Global Energy Weekly

Hot gasoline could soon run out of steam

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Commodities
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Gasoline has continued to lead a weakening oil complex…

We have reiterated our view for months (see Russian roulette for refined products, Gasoline still has fuel in the tank, and Oil takes a vacation) that gasoline was poised to hold the oil complex together in 1H23. In fact, gasoline cracks remain on solid footing heading into the peak of the driving season. New York Harbor gasoline is very tight and at the top of the global price stack helped by solid demand in the Tri-State area and limited refining capacity in the US Northeast. Meanwhile, Asian margins have lagged due to a weaker-than-expected reopening and higher Chinese export quotas, while European gasoline has held up firm in spite of record-breaking electric vehicle sales, as a multi-year trend away from diesel cars continues. Moreover, backwardation in the gasoline market is consistent with low inventory levels, providing support to RBOB prices in America and beyond. Yet these tail winds could soon change for gasoline.

…but mogas production is robust, yields are relatively high

While Americans and Europeans are poised to hit the roads again this summer, much of the strength in road fuels is already priced into the market. Looking into the end of the year, work-from-home trends keep shaving off demand even as companies push to bring workers back into the office. Plus, downside economic risks into the winter are growing partly due to high interest rates. Thus, we maintain a negative outlook for gasoline after the US driving season peaks on July 4. Also, we do not see strong support either for the middle distillate complex in 2H23. Diesel inventories across all the main trading regions are relatively low, but negative cyclical demand headwinds and robust Russian distillate exports could keep margins suppressed until the global economic outlook improves. Even if weekly and monthly distillate demand data in the US shows a modest improvement, a weak industrial backdrop and tighter lending conditions point to margin weakness ahead.

Winter RBOB specs, slower GDP, EV sales = weaker mogas

On the supply side, refinery distillation capacity is expanding at a rapid pace again. After a spike last year, lower US and global natural gas prices may encourage strong refinery runs too. Looking further out into 2030, we believe that the ongoing shift to electric cars will hurt gasoline the most relative to other segments of the oil market. At 75mn in 2022, global passenger vehicle sales have lagged substantially relative to pre-Covid levels of 81mn in 2019. More shared vehicles, more electric bikes/scooters, and less car ownership all suggest that the marginal mile is becoming increasingly electric. In any case, we expect electric vehicles globally to average 49% of total cars sold by 2030, setting a negative backdrop for demand for road fuels. So, gasoline prices have three major headwinds building into 4Q23 and 2024: a negative seasonal backdrop due to winter spec changes (which typically leads to increased output volumes as demand slows), a negative macro outlook due to high rates, and a negative structural backdrop due to rising EV sales. Thus, we reiterate our negative stance on winter gasoline cracks.

RBOB- Reformulated blendstock for oxygenate blending

Exhibit 1: BofA Commodity Research Themes and Outlook
Key takeaways

	View	Recent reports
Macro outlook	▪ Our economists see world GDP rising 2.7% in 2023 and expanding by an additional 2.6% in 2024.	
WTI and Brent crude oil	▪ We project Brent and WTI to average \$80/bbl and \$75/bbl, respectively, in 2023. ▪ The global oil balance should stay tight in 2023, supported by additional OPEC+ cuts starting in May, slower non-OPEC growth, and rebounding Asia demand, ▪ We forecast global demand growth to slow to 1.2mn b/d YoY in 2023 and 1mn b/d in 2024. ▪ Non-OPEC supply should grow roughly 1.8mn b/d YoY in 2023 and 720k b/d in 2024. ▪ We project total US crude and NGL supply to rise 1.1mn b/d in 2023 and 600k b/d in 2024. ▪ OPEC crude oil supplies are set to fall 650k b/d in 2023 and 230k b/d in 2024 as OPEC+ actively manages balances.	• Money breaks oil's back 08 May 2023 • OPEC+'s whatever it takes moment 05 April 2023 • Global Energy Paper: Medium-term oil outlook 26 February 2023 • \$80 is the new \$60 for oil 16 September 2022 • Oil demand has a supply problem 27 May 2022
Atlantic Basin oil products	▪ Refined product markets face risks from OPEC+ cuts, a looming recession, and rising global refining capacity. ▪ We forecast RBOB-Brent to average \$20/bbl in 2023, and we see ULSD-Brent cracks averaging \$26/bbl over the same period. ▪ OPEC+ cuts, rising complex refining capacity, lower gasoline and diesel cracks create upside for 3.5% fuel oil cracks, which we see averaging -\$15/bbl this year.	• Oil takes a vacation 21 April 2023 • Gasoline still has fuel in the tank 06 March 2023 • Heat poised to cool down 10 January 2023
US natural gas	▪ US gas supply and demand growth should hit 2.4Bcf/d and 0.2Bcf/d YoY in 2023, pushing stocks above +3.9Tcf by October. ▪ We forecast \$2.70/mmbtu US gas on average in 2023 and see a recovery to \$4/mmbtu in 2024.	• US nat gas rollercoaster nears the bottom 17 February 2023
LNG	▪ LNG supply growth is manageable from historical view at 13MMT in 23, 4MMT in 24, leaving demand to dictate future price path ▪ Several factors may prevent a 2020 redux: warmer summer, revival of Asian spot demand, fuel switching, poor hydro/nuclear gen ▪ TTF to grind lower in 2Q/3Q unless demand shifts, but beyond summer storage worries, we see a tightening LNG balance this winter and into 2024	• LNG is now a buyer's market 17 April 2023
Thermal coal	▪ Thermal coal prices surged to record highs as Russia, the world's 3rd largest coal exporter, invaded Ukraine. ▪ We expect Newcastle coal to average \$199/t in 2023 and \$160/t in 2024.	• King coal loses its crown 31 March 2023

Source: BofA Global Research estimates

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Exhibit 2: BofA Commodity Price Forecasts
(period averages)

	units	1Q23F	2Q23F	3Q23F	4Q23F	2023F	2024F
WTI Crude Oil	(\$/bbl)	76.00	72.00	75.00	77.00	**75.00**	**85.00**
Brent Crude Oil	(\$/bbl)	82.00	76.00	80.00	82.00	**80.00**	**90.00**
US NY Harbor ULSD (HO) Cracks to Brent Crude Oil	(\$/bbl)	40.62	24.00	20.00	18.00	**25.66**	**18.00**
US RBOB Cracks to Brent Crude Oil	(\$/bbl)	23.13	28.00	20.00	10.00	**20.28**	**12.00**
NWE Low Sulphur Gasoil Cracks to Brent Crude Oil	(\$/bbl)	31.30	16.00	12.00	10.00	**17.34**	**10.00**
NWE Eurobob Cracks to Brent Crude Oil	(\$/bbl)	15.00	18.00	12.00	2.00	**11.75**	**2.25**
NWE 1% Residual Cracks to Brent Crude Oil	(\$/bbl)	-13.40	-10.00	-7.00	-6.00	**-9.10**	**-5.00**
NWE 0.5% Residual Cracks to Brent Crude Oil	(\$/bbl)	2.50	0.00	2.00	2.00	**1.62**	**2.00**
NWE 3.5% Residual Cracks to Brent Crude Oil	(\$/bbl)	-23.20	-13.00	-12.00	-11.00	**-14.79**	**-10.00**
US Natural Gas	(\$/MMBtu)	2.65	2.25	2.75	3.25	**2.73**	**4.00**
Thermal coal, Newcastle FOB	(\$/t)	256	177	179	184	**199**	**160**
Aluminium	\$/t	2,445	2,450	2,750	3,000	**2,661**	**3,500**
Copper	\$/t	8,956	9,250	9,500	10,000	**9,427**	**9,875**
Lead	\$/t	2,131	2,200	2,050	2,050	**2,108**	**2,000**
Nickel	\$/t	26,389	24,000	22,500	20,000	**23,222**	**21,250**
Zinc	\$/t	3,122	3,000	2,750	2,750	**2,905**	**2,500**
Gold	\$/oz	1885	1950	2000	2200	**2009**	**2061**
Silver	\$/oz	22	23	25	28	**25**	**26**
Platinum	\$/oz	996	1,000	1,250	1,500	**1,186**	**1,632**
Palladium	\$/oz	1,578	1,500	1,500	1,500	**1,520**	**1,632**

