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2022 Crude oil outlook

2022 A QUESTION OF RELATIVE ACCELERATION IN SUPPLY/DEMAND, BUT MORE IMPORTANTLY TIMING OF MARKET DISCOUNTING LOOSENING BALANCES IN 2H22'

I. **Decelerating domestic demand growth Y/Y, with implied crude demand (refiner net inputs) hitting ~17mmbbl/d in summer 22'**
   - I. Total car sales likely to decelerate and drive reduced acceleration in vehicle miles traveled
   - II. E-commerce returns to trend driving limited acceleration in truck loadings
   - III. Domestic air travel returns to pre-covid levels with international accelerating to near pre-covid levels

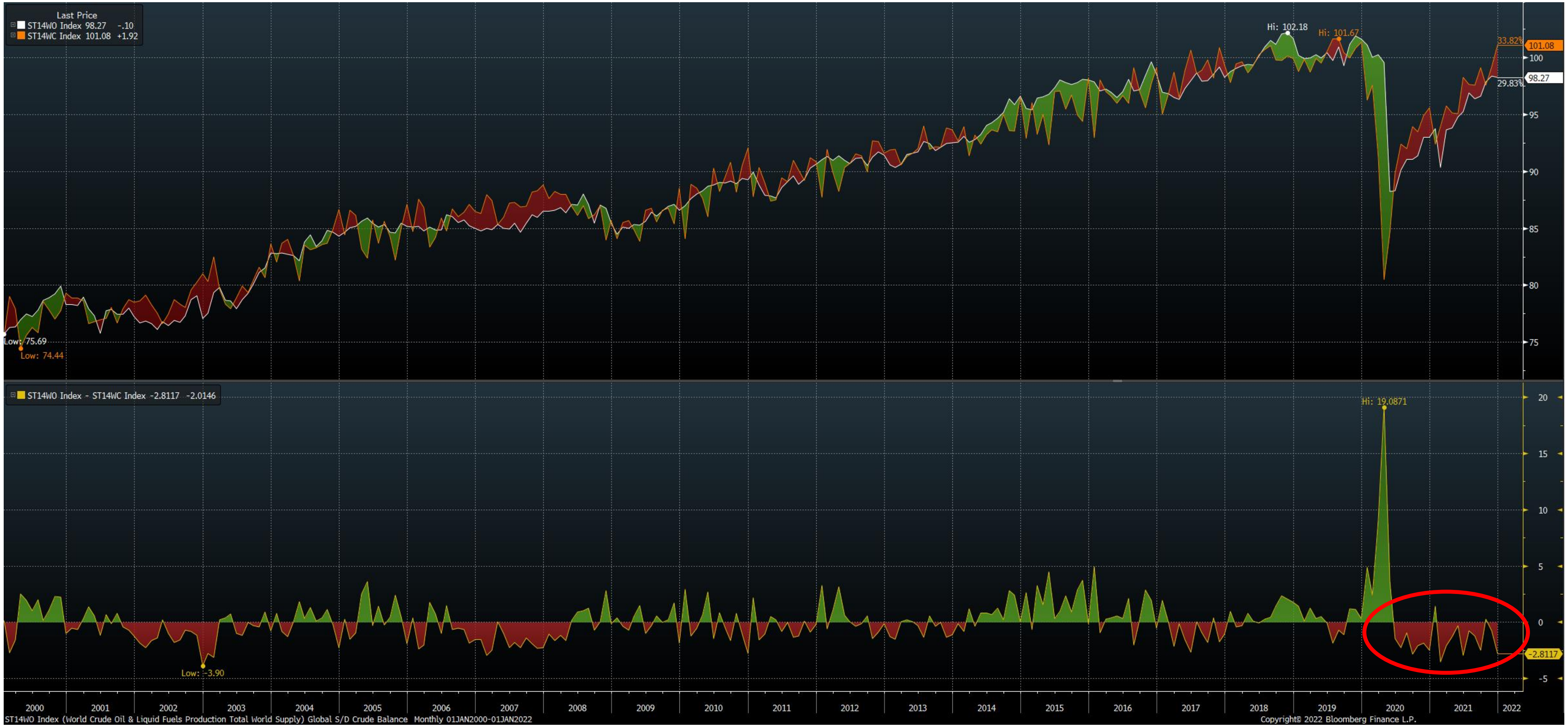
II. **Domestic supply acceleration lagged due to transitory supply chain constraints (US likely exits at ~12.5mmbbl/d)**
   - I. Efficiency gains in US shale limited going forward (no where close to 14'-18' gains in single well productivity)
   - II. OCTG supply acceleration in late 1Q22'/mid 2Q22' allows for rigs to ramp into summer
   - III. Accelerating rig count in 2Q22' provides sufficient runway for completion crews to accelerate
   - IV. Trucking equipment and labor shortages continues easing from 21' levels (more trucks, more labor, rates down)
   - V. Permian basin sand supply accelerates into summer with marginal capacity activated
   - VI. Field worker wage inflation remains persistent (main negative across the industry for 2022)
   - VII. Marginal rig and completion crews are activated, but have lower field level efficiencies

III. **International supply acceleration reduces spare capacity, but further expansion lagged due to timing from capex to first production**
   - I. Saudi Arabia increases production to ~10.5mmbbl/d to meet export demand, but incremental acceleration slower as capex ramps
   - II. Russia production increases lagged due to capex needs; spare capacity reduced to 0 by mid 1Q22'
   - III. Other international producers continue accelerating rigs as Brent remains above $70/bbl, but production lagged due to timing to first production

IV. **Federal Reserve and Global Central banks continue tightening via rate increases and balance sheet reduction driving deceleration in GDP growth**
   - I. GDP growth decelerates to levels still at ~20-year highs
   - II. Relative acceleration in tightening from Fed drives dollar higher
   - III. Fed backs off hawkish positioning and pivots dovish by pausing rate hikes and balance sheet reduction in late 2Q22'

Demand acceleration out of 1Q22' into 2Q22' likely drives accelerating undersupply of domestic crude markets. Economic headwinds, coupled with crude price driven inflation likely drive demand destruction into summer. Market starts to price this outcome in mid 2Q22' with prices peaking in May/June, followed by significant pull-back.

POST-PANDEMIC, SUPPLY DEFICIT HIT NEAR RECORD LEVELS…

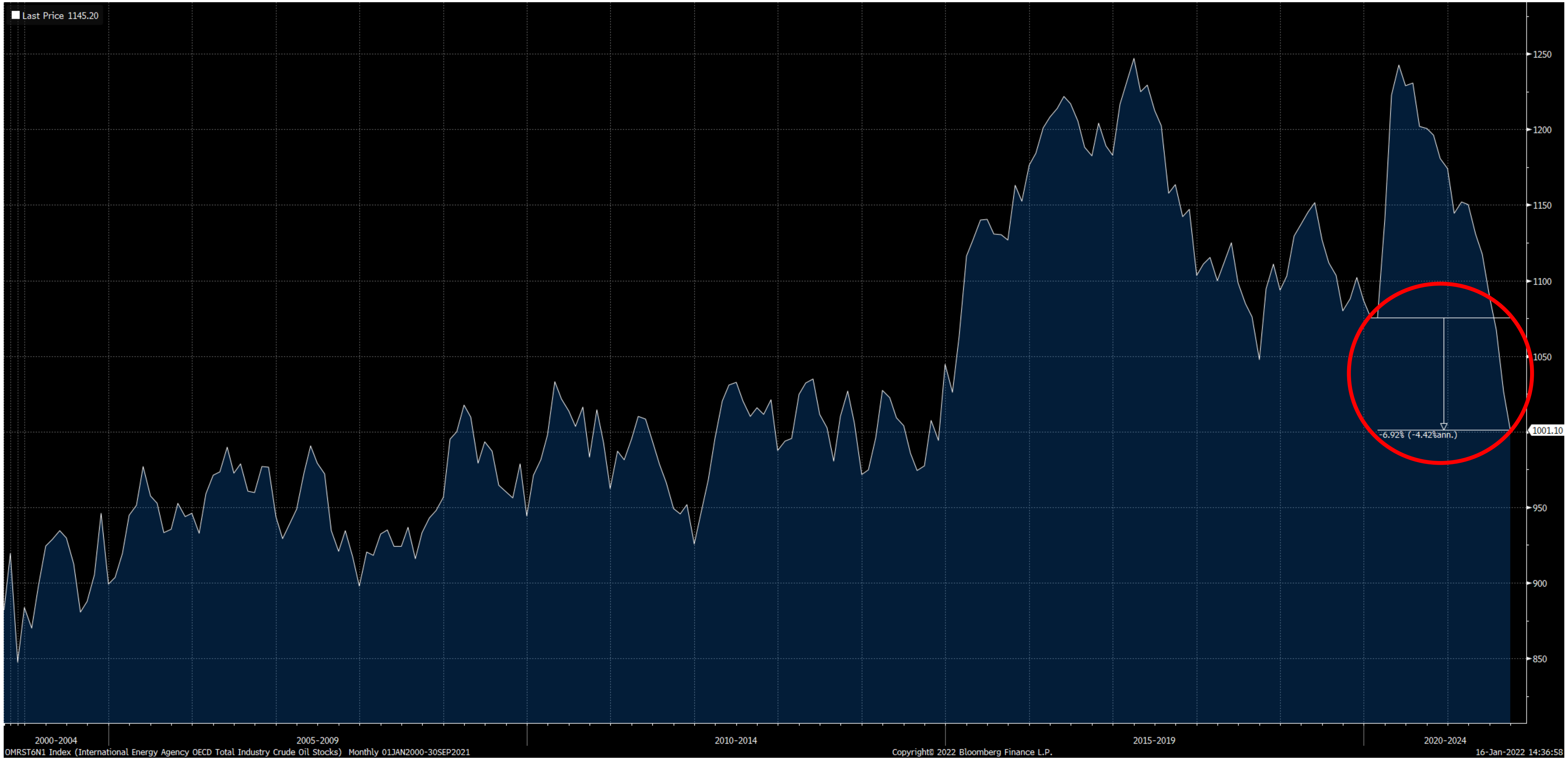


2nd largest TTM supply deficit in last 30 years

Source: Bloomberg

…WHICH DROVE A MASSIVE DE-STOCKING ACROSS THE GLOBE

Supply/demand imbalance has driven OECD crude stocks down to ***<u>-6.9% vs. pre-covid levels</u>***



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Source: Bloomberg

That destocking drove price acceleration

Brent finished 2021 up ~50% and is up 30% since pre-pandemic (vs. YE 2019)

Going forward, the 2022 outlook is a question of storage re-acceleration

IEA forecast calls for supply surplus for majority of 2022, with supply growing at ~3.9% vs. demand growth of 1.1%. Is that likely?

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Source: Bloomberg

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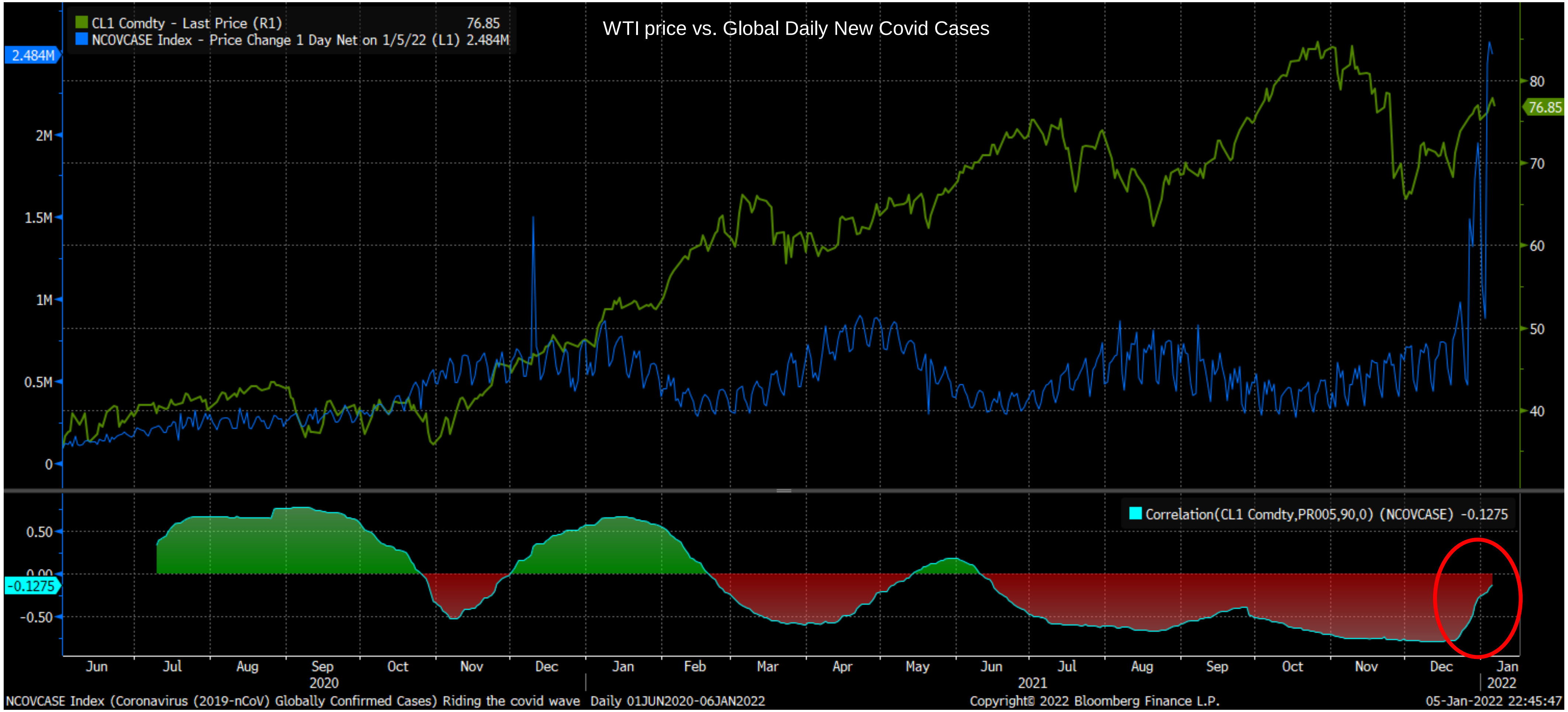
GLOBAL BACKDROP – A RETURN TO NORMAL

Covid wave finally breaking…

The positive inflection higher of daily covid cases has coincided with significant pull-backs in crude and associated equities



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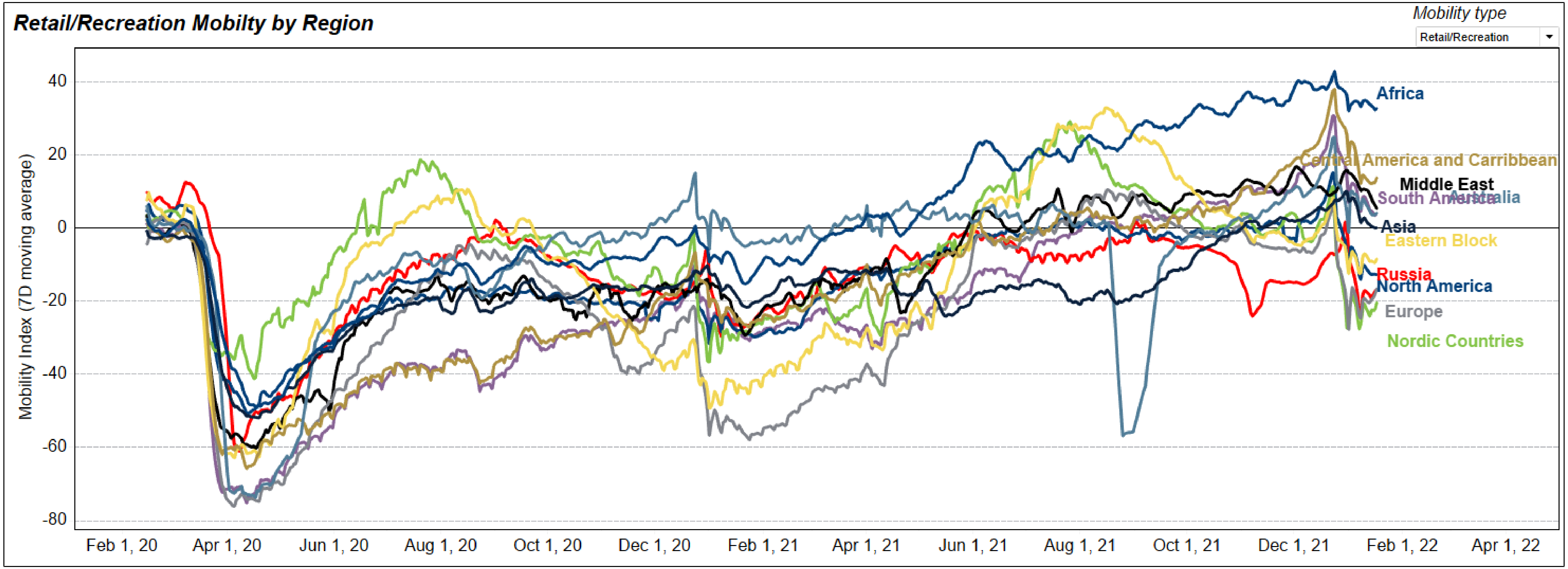
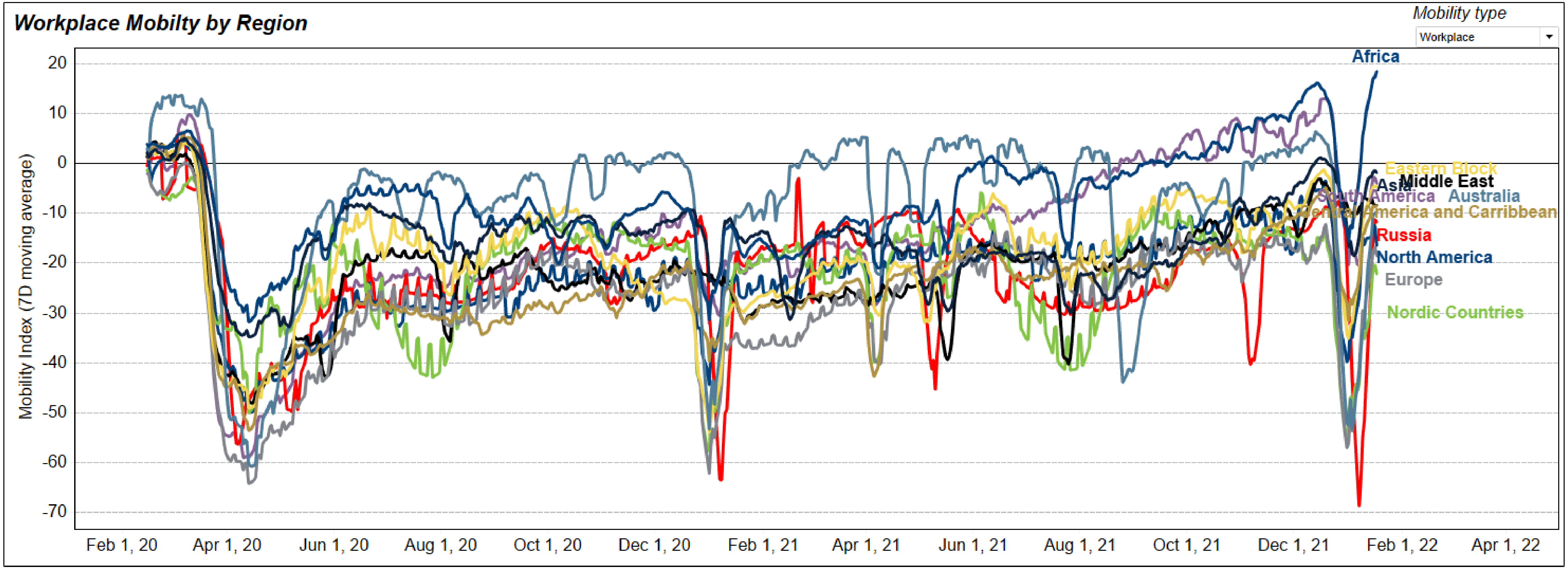
Source: Bloomberg

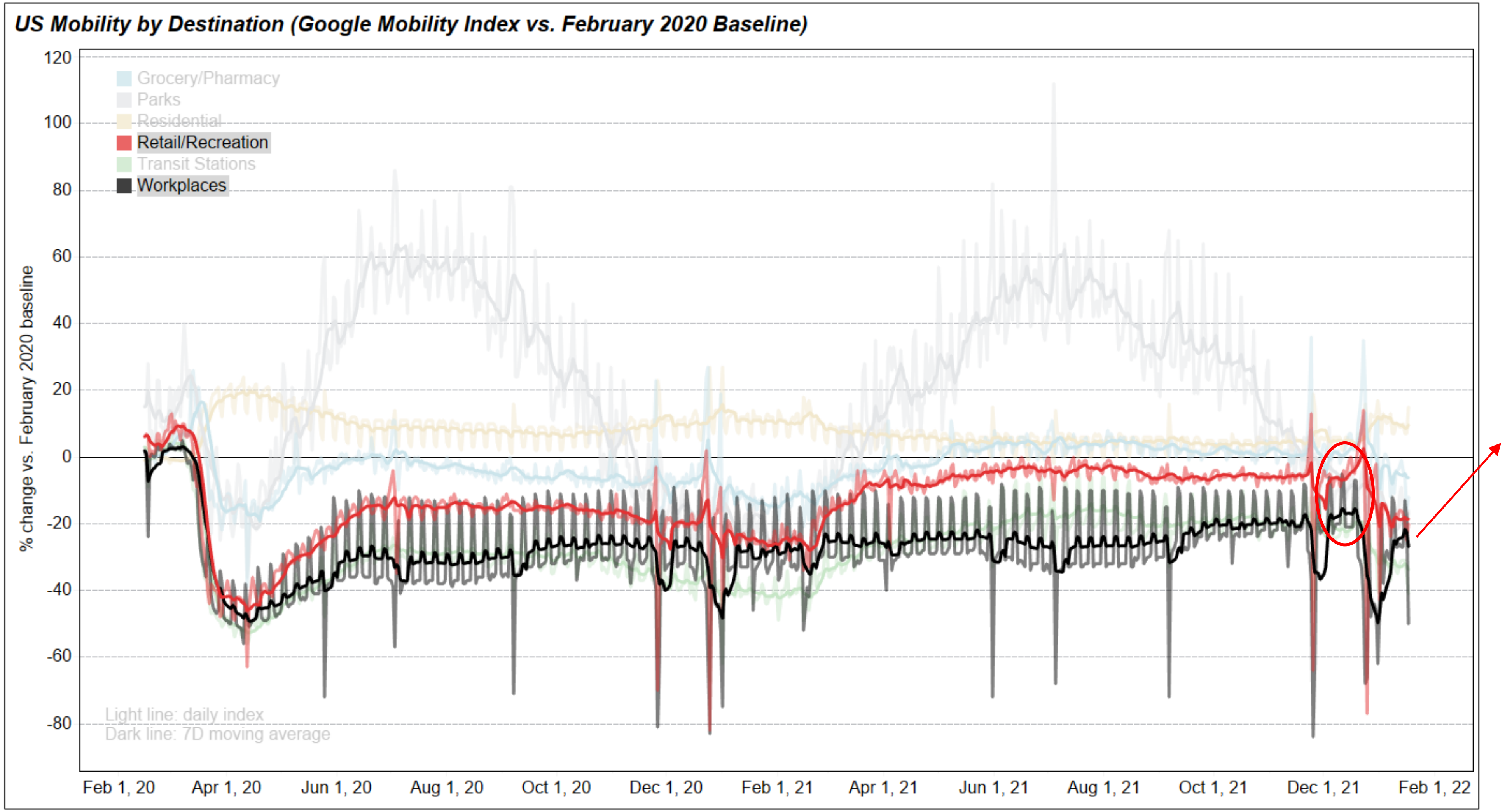


Source: Donovan Ventures, Google

Workplace mobility a laggard as corporations navigate COVID policy…



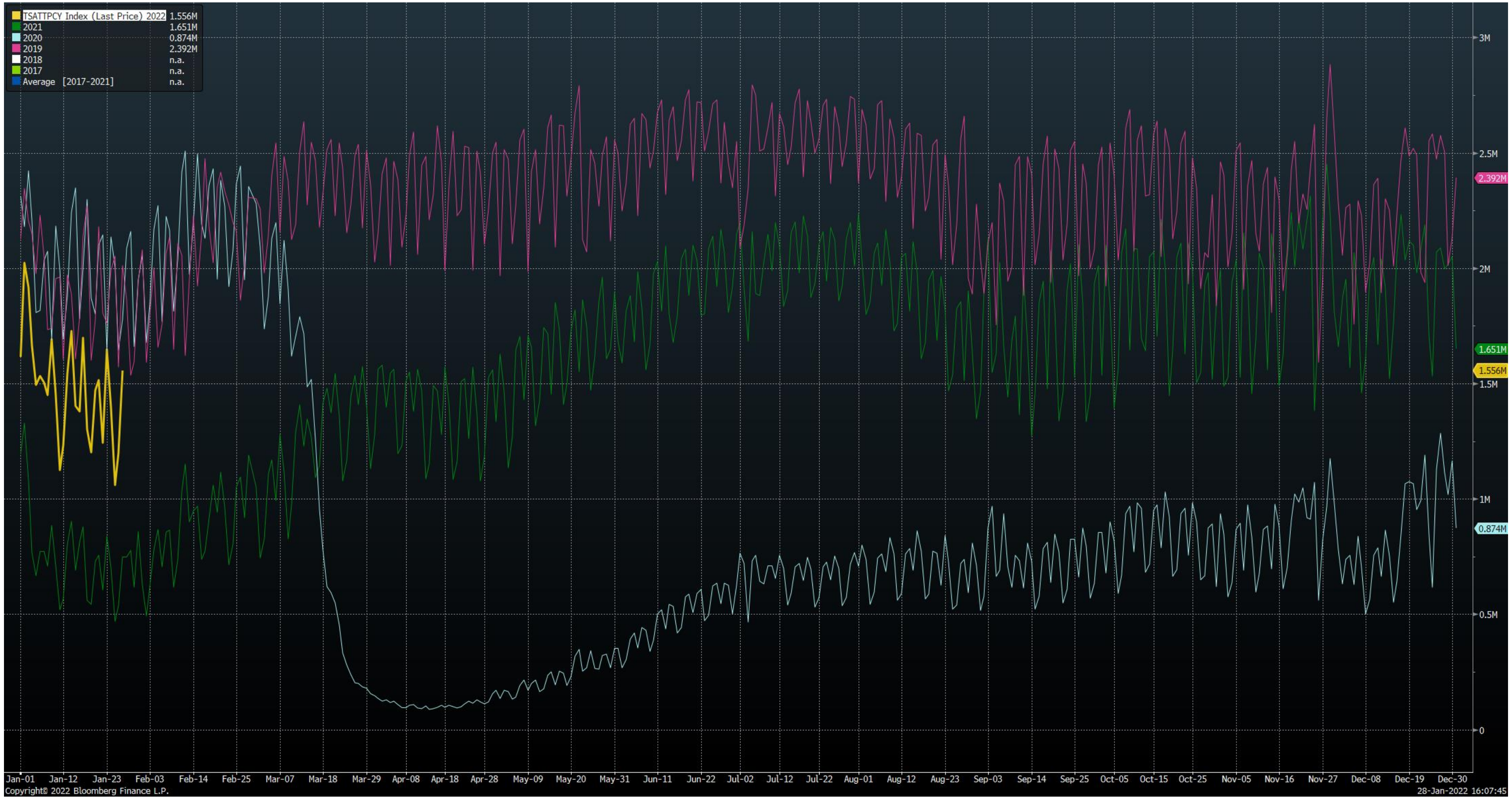
…BUT WORKPLACE MOBILITY HIT POST-PANDEMIC HIGHS IN LATE 21', OMICRON TRANSITORY ISSUE



