ICE Oil Markets: effective risk management for an interconnected world

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Dubai, UAE
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ICE Brent: the global crude benchmark

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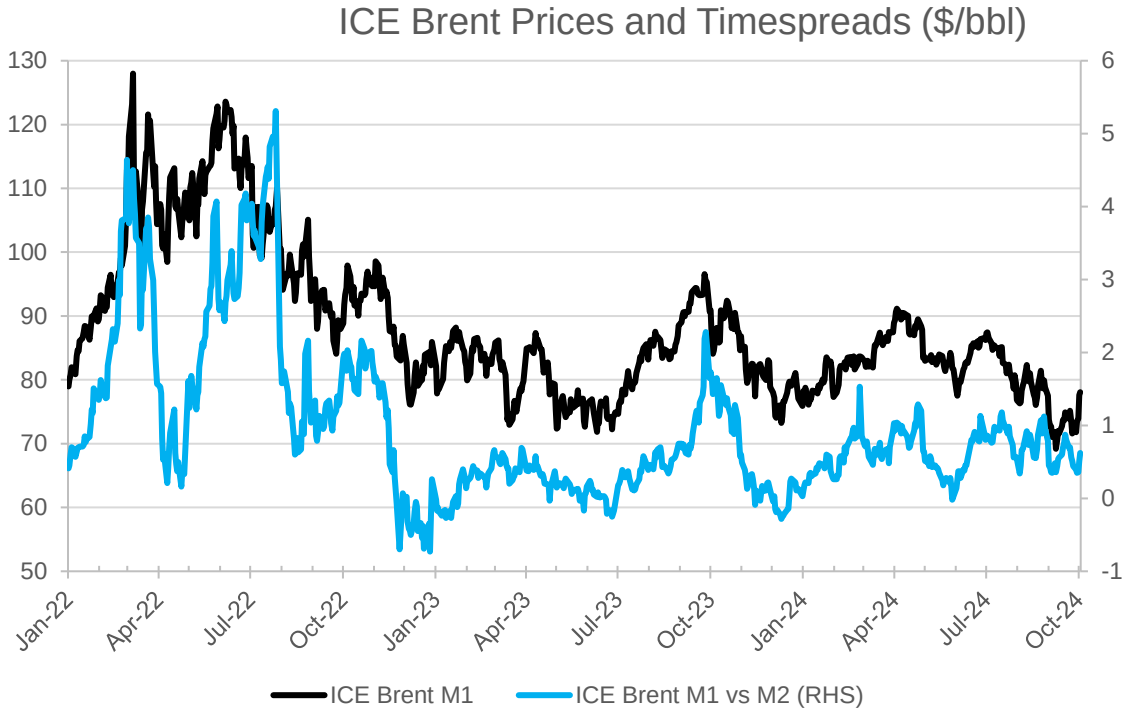
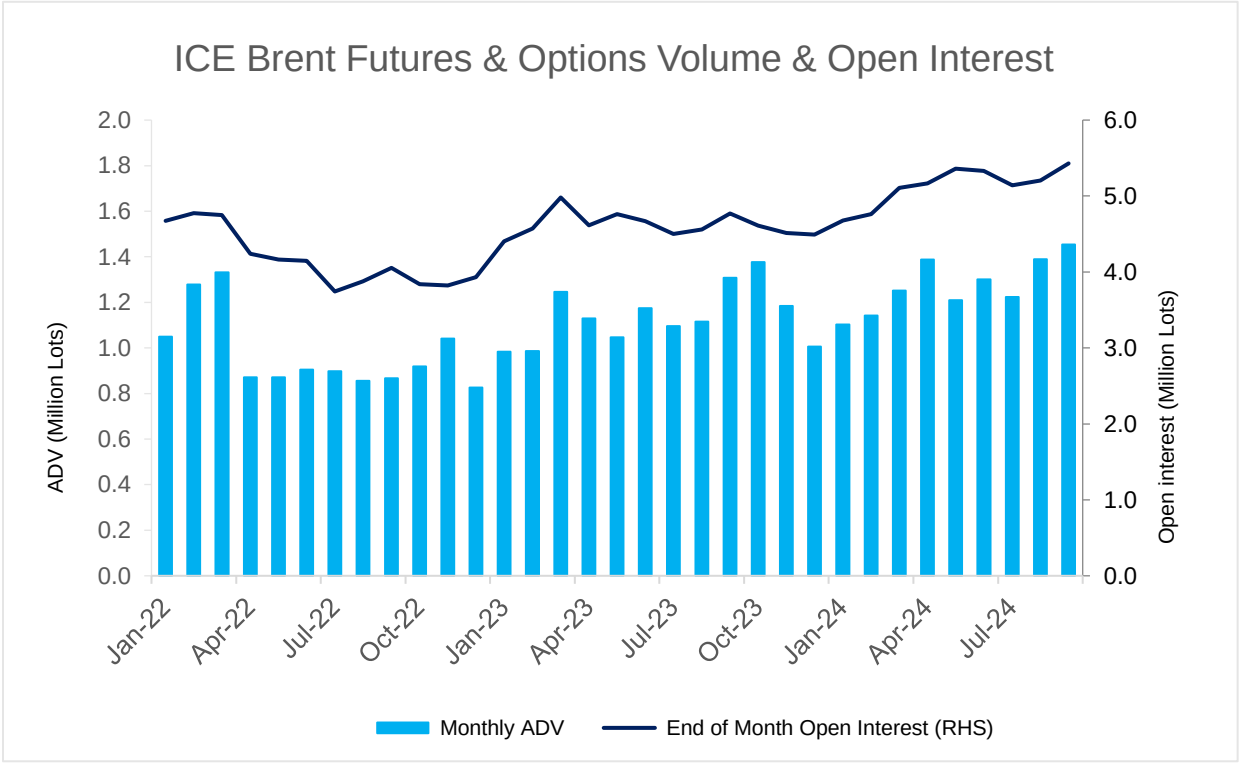
Around 75% of the world's traded crude prices off Brent (directly and indirectly)



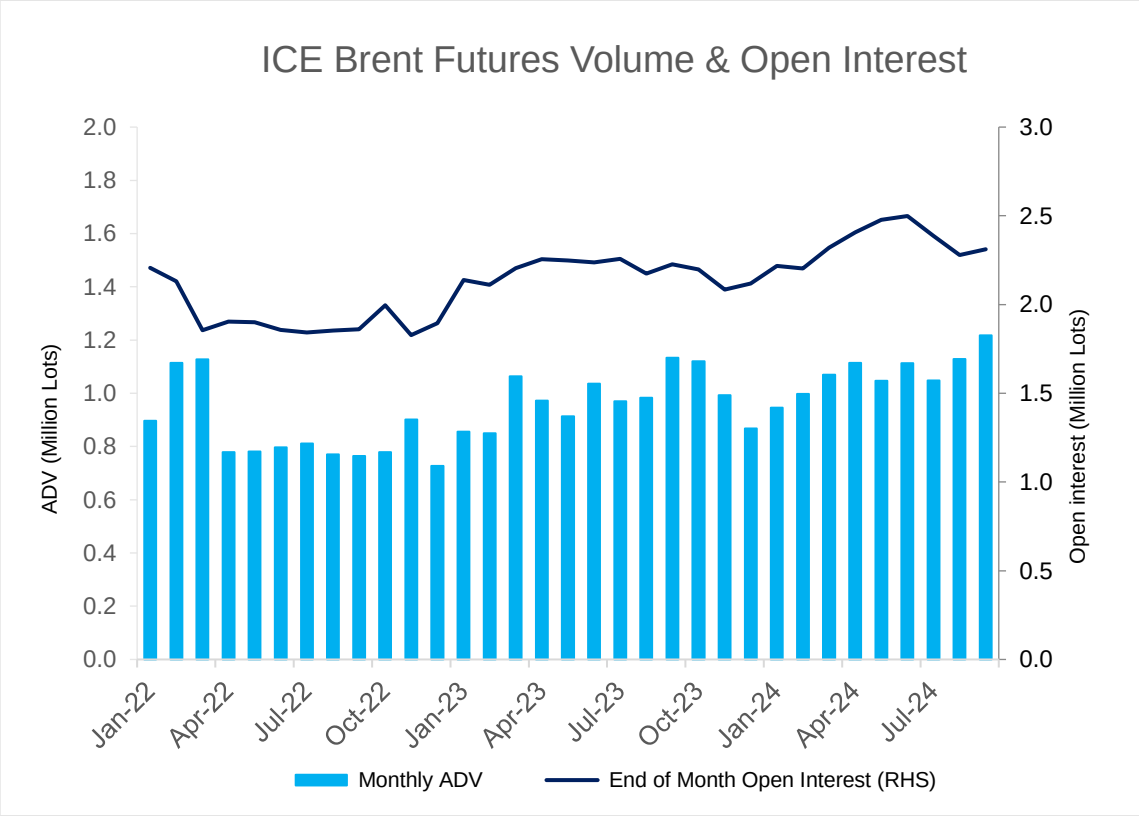
Source: ICE

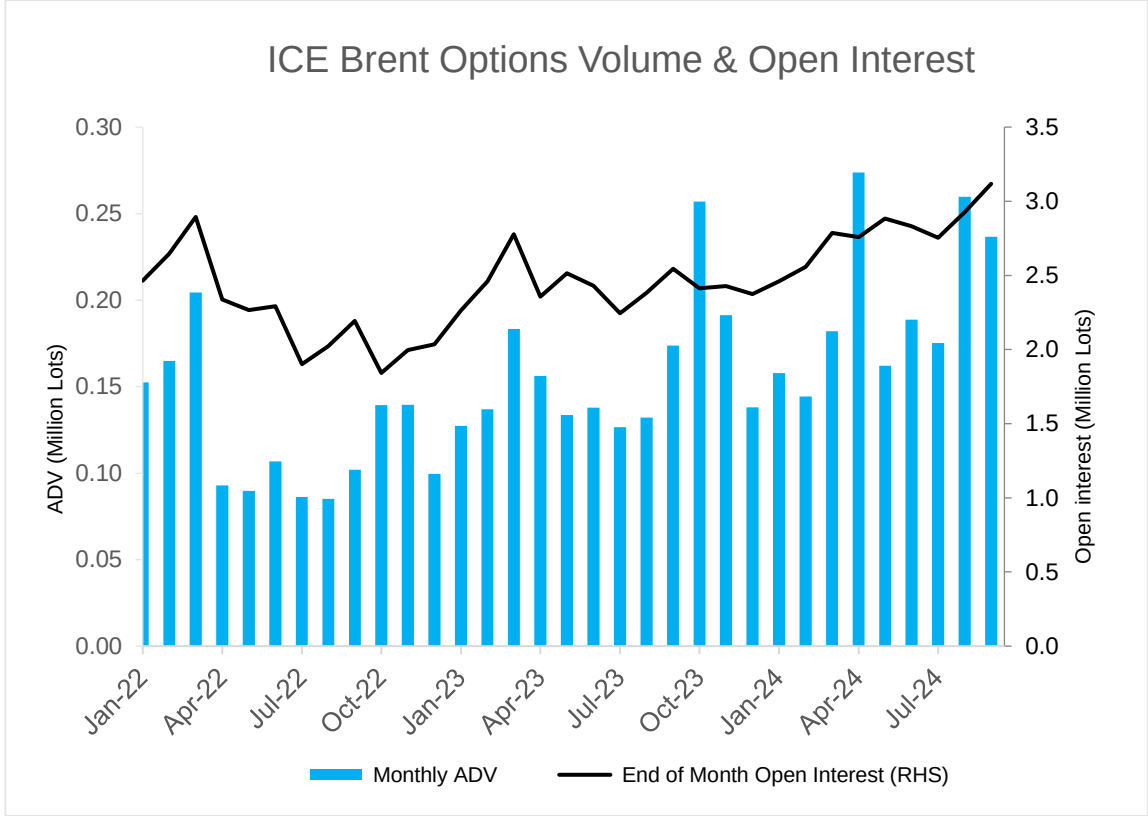


- In 2023, outright prices, volatility, and exchange margins all eased and normalized compared to the previous year. In 2024, normal market conditions continued. As a result, trading activity continued to grow this year. Record highs in futures & options open interest in Oct. 2024.
- Greater resilience of ICE Brent vs. NYMEX WTI:
  - A global vs. a regional benchmark, reflecting global vs. regional oil market fundamentals.
  - Brent is waterborne, with flexible logistics/storage. In contrast, WTI is landlocked, with logistics/storage constraints at Cushing.