Source: BofA Global Research estimates

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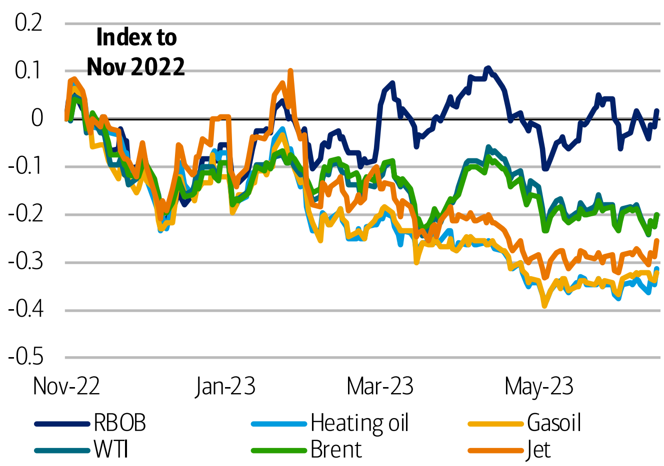
Hot gasoline could soon run out of steam

We argued in November '22 and March '23 that gasoline would lead oil complex

Gasoline prices have outperformed other fuels like diesel since we first discussed it (see Russian roulette for refined products) in November of last year (Exhibit 3). Back then, we argued that a weak industrial sector globally coupled with China reopening was likely to boost gasoline first and then jet fuel demand later, following a pattern previously observed in other regions such as the US and Europe (see Drive now, fly later). Along these lines, global petroleum product demand has come mostly from gasoline and jet fuel in recent months (Exhibit 4), with gasoline prices holding steady even as the rest of the complex rolled down.

Exhibit 3: Crude and petroleum prices, indexed
Gasoline prices have outperformed other fuels like diesel since we first discussed it in November



Source: Bloomberg

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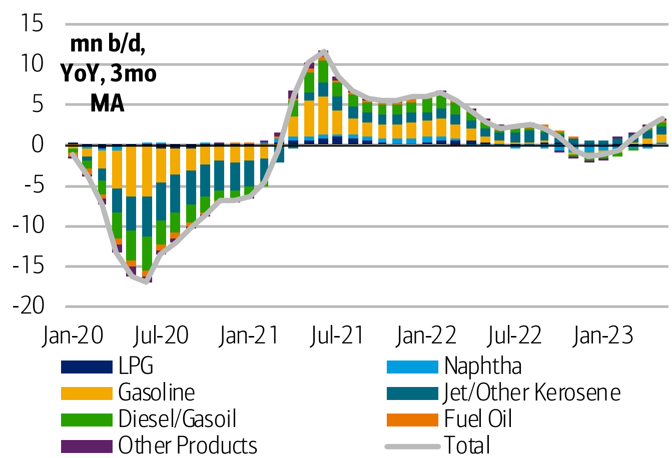
Exhibit 4: Global oil demand
Global petroleum product demand has come mostly from gasoline and jet fuel in recent months



Source: Woodmac

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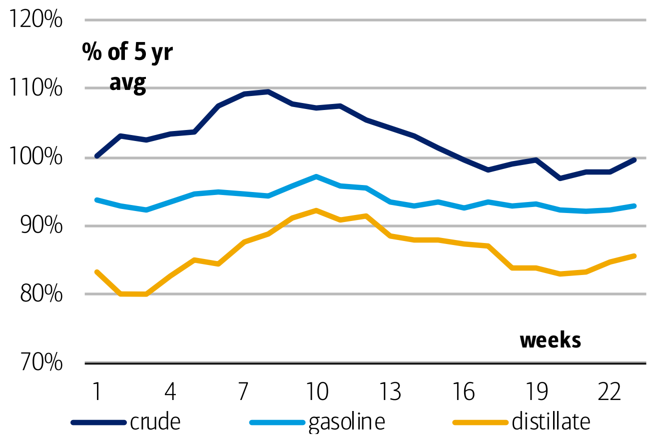
For now, gasoline remains the key driver of petroleum fuels

While distillates stocks are below the 5 year average, we note the small build since the start of the year. In contrast, gasoline stocks have undershot inventories of diesel products (Exhibit 5) and sit below January 1st levels, even as we approach the driving summer season. With gasoline demand continuing to recover and inventories failing to build, backwardation in gasoline markets has remained substantially more pronounced than that seen in other segments of the oil complex like crude or distillates (Exhibit 6). Put differently, gasoline has carried petroleum markets for more than six months now, even if crude and diesel prices have declined overall.

Exhibit 5: US 2023 inventories vs 5Y average

Gasoline stocks have undershot inventories of crude oil since the start of the year



Source: Bloomberg

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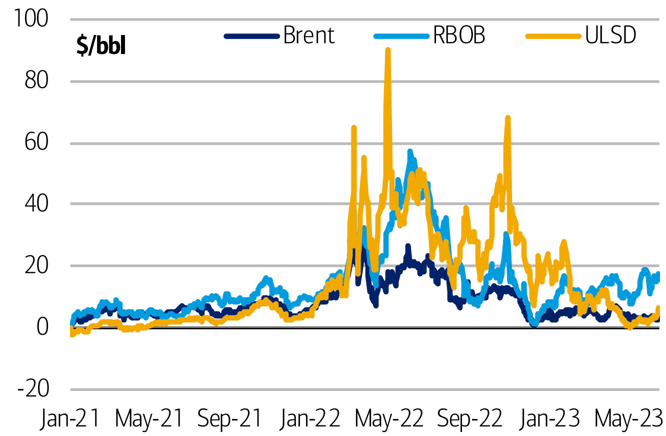
Exhibit 6: Crude oil and refined product timespreads (1-13)

Backwardation in gasoline markets is more pronounced than in other segments of the oil complex