Source: Google, Donovan Ventures (as of 01/20/2022)

Domestic flight travel saw a significant resurgence, but decelerated into year-end due to omicron

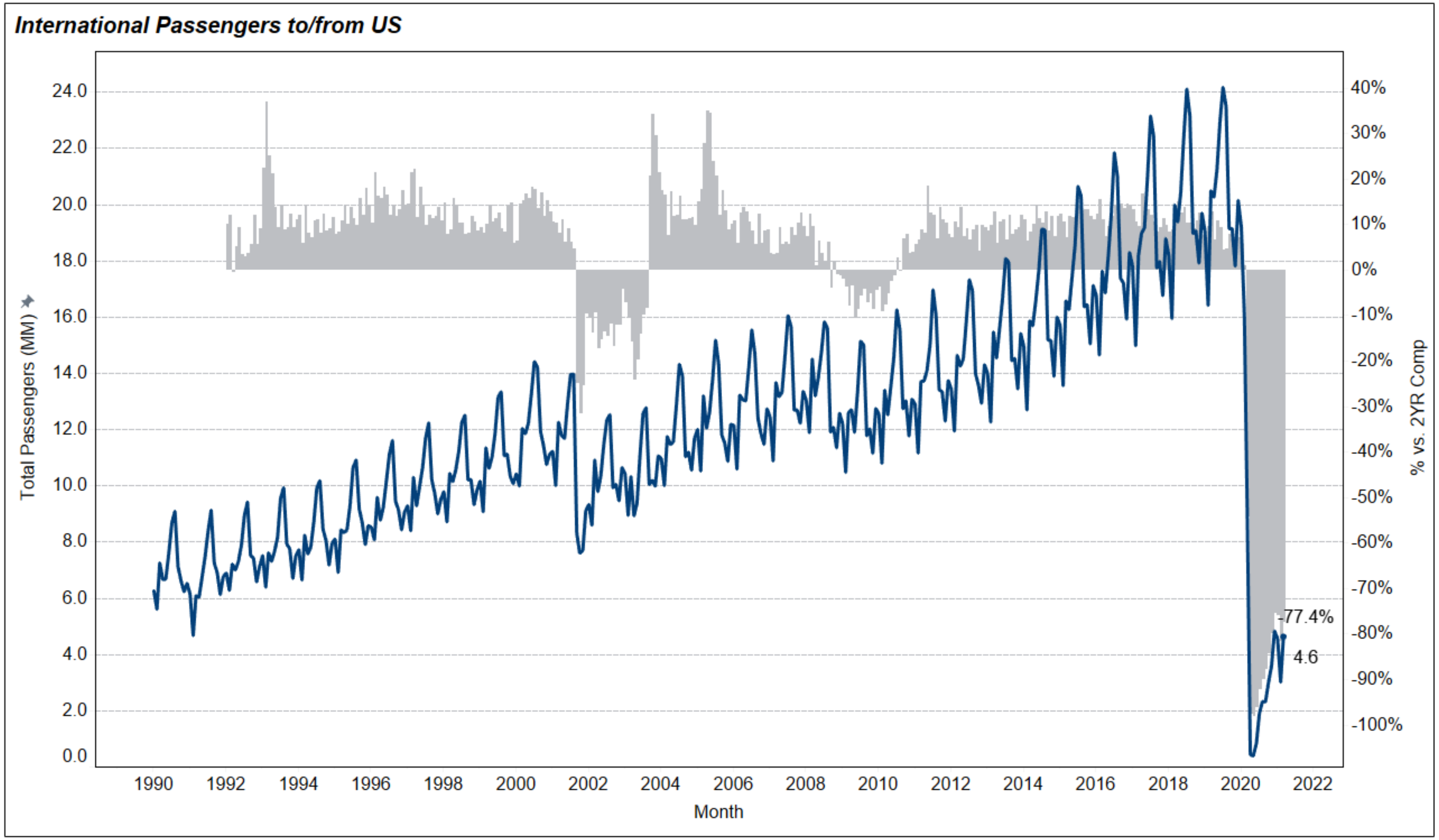
TSA checkpoints exited 2021 down ~24% vs. pre-covid levels due to omicron



Source: Bloomberg

INTERNATIONAL TRAVEL REMAINS WELL BELOW PRE-PANDEMIC LEVELS

Passengers traffic between US and international airports is down ~77% vs. pre-covid levels



Source: U.S. Department of Transportation, Donovan Ventures

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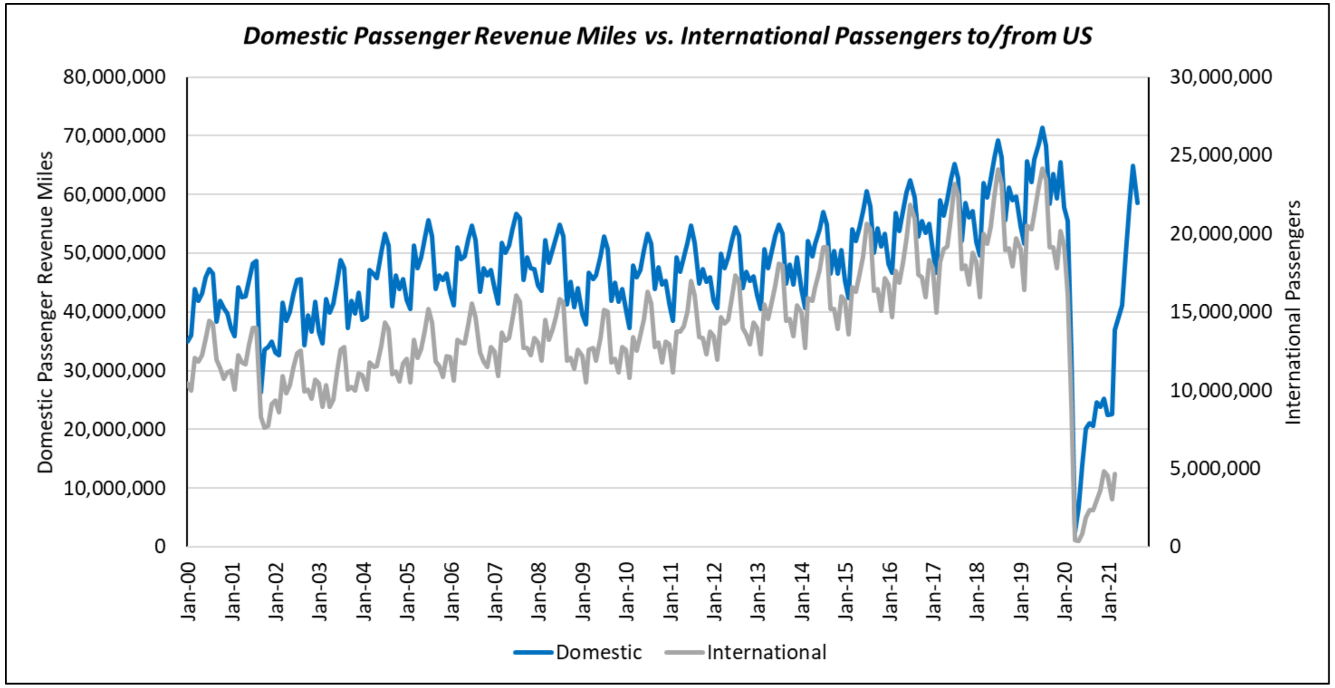
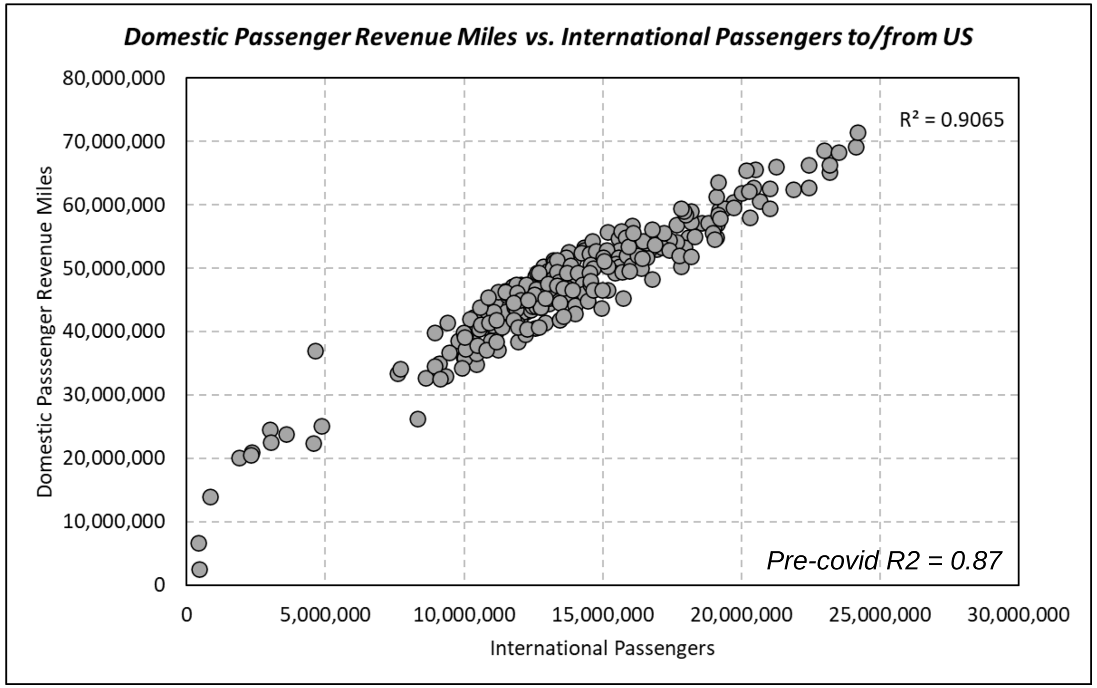
Historically, international and domestic flight demand are strongly correlated

Domestic travel re-accelerated much faster than international, which will follow as countries continue to open





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Source: Bloomberg, Donovan Ventures

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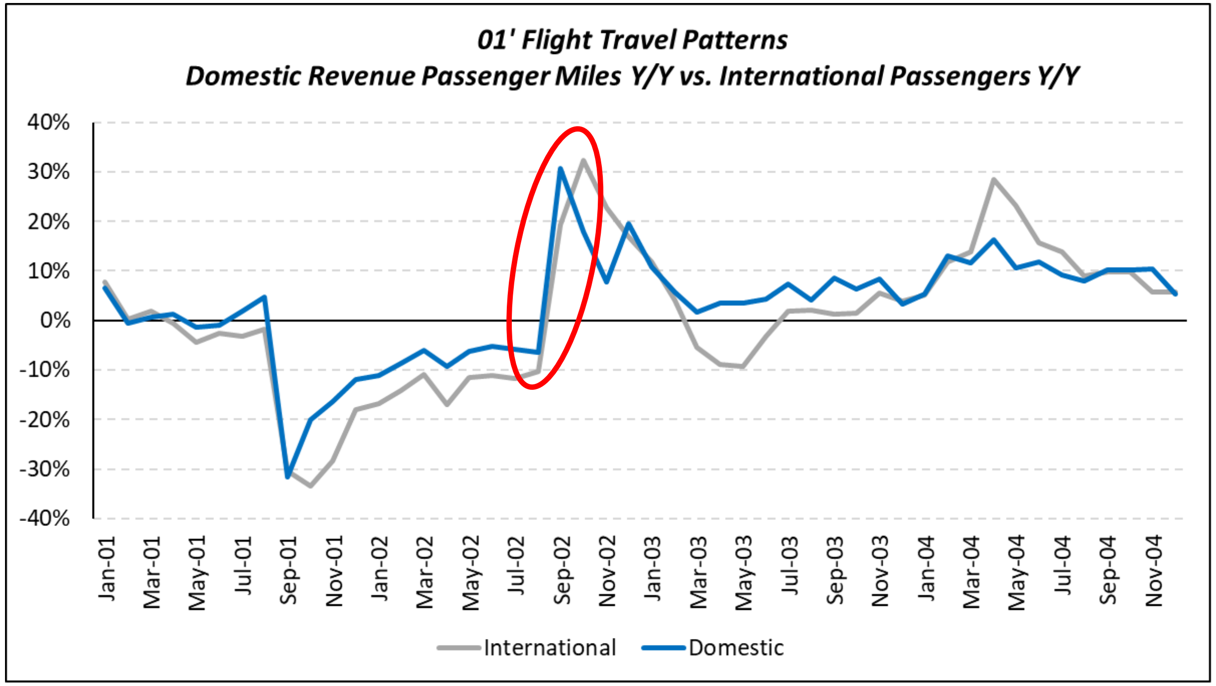
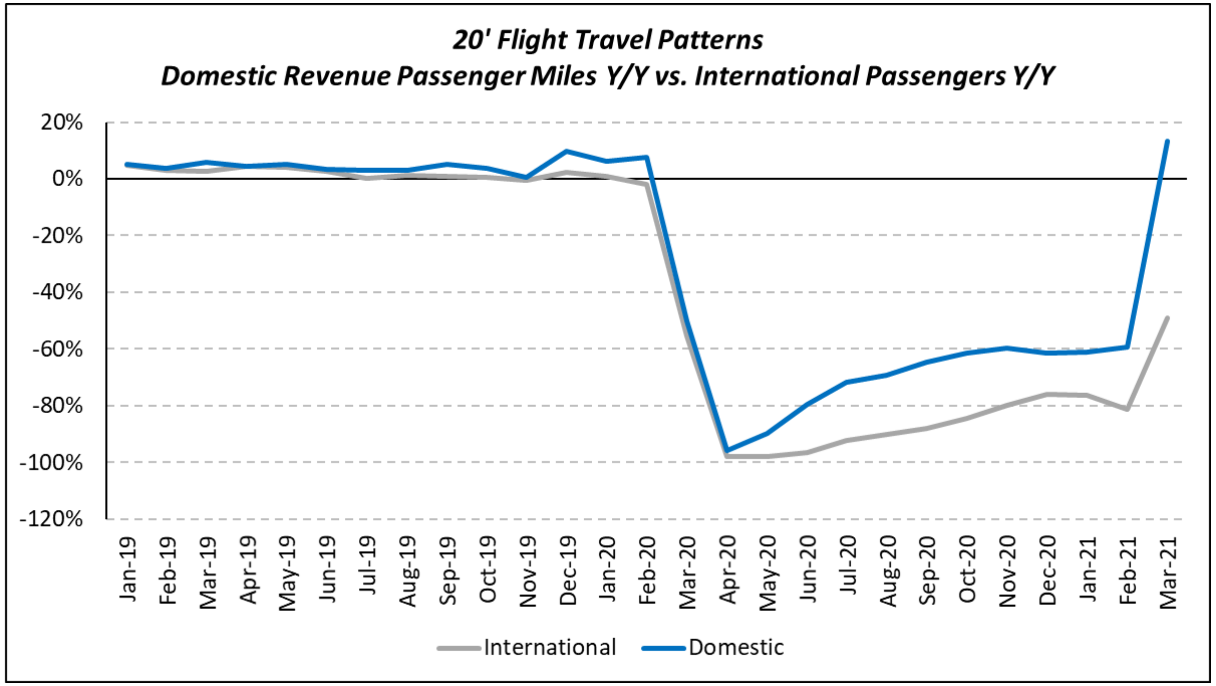
ANALOGS SHOW INTERNATIONAL MUCH SLOWER TO ACCELERATE, 2022 IS THE CATCH-UP



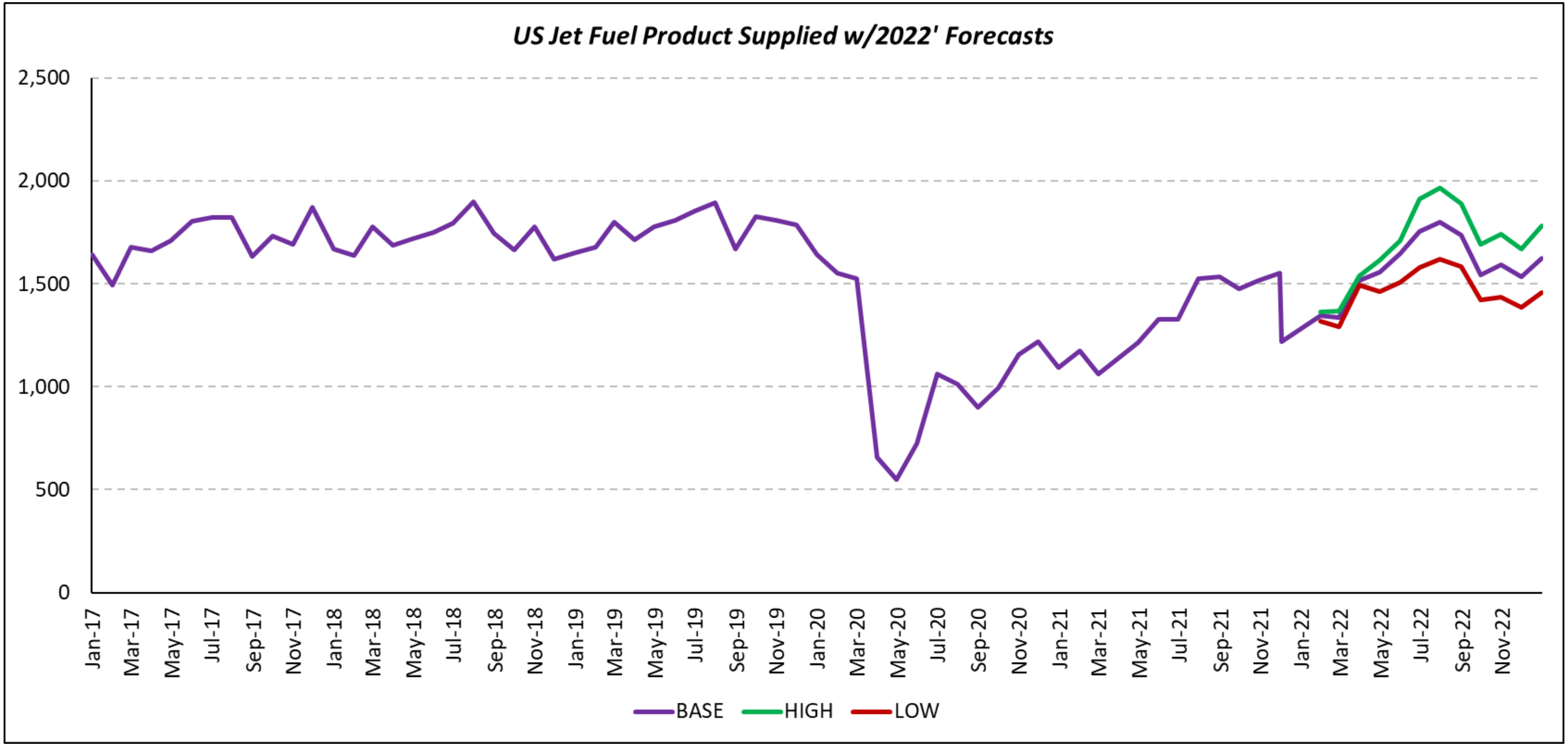


Pandemic is nearing the end as omicron spreads (much less deadly variant) throughout the Globe. As seen in 2001, international travel is likely to accelerate at a faster pace than domestic as countries continue opening cross-border travel going into summer 22'. Summer 22' will likely see a bump in international travel like the jump in domestic travel the US saw in 21'

Source: Bloomberg, Donovan Ventures

Domestic Jet fuel forecast scenarios

Base case assumes domestic travel hitting pre-covid levels during summer, with international accelerating to near pre-covid levels

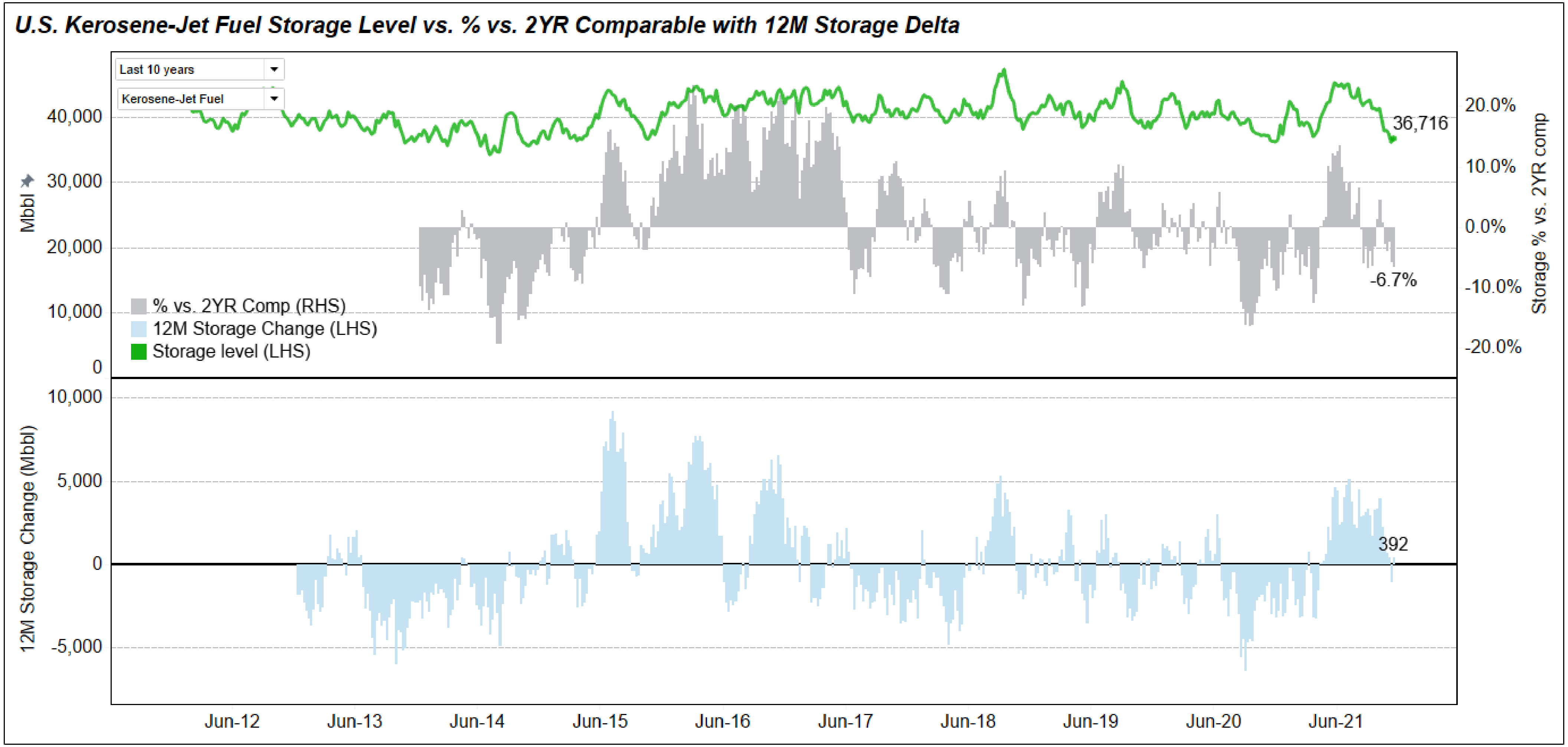


In the bullish scenario, domestic air travel is likely to exceed pre-covid levels and drive jet fuel demand to all-time highs