ICE Brent: the global crude benchmark

Trading activity growth in 2024 for both futures and options, with options growth faster

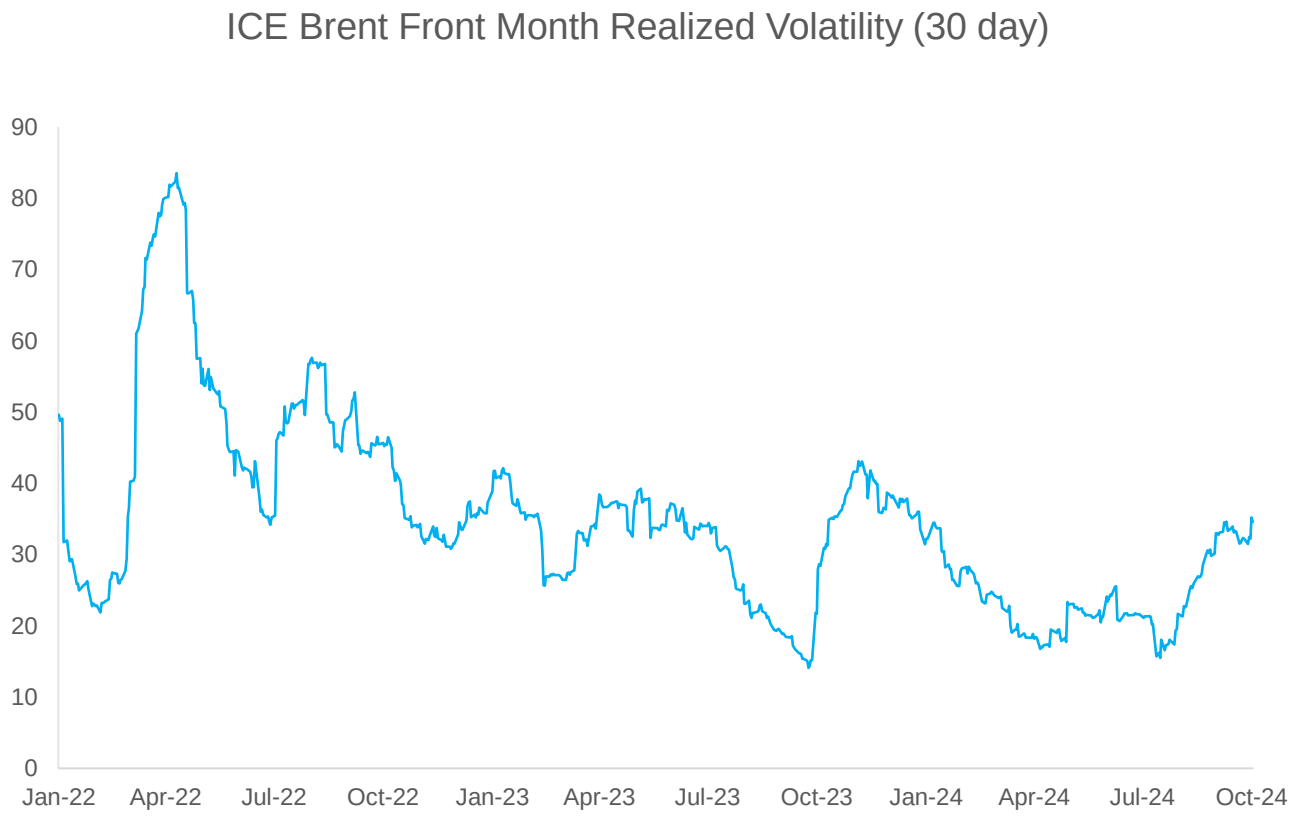




Source: ICE

ICE Brent: the global crude benchmark

Volatility falling and relatively low for much of 2024, until recently. Long term avg. approx. 30%.



Source: ICE

ICE Brent key points

- ICE Brent is the global crude benchmark. Around 75% of the world's physically traded crude (approximately 45-50 Mb/d) prices off Brent (directly and indirectly).

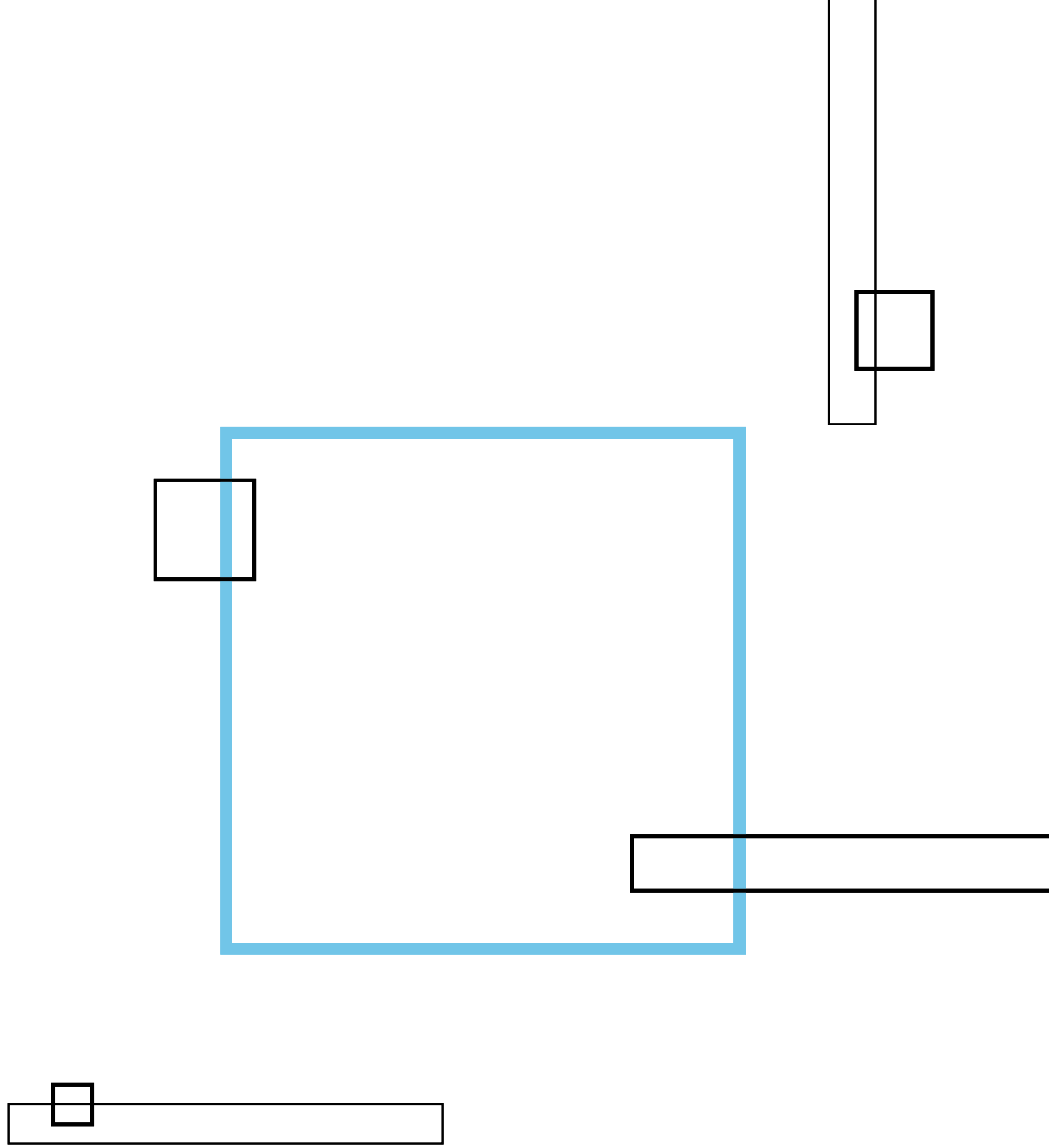
- In a highly interconnected global oil market for crude oil and refined products, ICE Brent is at the center of the global crude complex.

- Commercial participants want to manage their risks and investors want to take risks.

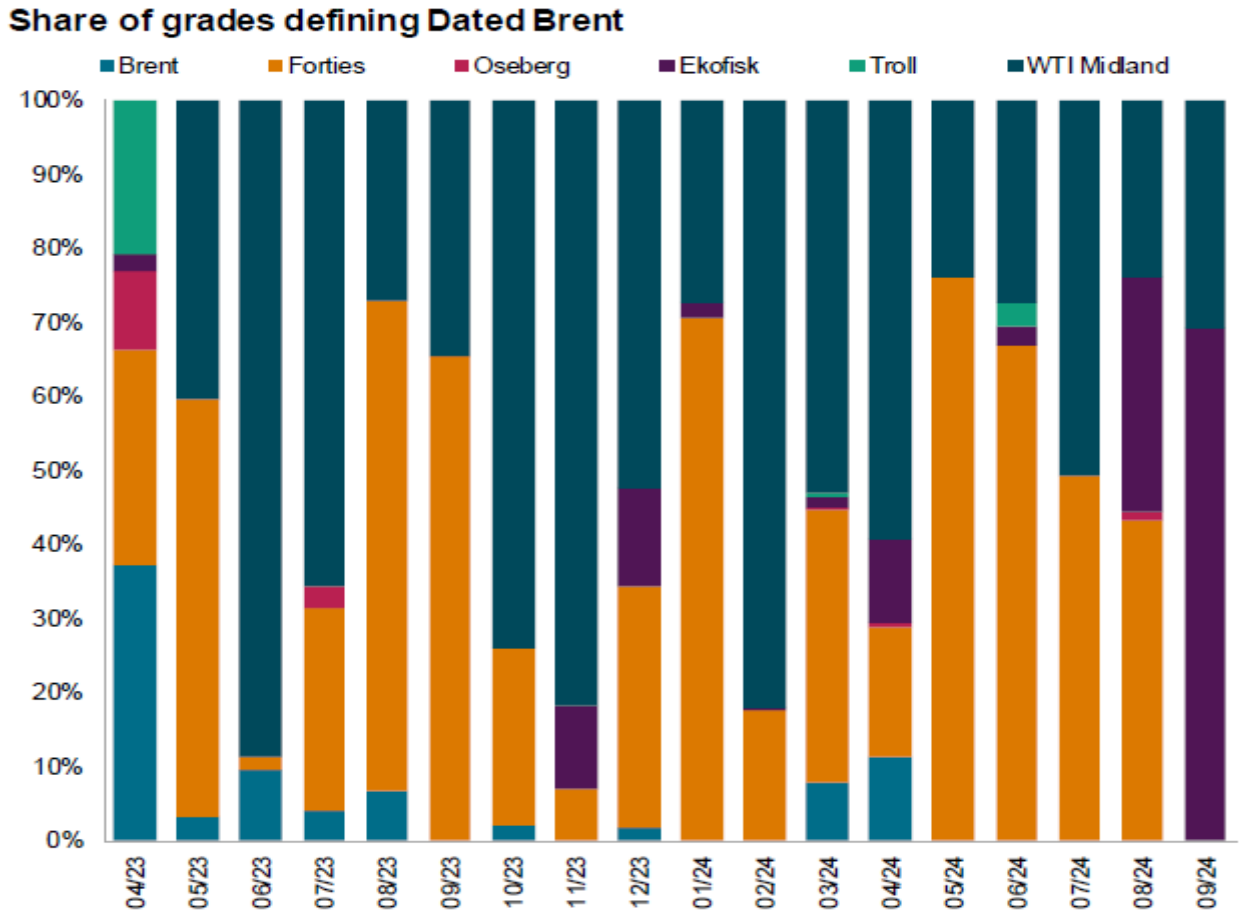
- In 2024, oil market risks and wildcards are as important as ever:
  - Fundamentals: Chinese demand and OPEC+ supply
  - Geopolitical risks to supply and shipping: focus on the Middle East
  - Swings in investor flows: managed money net length currently at very low levels (upside risk)

- ICE Brent reflects all of the above global price drivers.

The addition of Midland to the Brent complex: smooth and successful



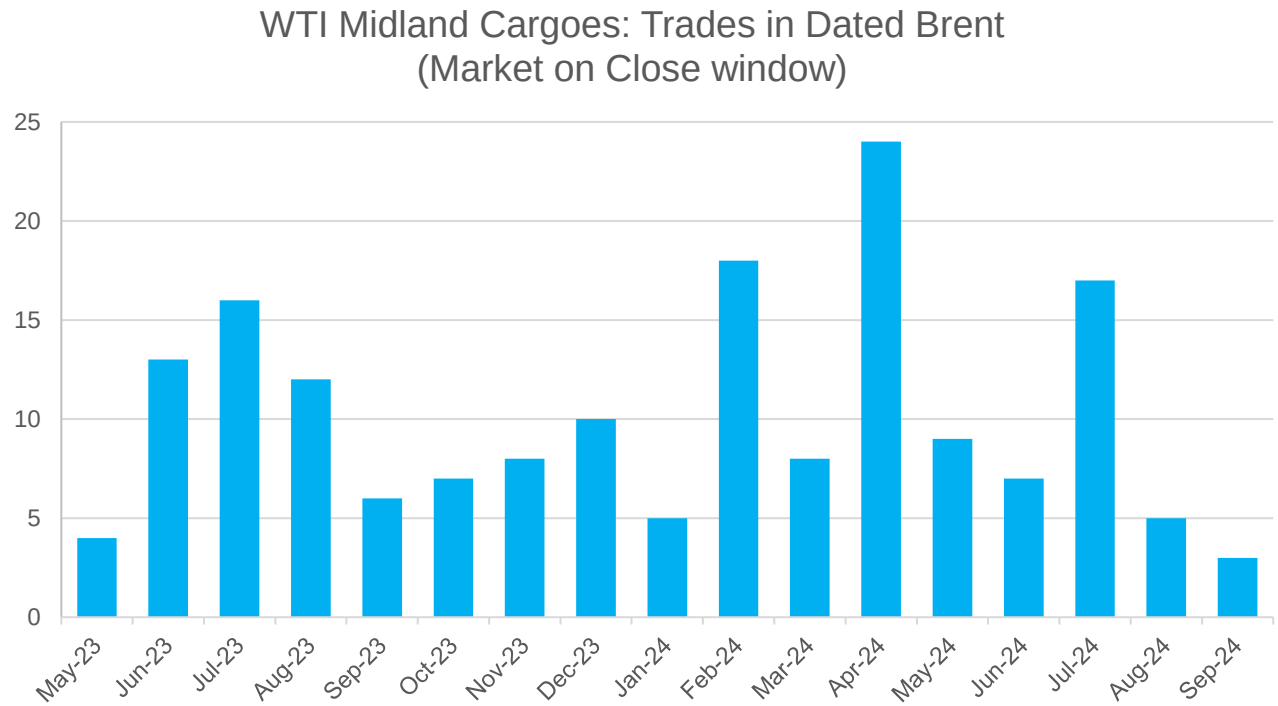
The addition of Midland WTI to the Brent Complex: smooth and successful. Impact on pricing similar to expectations.



