landed non-OECD crude stocks using Kpler end-of-June reading for non-OECD crude inventories and multiply it by 1.19 – the ratio between IEA crude OECD inventories and Kpler crude OECD inventories for the end of June – to adjust for the incomplete Kpler data coverage.
3. To estimate non-OECD products stocks, we assume the same ratio of crude-to-products in non-OECD as in the OECD (1.13), which we estimate from the IEA data for June. We then apply this ratio to our estimates of landed non-OECD crude stocks as described above in (2).

Nowcasting Models for the Components of OECD Commercial Stocks

For all the models below, both IEA stocks on the left-hand side and the main predictive regressor on the right-hand side are in mb monthly changes. High-frequency data is aggregated to monthly frequency for the modeling purposes.

1. OECD crude stocks: We regress IEA commercial crude stocks for OECD total on Kpler landed OECD crude stocks excluding US SPR stocks, monthly fixed effects (seasonality), and Covid effects.
2. US products stocks: We regress IEA commercial products stocks for the US on DOE total products stocks excluding SPR, monthly fixed effects (seasonality), Covid effects, and a 1-month lag of the IEA commercial products stocks for the US.
3. Japan products stocks: We regress IEA commercial products stocks for Japan on PAJ total products stocks, monthly fixed effects (seasonality), Covid effects, and a 1-to-3-month lag of the IEA commercial products stocks for Japan.
4. Europe product stocks: We use a multi-steps approach to nowcast Europe product stocks, and the nowcast composition depends on the availability of Euroilstocks data.
    - Nowcasting the month with available Euroilstocks data: We regress IEA commercial products stocks for OECD Europe on the sum of Euroilstocks gasoline, distillate, fuels, and naphtha stocks for 16 European countries, monthly fixed effects (seasonality), Covid effects, and a 1-month lag of the IEA commercial products stocks for OECD Europe.
    - Nowcasting the days with unavailable Euroilstocks data:
        - We first nowcast Netherlands and Belgium products stocks separately. To do this, we regress IEA commercial products stocks for Netherlands and Belgium on the sum of ARA (the Amsterdam-Rotterdam-Antwerp

hub) PJK gasoil, gasoline, fuel oil, jet fuel, and naphtha stocks, monthly fixed effects (seasonality), Covid effects, and a 1-month lag of the IEA commercial products stocks for Netherlands and Belgium.

- We then nowcast product stocks for the rest of Europe. To do this, we regress IEA commercial products stocks for EU excl. Netherlands and Belgium on a 1-month lag of net imports of products of EU excl. Netherlands and Belgium from the rest of the world, monthly fixed effects (seasonality), Covid effects, and a 1-month lag of the IEA commercial products stocks for EU excl. Netherlands and Belgium.

5. Rest of OECD product stocks: We regress IEA commercial products stocks for OECD total excluding the US, Japan, and Europe on monthly fixed effects (seasonality), Covid effects, and a 1- month lag of the IEA commercial products stocks for OECD total excluding the US, Japan, and Europe.
6. NGL and feedstocks: We regress IEA commercial NGL and feedstocks stocks for OECD total on monthly fixed effects (seasonality) and Covid effects.

Disclosure Appendix

Reg AC

We, Yulia Zhestkova Grigsby, Daan Struyven and Callum Bruce, CFA, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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