Source: Bloomberg, Donovan Ventures

JET-FUEL STORAGE ALREADY ~6.7% BELOW, PROVIDING INCREMENTAL TAILWIND TO REFINER INPUTS

Acceleration in international travel likely to provide the change on the margin needed for incremental refinery runs

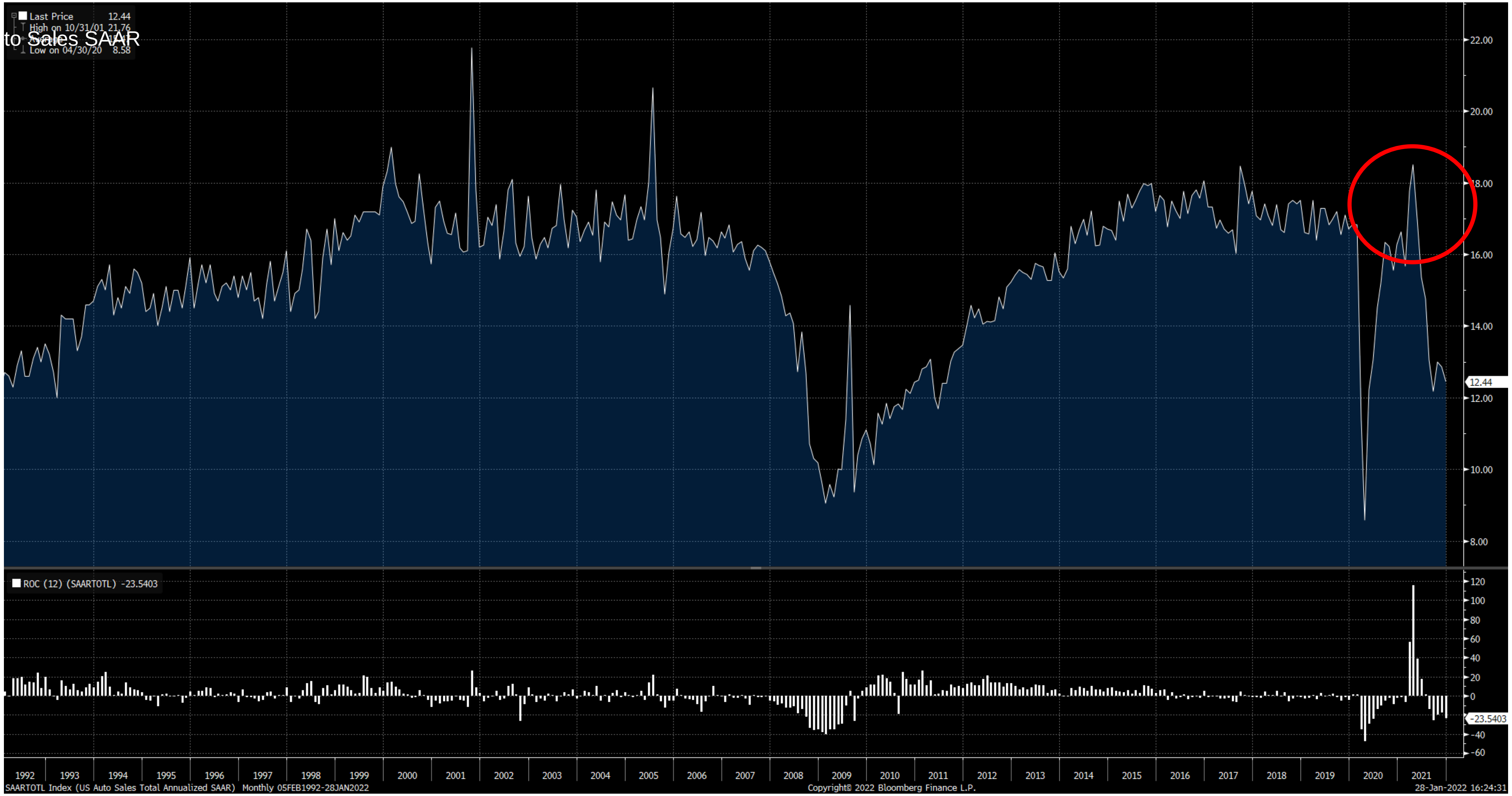


Source: EIA, Donovan Ventures (as of 12/8/2021)

JET DEMAND ACCELERATION IS POSITIVE ON THE MARGIN, BUT LESS MEANINGFUL THAN THE CARS

A FUNDAMENTAL SHIFT IN MOBILITY PREFERENCE DROVE A SURGE IN VEHICLE DEMAND…

In early 2021, auto sales reached a 15 year high before supply chain issues drove sales lower due to record low inventory



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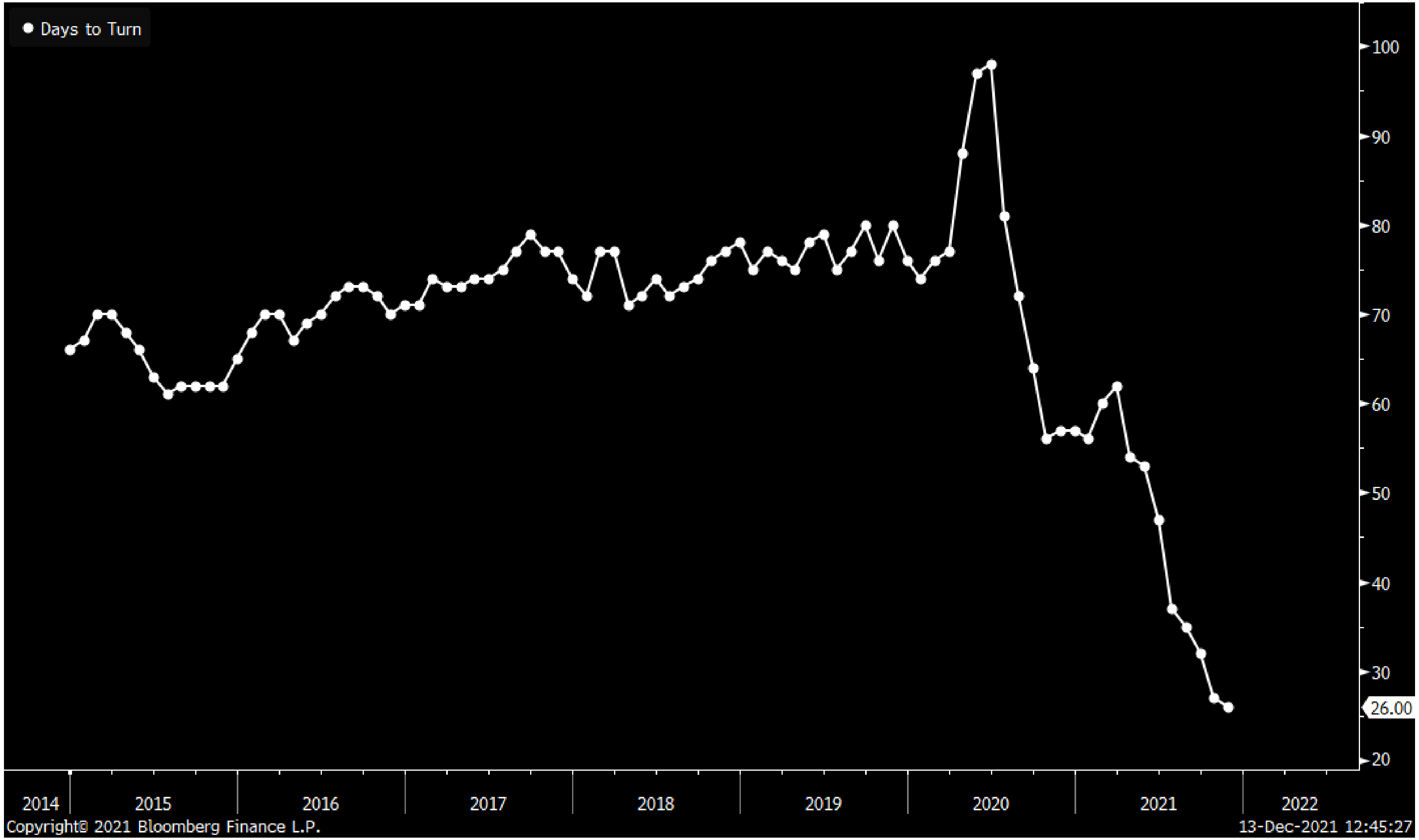
Source: Bloomberg

…BUT CHIP SHORTAGES LEAD TO SIGNIFICANT DECLINE IN INVENTORIES LIMITING NEW SALES



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Source: Bloomberg

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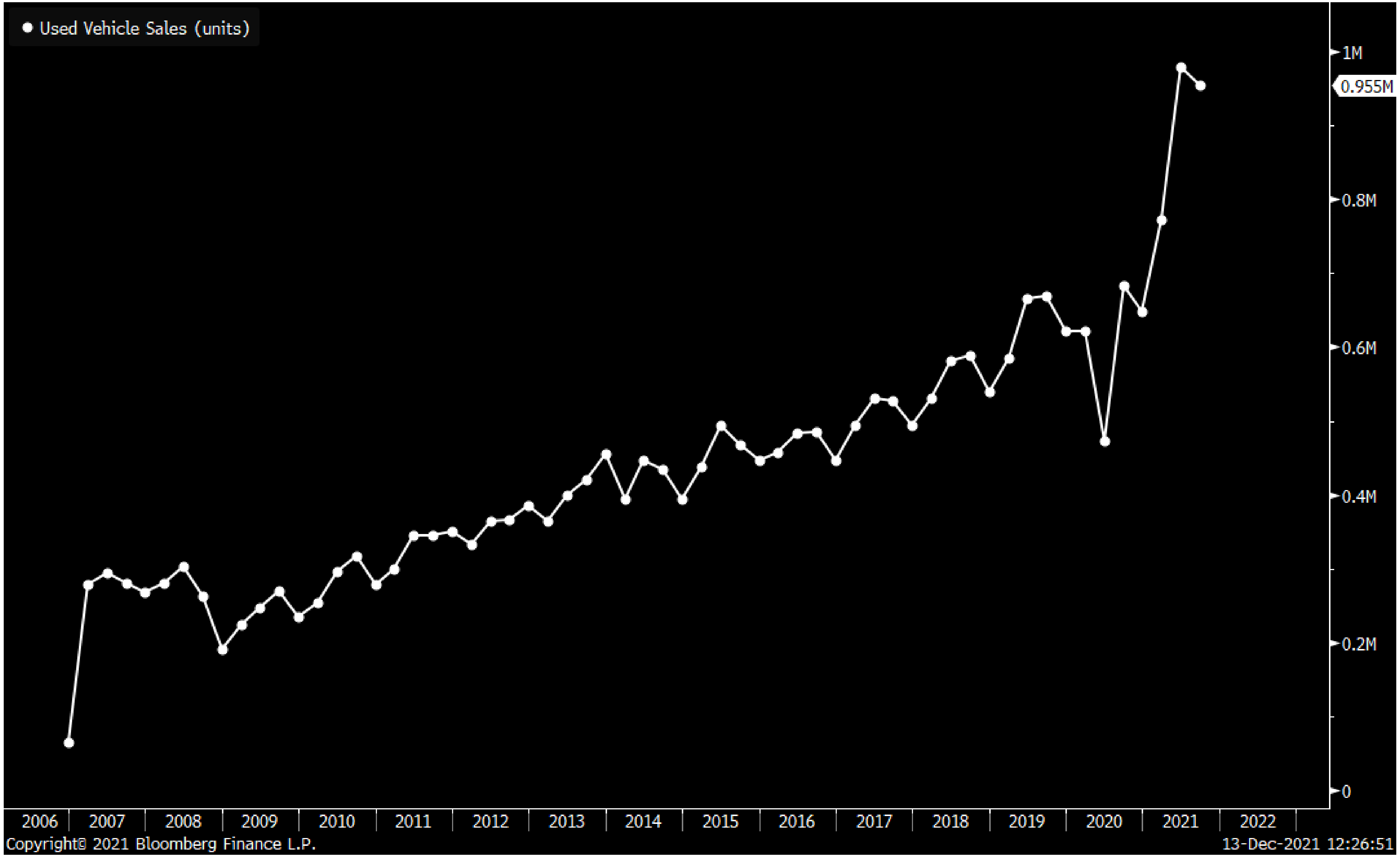
Low new inventories led to record used car demand



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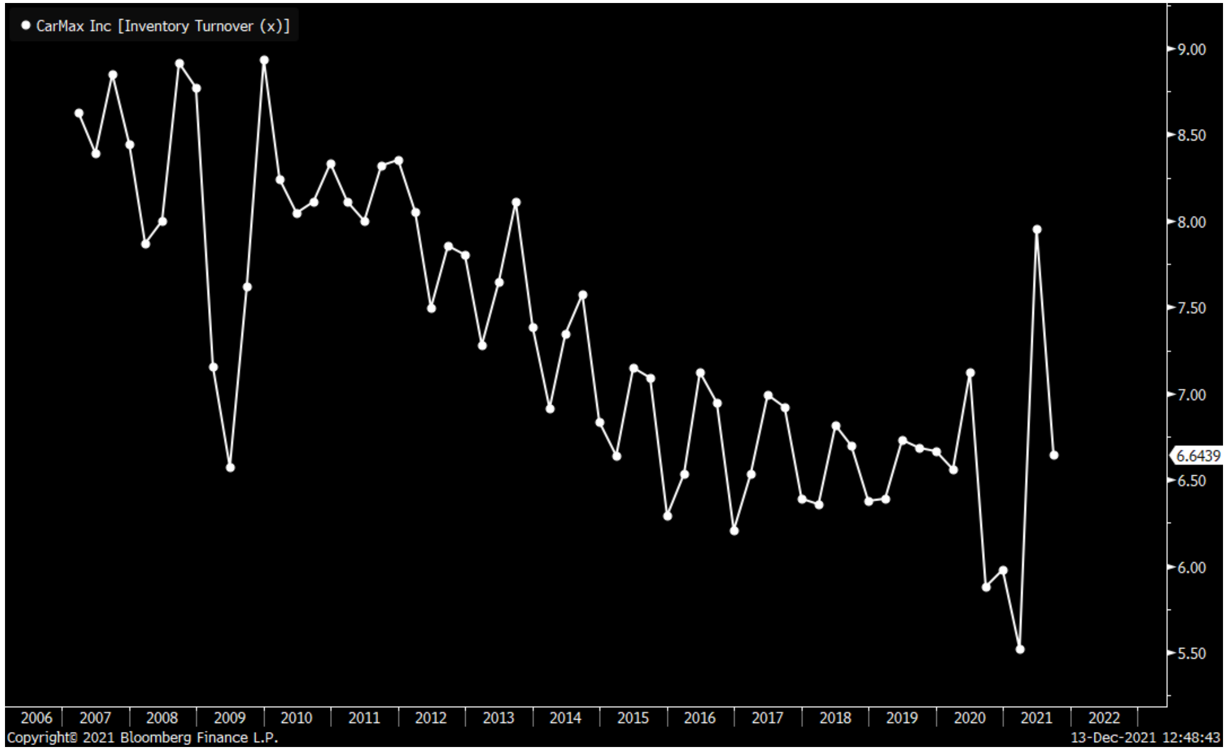
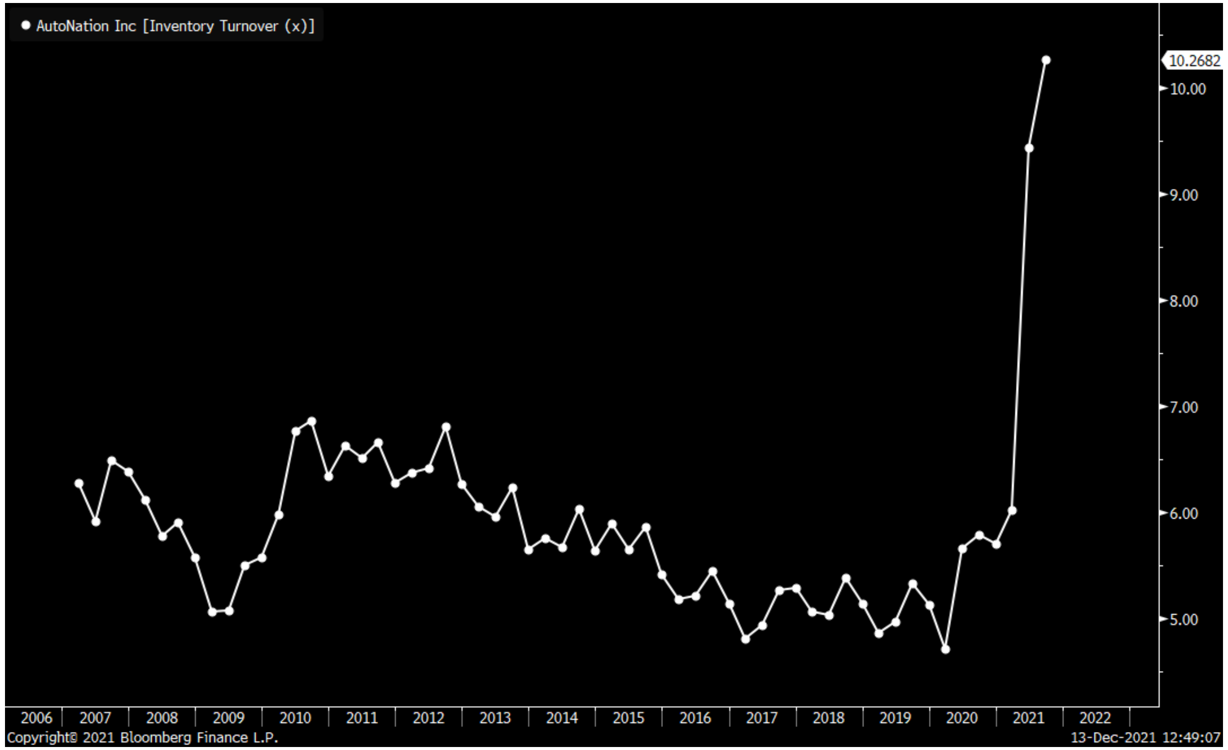
Source: Bloomberg

THAT RECORD DEMAND DROVE USED INVENTORIES SIGNIFICANTLY LOWER





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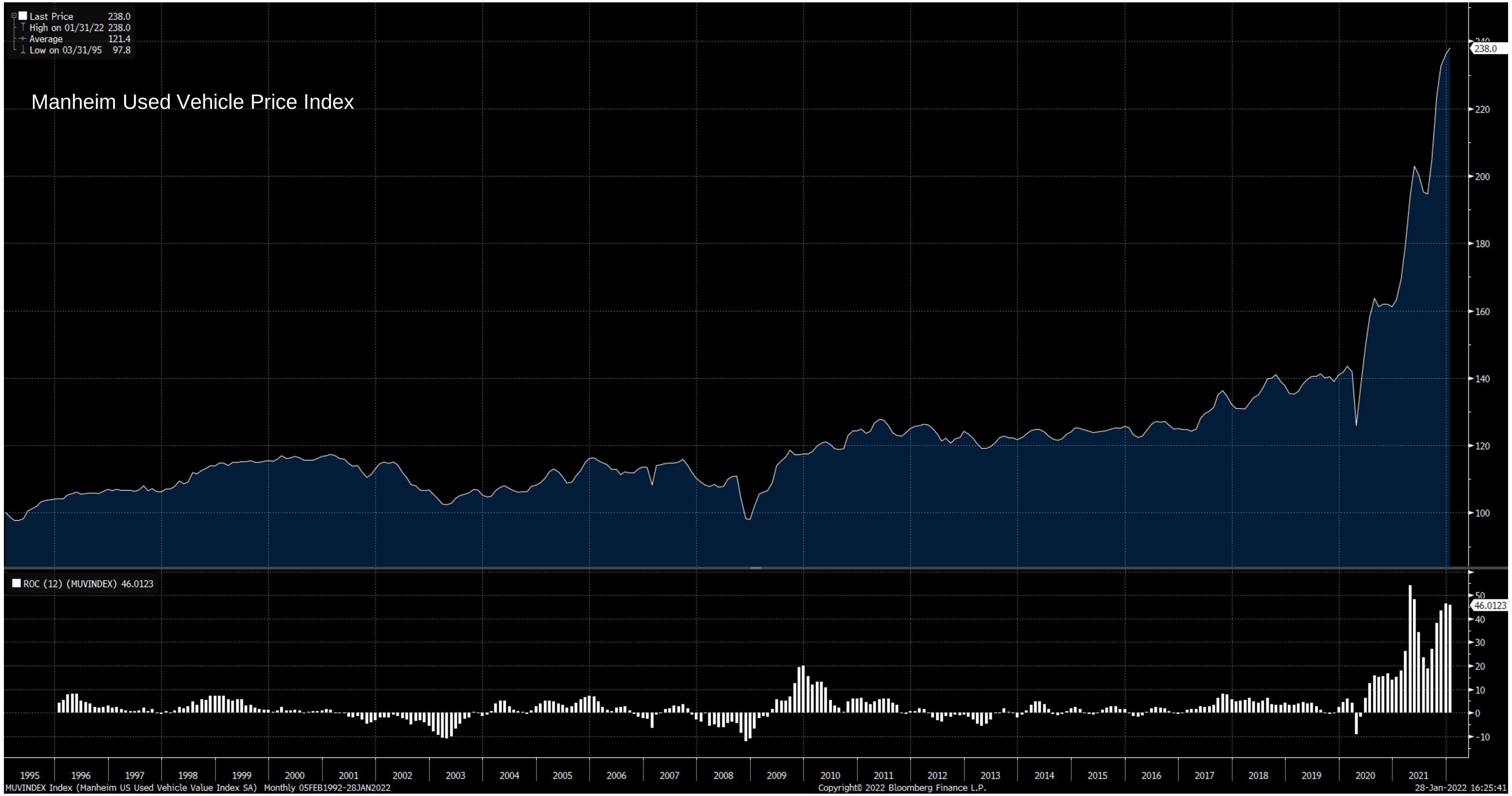
Source: Bloomberg

USED CAR PRICING EARLY INDICATOR FOR AUTO SUPPLY CHAINS

Used car pricing nearing a peak is likely indicative of decelerating demand, since inventories remain low