Source: S&P Global Commodity Insights - Europe, Eurasia and Africa Crude Oil Markets Short-term Outlook, October 2024. Data as of Sept. 25, 2024.

- Pricing: from May 2023 through late September 2024, Midland WTI was the most competitive grade that set the price of Dated Brent approximately 50-60% of the time. This has been broadly similar to expectations.

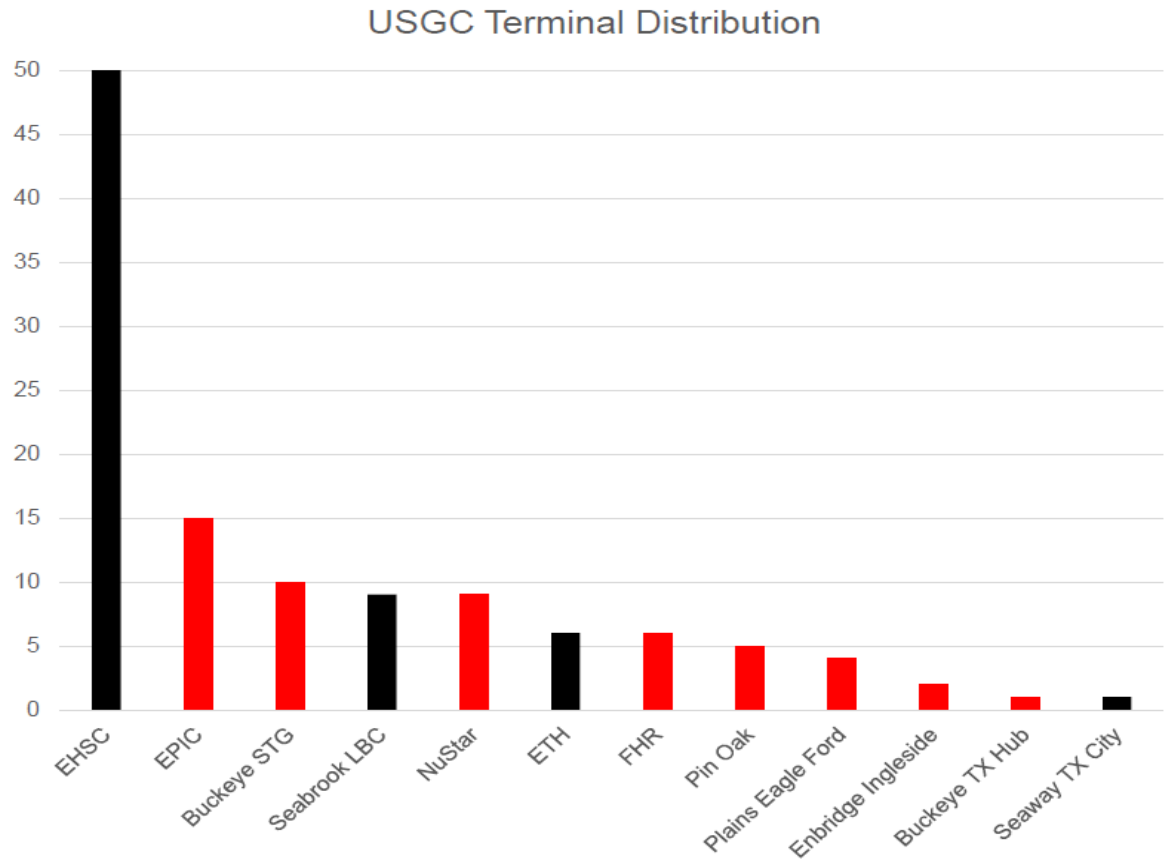
The addition of Midland WTI to the Brent Complex: smooth and successful. Impact on physical volumes similar to expectations.



Source: Platts Crude Oil Marketwire. Data assembled by ICE. Data through September 2024.

- Volumes: from June 2023 through Sept. 2024, an average of 10 cargoes of Midland per month traded in the Dated Brent MOC window.
- Before Midland WTI was added, less than 10 cargoes of BFOET (the old basket) traded per month. With Midland, volumes have approximately doubled. Again, this has been broadly similar to expectations.
- Midland WTI is <u>not</u> WTI Cushing. Midland is literally a different crude grade, with different quality, origin, and pricing location.
- The same Midland WTI crude deliverable against the ICE HOU contract is deliverable into the Brent complex.

More than half of Midland WTI cargoes delivered into the Platts Dated Brent Market on Close window load at Houston terminals. Only EHSC and Seabrook guarantee the quality of Midland crude.



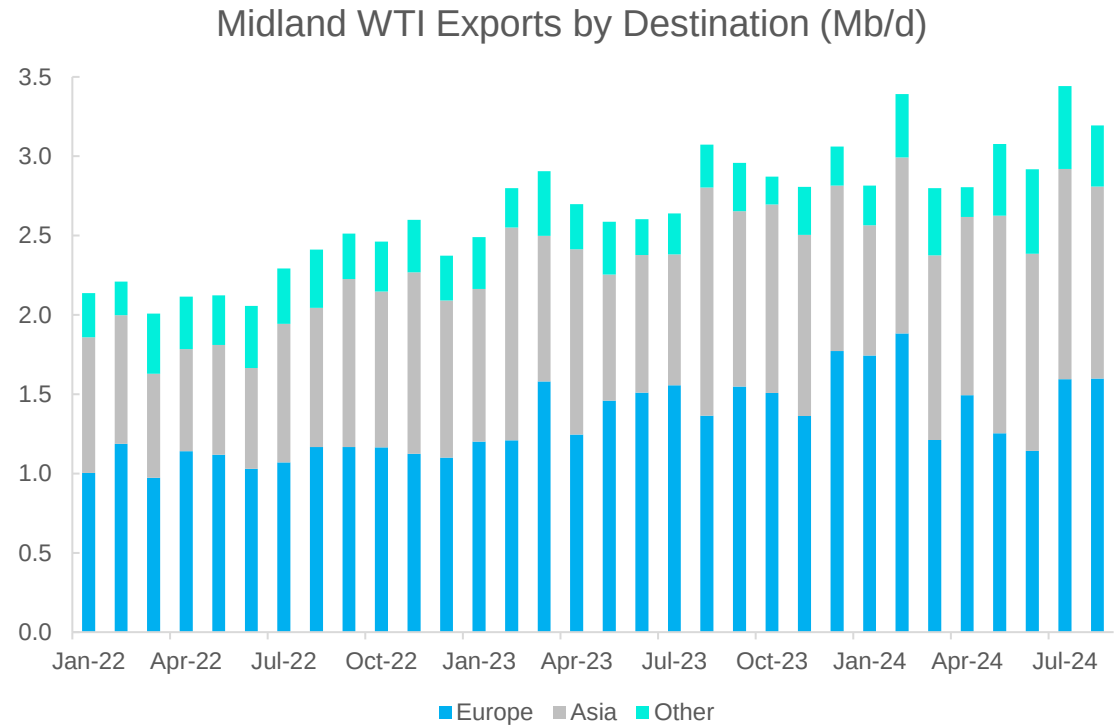
Note: Houston terminals in black. Source: S&P Global Commodity Insights. Data through mid-September.

- From Platts performance tracking. Physical performance is reviewed against published parameters.
- All 12 Platts-approved terminals have delivered Midland into Dated Brent. As of mid-September, 56% of cargoes have loaded from Houston.
- Of Houston loadings, most have been from Enterprise EHSC and ONEOK Seabrook terminals. These are the only terminals that guarantee the quality of Midland crude

ICE Midland WTI (HOU) Futures: physically deliverable crude futures for the USGC

Midland WTI: driving growth in U.S. crude production and exports

Exports of Midland act as a key swing supply between Atlantic Basin and Asia



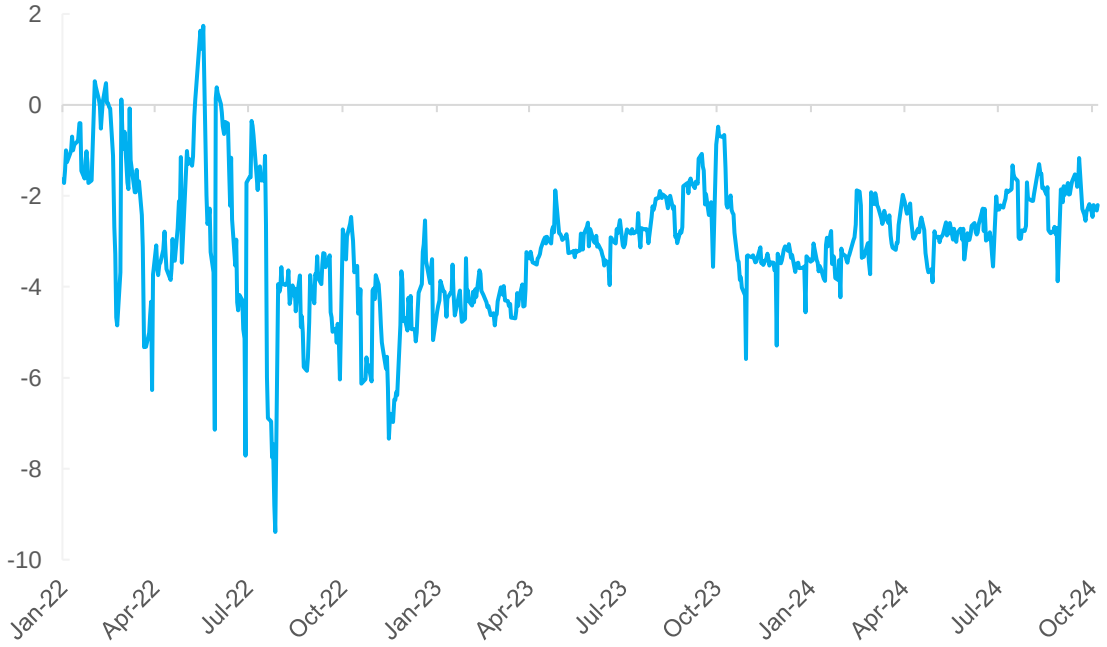
Source: Kpler and ICE

- The Permian Basin/Midland dominates U.S. crude production and exports. Total U.S. output 13.3 Mb/d. Permian Basin output 6.3 Mb/d.
- Driven by the Permian Basin, U.S. crude is forecast to grow. According to US EIA: US +0.29 Mb/d in 2024, +0.32 Mb/d in 2025.
- U.S. crude exports should increase broadly in line with output, because U.S. refiners are usually maxed out in processing light sweet crude
- Out of a total 4.1 Mb/d of U.S. crude exports in 2024 (to date), Midland WTI has accounted for around two-thirds
- Due to shale and the Permian Basin, the U.S. market has evolved and is now centered on the U.S. Gulf Coast, not Cushing. Crude flows directly from the Permian Basin to the USGC, and mainly bypasses Cushing altogether.

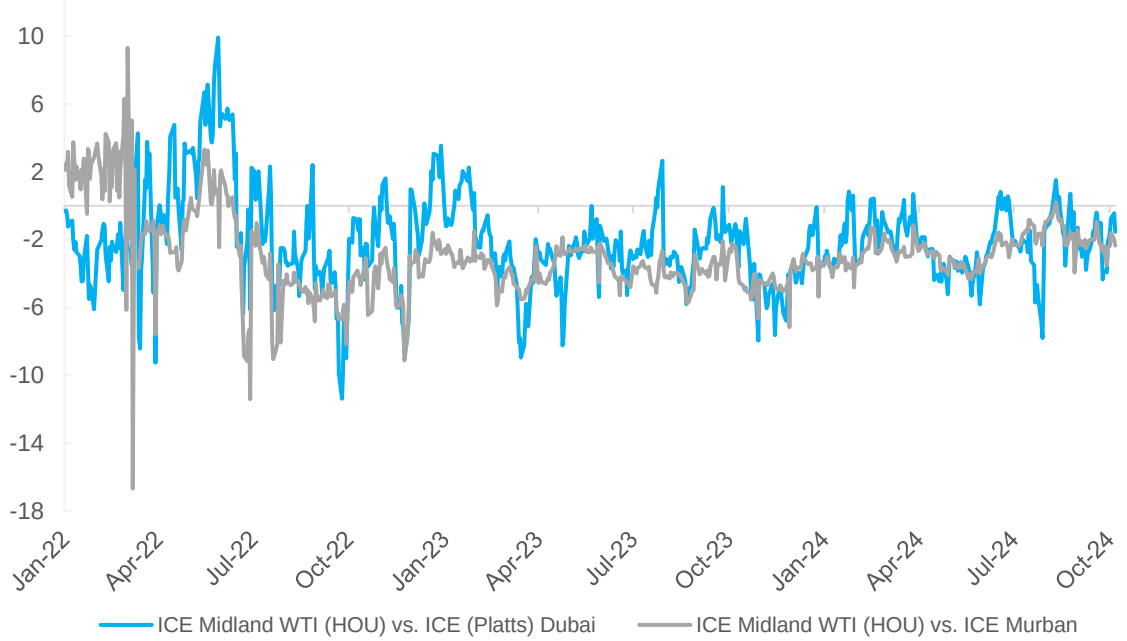
Midland WTI exports price off Brent to Europe or Dubai/Murban to Asia.