Source: Bloomberg

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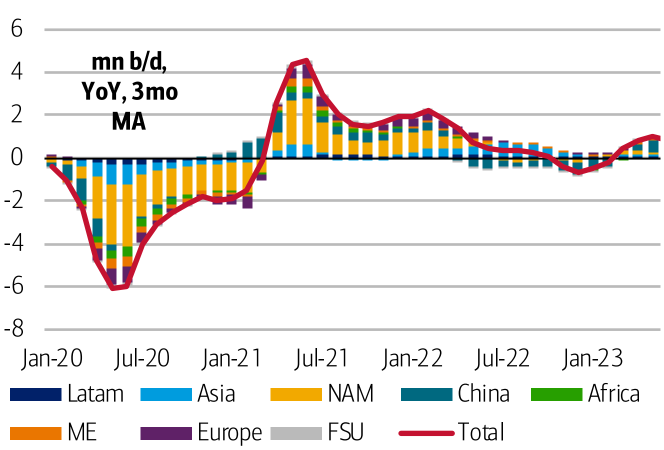
Americans are poised to hit the roads again this summer…

Taking a broader look at the world, we note that global demand for oil is growing at a rate of 3.2mn b/d year-on-year, according to WoodMac. Part of this overall number, gasoline demand growth globally is currently averaging 0.98mn b/d, a seasonally strong figure when compared to this time last year (Exhibit 7). Miles driven in the US have remained at relatively high rates for several months now (Exhibit 8), although they are below the levels observed prior to the pandemic in 2018 and 2019.

Exhibit 7: Global gasoline demand growth

Gasoline demand is seasonally strong compared to this time last year



Source: Woodmac

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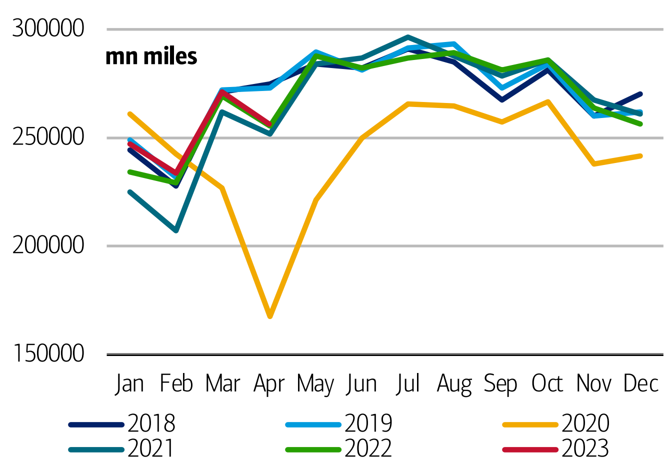
Exhibit 8: US vehicle miles traveled

Miles driven in the US has remained at relatively high rates for quarters now



Source: Bloomberg

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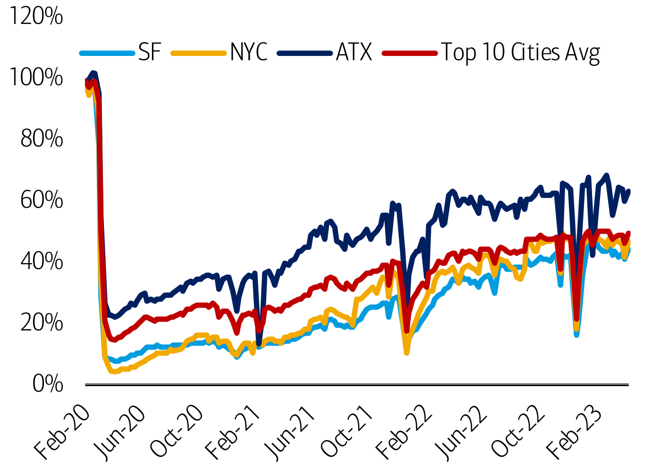
…although work-from-home trends have shaved off demand

In fairness, miles driven in America have never recovered back to pre-Covid levels largely because many Americans continue to work from home on a part time basis. While we initially argued in 2021 that many Americans were "working from car" not just from home, trends have normalized and gasoline demand (Exhibit 9) has stabilized slightly below pre-Covid levels. US gasoline demand has averaged 8.8mn b/d so far this year compared to 9.2mn b/d in 2019. The somewhat reduced use rates have allowed US refiners to boost their gasoline exports at a faster rate compared to pre-Covid levels (Exhibit 10) despite the extensive refinery shutdowns.

Exhibit 9: Office occupancy as % of 2019 levels
Many Americans continue to work from home on a part time basis, capping gasoline demand...



Source: Kastle Systems, BofA Global Research

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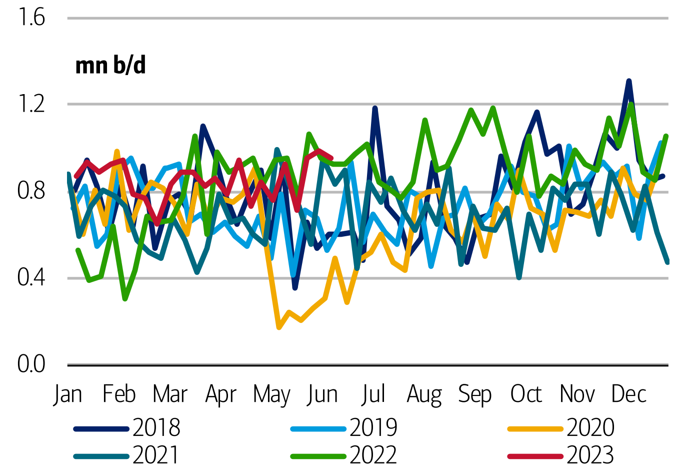
Exhibit 10: US gasoline exports
...allowing US refiners to boost their gasoline exports at a faster rate compared to pre-Covid levels



Source: Bloomberg

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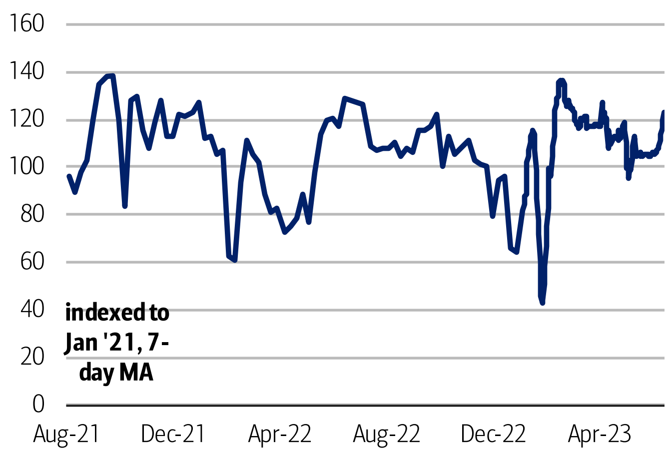
Asia is emerging out of Covid with a penchant for driving too...

Driving patterns in Asia are comparable to those in other regions that have re-opened after a pandemic lockdown. Looking at weekly average city-level congestion indices, we note that Chinese drivers have emerged from Covid with a penchant for driving too (Exhibit 11). While gasoline demand across OECD Asia has remained supportive as well (Exhibit 12) compared to 2022 levels, we would note that consumption patterns at 1.3mn b/d on average so far in 2023 are about 200k b/d below 2019 levels. Changes in car usage as well as increasing vehicle efficiency are partly responsible for these lower figures.