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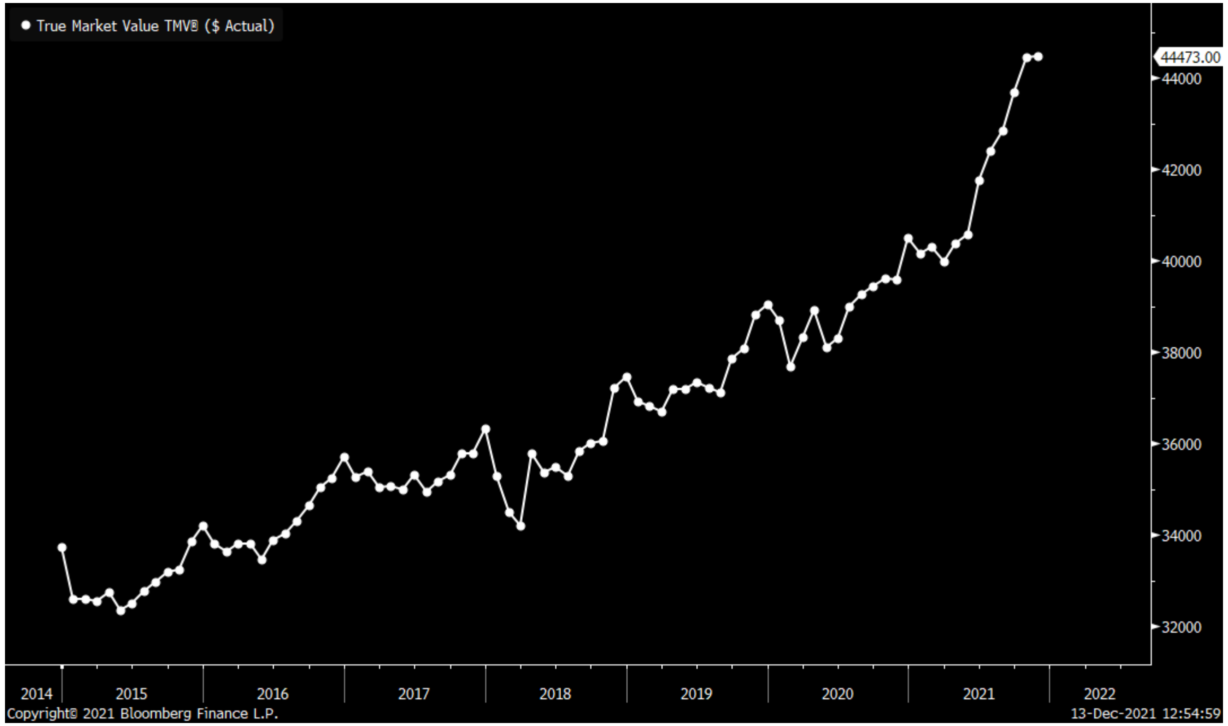
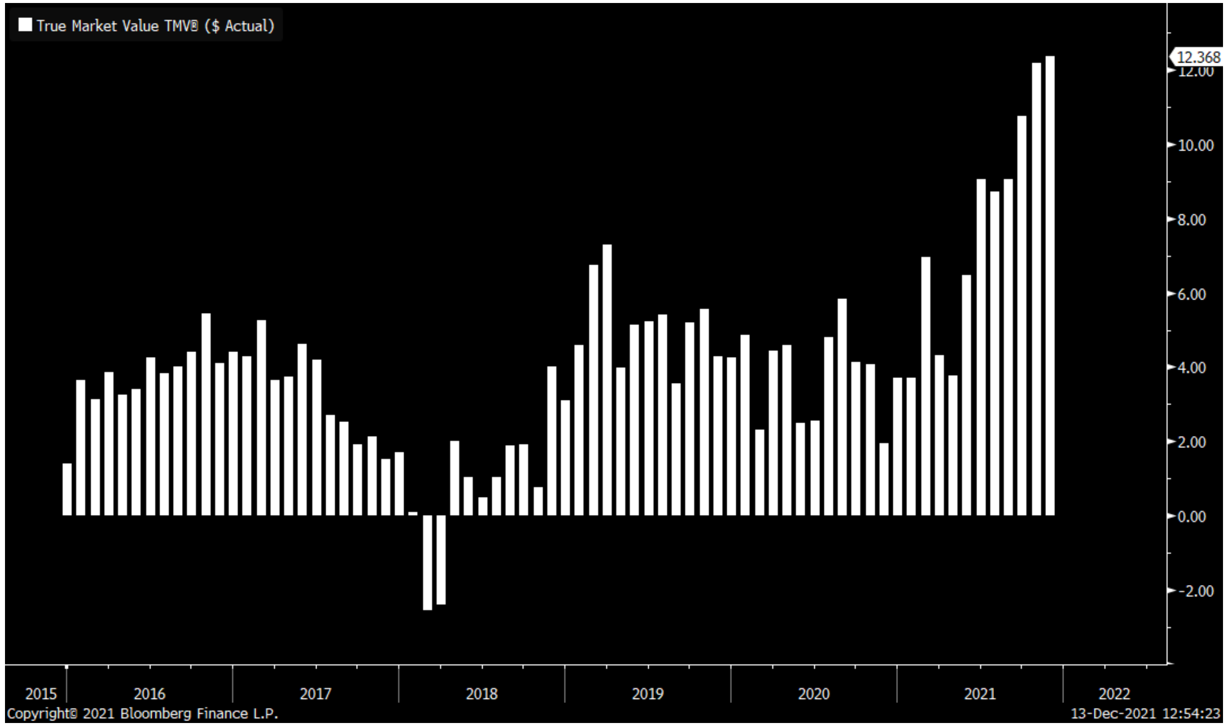
Source: Bloomberg

NEW PRICE GAINS ARE ALSO ALREADY SLOWING

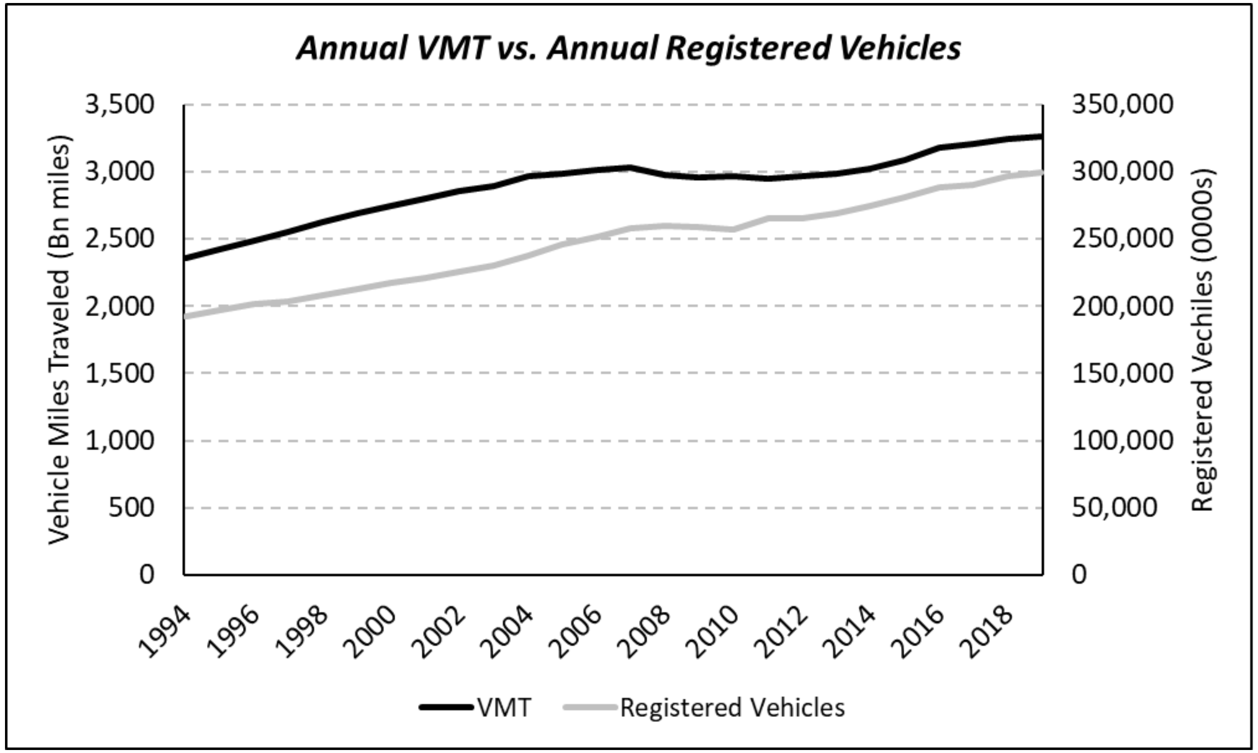




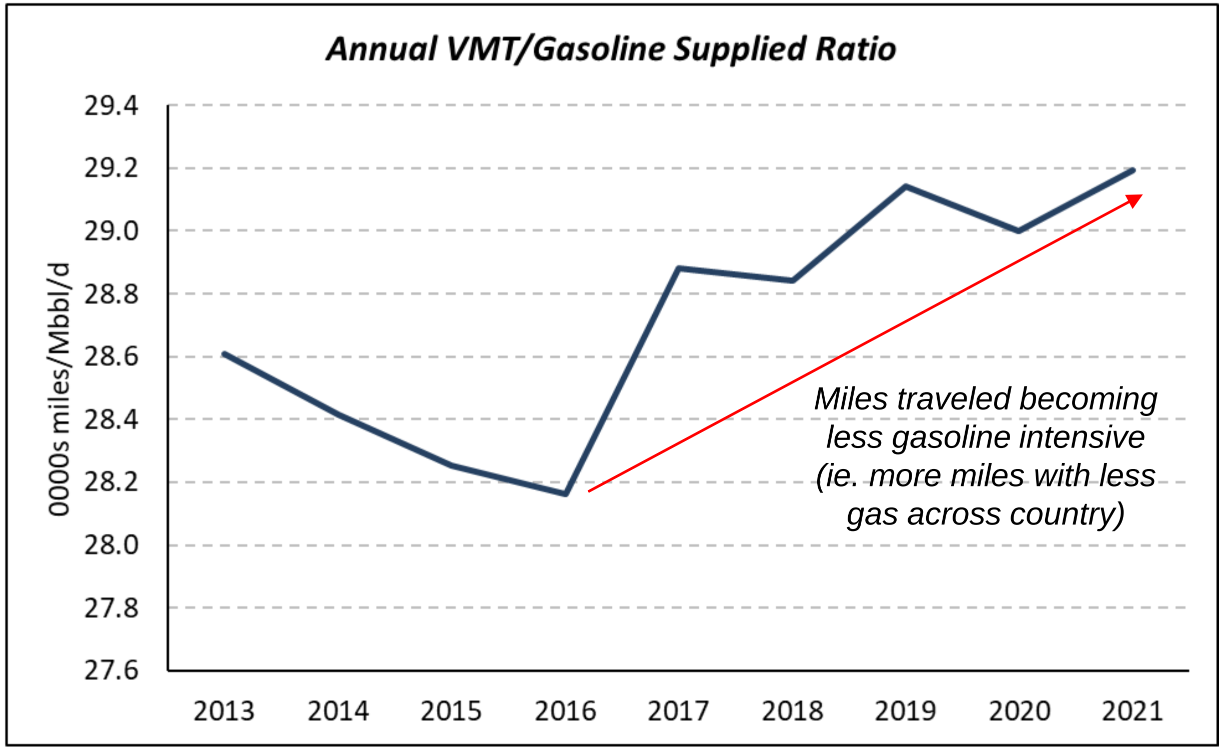
Source: Bloomberg

Total sales decelerating + fuel source shift accelerating = slower acceleration in gas demand

5YR growth in registrations pre-pandemic (2019) was ~9% per year, post-pandemic growth likely to slow closer to 3 to 4% annually



Fuel efficiency gains, combined with accelerating EV sales is likely to limit long-term gasoline demand growth



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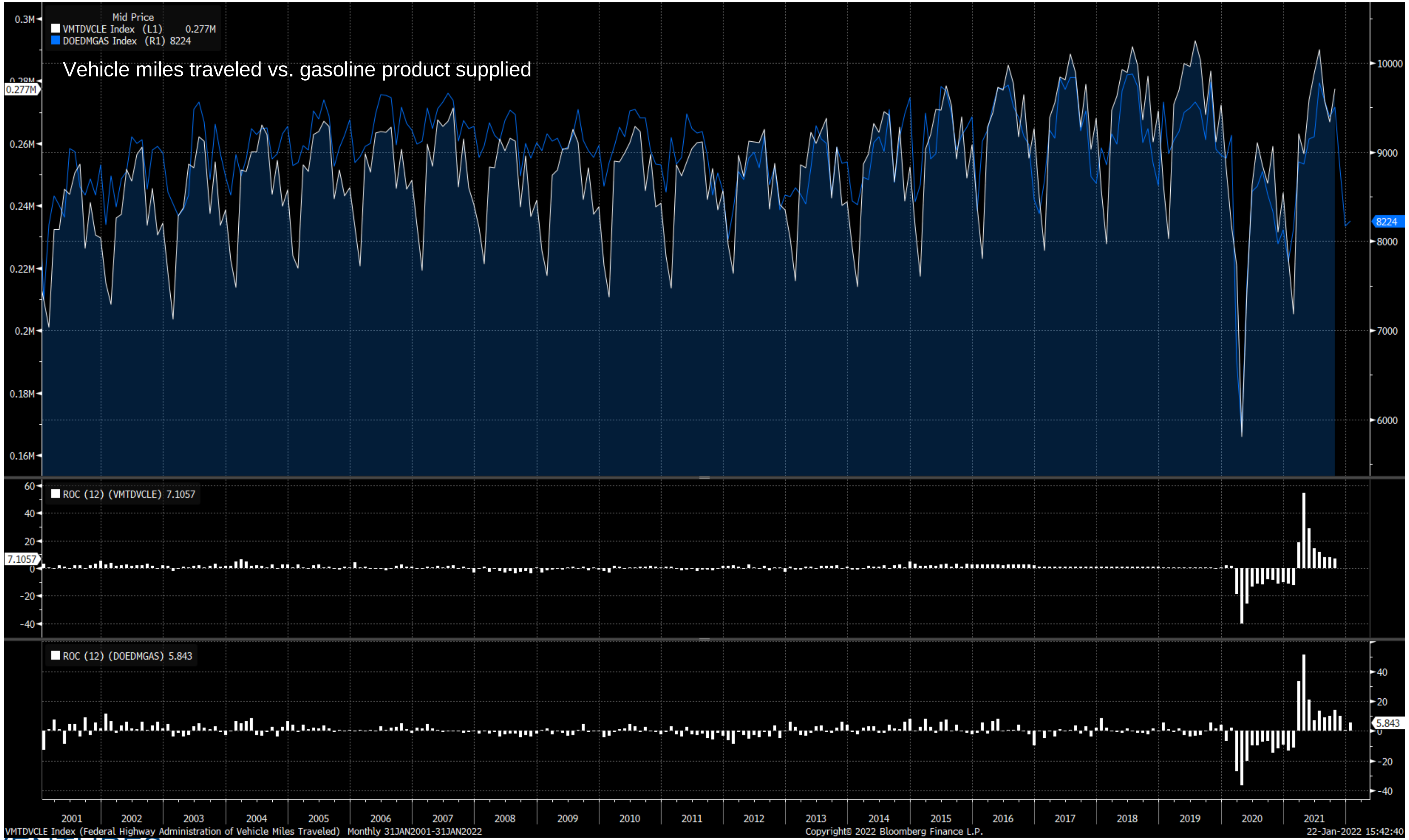
Source: Bloomberg, Donovan Ventures

Evolving new sales dynamics likely leads to limited acceleration in vehicle miles traveled

Vehicle miles traveled is a primary driver of gasoline demand; with limited acceleration in total sales VMT acceleration is likely to slow, steadying down ~1.5% vs. pre-pandemic levels



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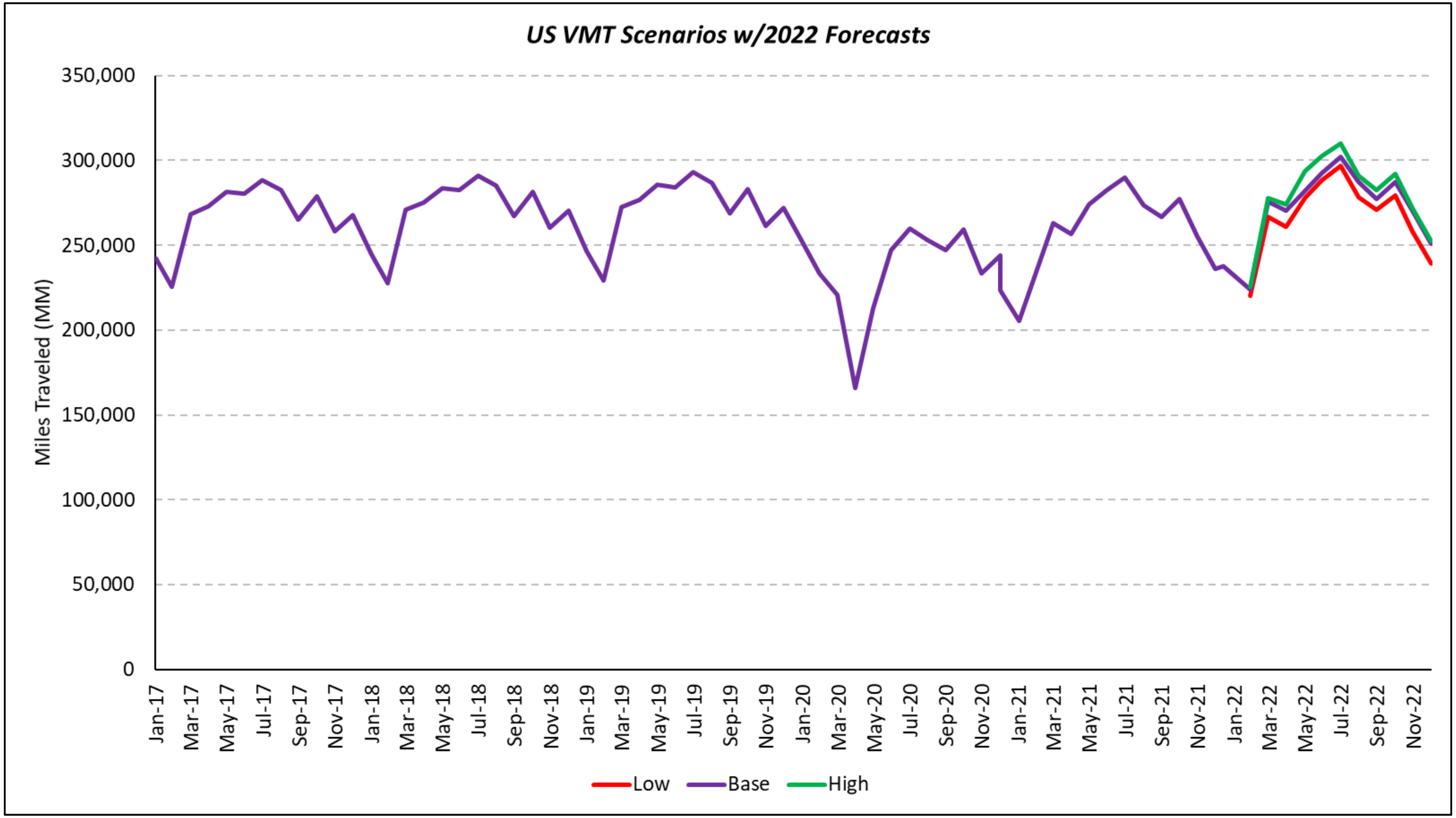
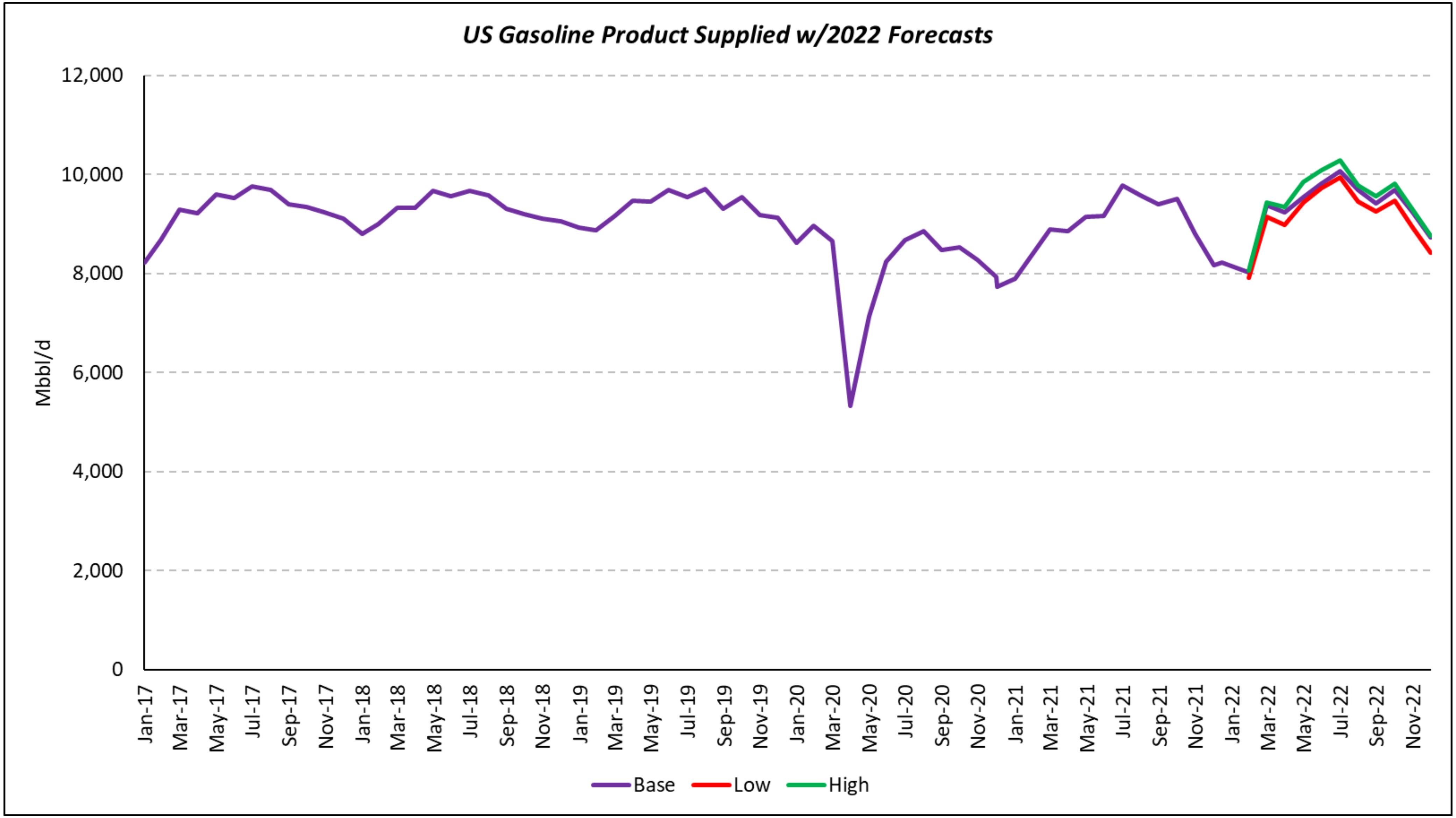
Source: Bloomberg

VMT LIKELY CONTINUES TO GROW AT A MUCH SLOWER PACE THAN IN 2021



Source: Donovan Ventures, Bloomberg

SUMMER 22' LIKELY SEES ~10 MMBBL/D AT THE PEAK, BEFORE SEASONAL DECLINES



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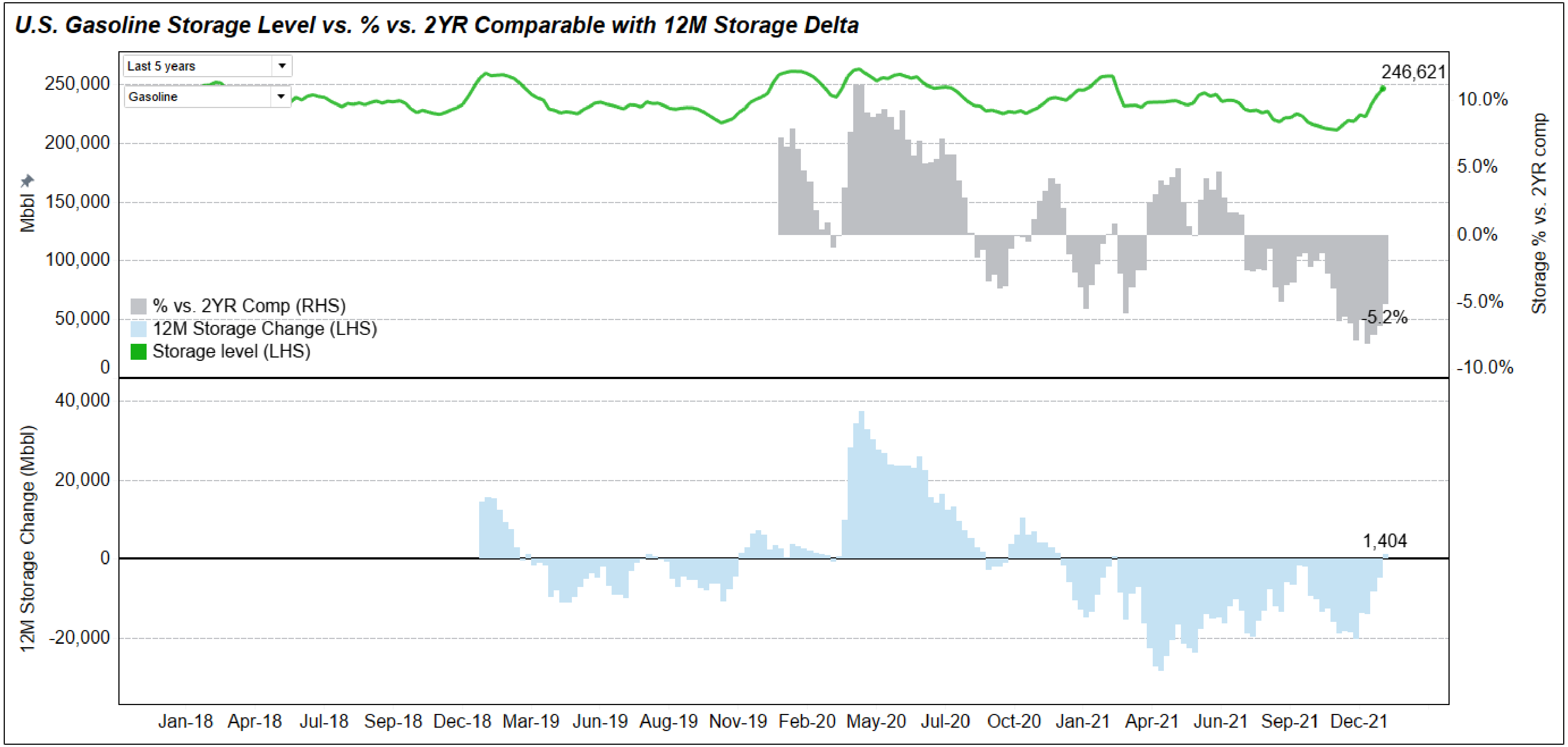
Source: Donovan Ventures, Bloomberg