Midland WTI is a different crude grade than WTI Cushing: origin, quality, pricing location, storage capacity.

ICE Midland WTI (HOU) vs. ICE Brent ($/bbl)



ICE Midland WTI (HOU) vs. ICE (Platts) Dubai & ICE Murban ($/bbl)



Source: ICE

- HOU is a physically deliverable futures contract for Midland-origin / Midland-quality crude priced in Houston, on the US Gulf Coast.
- Houston has evolved from MEH to both MEH and ECHO. ONEOK (Magellan) and Enterprise combined infrastructure includes substantial direct-from-Permian supply capacity (2.8 Mb/d), storage capacity (60 Mb/150 Mb Houston), and access to domestic & export refinery demand.
- The same Midland WTI crude deliverable against HOU is deliverable into Brent complex. HOU is tradeable vs. Dated Brent and ICE Brent.

Key USGC crude price differentials drive exports & hedging

- Traders are exposed to Midland WTI where it meets the global waterborne market on the USGC.

- For U.S. crude exports to Europe, the key is Midland WTI priced at Houston vs. Brent -- not WTI Cushing vs. Brent.
- For U.S. crude exports to Asia, the key is Midland WTI priced at Houston vs. Dubai/Murban – not WTI Cushing vs. Dubai/Murban
- How to hedge/manage this risk?

- Currently (for exports to Asia):
  - A) ICE Midland WTI (HOU) vs. WTI Cushing
  - B) WTI Cushing vs. Dubai/Murban
  - C) ICE Midland WTI (HOU) vs. Dubai/Murban
- Trader does A and B. The WTI Cushing legs cancel, and trader is left with C.
- A better way: Trader simply does C.

- HOU offers a more direct, more efficient (simpler) and more cost-effective way for producers, refiners, and traders to hedge USGC exposure. Also minimize unnecessary exposure to Cushing logistics/storage constraints and WTI Cushing price volatility.

- Margin offsets as high as 97% when clearing HOU alongside other positions on ICE Clear Europe (including ICE Brent, ICE Dubai (Platts), ICE Murban and ICE Gasoil).

New pricing for US crude markets vs. ICE Midland WTI (HOU) futures -- from General Index (GX)

14.30 America/New_York

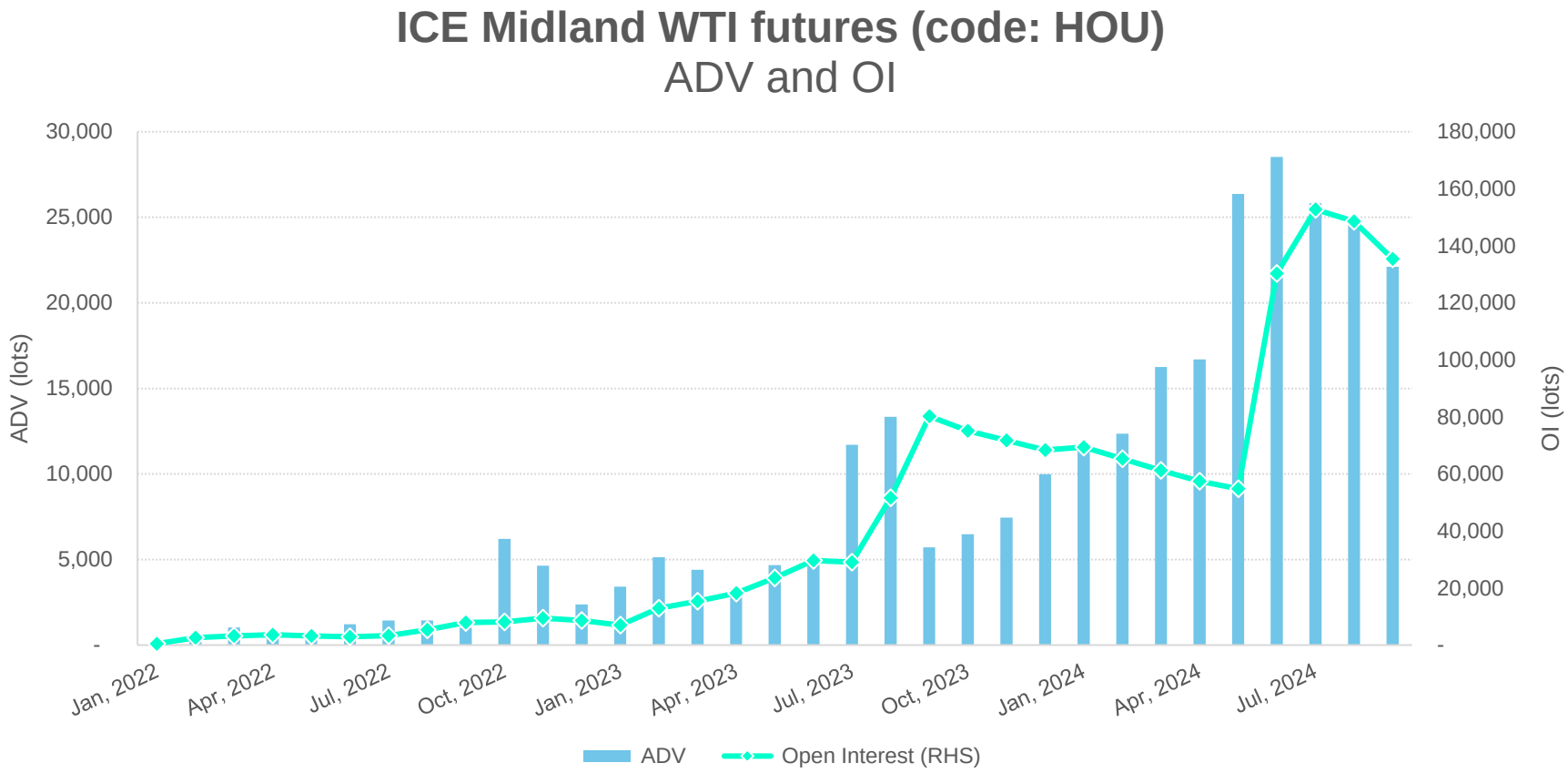
Contract	Delivery	Settle	Contract	Delivery	Settle
ICE Midland WTI AGC (HOU)	Jul	81.38	ICE Midland WTI AGC CMA (HOO)	May	80.43
ICE Midland WTI AGC (HOU)	Aug	80.97	ICE Midland WTI AGC CMA (HOO)	Jun	81.25
ICE Midland WTI AGC (HOU)	Sep	80.46	ICE Midland WTI AGC CMA (HOO)	Jul	80.81
ICE Midland WTI AGC (HOU)	Oct	79.86	ICE Midland WTI AGC CMA (HOO)	Aug	80.24
2/3 : 1/3 Roll	Jul	0.57	CM1	Jul	0.56

16.00 America/Chicago

ICE HOU Markets	Basis	Delivery	VWA Diff	Change	VWA Outright	Change	MTD Diff	IMAVG Diff
Houston/Texas Gulf Coast								
WTI East Houston	ICE HOU	Jul	0.07	+0.04	81.45	+2.12	0.03	0.06
Canadian Sour	ICE HOO	Jul	-7.13	-0.09	73.68	+2.02	-7.13	-7.13
Bakken	HOO+CM1	Jul	0.18	+0.98	81.55	+3.06	-0.62	0.02
SGC	ICE HOU	Jul	-2.05	+1.05	79.33	+3.13	-2.69	-2.18
Midland								
WTI	ICE HOU	Jul	-0.55	-0.07	80.83	+2.01	-0.49	-0.54
WTS	ICE HOU	Jul	-1.65	-0.07	79.73	+2.01	-1.57	-1.63
WTL	ICE HOU	Jul	-1.39	-0.26	79.99	+1.82	-1.15	-1.34
Louisiana/Gulf of Mexico								
Mars	ICE HOU	Jul	-0.95	+0.20	80.43	+2.28	-1.03	-0.97
Poseidon	ICE HOU	Jul	-1.35	+0.25	80.03	+2.33	-1.23	-1.33
Thunder Horse	ICE HOU	Jul	0.45	+1.43	81.83	+3.51	-0.13	0.33
WTI St. James	ICE HOU	Jul	1.40	+2.10	82.78	+4.18	0.51	1.22
LLS	ICE HOU	Jul	1.21	+0.79	82.59	+2.87	0.94	1.16
HLS	ICE HOU	Jul	0.25	+1.63	81.63	+3.71	-0.55	0.09
Bonito	ICE HOU	Jul	2.45	+1.25	83.83	+3.33	1.79	2.32
Cushing								
Canadian Sour	ICE HOO	Jul	-8.13	-0.09	72.68	+2.02	-8.13	-8.13
WTI ex-Basin	ICE HOU	Jul	0.08	+0.57	81.46	+2.65	-0.22	0.02
Bakken Light Sweet	ICE HOU	Jul	-1.12	+0.55	80.26	+2.63	-1.38	-1.17
Saddlehorn Crude	ICE HOU	Jul	-0.60	+0.52	80.78	+2.60	-0.85	-0.65
Saddlehorn Light	ICE HOU	Jul	-2.55	+0.67	78.83	+2.75	-2.85	-2.61
DJ Light	ICE HOU	Jul	-2.55	+0.62	78.83	+2.70	-2.84	-2.61

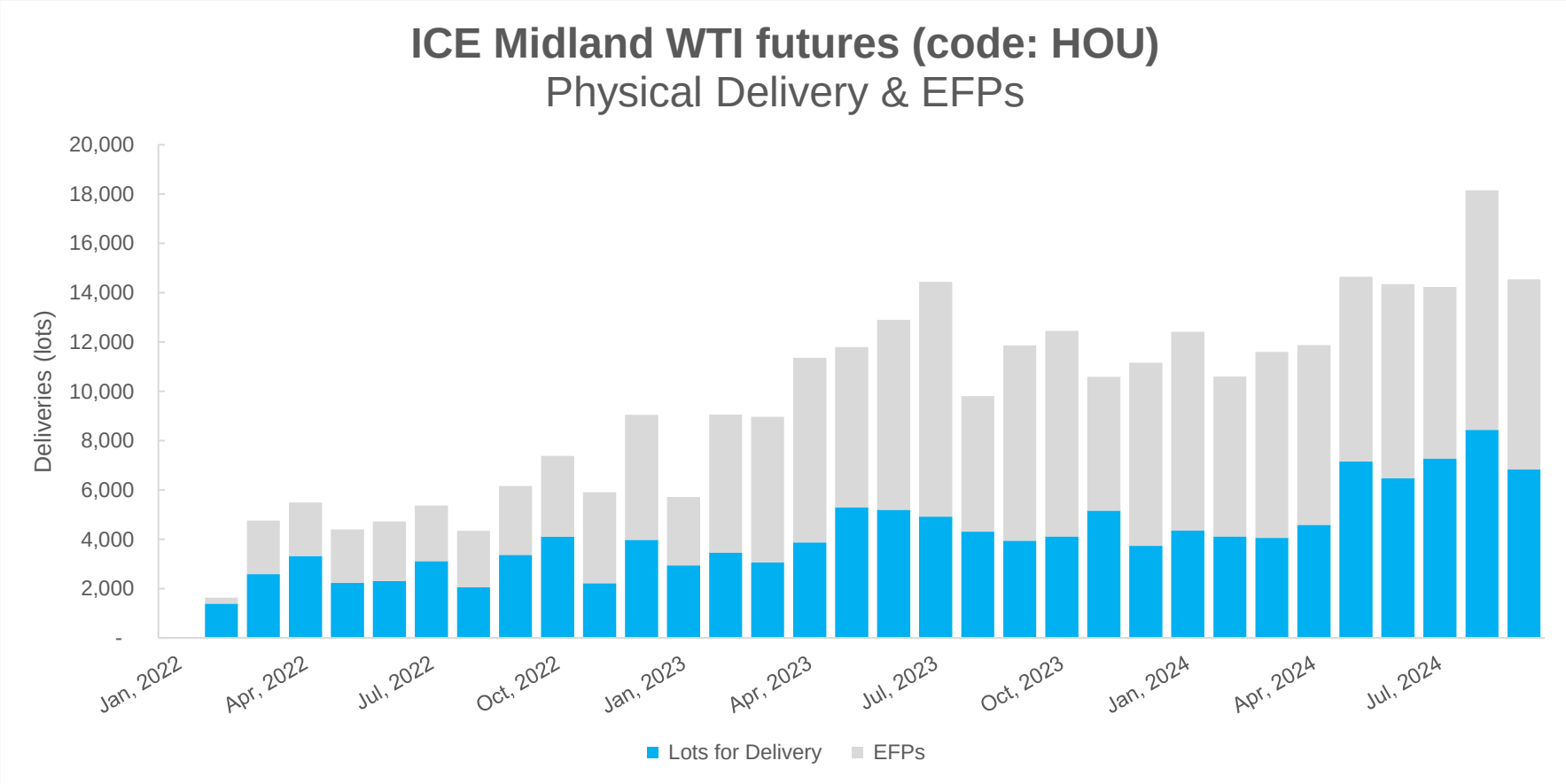
Source: General Index

ICE Midland WTI (HOU): trading activity (ADV/Open Interest) gaining momentum



Source: ICE

ICE Midland WTI (HOU): physical deliveries & EFPs also gaining momentum



Source: ICE

ICE Midland WTI (HOU) key points: effective management of price risk and physical supply risk

- **Price risk management:**

- HOU offers a more direct, more efficient (simpler) and more cost-effective way for producers, refiners, and traders to hedge USGC exposure. Also a way to minimize unnecessary exposure to Cushing logistics/storage constraints.