Exhibit 11: China's weekly average city-level congestion index
Chinese drivers have also emerged from Covid with a penchant for driving too...



Source: BNEF

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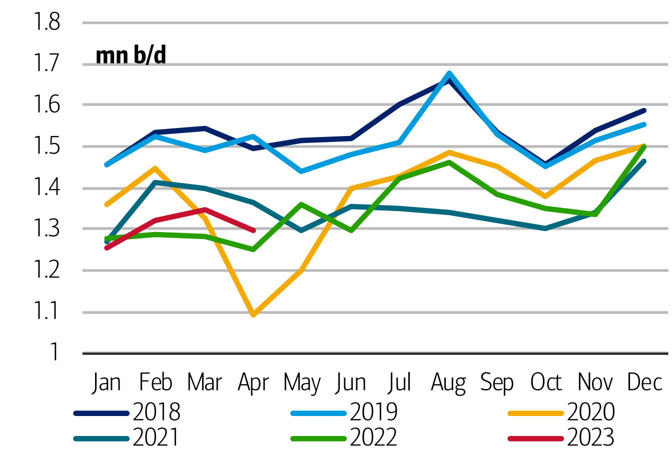
Exhibit 12: OECD Asia motor gasoline demand
...while gasoline demand across OECD Asia has remained supportive as well



Source: IEA

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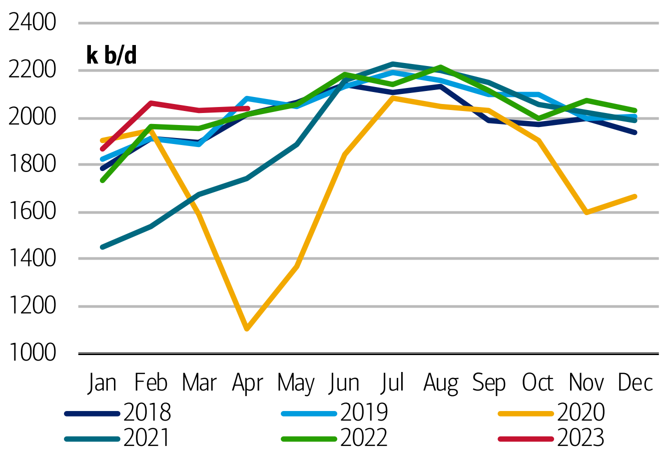
...while Europe is set to see another bumper tourism season

In contrast, European gasoline consumption has held up firm and will likely top last year's levels this summer (Exhibit 13), averaging 2mn b/d this year or 85k b/d above last year. In contrast to Asia or the US, European gasoline demand is actually above 2019 levels. Despite the surge in electric vehicle (EV) sales, the relative strength of European gasoline consumption reflects partly the continued shift away from diesel in the continent. Even then, the collapse in European natural gas prices has helped increase runs across regional refiners, which means that European gasoline availability has increased, and exports have trended higher (Exhibit 14).

Exhibit 13: OECD Europe gasoline demand
In Europe, gasoline consumption has held up firm and will likely top last year's levels this summer



Source: IEA

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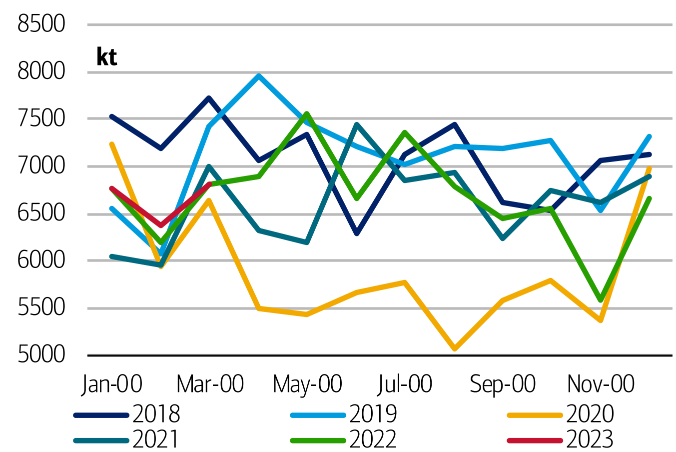
Exhibit 14: OECD Europe gasoline exports
European gasoline exports are also tracking higher YoY on average



Source: IEA

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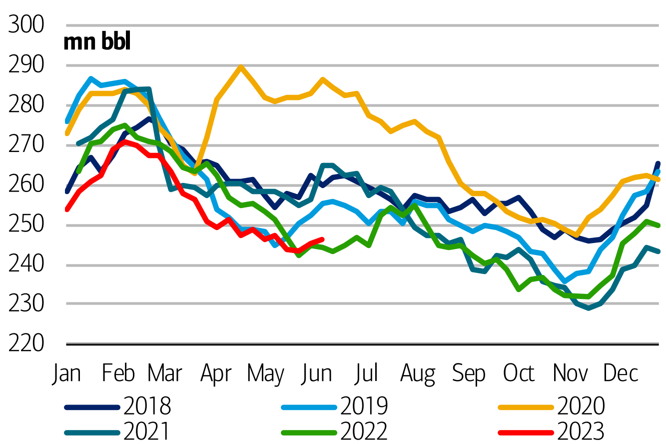
Inventories for gasoline are at very low levels in key regions...

A low level of inventories has been perhaps the key variable supporting gasoline prices, crack spreads and time spreads in recent months. When measured across the US, Singapore, and Northwest Europe, we note that weekly gasoline stocks in the three main trading regions are at very low levels (Exhibit 15) and have only recently moved slightly above 2022 figures. Meanwhile, monthly gasoline inventories are low also when looking at OECD measures (Exhibit 16), although the data lags prevent us from having a more real-time read on this key metric underpinning gasoline market strength.

Exhibit 15: Gasoline inventories in US, ARA, and Singapore
Weekly gasoline stocks measured across the three main trading regions are at very low levels...



Source: Bloomberg

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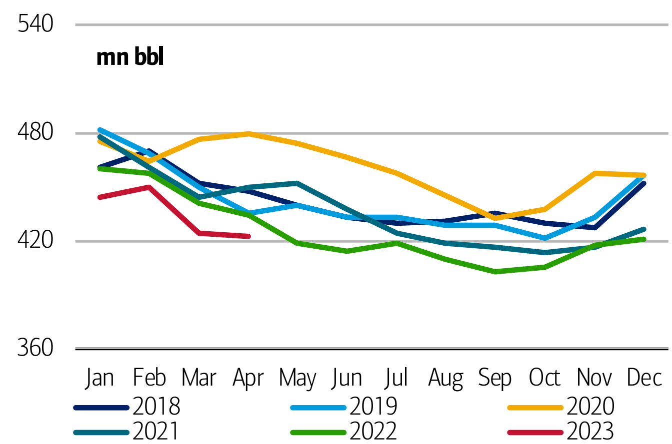
Exhibit 16: OECD total gasoline inventories
...while monthly gasoline inventories are low also when looking at the monthly OECD measures