GASOLINE STORAGE RE-ACCELERATED SIGNIFICANTLY INTO YEAR END 21'

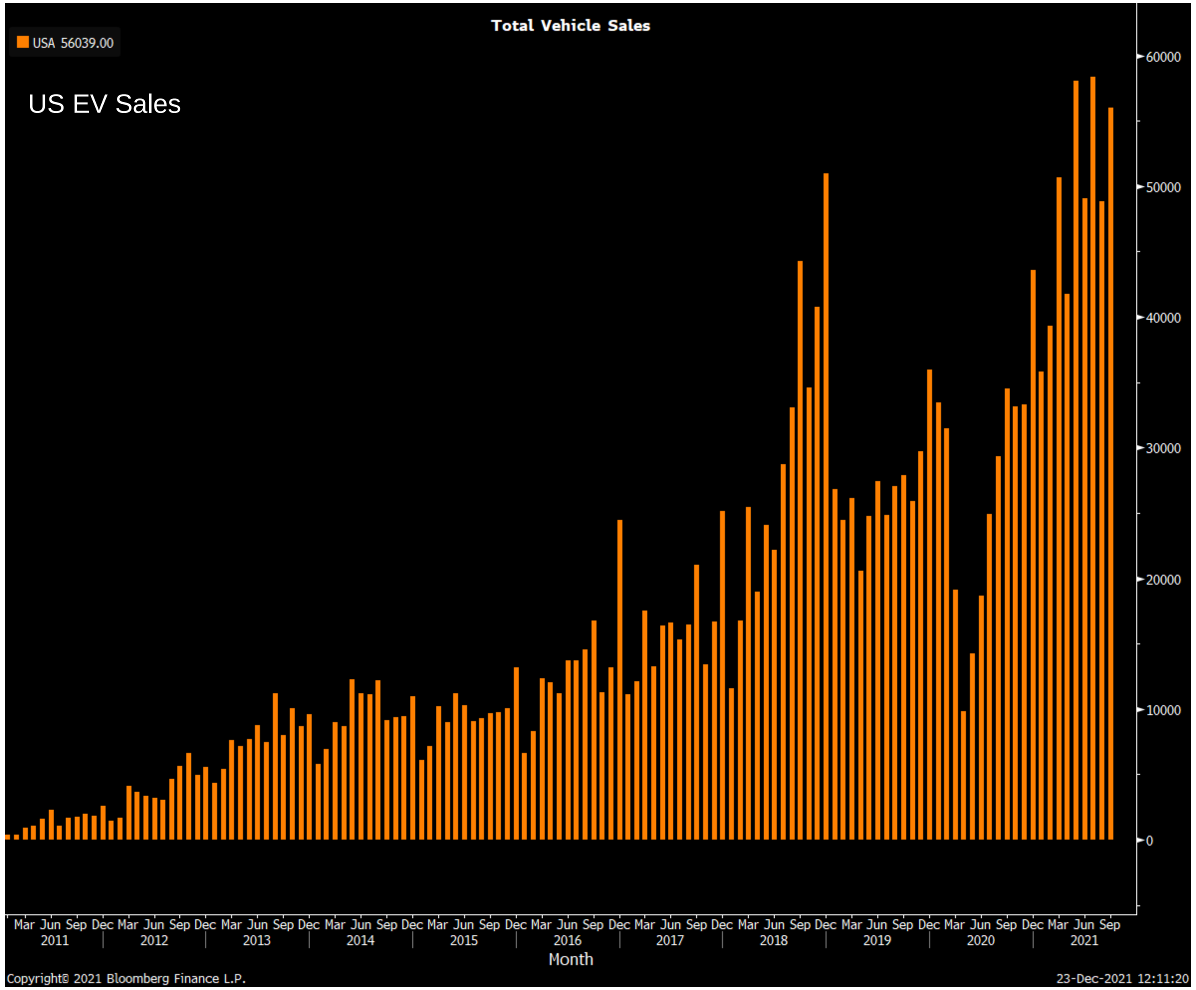
Weak demand due to omicron (likely transitory) drove a drop in gasoline demand, driving a re-acceleration in gasoline storage domestically. This is likely a main headwind to refiner net inputs. With demand re-acceleration into late 1Q22', storage is likely to re-decelerate.



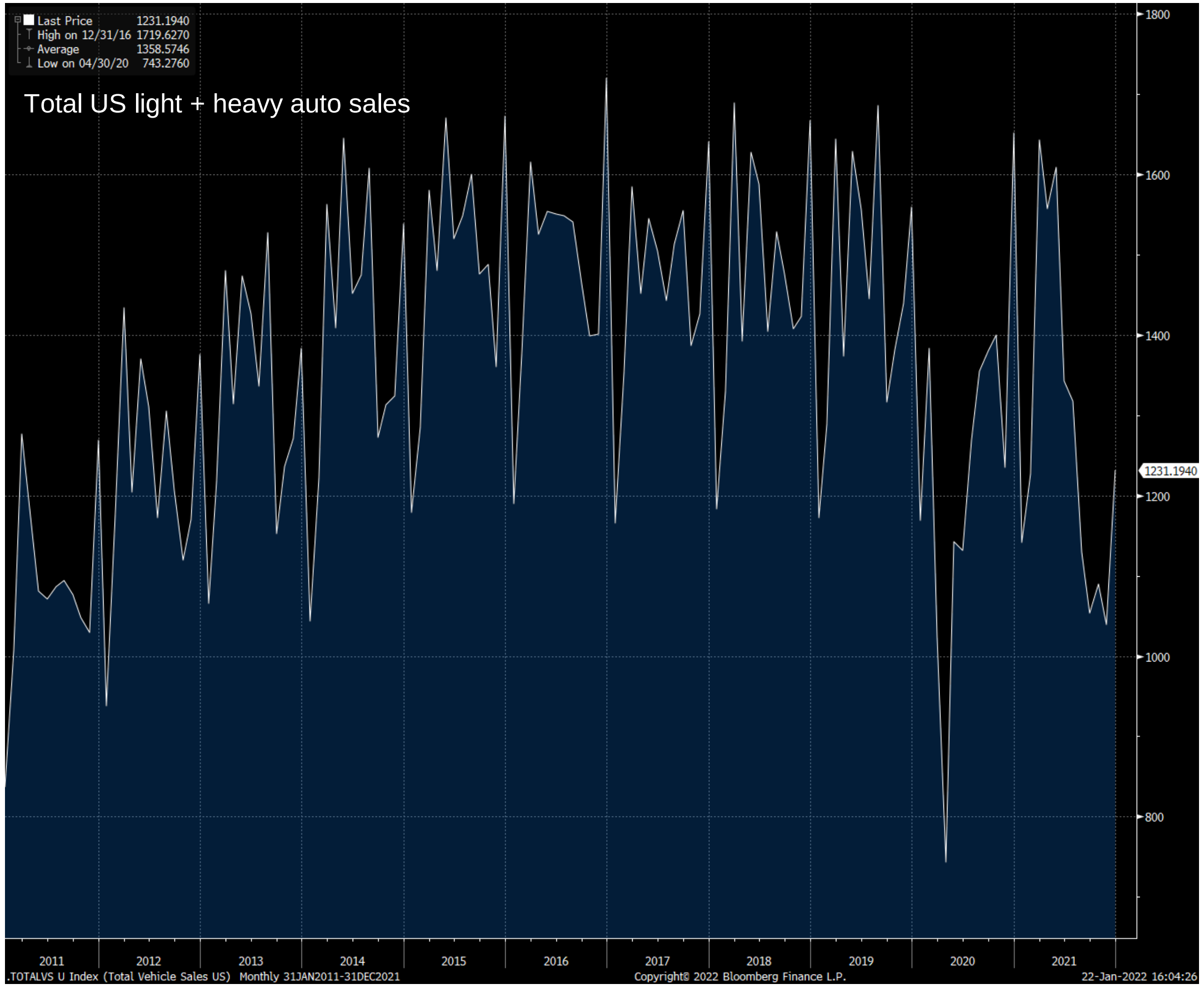
Source: EIA, Donovan Ventures (as of 1/7/2022)

EV SALES HAVE BEEN RESILIENT, BUT IMPACT TO GASOLINE DEMAND NOT A NEAR-TERM ISSUE…

*TTM US EV sales have grown at a **44% CAGR** since 2012*



*Total US auto sales (light + heavy) have grown at a **2% CAGR** over same time period*



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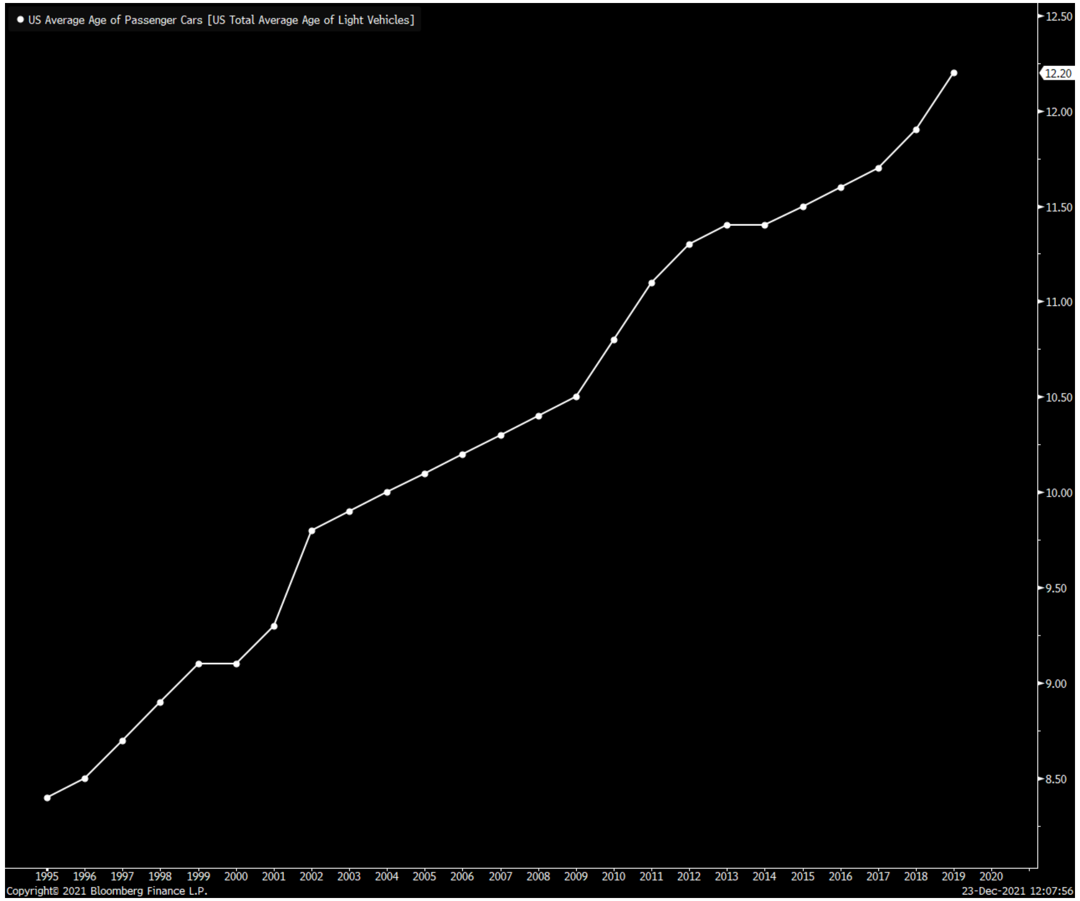
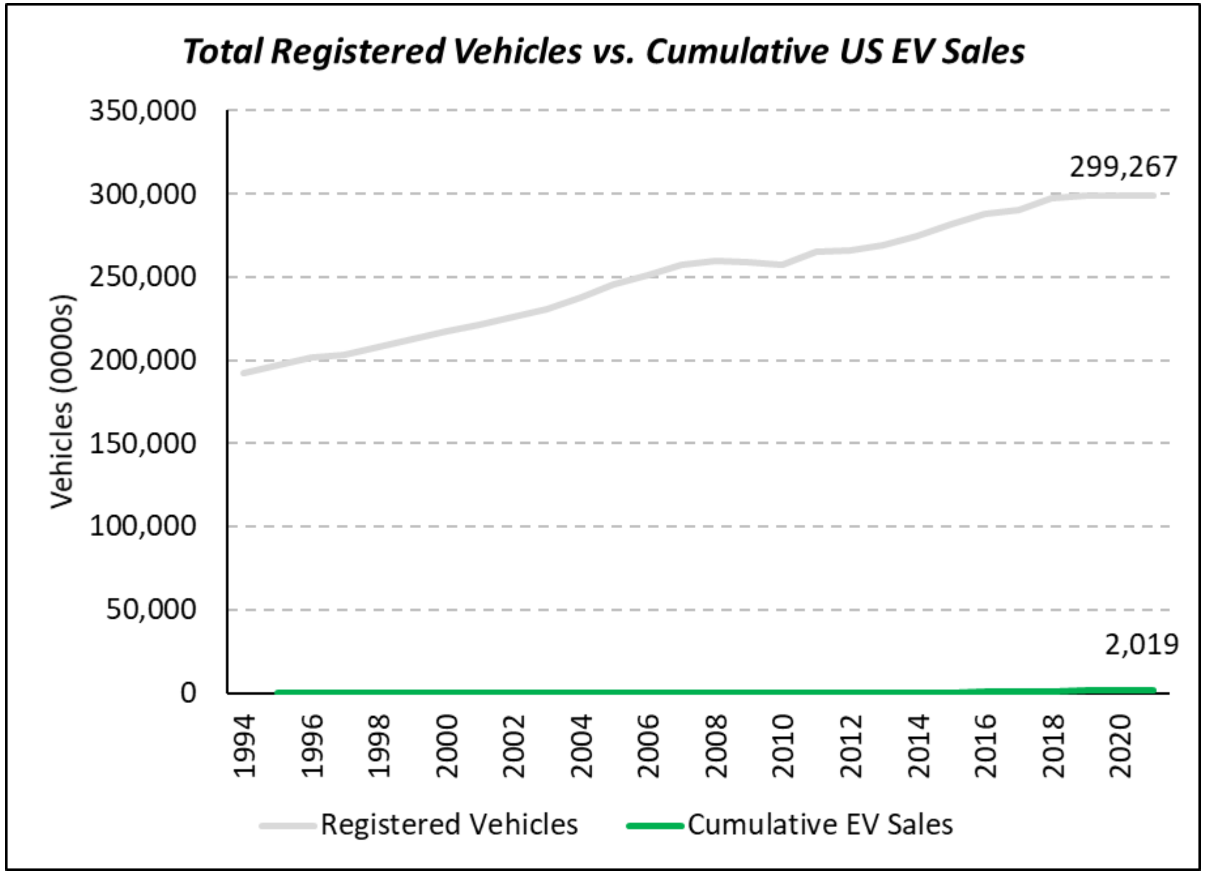
Source: Bloomberg

…GROWING VEHICLE AGE MEANS TOTAL FLEET MIX WILL REMAIN HEAVILY WEIGHTED TOWARDS ICE

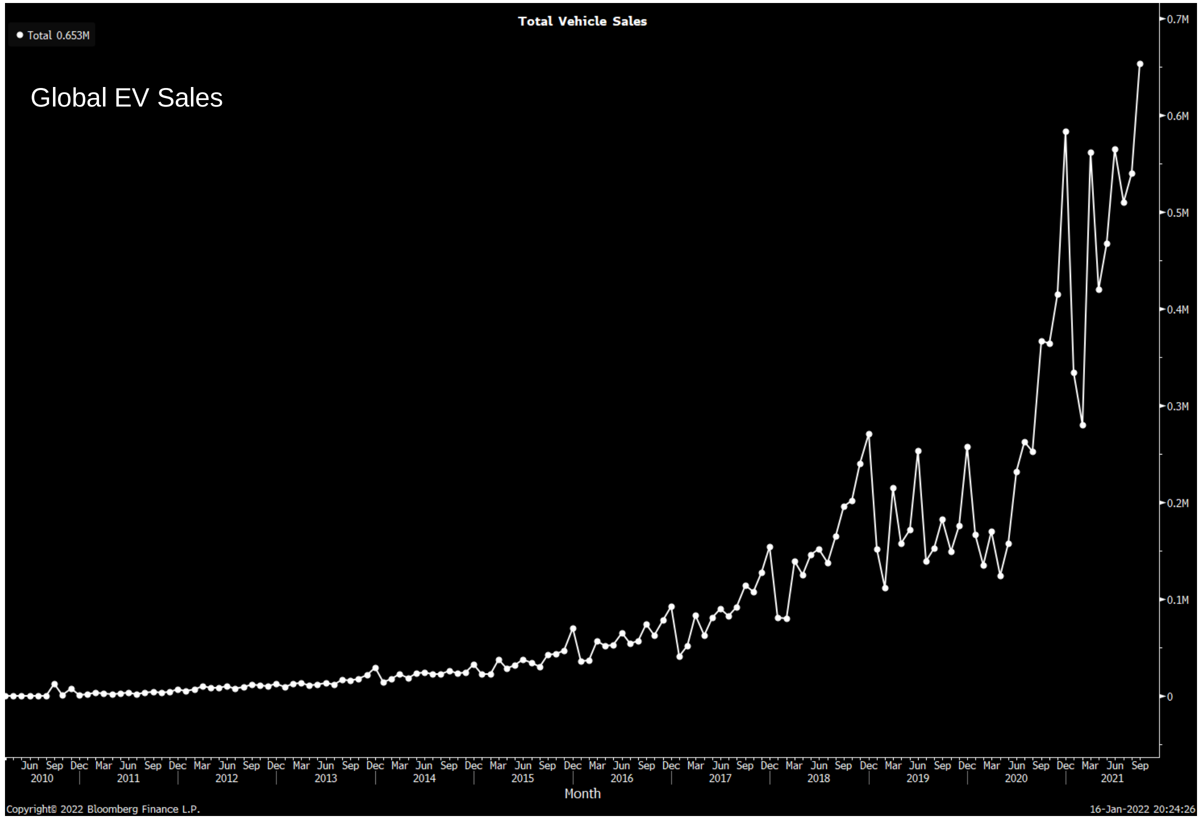


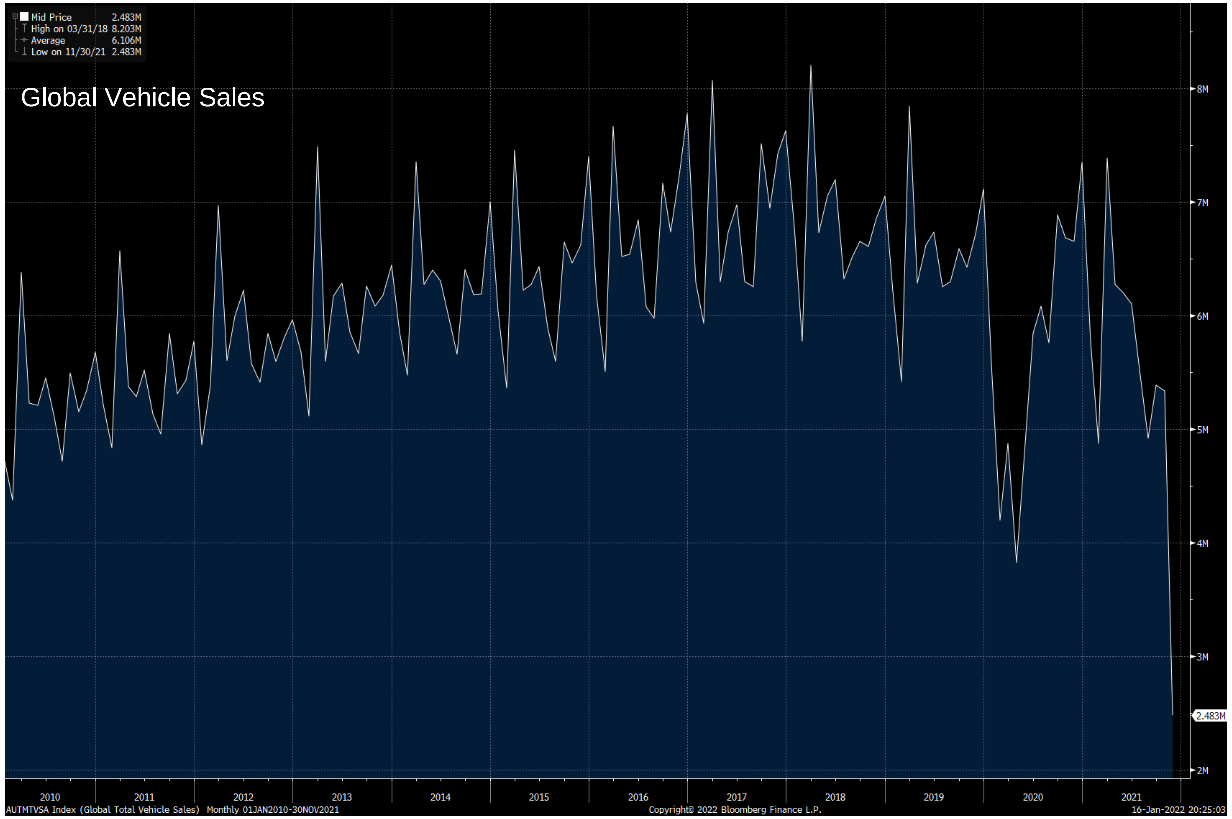


Implied EVs on road (utilizing cumulative EV sales, which represents a best-case scenario) only represent ~0.7% of the total US autos on road

GLOBALLY, EVS REMAINED RESILIENT WHILE TOTAL AUTO SALES DECLINED SIGNIFICANTLY OVER LAST YEAR

EV sales now represent ~8% of total car sales on a TTM basis





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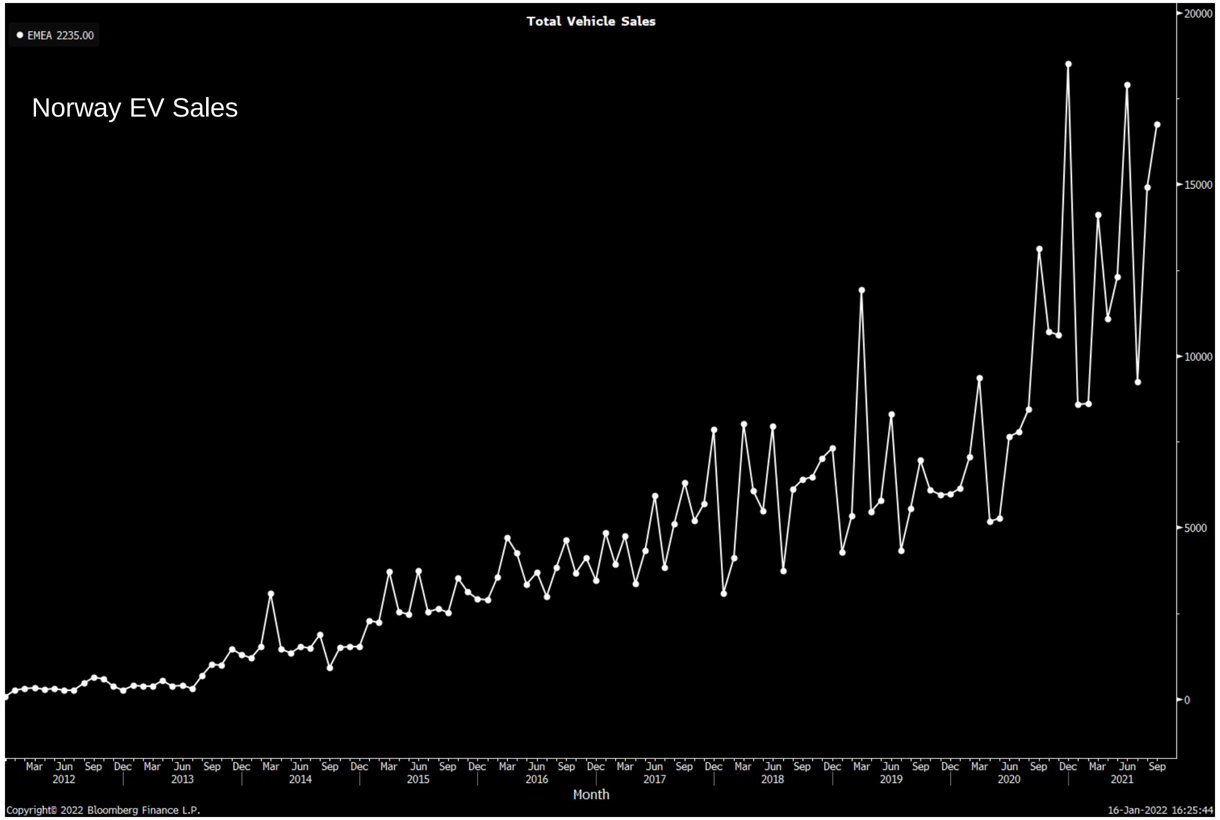
Source: Bloomberg