- Once Midland WTI hits the water, it prices off Brent (to Europe) or Dubai/Murban (to Asia). It can be used to hedge export flows to both regions.

- **Physical supply risk management:**

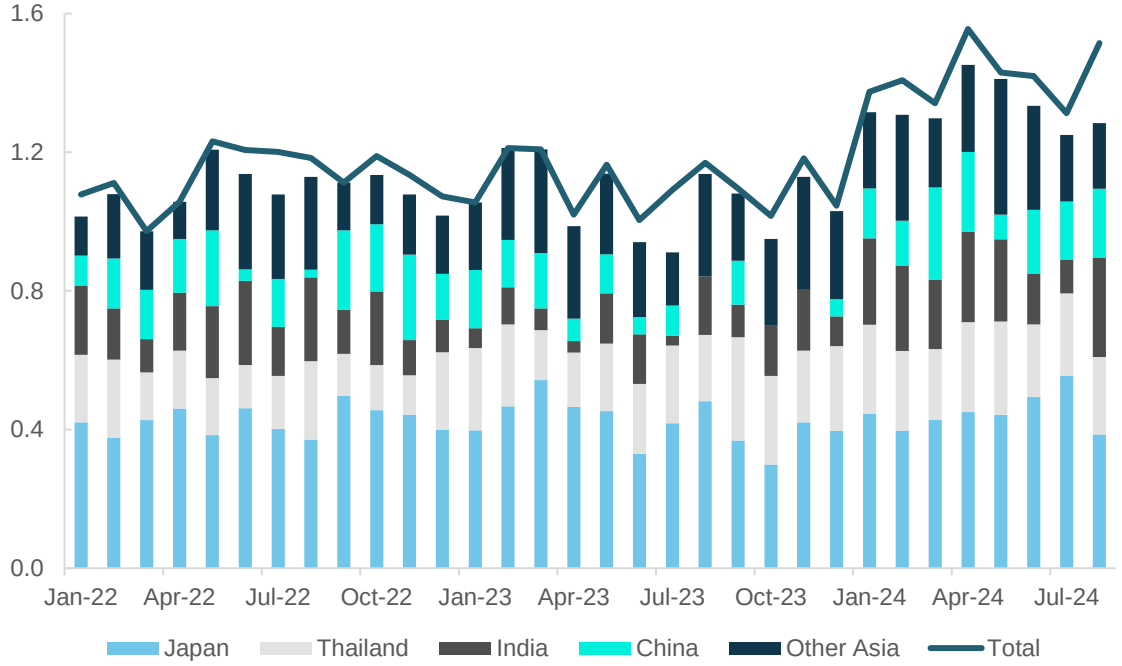
- US physical market participants experience occasional problems with Midland crude supply.
  - Exporters can receive off-spec Midland WTI at USGC terminals.
  - Refiners can unexpectedly receive non-ratable volumes of Midland WTI from suppliers (i.e., supply cuts).

- Going to expiry in the HOU contract results in guaranteed physical delivery of on-spec and ratably delivered Midland WTI crude that can be run in US domestic refineries or exported to European and Asian refiners.
- Volumes are received as planned: on-spec and at the agreed volumes and delivery timeframe

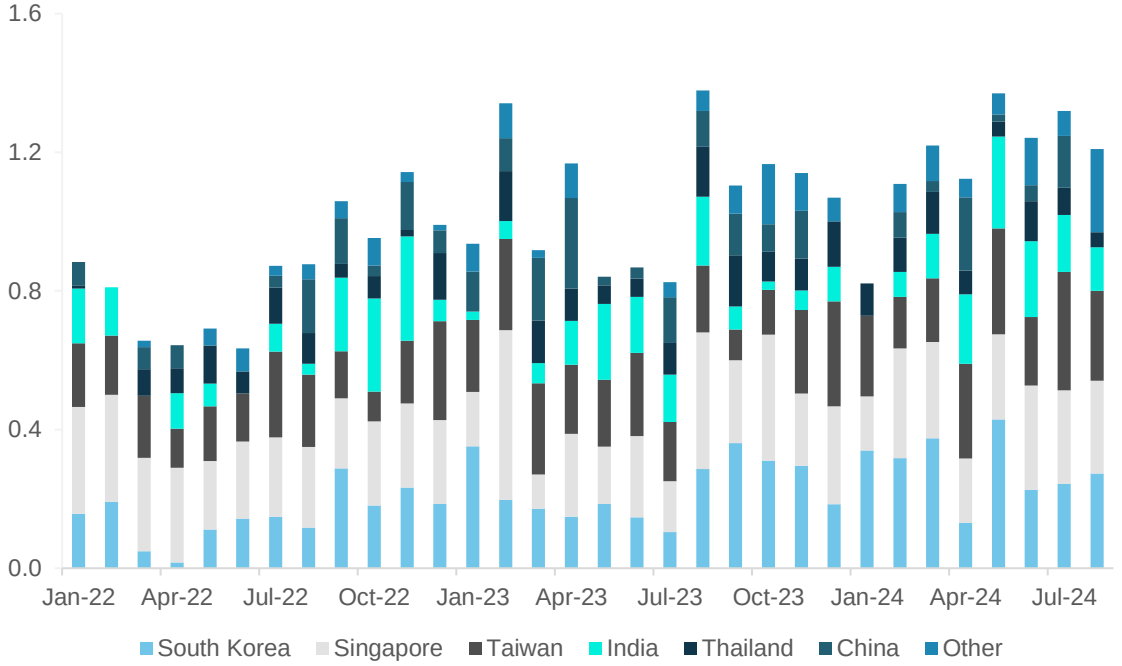
ICE Murban (ADM) Futures: a light sour crude benchmark for the Middle East

Murban exports go almost entirely to Asia. Midland WTI is a competing grade.

Murban Exports by Destination (Mb/d)



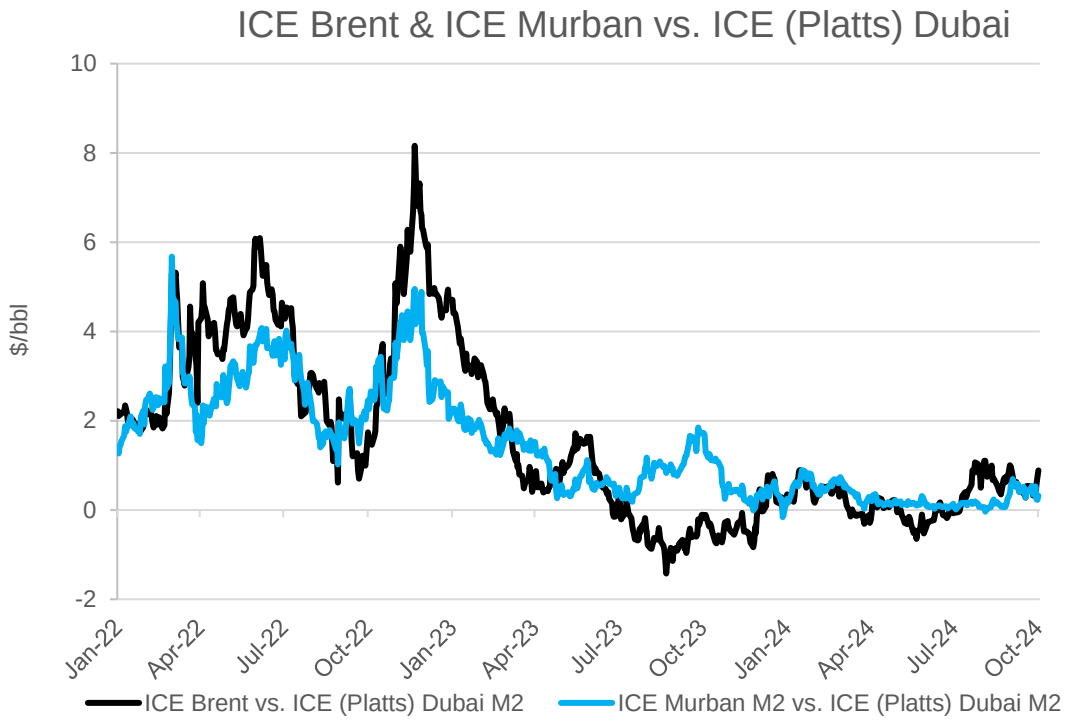
Midland WTI Exports to Asia (Mb/d)

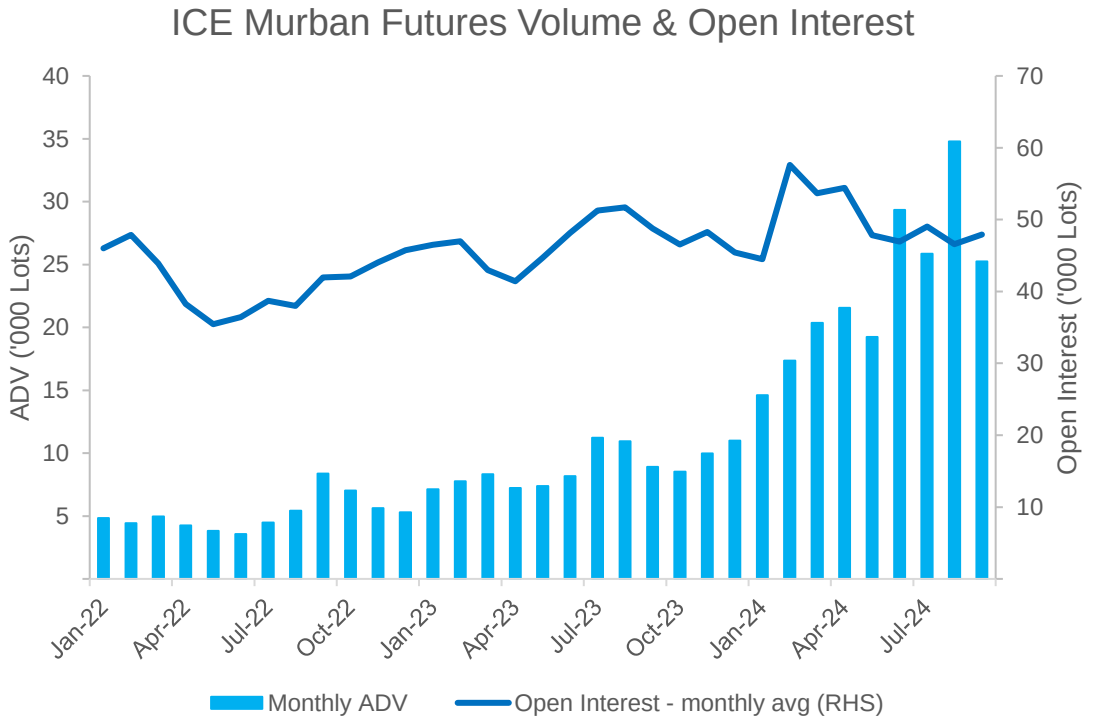


Source: Kpler and ICE

- Murban crude exports approximately 1.4 – 1.5 Mb/d, up from 1.1 – 1.2 Mb/d. Due to Ruwais upgrading project completion.
- Murban crude exports almost entirely to Asian countries (around 95%).