Source: IEA

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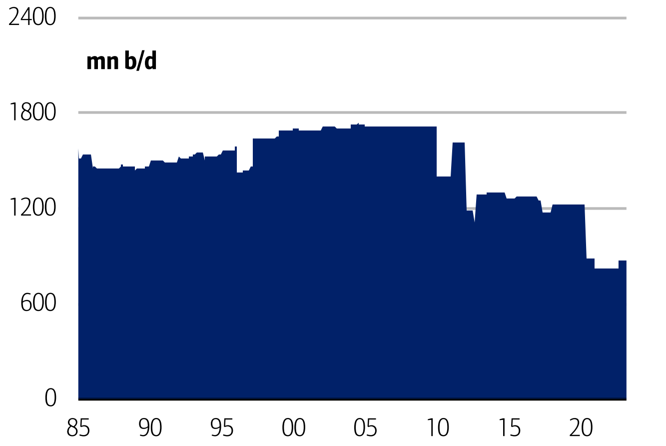
...and NY Harbor prices recently spiked to attract molecules

The US Northeast has been the one outsized market that has found it difficult to attract fresh gasoline molecules. Of course, the tri-state area faces more of a structural problem here. Stocks in NY Harbor have been depleted as a result of limited refining capacity in the US East Coast (Exhibit 17) and continued shut-downs due to underinvestment and environmental risks, like Philadelphia Energy Solutions. In fact, when compared to other regions across the US, we note that PADD1 has experienced the steepest decline in refining runs from an average of 0.98mn b/d in 2018/19 to an average of 0.73mn b/d during the last two years due to shutdowns (Exhibit 18).

Exhibit 17: US PADD 1 refining capacity
Stocks in NY Harbor have been depleted as a result of limited refining capacity in the US East Coast



Source: EIA

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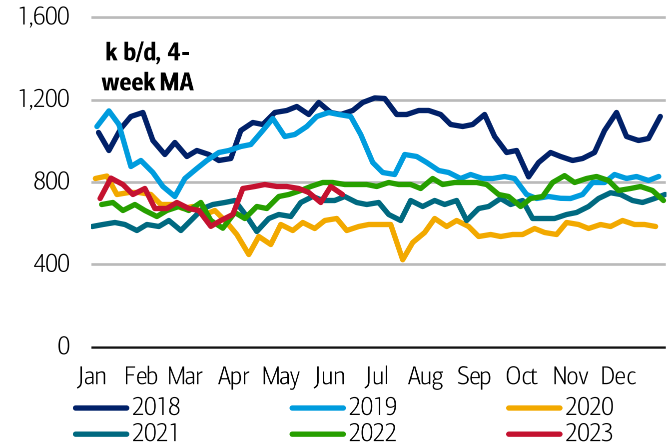
Exhibit 18: US PADD 1 refining inputs
PADD1 has experienced the steepest decline in refining runs across the US due to shutdowns



Source: Bloomberg

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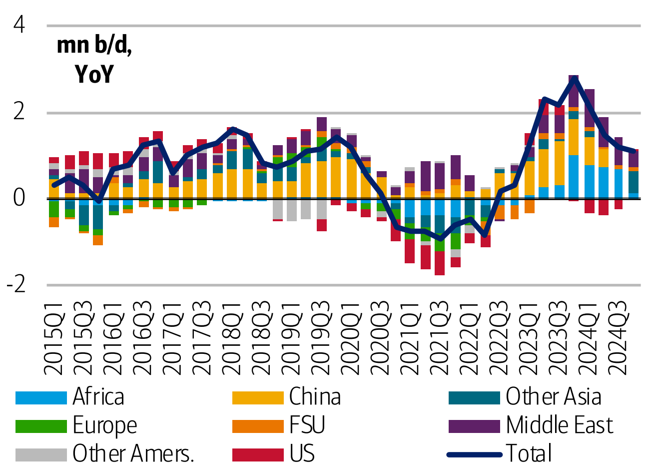
Still, refining capacity is expanding at a rapid pace again…

The refining crunch in the US Northeast will be eased by growth in other parts of the world. After a two year window where refining capacity contracted by 1.6mn b/d from peak to trough, global refining capacity is once again expanding at a rapid clip compared to prior years (Exhibit 19). We expect growth of 2.1mn b/d in 2023 following growth of -0.2mn b/d in 2022, providing some relief to a globally tight refining environment. Moreover, China is once again allowing for larger volumes of petroleum product exports to the Pacific Basin (Exhibit 20) after meagre figures in 1H22.

Exhibit 19: Global refining capacity
In contrast to the US, global refining capacity is expanding at a rapid clip compared to prior years



Source: Platts

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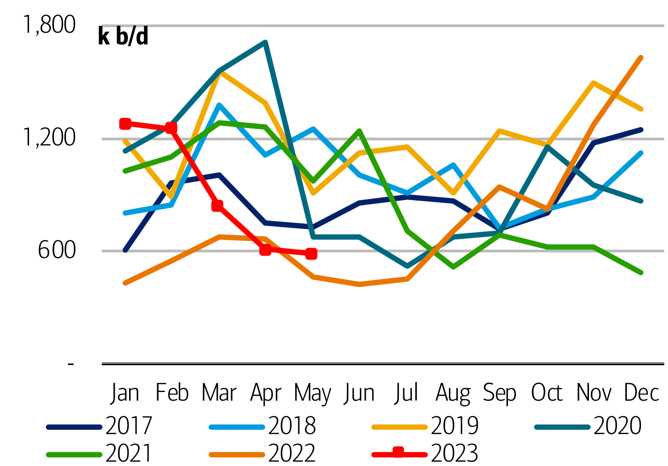
Exhibit 20: China exports of gasoline, jet fuel, and diesel
China has allowed for large volumes of petroleum product exports to the Pacific Basin at times this year



Source: Bloomberg

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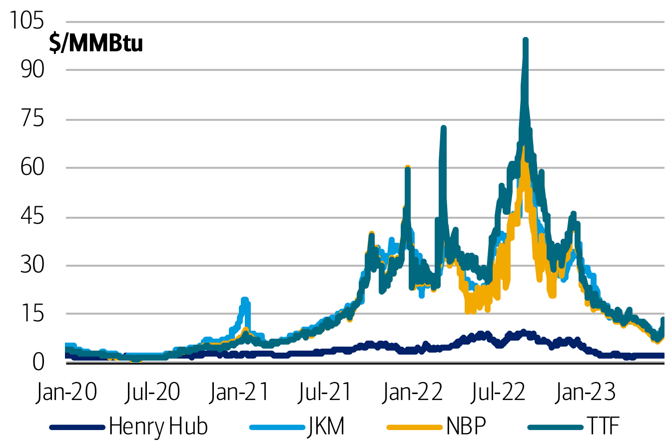
…while low natural gas prices should encourage high runs

With refining capacity expanding at a good clip, we also note that lower natural gas prices should encourage high levels of runs around the world. After all, natural gas is a key input into refining activity as the main fuel used to distil crude around the world. Not surprisingly, the steep decline in US and global natural gas prices in the past year or so (Exhibit 21) has benefitted marginal refiners, allowing for simpler units to operate despite falling cracks (Exhibit 22). With US and global gas markets settling in at lower levels, we expect continued downward pressure on margins.