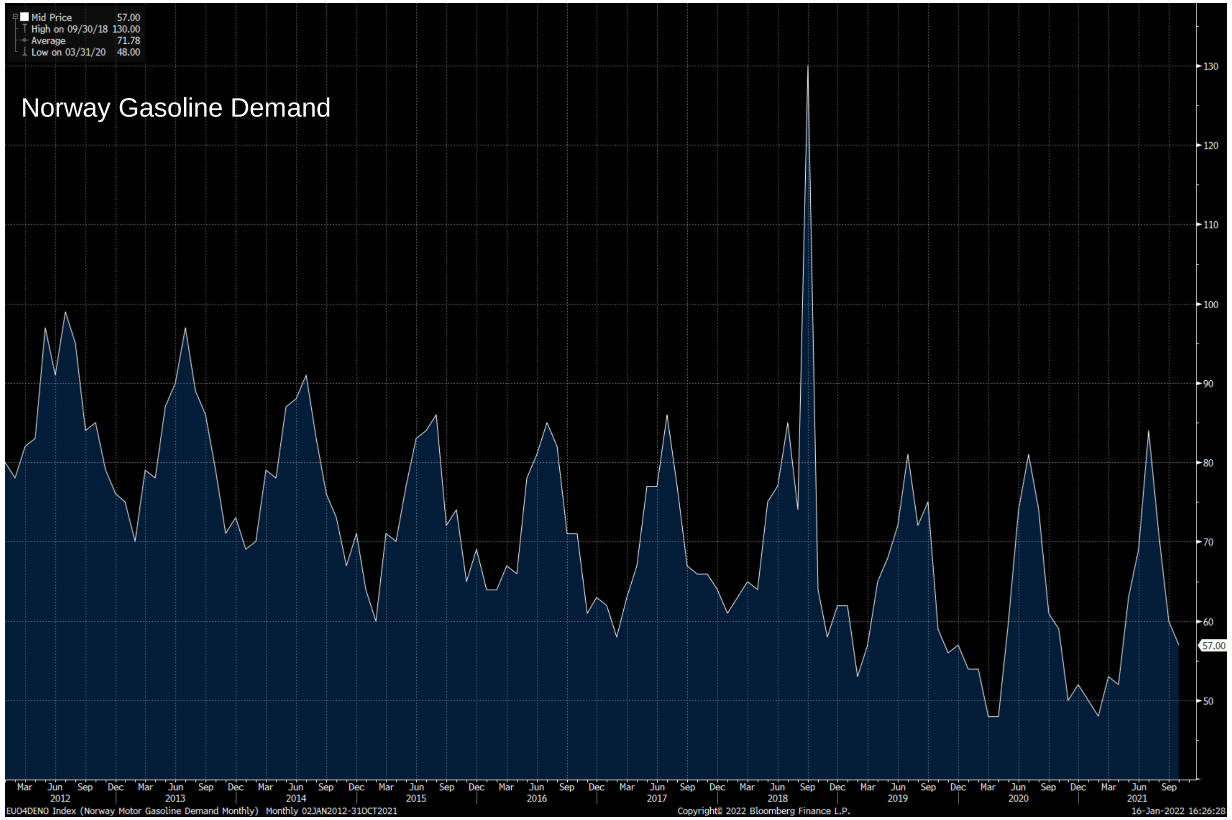
Is Norway a harbinger of things to come? It's a long road to electric paradise

A 9% market share for EVs in Norway has driven a nearly 15% reduction in gasoline demand

EVs represent ~95% of all new auto sales in Norway



EVs with 9% share of vehicle fleet has driven an ~15% reduction in gasoline demand since 2012



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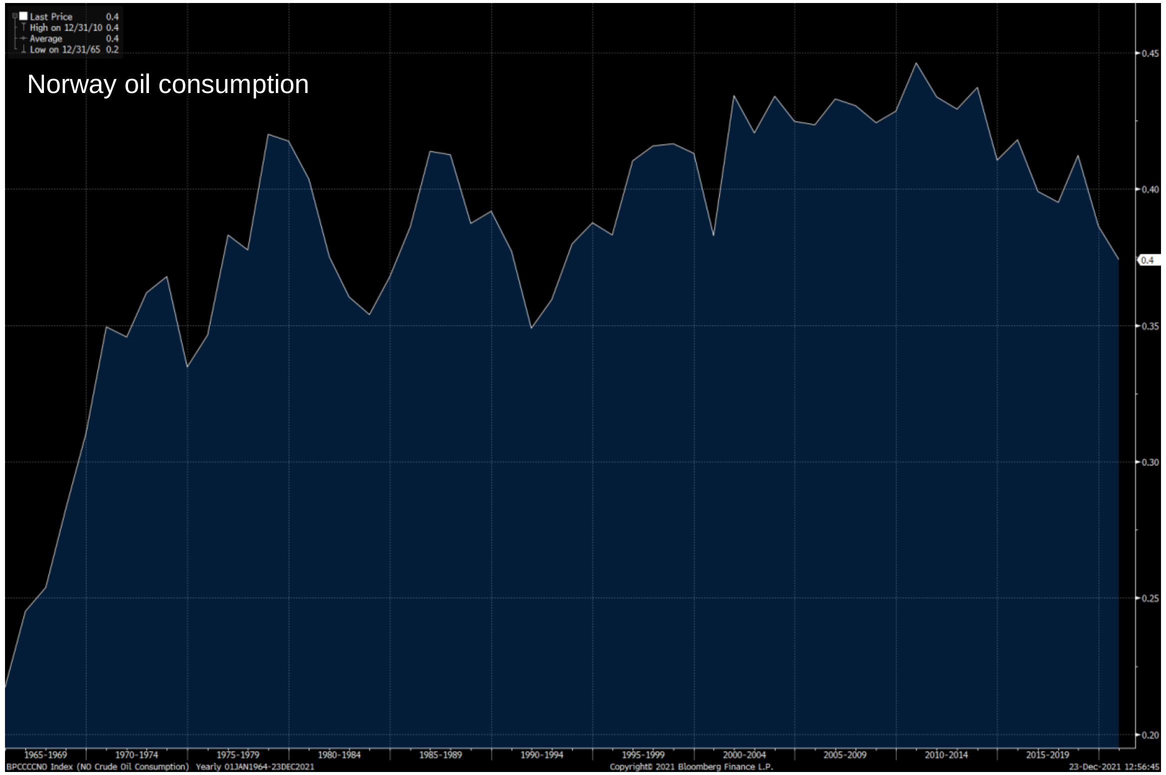
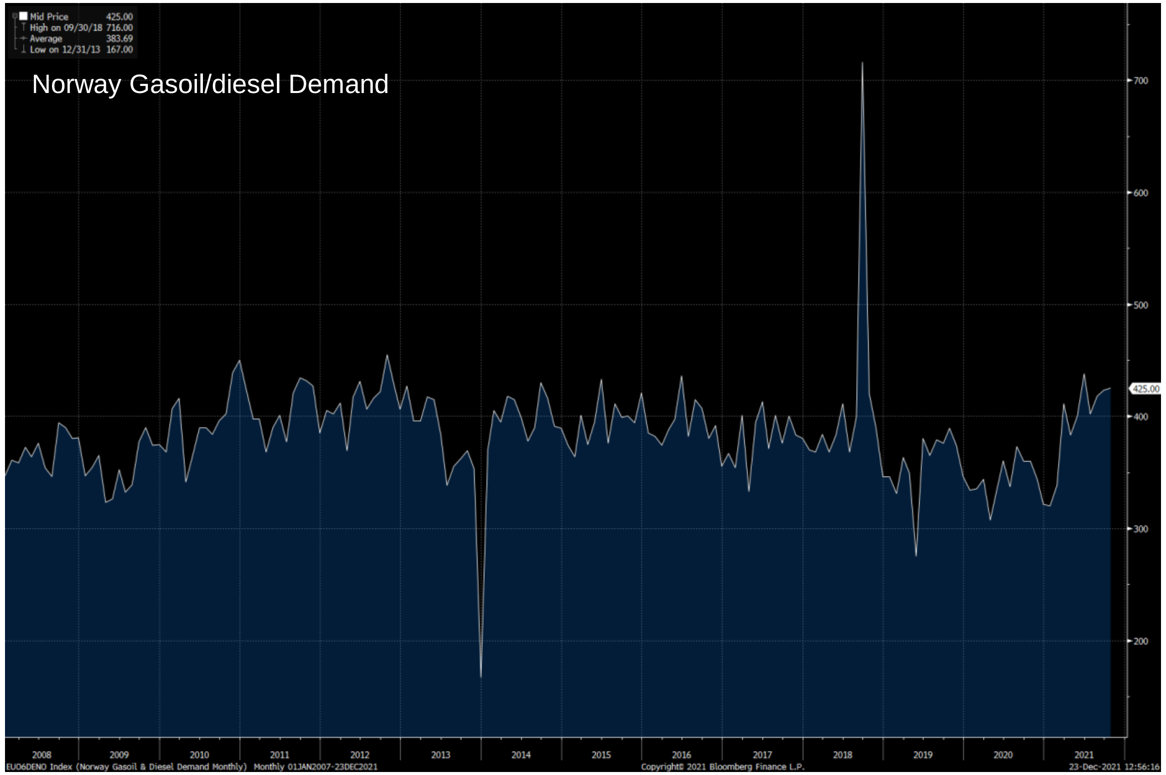
Source: Bloomberg

NORWEGIAN TOTAL OIL CONSUMPTION IS DOWN ~10% SINCE 2012, WHILE GASOIL/DIESEL IS UP ~4%

Oil consumption started decline in 2010



Gasoil/diesel consumption declined from 2010 through 2020, but has since rebounded significantly



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Source: Bloomberg

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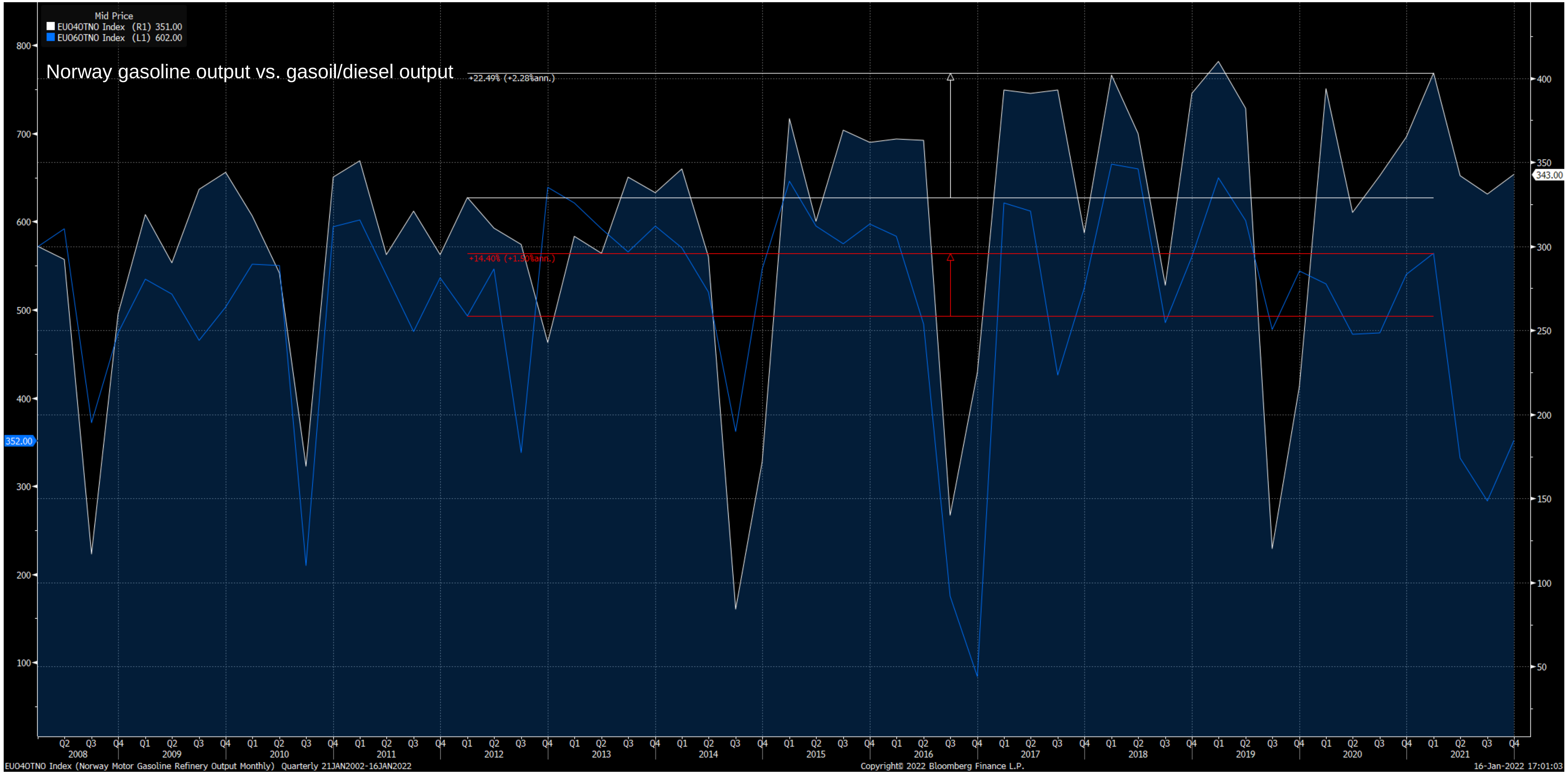
PRODUCT OUTPUTS FROM REFINERIES IS UP FOR BOTH GASOLINE AND GASOIL/DIESEL…

Gasoline *output (white line) from refineries is* ***+22%*** *since 2012, and* ***gasoil/diesel*** *output (blue line) is* ***+14%***



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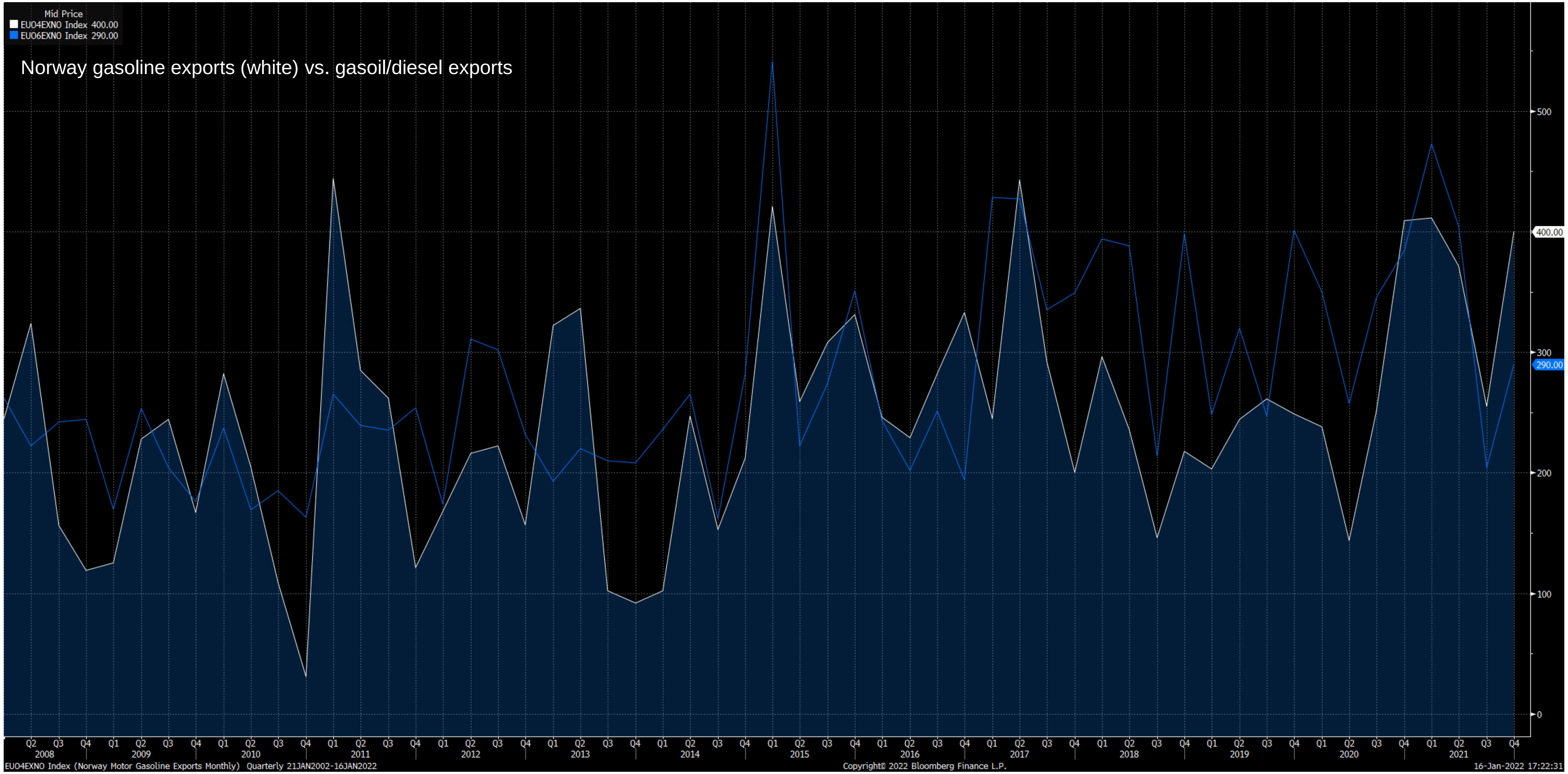
Source: Bloomberg

…So where is that excess product going? Exports

*Exports have significant seasonality, but are **+154%** for **gasoline** and **+14% for gasoil/diesel** (2012 average to 2021 average)*



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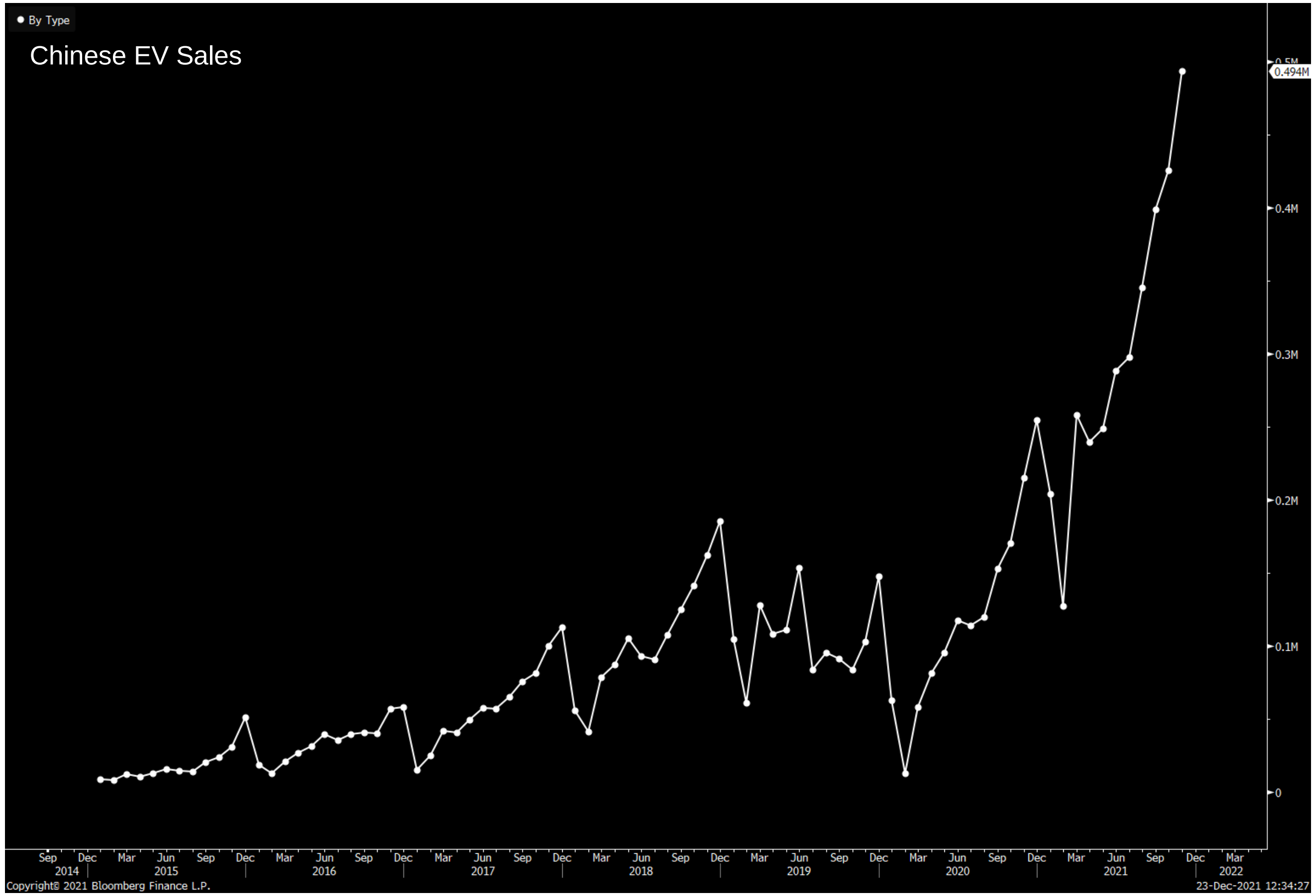
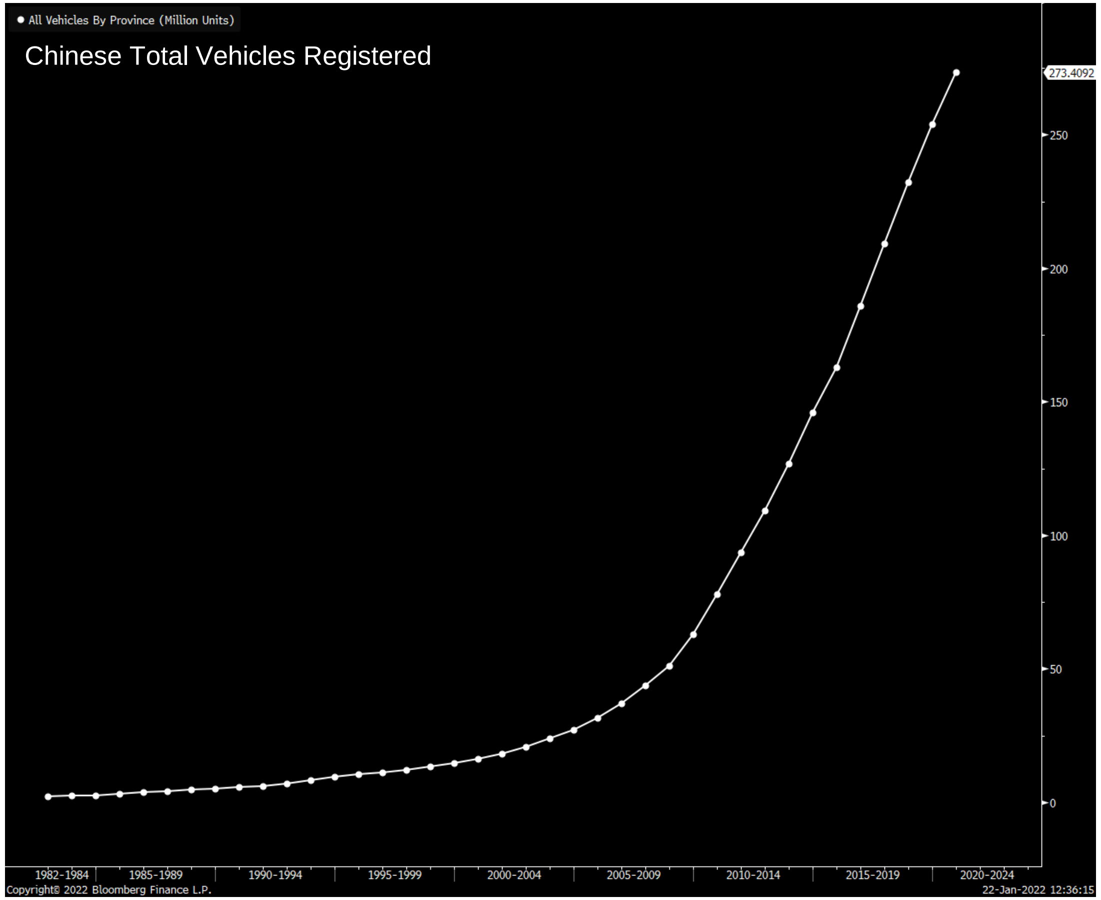
Source: Bloomberg