ICE Murban: trading activity (ADV & Open Interest) building quickly

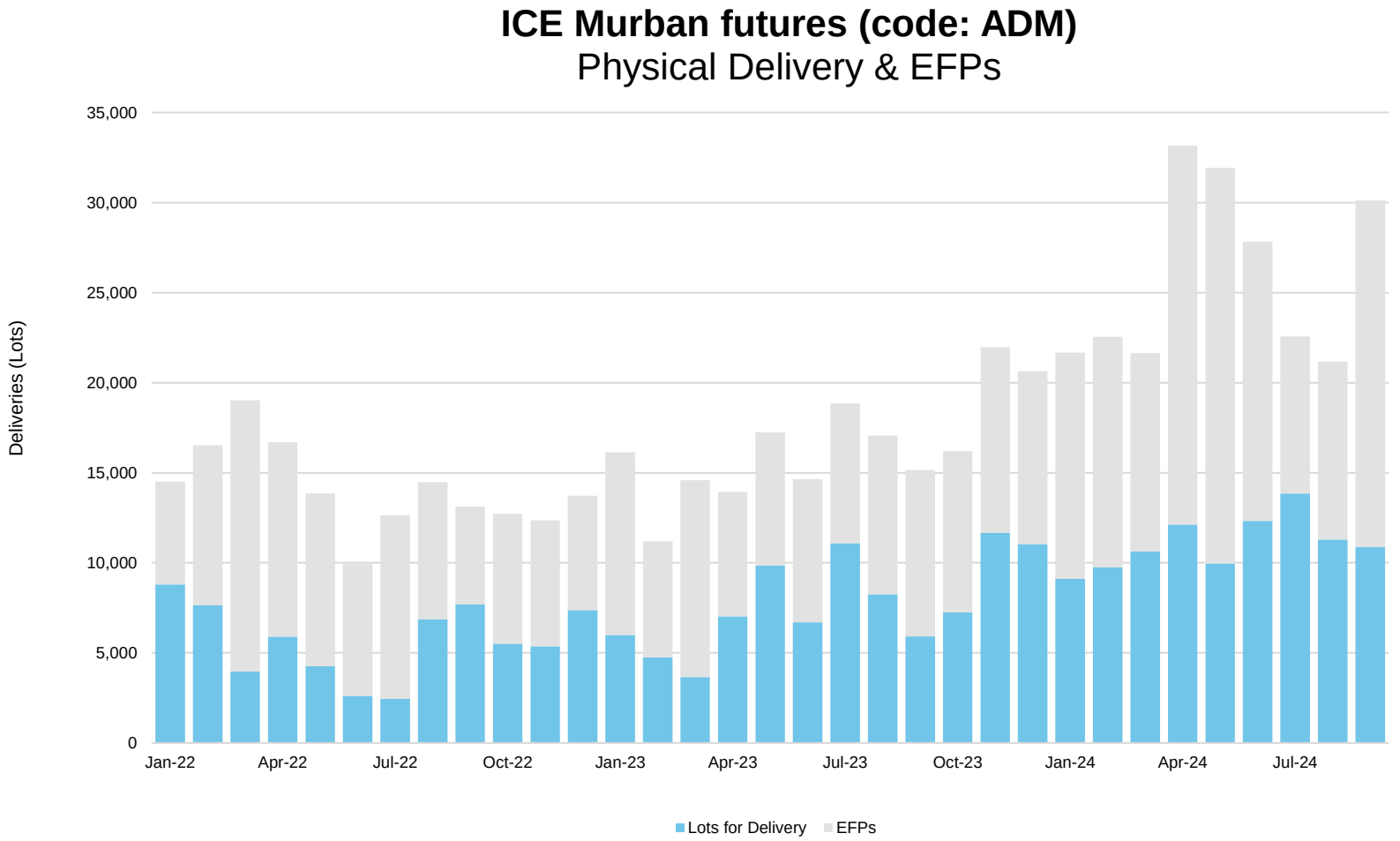




Source: ICE

- Successful launch in March 2021. Trading activity gathering pace, as the contract continues to become more established in the market.
- Fundamentals supporting the physically deliverable ICE Murban contract include: high physical volumes, transparent export plans, high crude quality, diverse groups of sellers and buyers, strong terminal/port infrastructure, and ample crude storage at Fujairah.
- Two key reforms made to physical pricing and trading: transparent market-driven pricing and no more destination and resale restrictions

ICE Murban (ADM): physical deliveries & EFPs also building quickly



Source: ICE

ICE Murban key points

- Fundamentals underpinning the ICE Murban contract continue to strengthen
  - Murban crude production of around 1.7 – 1.8 Mb/d
  - Murban crude exports approximately 1.4 – 1.5 Mb/d, almost entirely to Asian countries

- Crude production and exports planned to increase in the next few years, with ADNOC capacity expansion plans
  - Total capacity from 4.4 – 4.5 Mb/d currently to 5.0 Mb/d by 2027
  - Murban capacity from 2.0 – 2.1 Mb/d currently to 2.3 – 2.5 Mb/d

- Note: crude production and capacity figures, both total and for Murban, are unofficial and from trade press and industry sources

- Murban crude exports growth in 2024
  - ADNOC Ruwais refinery (837 kb/d) upgrading/crude flexibility project completed 1Q24.
  - Allows higher runs of heavier crude such as Upper Zakum and lower runs of Murban
  - Result in lower exports of Upper Zakum and higher exports of Murban

ICE Murban key points (continued)

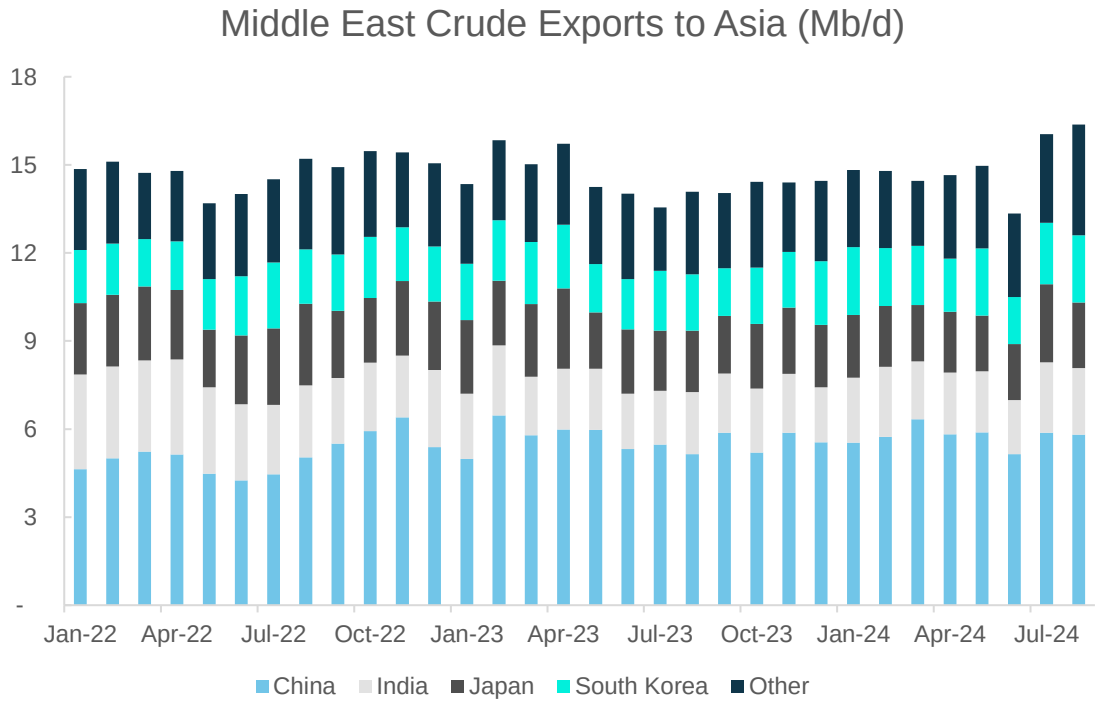
- With current Middle East geopolitical environment, including threats to supply and shipping, Fujairah may have an advantage from its location outside the Persian Gulf / Straits of Hormuz

- In 2024, unusually narrow Murban vs. Dubai differential (weak or negative quality premium).
  - Downward pressure on Murban from higher exports and strong flows to Asia of competing Midland WTI
  - Support for Dubai from OPEC+ cuts and lower exports of Upper Zakum

- Relatively inexpensive Murban vs. other grades has created hedging opportunities
  - The Murban vs. Midland differential can be hedged using ICE Murban (ADM) vs. ICE Midland WTI (HOU).
  - There has been market demand from Asian refiners and traders to trade this spread.
  - This differential is offered on the screen and is actively trading.

ICE (Platts) Dubai (DBI) Futures: the key medium sour crude benchmark for the Middle East

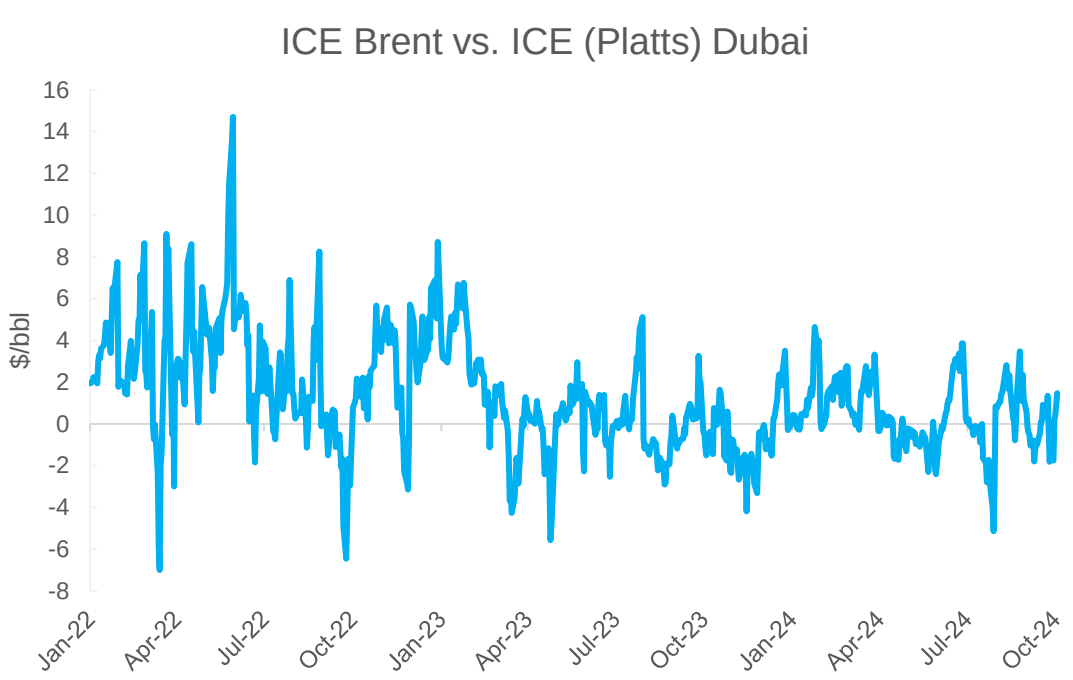
The most important physical flows of crude: Middle East to Asia

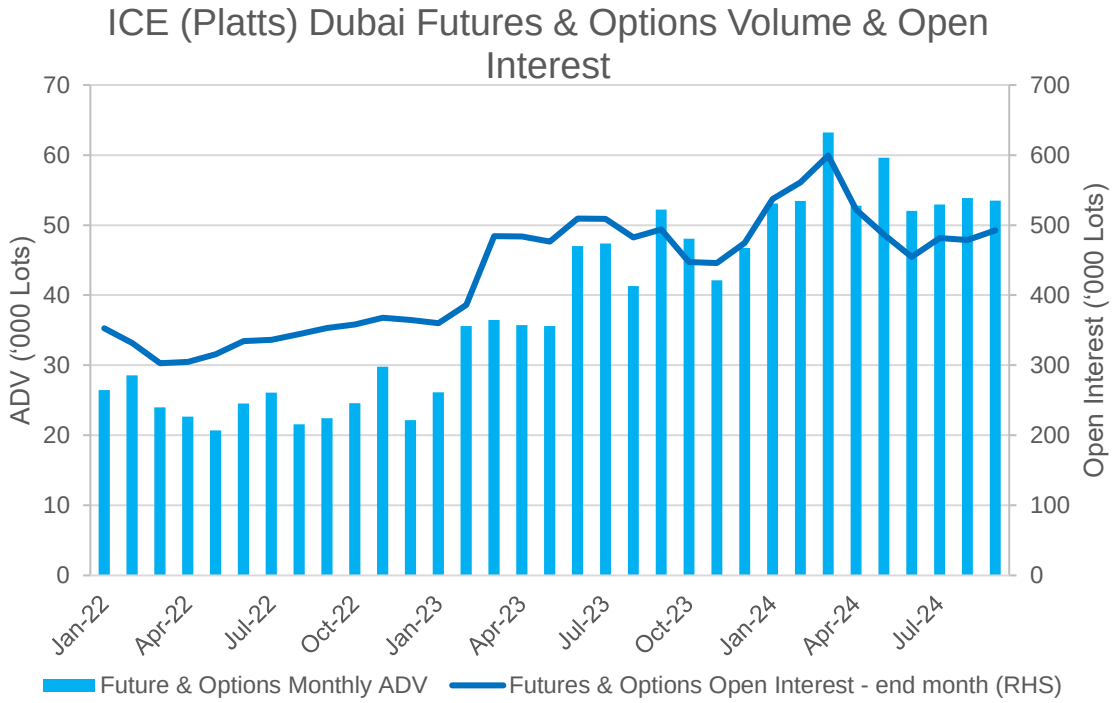


Source: Kpler and ICE

- The most important physical flows of crude oil, in terms of volumes, are from the Middle East to Asia. Around 60% of Asian imports are from the Middle East.
- The center of gravity of global oil demand growth is Asia. In the medium term, slowing growth in China and an increasing role for India.