Exhibit 21: Global natural gas prices
The steep decline in US and global natural gas prices in the past year or so...



Source: Bloomberg

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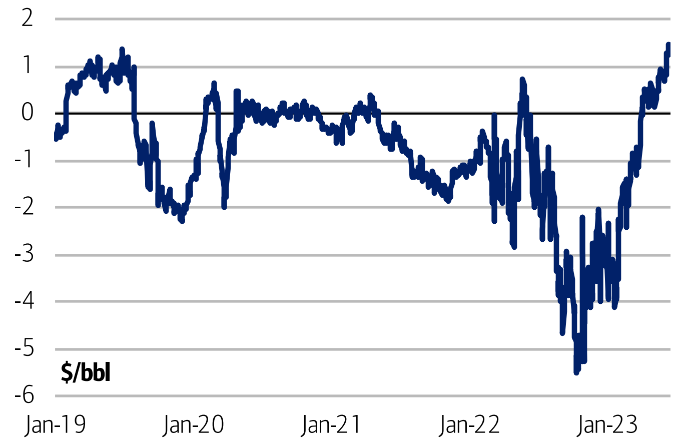
Exhibit 22: WTI FCC vs coking margins
...has benefitted marginal refiners, allowing for simpler units to operate despite falling cracks



Source: Bloomberg

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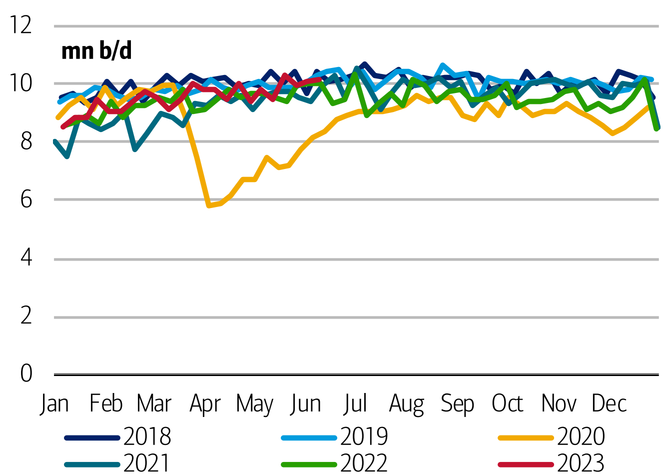
Gasoline production is robust and yields are relatively high

Despite refinery shutdowns across America and high global gas prices, production has remained at very healthy levels. Looking at US gasoline yields, we note production volumes of around 9.8mn b/d since April (Exhibit 23) compared to 9.6mn b/d last year or 1mn b/d in 2019. Importantly, gasoline and naphtha yields remain elevated versus jet fuel and diesel yields (Exhibit 24) at around 47% roughly in line with the average of the past five years.

Exhibit 23: US gasoline production
Looking at US gasoline yields, we note production levels of around 9.8mn b/d in recent months...



Source: Bloomberg

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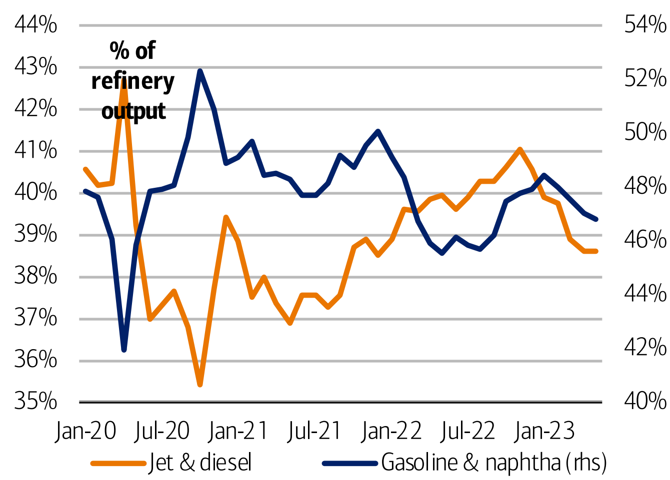
Exhibit 24: Refinery yields by product, United States
...while gasoline and naphtha yields are tracking higher than jet fuel and diesel



Source: Woodmac

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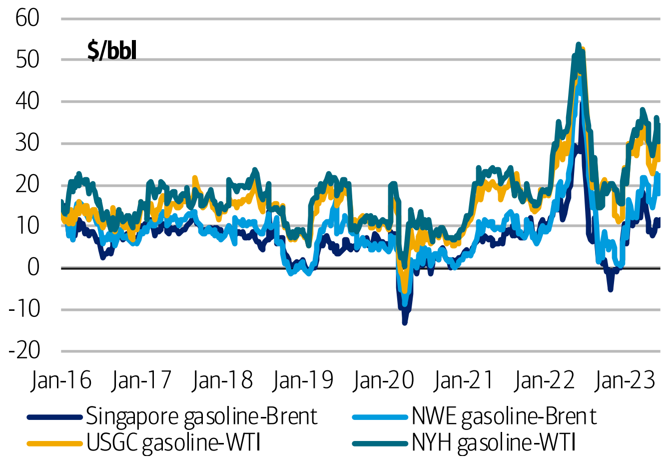
All these factors should support gasoline cracks into July but…

We have reiterated our view several times this year (see Gasoline still has fuel in the tank and Oil takes a vacation) that gasoline was poised to hold the oil complex together. In fact, gasoline cracks remain on solid footing heading into the peak of the driving season (Exhibit 25), with NY Harbor of course at the top of the food chain and Asian margins lagging due to a weaker demand profile when compared to Europe. Looking at more technical price patterns, we note that backwardation in the gasoline market is consistent with low inventory levels, providing price support (Exhibit 26) to RBOB prices in America and beyond.

Exhibit 25: Global gasoline cracks

Gasoline cracks remain on solid footing heading into the peak of the driving season



Source: Bloomberg

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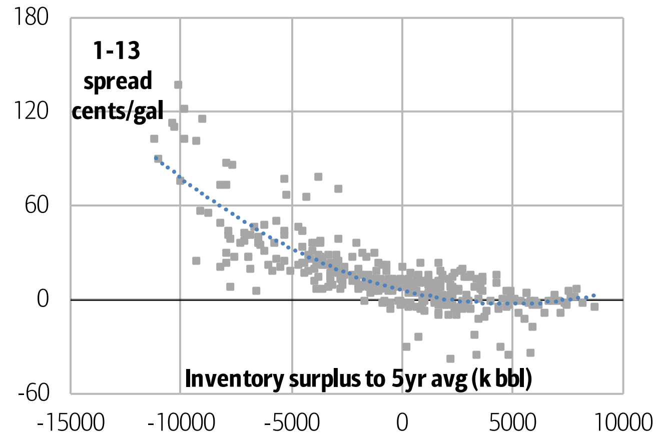
Exhibit 26: US PADD 1B gasoline timespreads vs inventories

Backwardation in the gasoline market is consistent with low inventory levels, providing price support