RED GIANT – WORLD'S 2ND LARGEST AUTO-MARKET HAS A LONG WAY TO GO WITH EVs

EV sales currently represent ~10% of TTM total auto sales in China, but only ~2% of the total fleet





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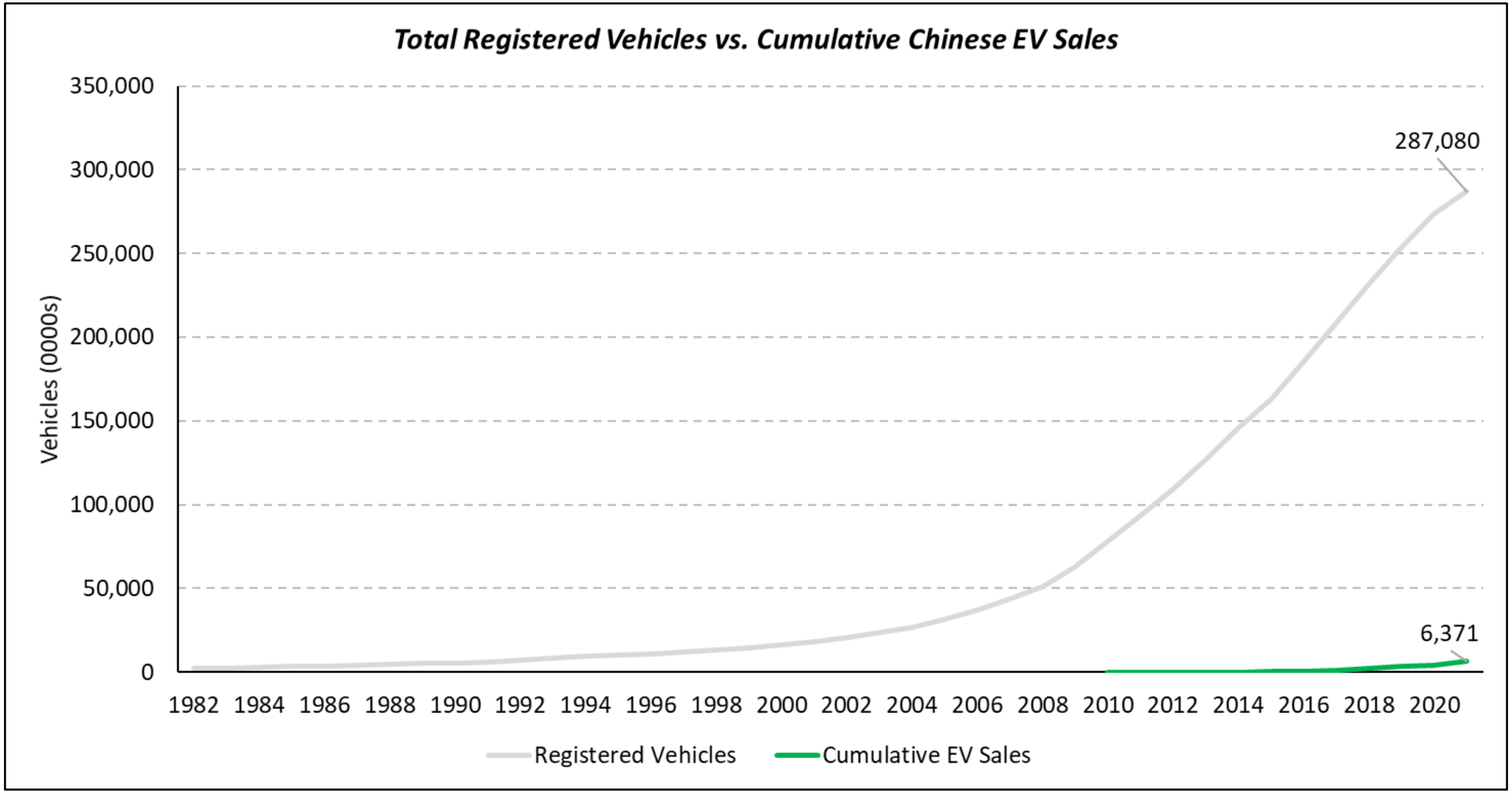
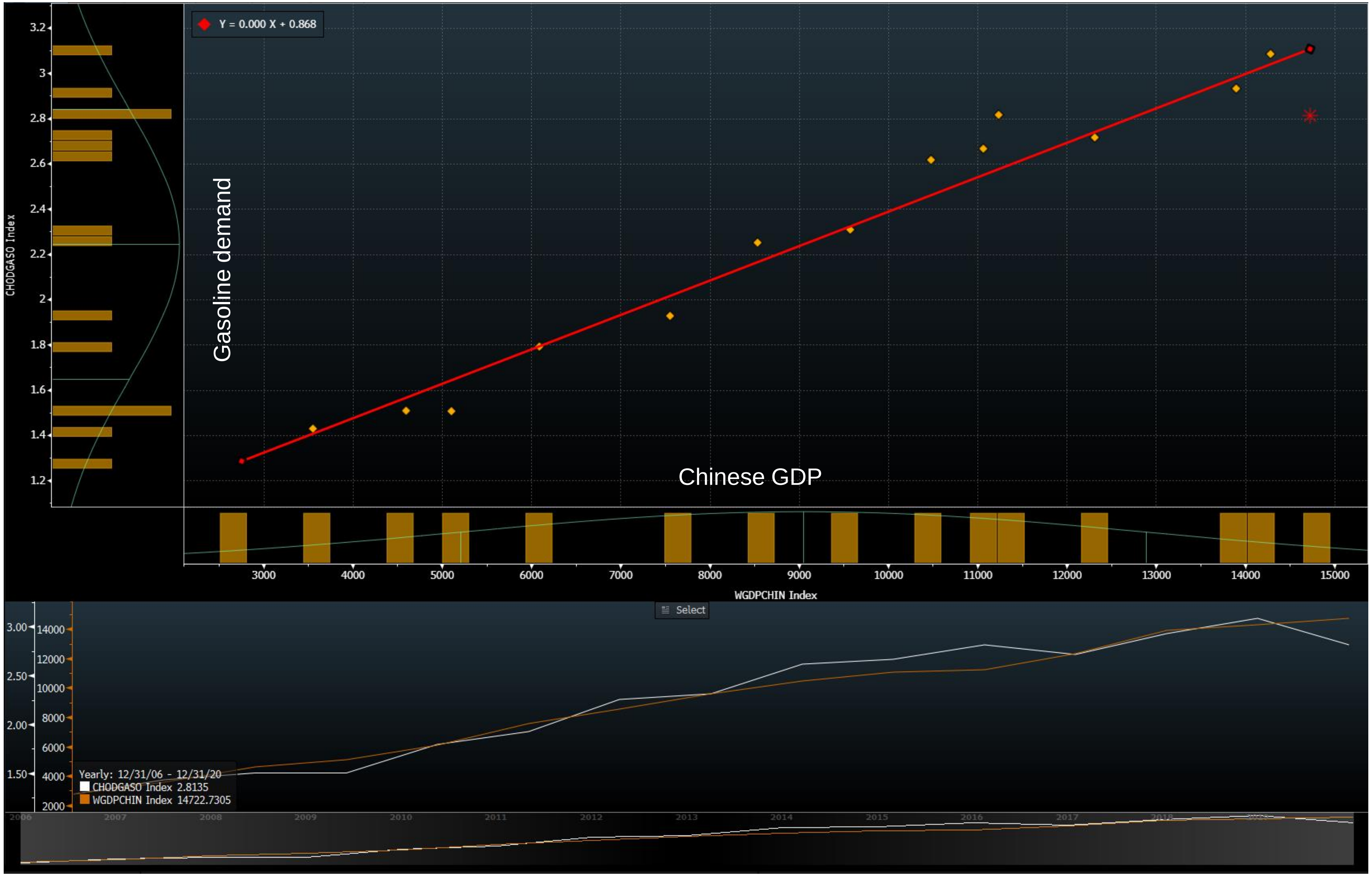
Source: Bloomberg

EV SALES CONTINUE TO ACCELERATE IN CHINA, WHILE TOTAL REGISTRATION GROWTH SLOWS



Source: Bloomberg, Donovan Ventures

CHINESE GASOLINE DEMAND CONTINUES TO ACCELERATE, BUT IS DEPENDENT ON CONTINUED ECONOMIC GROWTH



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Source: Bloomberg

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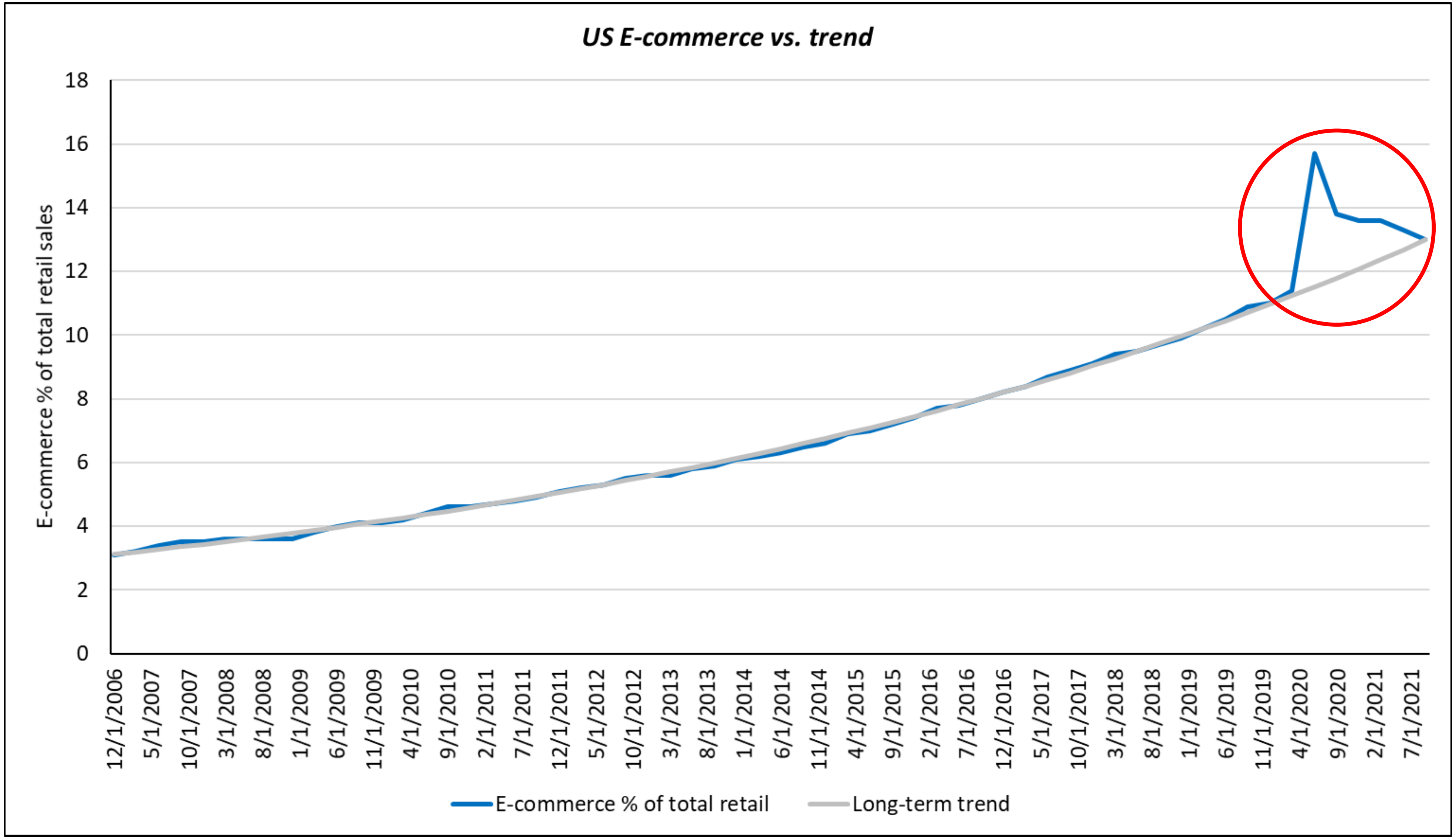
DOMESTIC GASOLINE DEMAND IS LIKELY CAPPED AT ~10MMBBL/D IN 22', WHAT ABOUT DIESEL/DISTILLATES?

Deliveries in the pandemic accelerated significantly above trend: likely a transitory change



Source: Bloomberg, Donovan Ventures

E-COMMERCE BUMP DROVE A SWIFT REBOUND TO ALL-TIME HIGH IN TRUCK LOADINGS…

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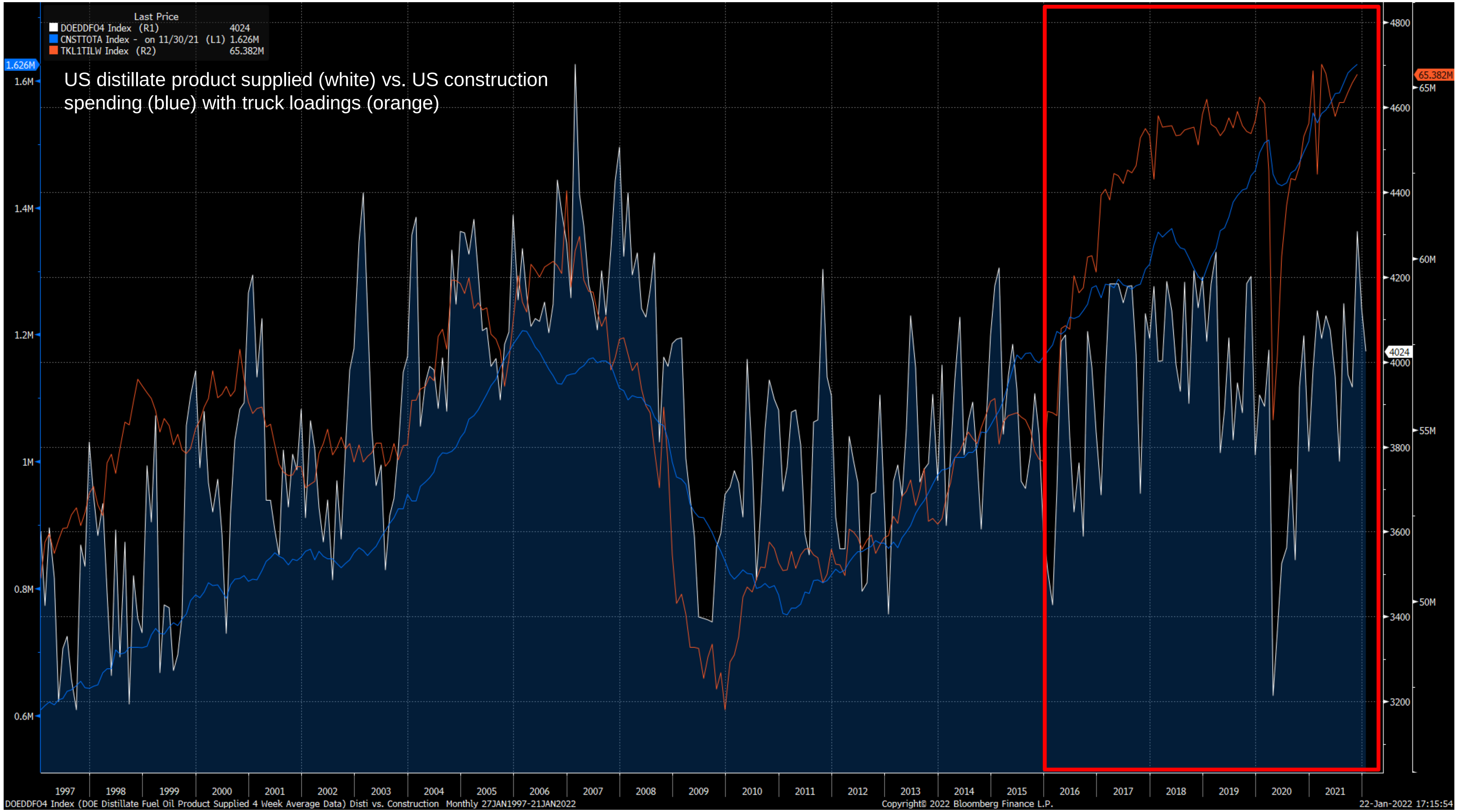
Source: Bloomberg

…HOWEVER, IMPACT OF TRUCK LOADINGS AND CONSTRUCTION SPEND LESS MEANINGFUL TO DEMAND VS. PRE-15'



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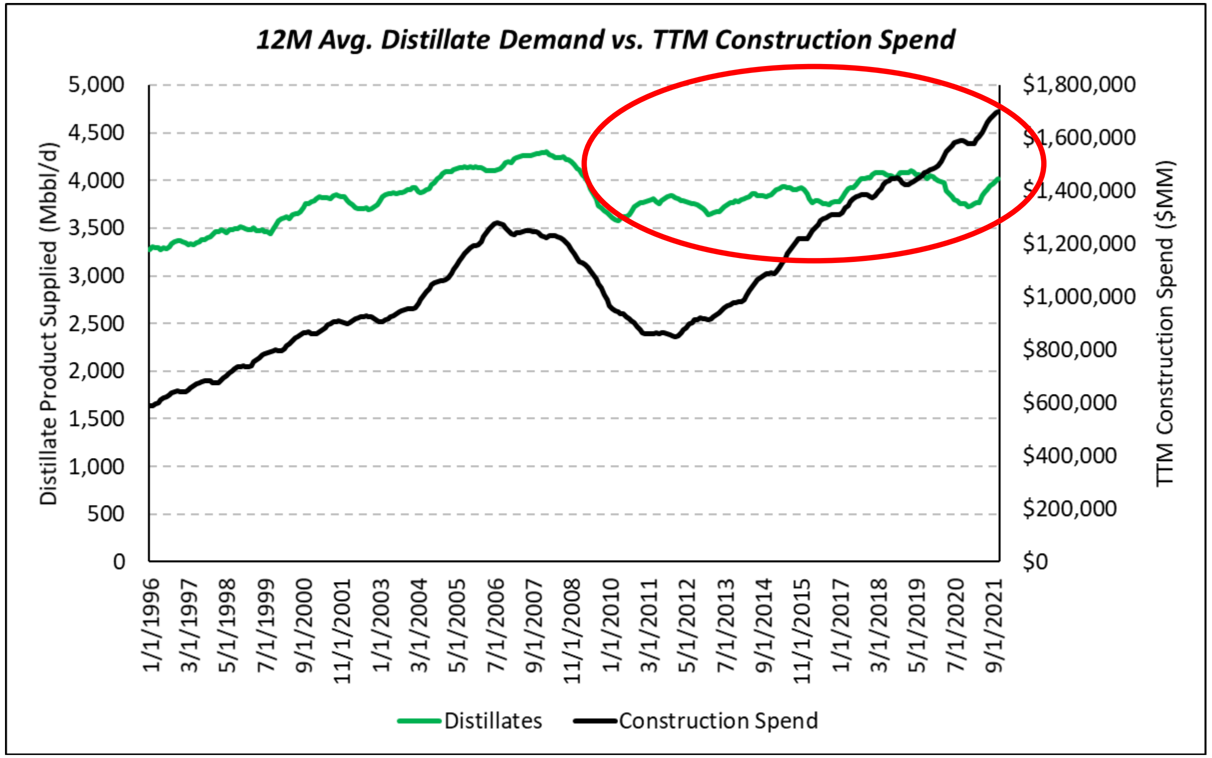
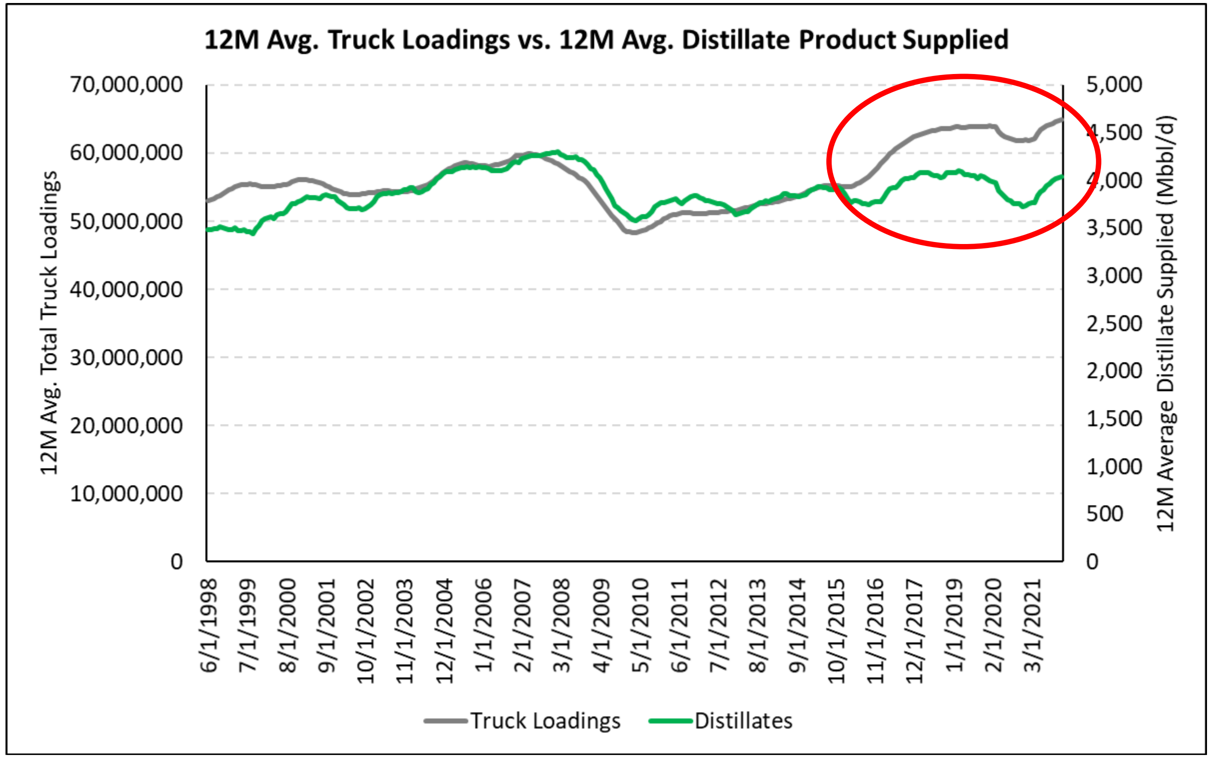
Source: Bloomberg

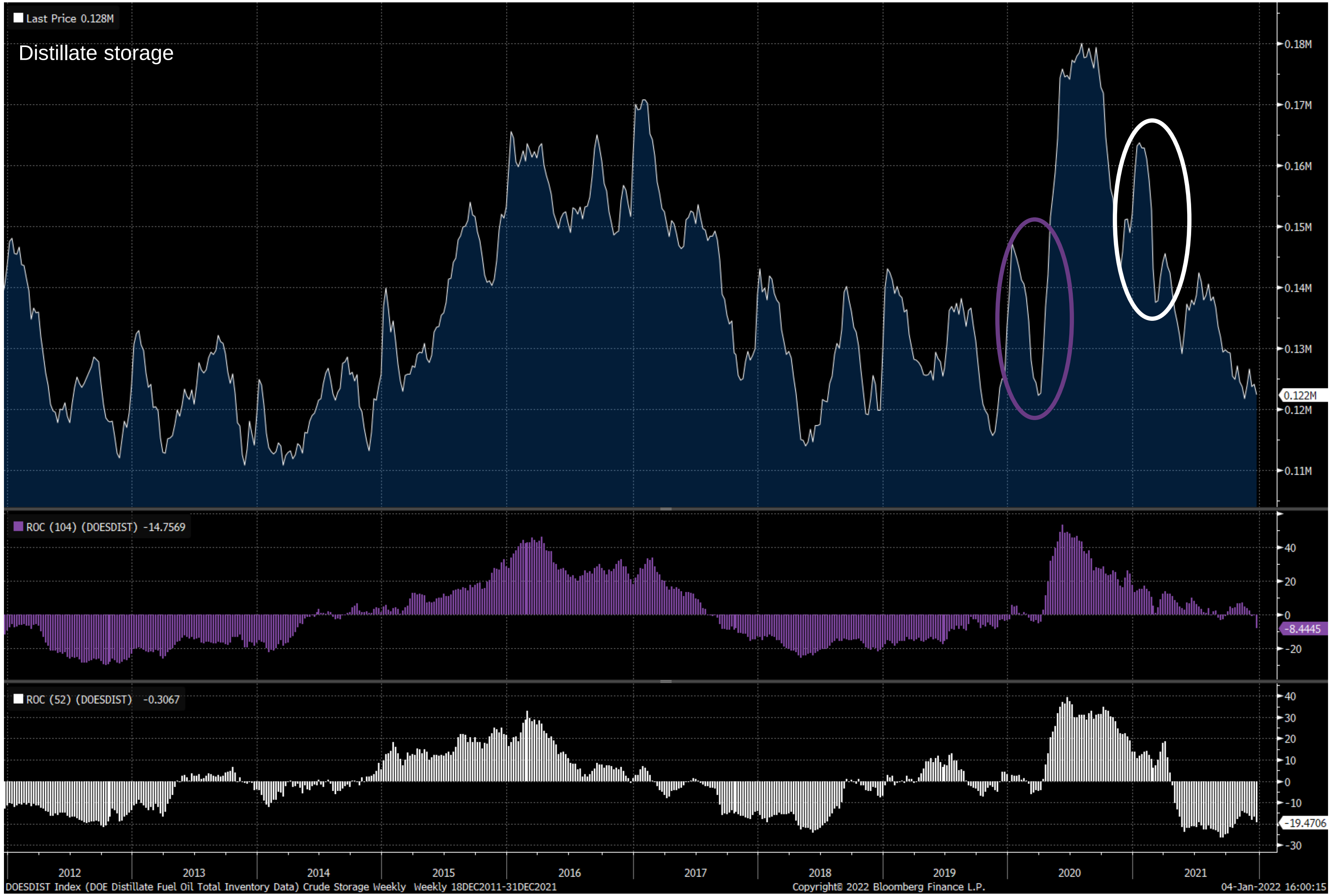
ON A TTM BASIS, TRUCK LOADINGS DRIVE DISTILLATE DEMAND, BUT AT MUTED PACE VS. 01' – 15'





Source: Bloomberg, Donovan Ventures

Limited growth in distillate demand is likely to drive accelerating storage in 2022



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Source: Bloomberg

Should we be worried about EVs in the long-haul space? Not for a long time.