ICE (Platts) Dubai: trading activity (ADV & Open Interest) robust

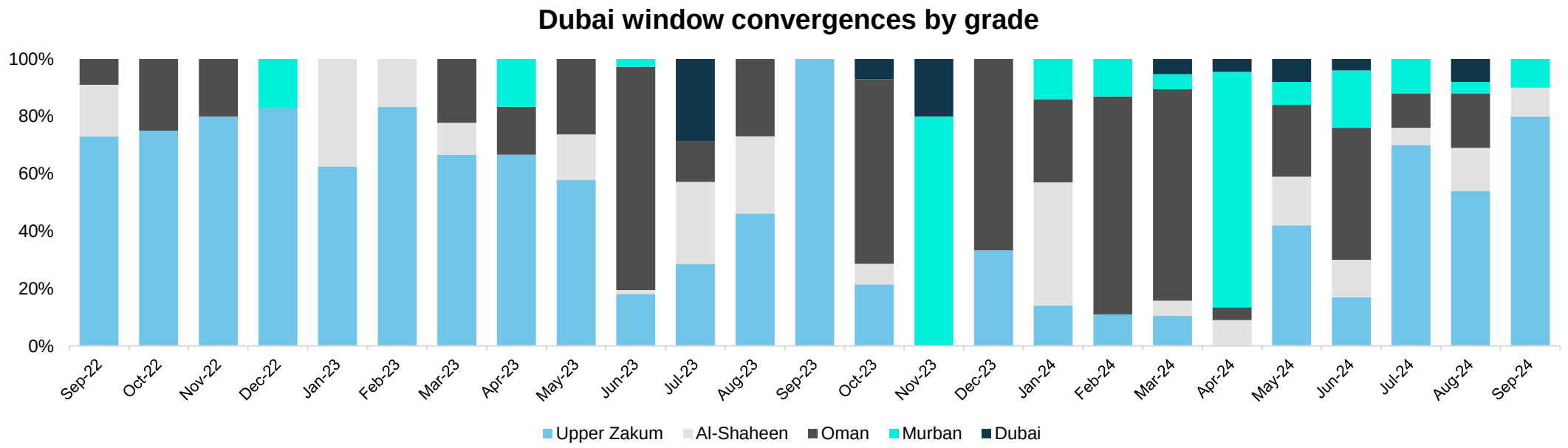




Source: ICE

- Dubai is the key price benchmark for Middle Eastern medium sour crude.
- Changes in Brent vs. Dubai differentials reflect both Asia vs. Atlantic Basin and sweet vs. sour crude

The complexion of the Dubai pricing basket has changed and become more diverse. Decreasing role for Upper Zakum, increasing role for Murban and other grades.



Source: Renaissance Energy Advisors

- Platts Dubai assessment based on most competitive price of a basket of grades -- similar concept to Platts Dated Brent.
- Tighter Upper Zakum supply means a decreasing role in setting the Dubai price, increasing role for Murban and other grades.
- To repeat: in 2024, unusually narrow Murban vs. Dubai differential.
  - Downward pressure on Murban from higher exports and strong flows to Asia of competing Midland WTI
  - Support for Dubai from OPEC+ cuts and lower exports of Upper Zakum

ICE (Platts) Dubai key points

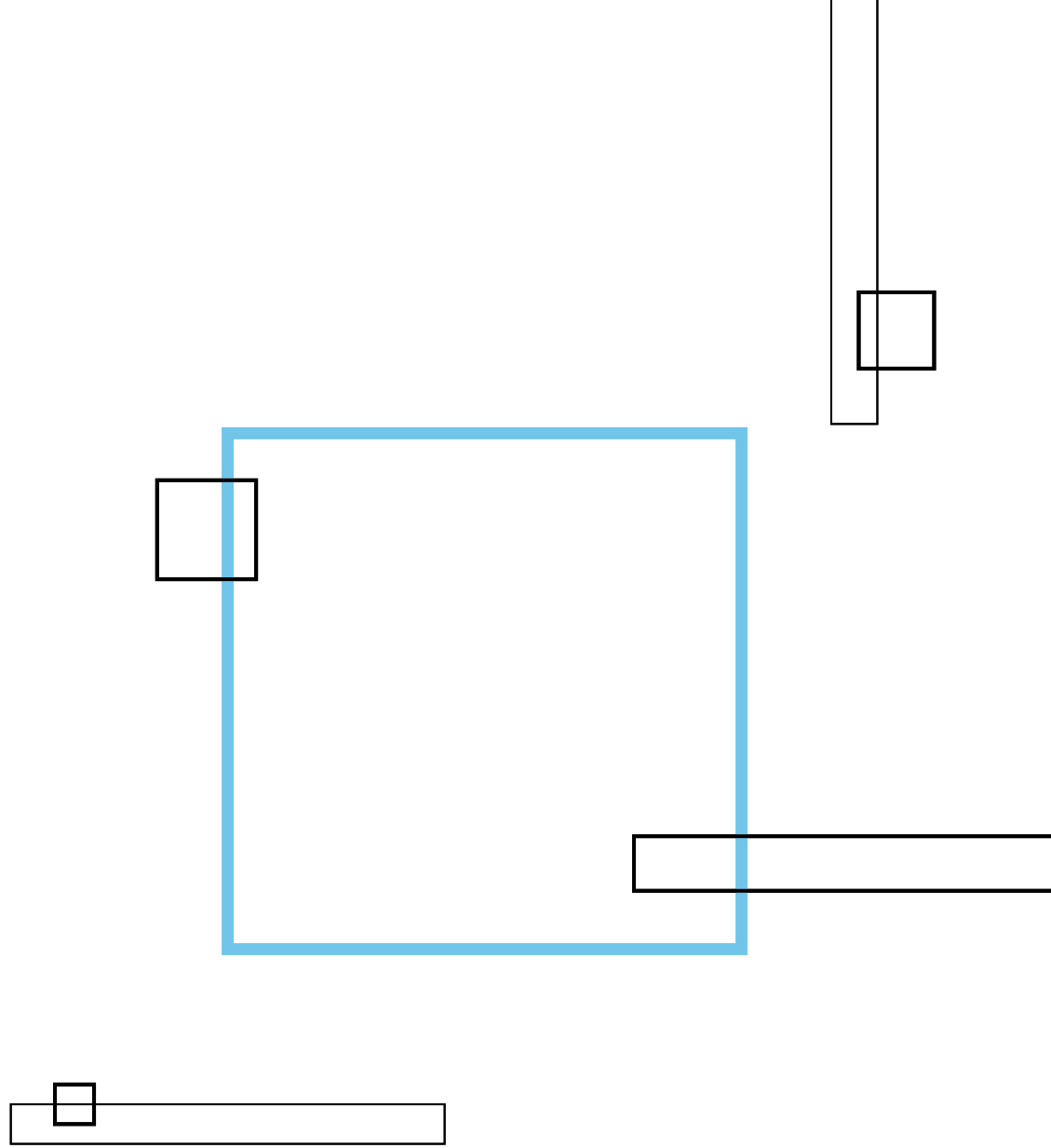
- Fundamental risks
  - Asian demand (China)
  - Middle Eastern supply (OPEC+)

- Geopolitical risks in the Middle East
  - Supply and shipping

- In 2024, relatively narrow Brent vs. Dubai differentials on average – but volatile.

- Narrow Brent vs. Dubai makes Brent-linked Atlantic Basin grades more economically attractive to refiners in Asia. Relatively comfortable balances for Atlantic Basin sweet crude, relatively tight balances for Middle Eastern sour crude.

ICE Low Sulphur Gasoil: the anchor of the global distillates complex



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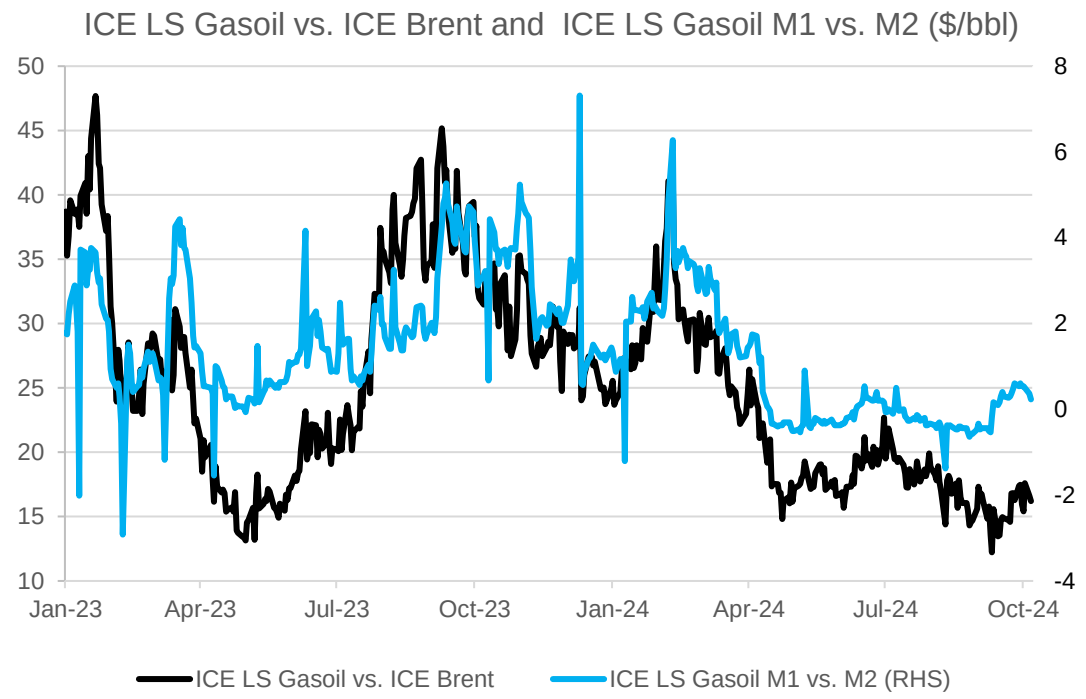
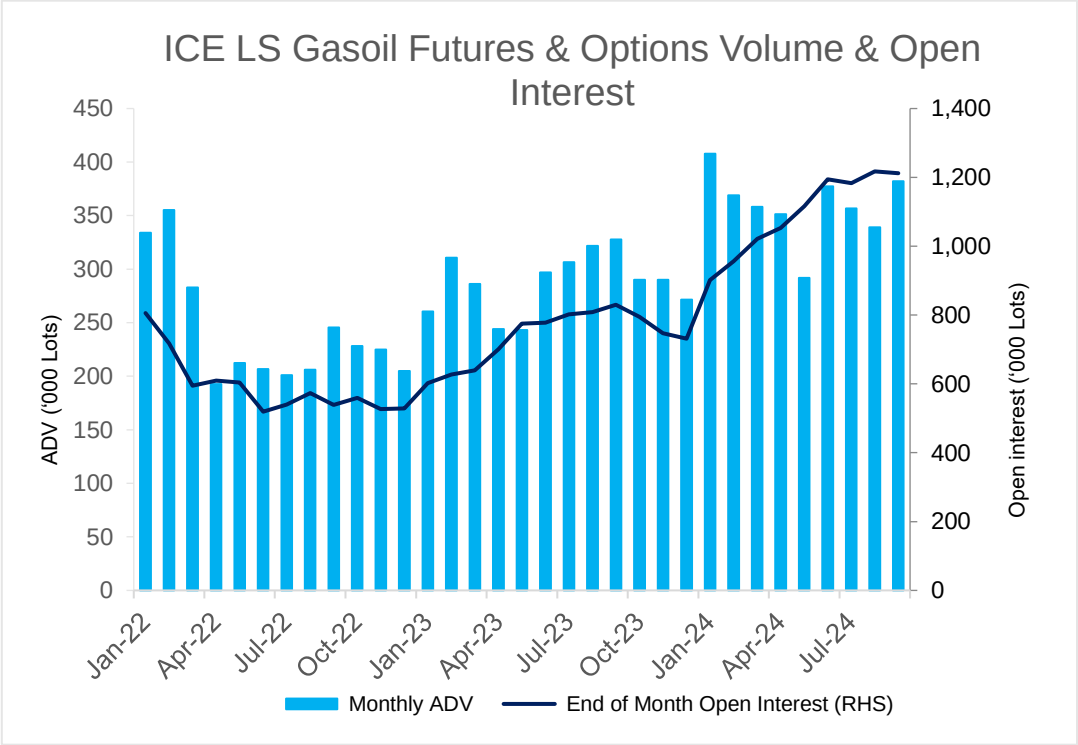