Source: Bloomberg

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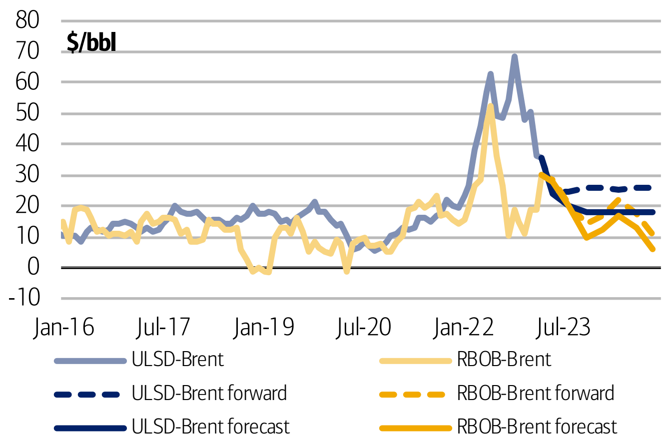
…gasoline cracks may face downward risks heading into 2H23

While we have remained positive on gasoline for months now, we believe dynamics are changing quickly and RBOB could lose strength heading into 2H23. As a result, we project a steep decline in gasoline cracks heading into 2H23 (Exhibit 27), although we notably also project weaker distillate cracks. Put differently, we remain negative on margins overall and see headwinds building as the US economy heads for a likely recession into year-end and slowing global growth and rising supplies take a toll on diesel. Moreover, we expect substantial growth in biofuels production over coming quarters (Exhibit 28) adding further fuel to the mix.

Exhibit 27: RBOB-Brent crack history, forecast, and forward curve
Having said that, we project a steep decline in gasoline cracks heading into 2H23



Source: Bloomberg, BofA Global Research estimates

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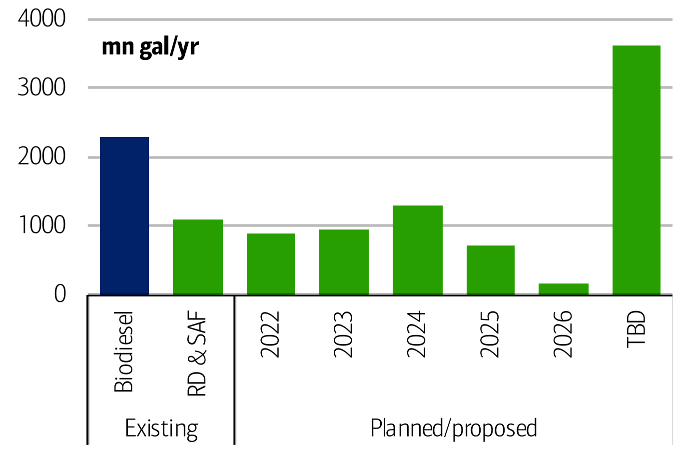
Exhibit 28: US biodiesel, renewable diesel, and SAF capacity
Moreover, we expect substantial growth in biofuels production over coming quarters



Source: Platts, BofA Global Research estimates

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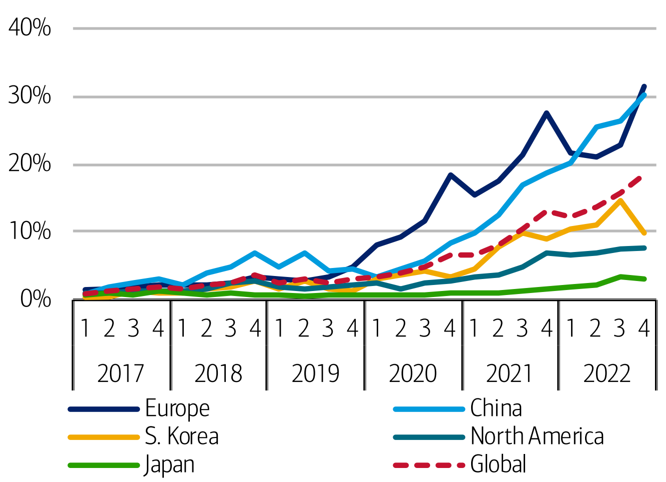
Further out, the ongoing shift to electric cars will hurt gasoline…

Beyond the next six months, the medium-term outlook for gasoline as a transportation fuel is not great. For starters, electric vehicles sales are already at 30% of total in Europe and China and are poised to keep growing over the coming years (Exhibit 29). With global EV sales approaching 20% this year and set to reach 49% by 2030, we see a scenario that leads to a structural decline in transportation fuel demand into 2050 (Exhibit 30). Note that aviation and sea bunker fuels will likely hold up better, but road transportation led by gasoline will likely be impacted the most over the next three decades.

Exhibit 29: EV share of new passenger vehicle sales
Electric vehicles sales are poised to keep growing over the coming years…



Source: BNEF

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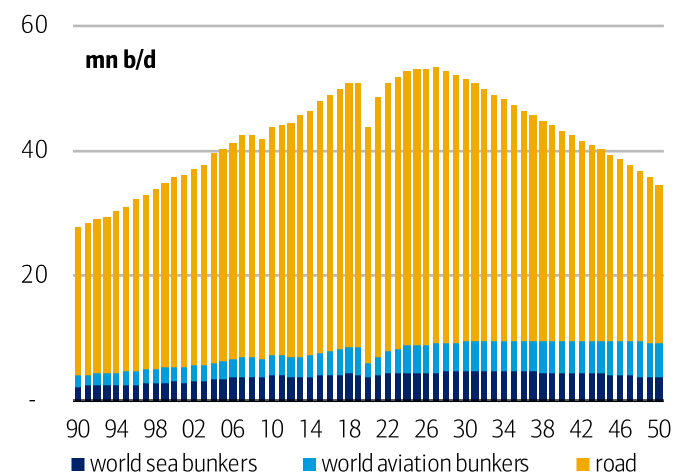
Exhibit 30: Transport fuel demand
…setting the stage for a structural decline in transportation fuel demand into 2050



Source: IEA, BofA Global Research estimates

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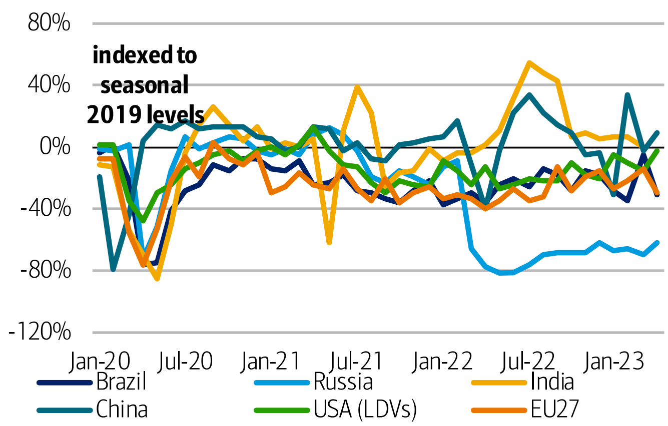
…particularly because the marginal mile is increasingly electric

Importantly, the vehicle fleet is no longer growing as fast as it used to. Global passenger vehicle sales have lagged substantially relative to pre-Covid levels (Exhibit 31), with total car sales averaging 74.8mn in 2022 compared to 81.3mn in 2019. In the five years before the pandemic, the annual rate of global vehicle sales growth averaged 0.26mn units or 0.4% per annum, but that is likely to change going forward. More shared vehicles and less ownership means that the marginal mile driven is increasingly electric

(Exhibit 32). Whether it is Uber, Dasher, or the multiple shared-vehicle schemes, incremental driving is unlikely to be done on internal combustion engines.

Exhibit 31: Global passenger vehicle sales, indexed
Global passenger vehicle sales have lagged substantially relative to pre-Covid levels...



Source: Bloomberg
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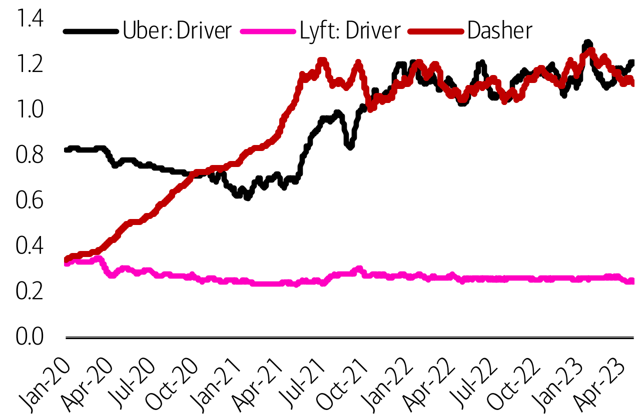
Exhibit 32: US driver app DAUs (14-day moving avg., mn)
...and more shared vehicles, less ownership means that the marginal mile is increasingly electric



Source: Sensor Tower
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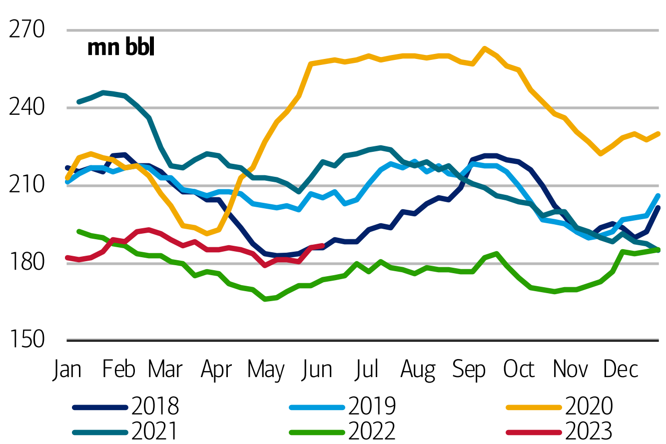
In contrast to prior years, diesel may not take the baton next

While we see a negative outlook for gasoline after the US driving season peaks on July 4, we do not see strong support either for the middle distillate complex in 2H23. True, diesel inventories across all the main trading regions are still relatively low, even if a tad higher than gasoline (Exhibit 33). However, negative cyclical headwinds could keep distillate demand depressed (Exhibit 34) until the global economy experiences a cyclical recovery. The Cass freight index points to weakness ahead, although weekly and monthly distillate demand data in the US show a modest improvement.

Exhibit 33: Middle distillate inventories in US, ARA, and Singapore
Diesel inventories across all the main trading regions are a tad higher than gasoline...



Source: Bloomberg
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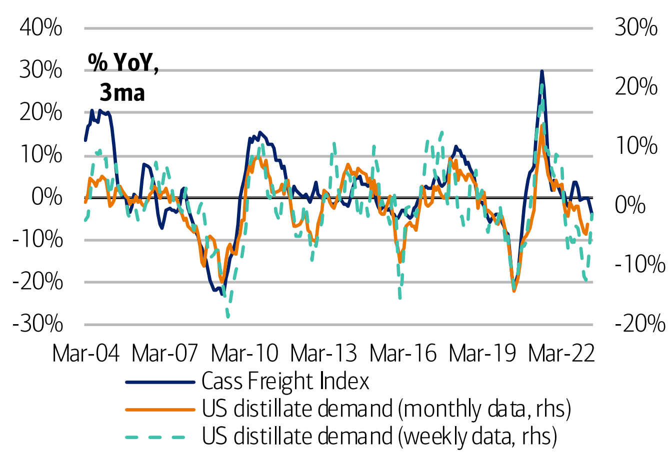
Exhibit 34: North American freight activity and diesel demand
...but negative cyclical headwinds could keep distillate demand depressed



Source: Bloomberg
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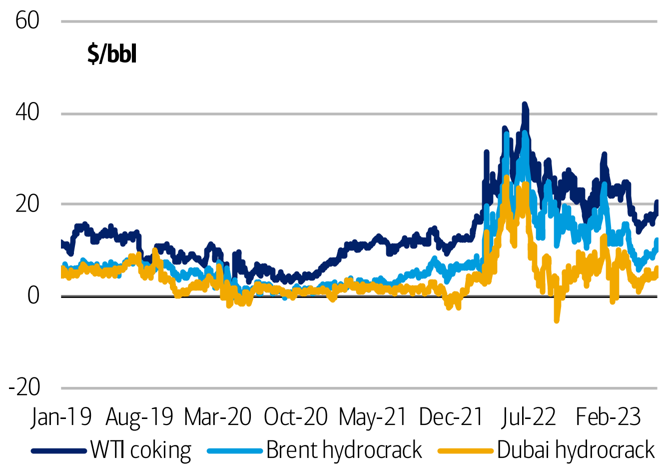
As a result, we continue to expect refining margins to suffer

To sum up, we expect refining margins to suffer in the coming quarters, dragged down by gasoline. In spite of the modest rebound observed in the past two months, global refining margins have come down over the course of recent quarters and could drop further in 2H23 (Exhibit 35). Still, a flatter crude oil curve could lend some support to refining margins in 2H23 (Exhibit 36), even if OPEC production cuts do not tend to be particularly constructive for refining operations.

Exhibit 35: Refinery margins

Global refining margins have come down over the course of recent months and could drop further



Source: Bloomberg

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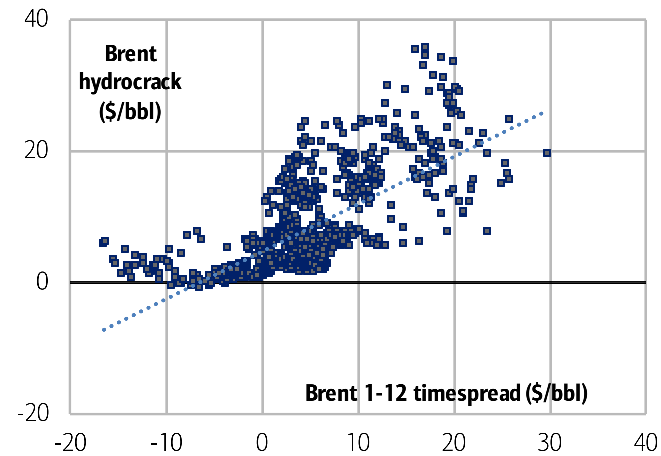
Exhibit 36: Refining margin vs crude oil timespread

Still, a flatter crude oil curve could lend some support to refining margins in 2H23



Source: Bloomberg

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