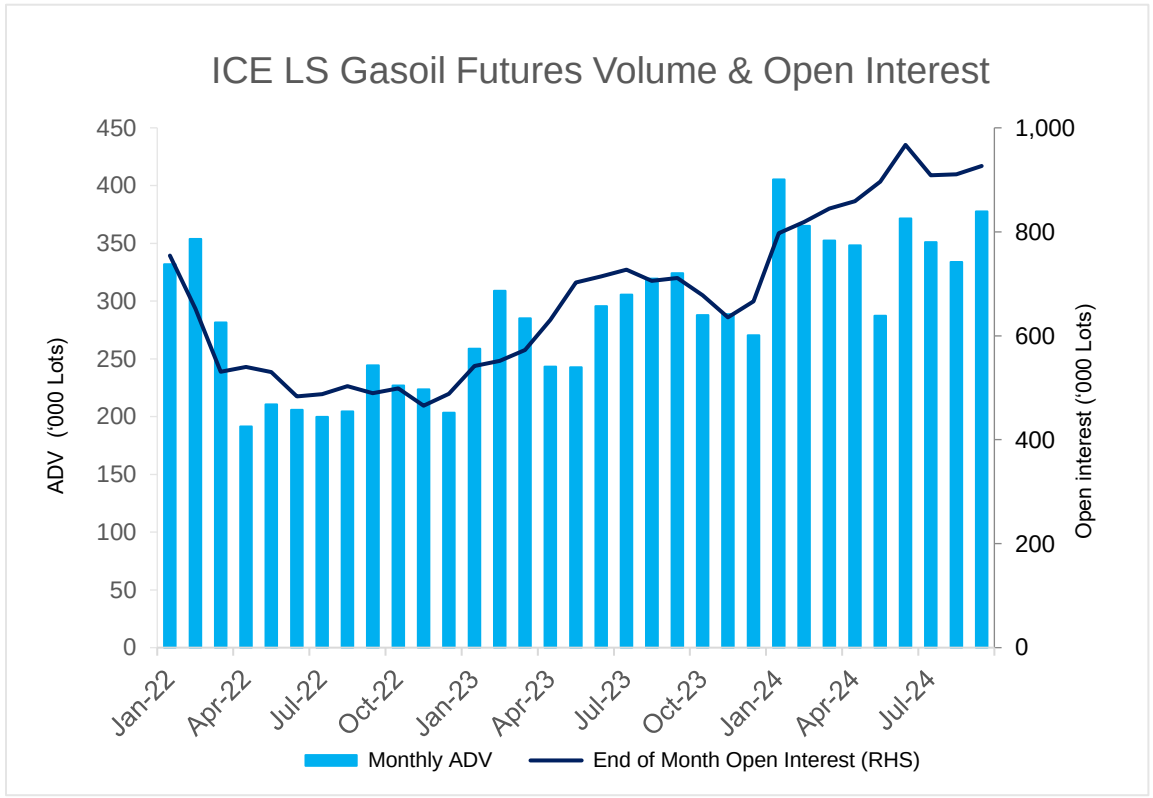
Source: ICE

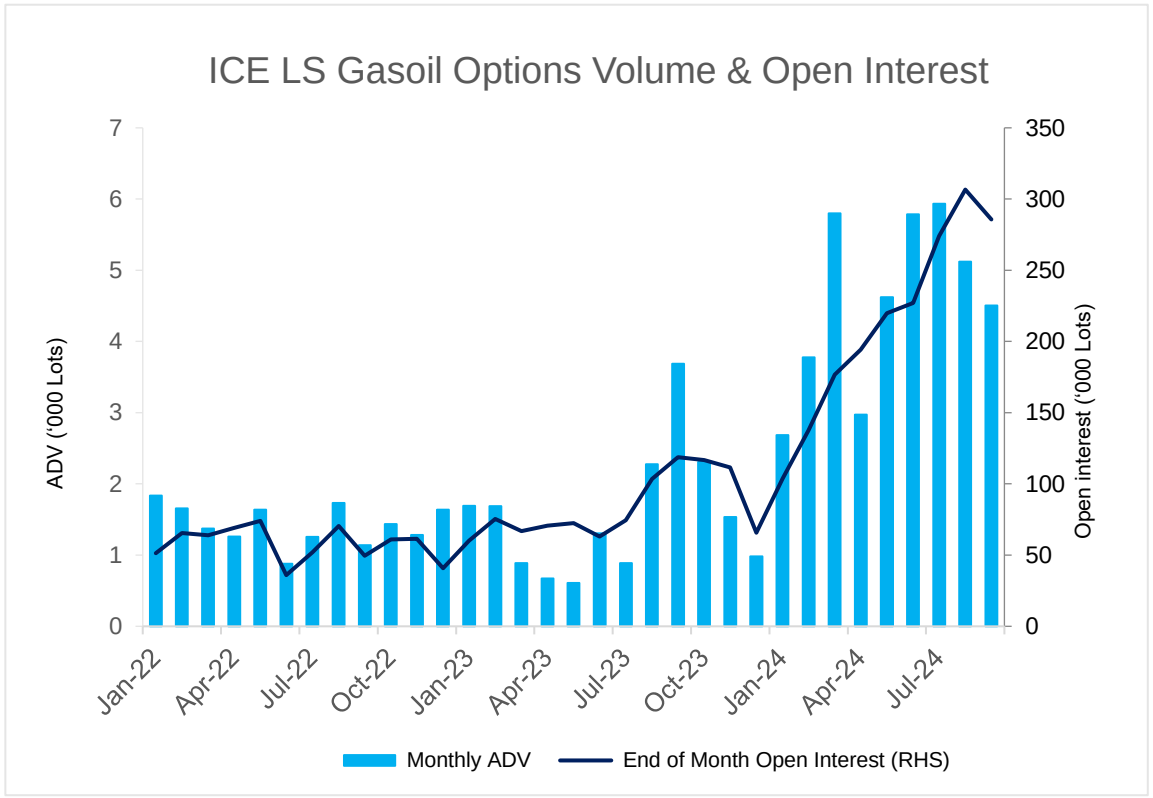


- Similar to Brent crude, in 2023, outright prices, volatility, and exchange margins all eased and normalized compared to the previous year. In 2024, normal market conditions continued. As a result, ICE Low Sulphur Gasoil trading activity continued to grow this year. Record highs in futures & options open interest in Oct. 2024.
- Another key driver: ICE excluded Russian-origin gasoil from delivery via the ICE Low Sulphur Gasoil contract, with effect from January 2023. Almost 2 years later, this remains an important step that laid the groundwork for trading activity in a sanctions environment.
- ICE Low Sulphur Gasoil deliveries dropped after the Russia-Ukraine war began but have returned to pre-war levels.

ICE Low Sulphur Gasoil: the anchor of the global distillates complex

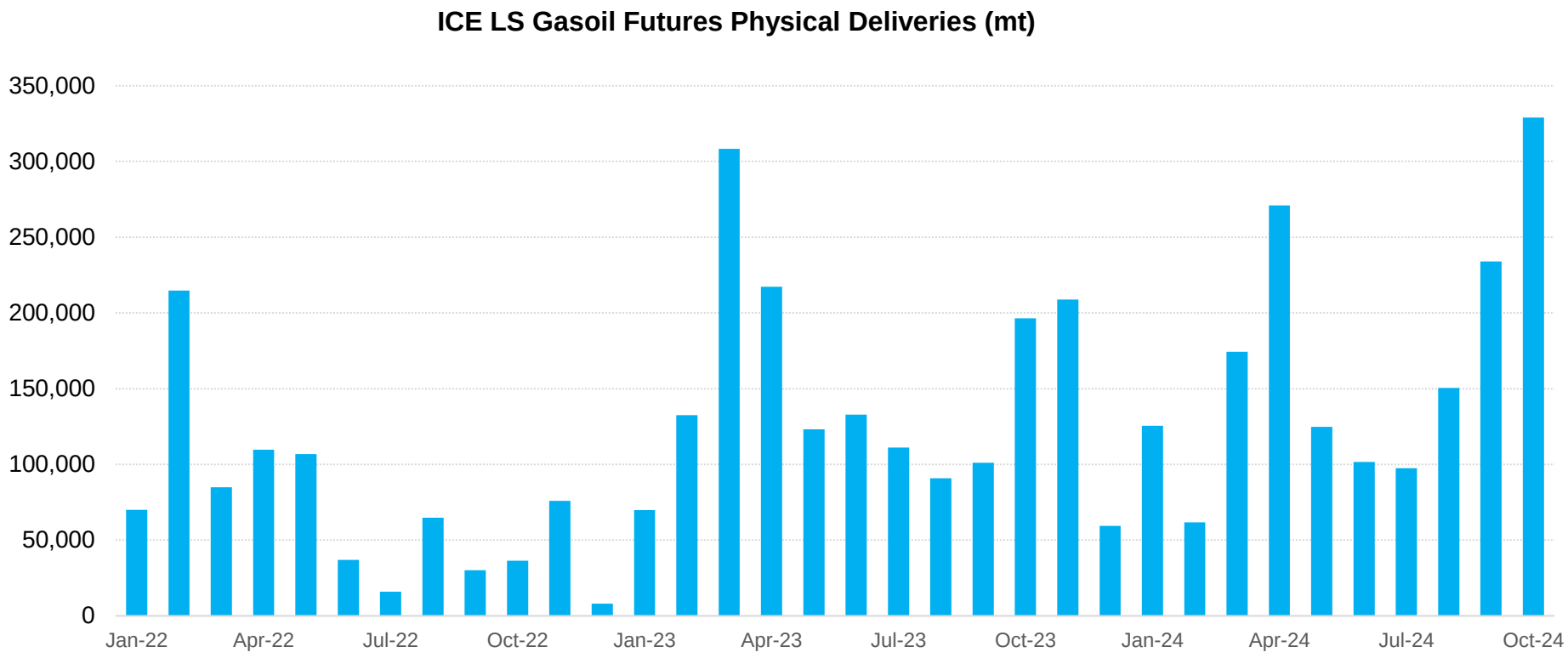
Trading activity growth in 2024 for both futures and options, with options growth faster





Source: ICE

ICE LS Gasoil Futures: physical deliveries fully recovered after Russian-origin gasoil was excluded from the contract in Jan. 2023



Source: ICE

ICE Low Sulphur Gasoil key points

- ICE Low Sulphur Gasoil LS Gasoil has remained a robust benchmark, with diligent delivery procedures in place.
  - Key driver: ICE exclusion of Russian-origin gasoil from delivery via the contract.

- ICE Low Sulphur Gasoil will continue to be the linchpin of the gasoil/diesel and broader middle distillate markets across global regions.
  - Fundamentals, geopolitics, and investor flows
  - Geopolitics includes impact on shipping routes and freight rates for gasoil/diesel and other refined products. Example – ongoing Red Sea shipping issues. Also, in spring 2024, Ukrainian attacks on Russian refining took up to 1 Mb/d of refining capacity offline.

- Key geographic trade / arbitrage hedging tools include:
  - US vs. Europe: Heating Oil/Low-Sulphur Gasoil differential
  - Europe vs. Asia Low Sulphur Gasoil to Singapore Gasoil differential

- Other key links extend across refined products, including Biofuels and Marine Fuel 0.5% Sulphur

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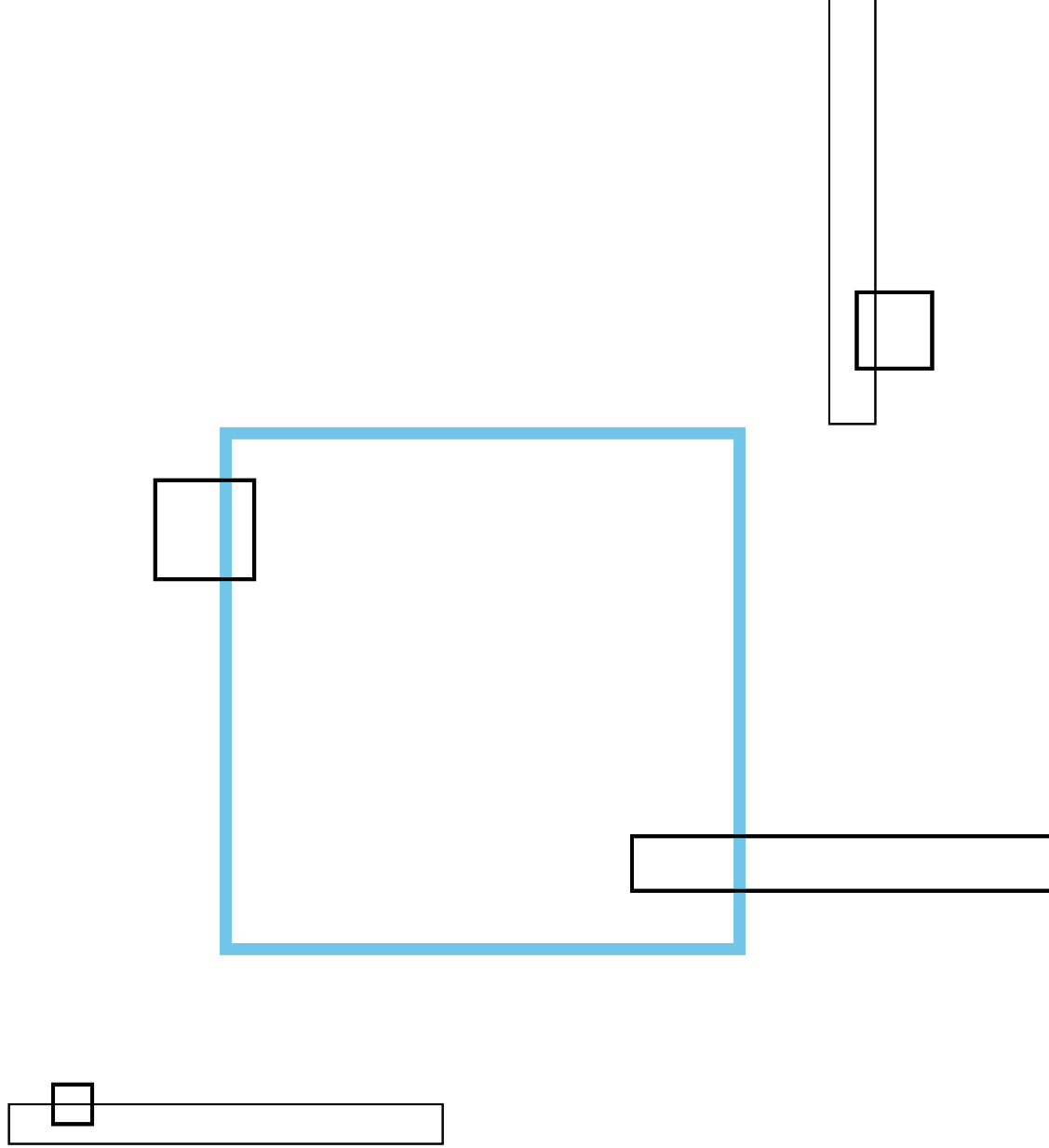
Thank You



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