From Nikola fraud…

Nikola Board, Backers Hit With Insider Trading Suit in Delaware

- **COURT:** Del. Ch.
- **TRACK DOCKET:** No. 2022-0023 (Bloomberg Law Subscription)
- **JUDGE:** Kathaleen St. Jude McCormick (Bloomberg Law Subscription)
- **COMPANY INFO:** Nikola Corp. (Bloomberg Law Subscription)

By Mike Leonard

(Bloomberg Law) -- A Nikola Corp. investor filed suit in Delaware against its leaders, backers, and indicted founder, claiming they ran "an old-fashioned 'pump and dump' scheme" while a board member sold stock at prices inflated by lies about the startup's electric vehicle prototypes.

The 140-page lawsuit, made public late Wednesday, targets Nikola founder Trevor Milton, two top executives, current and former members of its board, ex-directors of the "special purpose acquisition company" the truck maker merged with in 2020, and investment firms affiliated with several of them.

"This is a tale of criminal fraud perpetrated" with "the knowing assistance" of the "disloyal, self-interested, and interconnected boards" of Nikola, the SPAC, and the combined company, according to the partly redacted complaint in Delaware's Chancery Court.

Nikola didn't immediately respond to a request for comment Thursday.

The derivative suit accuses the boards of looking the other way while Milton, who faces federal fraud charges, advanced the false narrative that Nikola "was on the cutting edge of electric trucking technology," hyping its value to $3 billion before its blank-check merger with VectoIQ Acquisition Corp.

Blank-check companies, or SPACs, are publicly traded entities raising money on the promise of a reverse merger with a private business that can then access public markets without the scrutiny of an initial public offering. SPAC deals exploded in popularity in 2020, leaving regulators to play catch-up.

Those regulatory loopholes allegedly "played right into" Milton's hands. Because SPAC mergers aren't subject to the traditional "quiet period" under federal securities laws, he was able to continually promote the deal with false hype and "the acquiescence" of both boards, according to the complaint.

After the merger closed, Milton–now "motivated by performance awards"–sought to boost the stock price further with "a relentless torrent of" lies, the suit says.

It tallies 33 allegedly "false and misleading statements" made "with the knowledge or assistance of the Nikola board" members, who "did nothing to stop him, largely because they too, stood to gain financially from increases in Nikola's stock price."

Company used a slope to propel their "protype" semi

… to continued Tesla Semi delays

Tesla Semis Could Be Delivered To PepsiCo In Late January

(Benzinga Newswire)

Electric vehicle giant **Tesla Inc** (NASDAQ:TSLA) surprised investors and customers in 2021 with an announcement that the highly anticipated **Tesla Semi** would be delayed. A new report shows Semi deliveries could be just around the corner.

What Happened: A **Frito-Lay** facility in Modesto, California received Tesla Megachargers recently and is set to receive deliveries of Tesla Semis.

The **PepsiCo, Inc.** (NYSE:PEP) facility could receive Tesla Semis later this month, according to a report from Drive Tesla. Photos show Megachargers ready for installation and some in packaging. A Megapack battery storage system is also installed at the facility.

"After receiving these photos we were able to confirm with one of our sources that PepsiCo has been told to expect to receive all 15 Tesla Semis before the end of January," Drive Tesla said.

PepsiCo announced in a press release in March 2021 they would take delivery of 15 Tesla Semis before the end of 2021.

Tesla announced it was delaying the Tesla Semi during the second-quarter earnings release in 2021. Tesla CEO **Elon Musk** cited limited battery supply as one of the reasons for the Tesla Semi delay.

Despite the announced delays, PepsiCo CEO **Ramon Laguarta** shared in a CNBC interview in November 2021 that the company would be receiving Tesla Semis soon.

"We are getting our first deliveries this Q4," Laguarta said

Related Link: Tesla PUBG Mobile Partnership Puts Cars, Semis In Game: What It's Important For China, India

Why It's Important: The comments from Laguarta suggested that Pepsi could have a different timeline than other companies or have preferred status from Tesla.

The purchase of Tesla Semis is one of several planned initiatives by PepsiCo to reduce its carbon emissions in the future, Laguarta added.

Pepsi is one of several large companies that have pledged to order Tesla Semis in the future. Pepsi placed an initial order for 100 Tesla Semis in 2017.

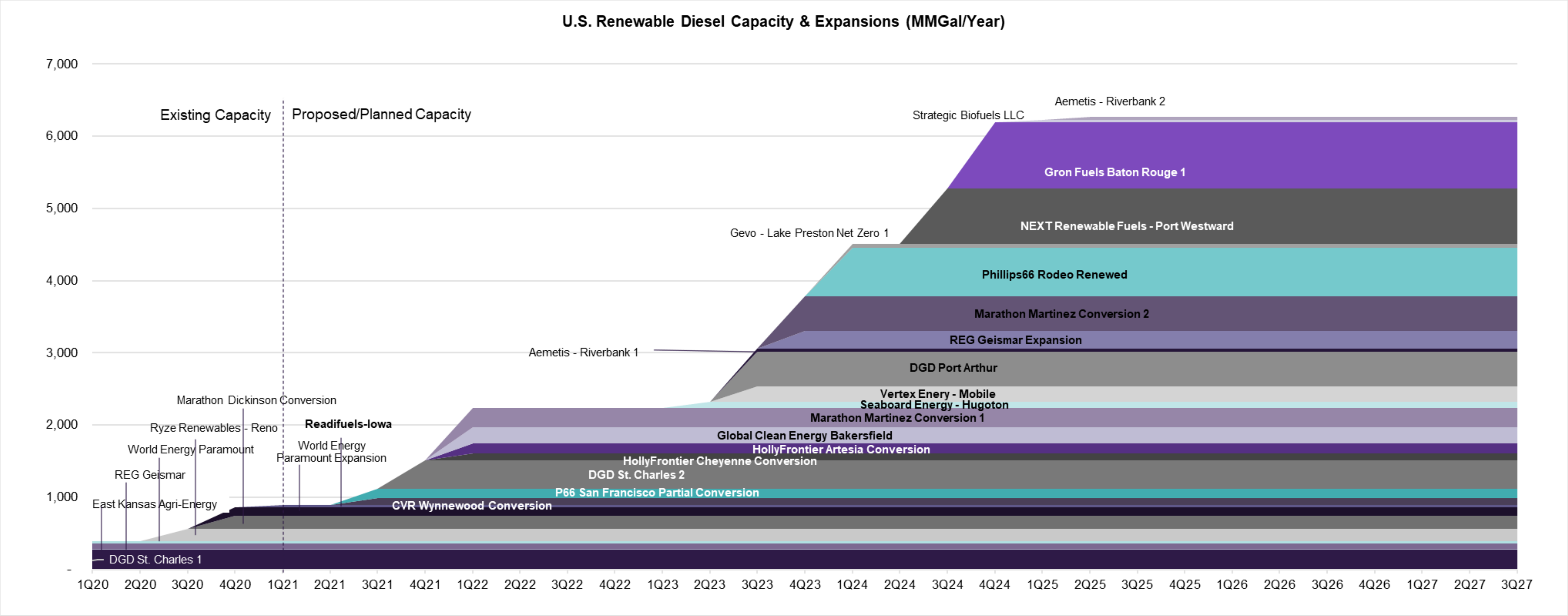
Tesla delayed the Tesla Semi into 2022 and new reports by the end of 2021 suggested Tesla Semis would not be delivered until 2023.

If reports hold true and PepsiCo receives its 15 Tesla Semis, it could lead to an improved timeline. But, it might be a one-off event possibly based on an exclusive deal or certain terms.

Delivery already pushed back to January 2022 and have not been delivered

THE MAIN NEAR-TERM HIT TO REFINER NET INPUTS IS FROM RENEWABLE DIESEL

Proposed expansions and new renewable diesel refiners are expected to add up to 6,000 MMGal/year of capacity in the U.S by 2025



Source: Truist

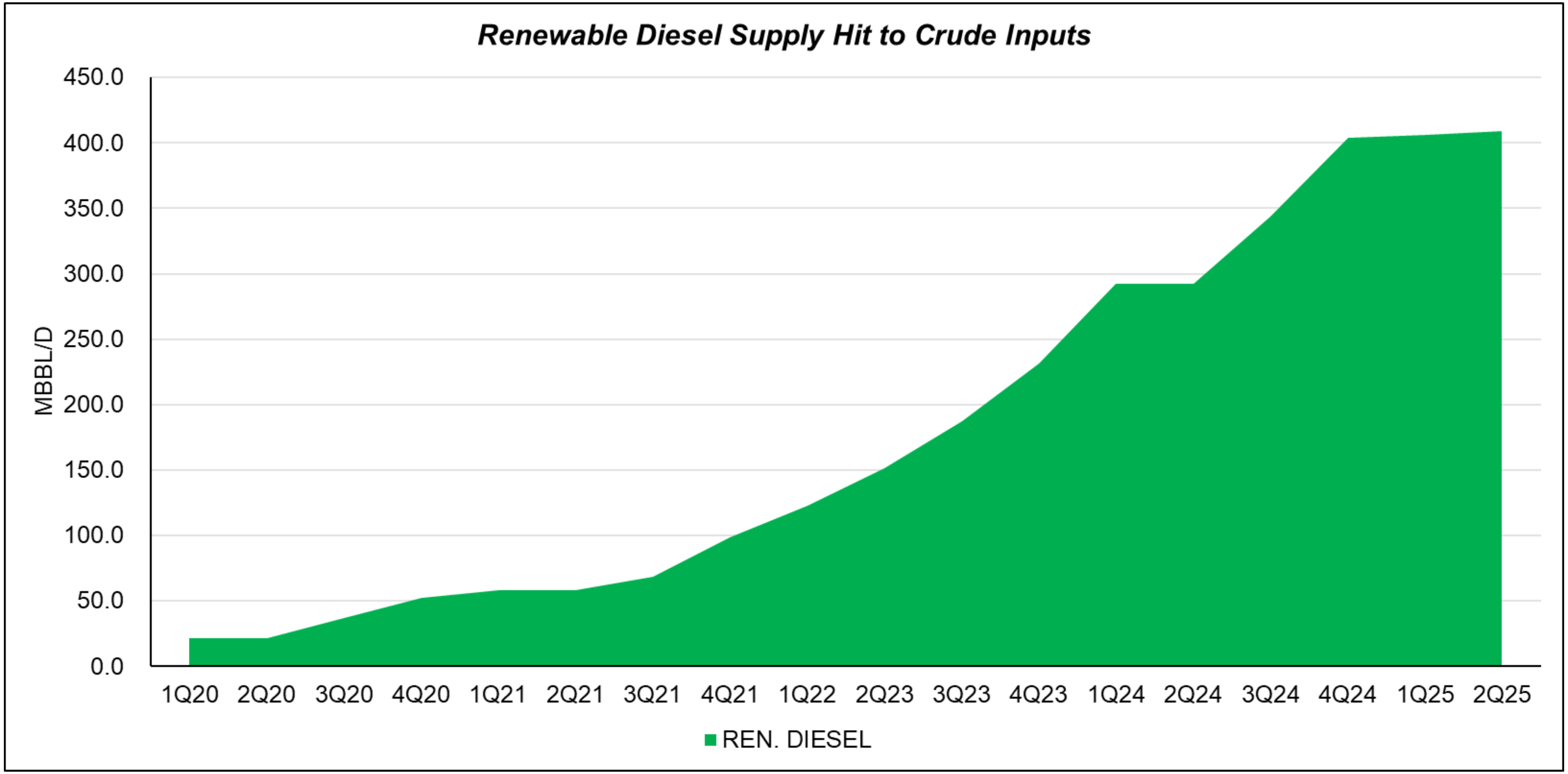
RINS DRIVING RENEWABLE DIESEL INVESTMENTS – PEAK INCENTIVE PRICED IN?

Soybean oil pricing remains elevated, while RINs have traded off since May 2021

Source: Bloomberg

Best case scenario for renewable diesel is ~400Mbbl/d of capacity by 2025 (implied hit to crude runs)

Planned/proposed new and expansion capacity for renewable diesel would impact crude inputs *by ~2% by 2025*



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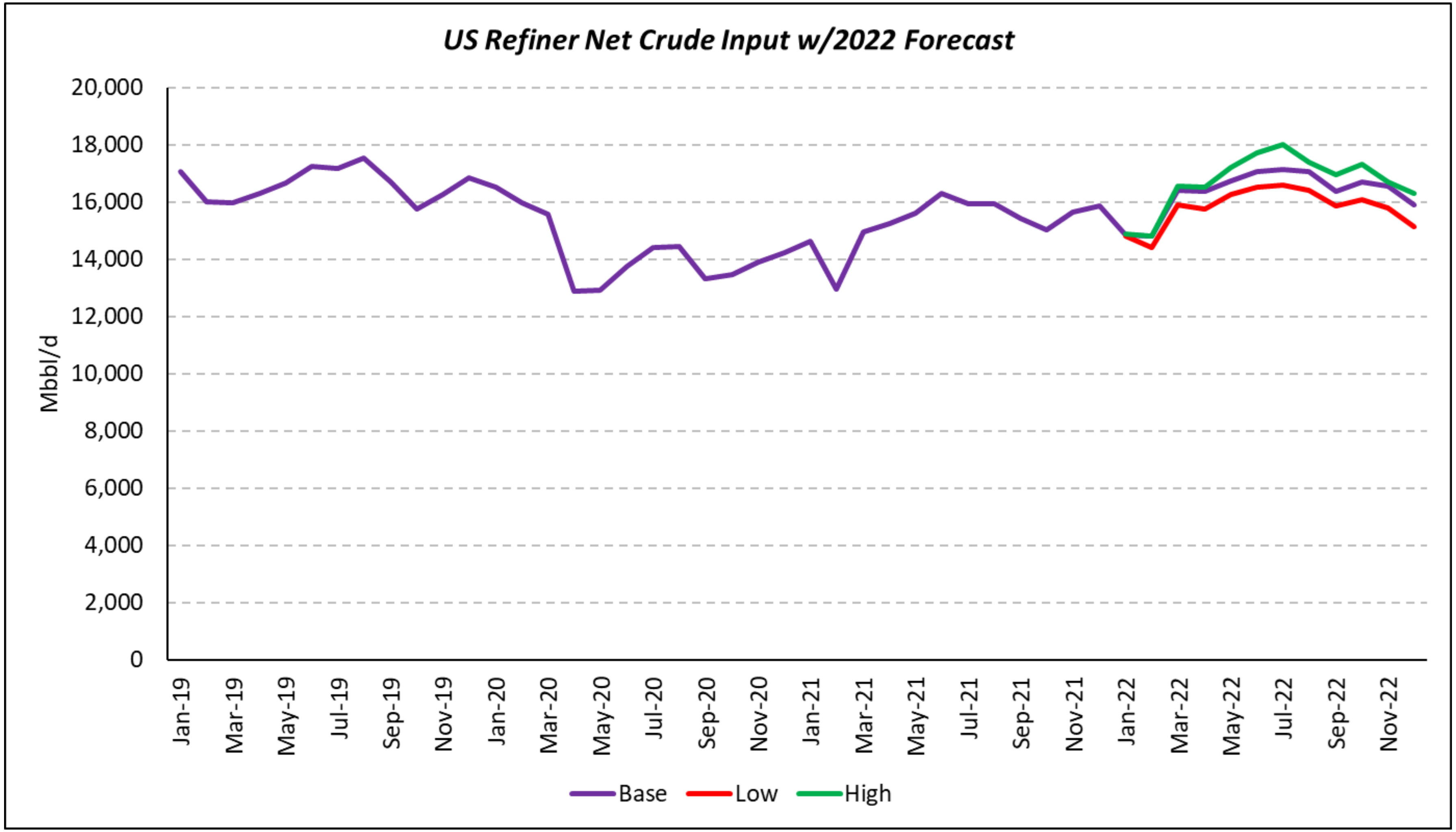
Source: Truist, Donovan Ventures

Aggregating refined product complex, US crude demand is likely to hit ~17.1mmbbl/d by July 2022

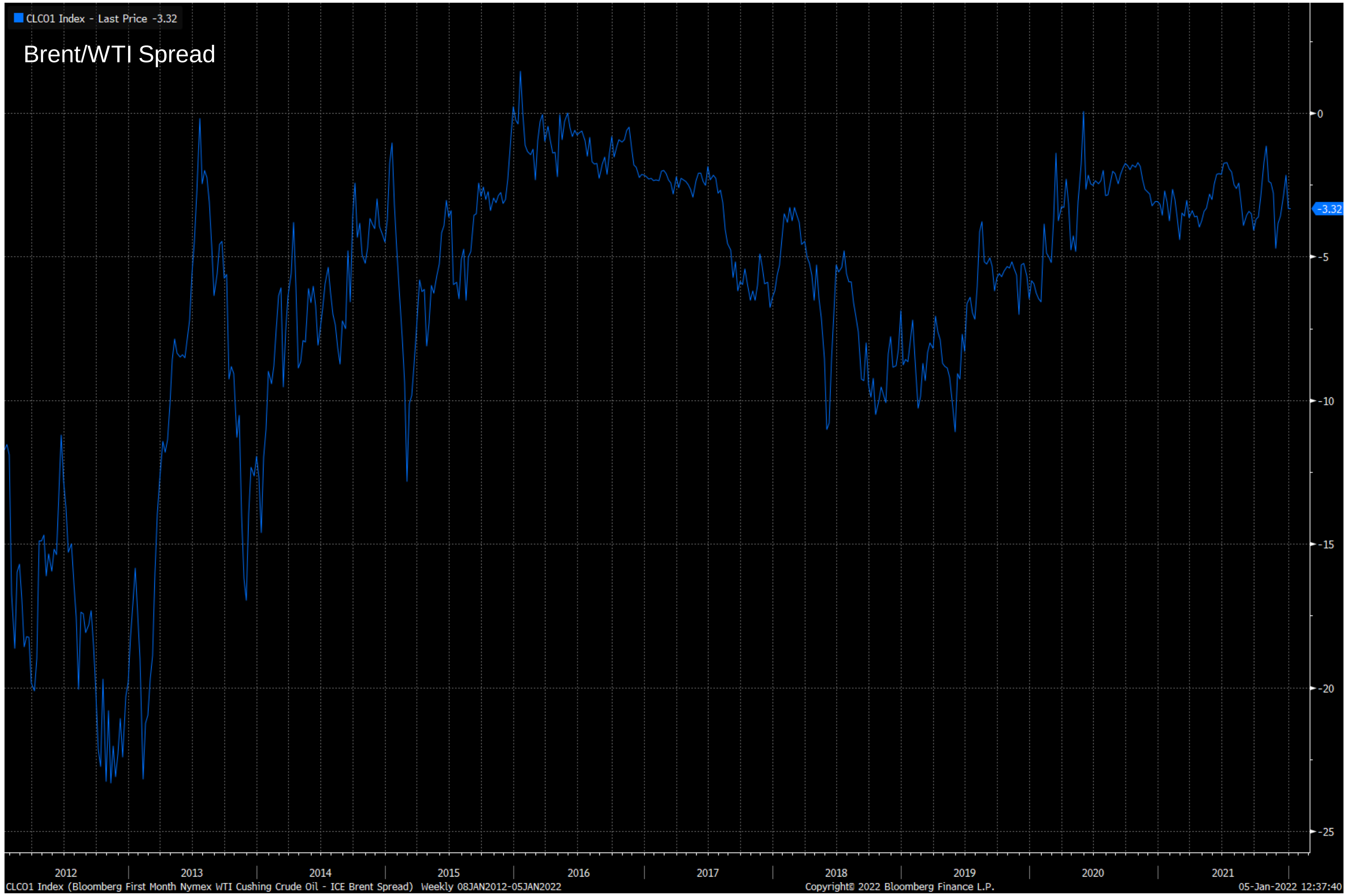


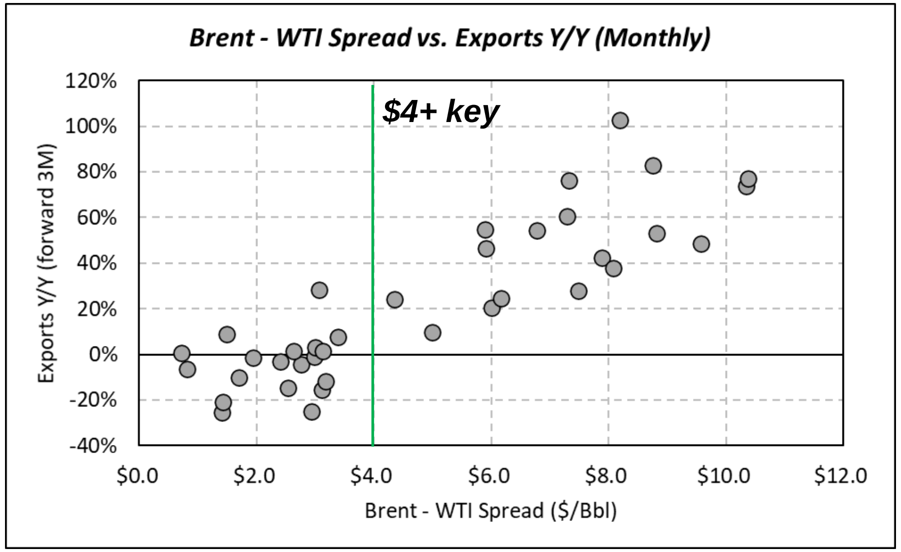
Base case assumes demand acceleration to 17.1mmbbl/d by July 2022, which is -3.6% vs. pre-covid highs of ~17.7mmbbl/d

Source: Bloomberg, Donovan Ventures

For the total domestic balance - Exports are the lynch pin

US crude export acceleration on a Y/Y basis lags the Brent/WTI spread by ~3 months with acceleration highly likely with >$4 spreads





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Source: Bloomberg, Donovan Ventures

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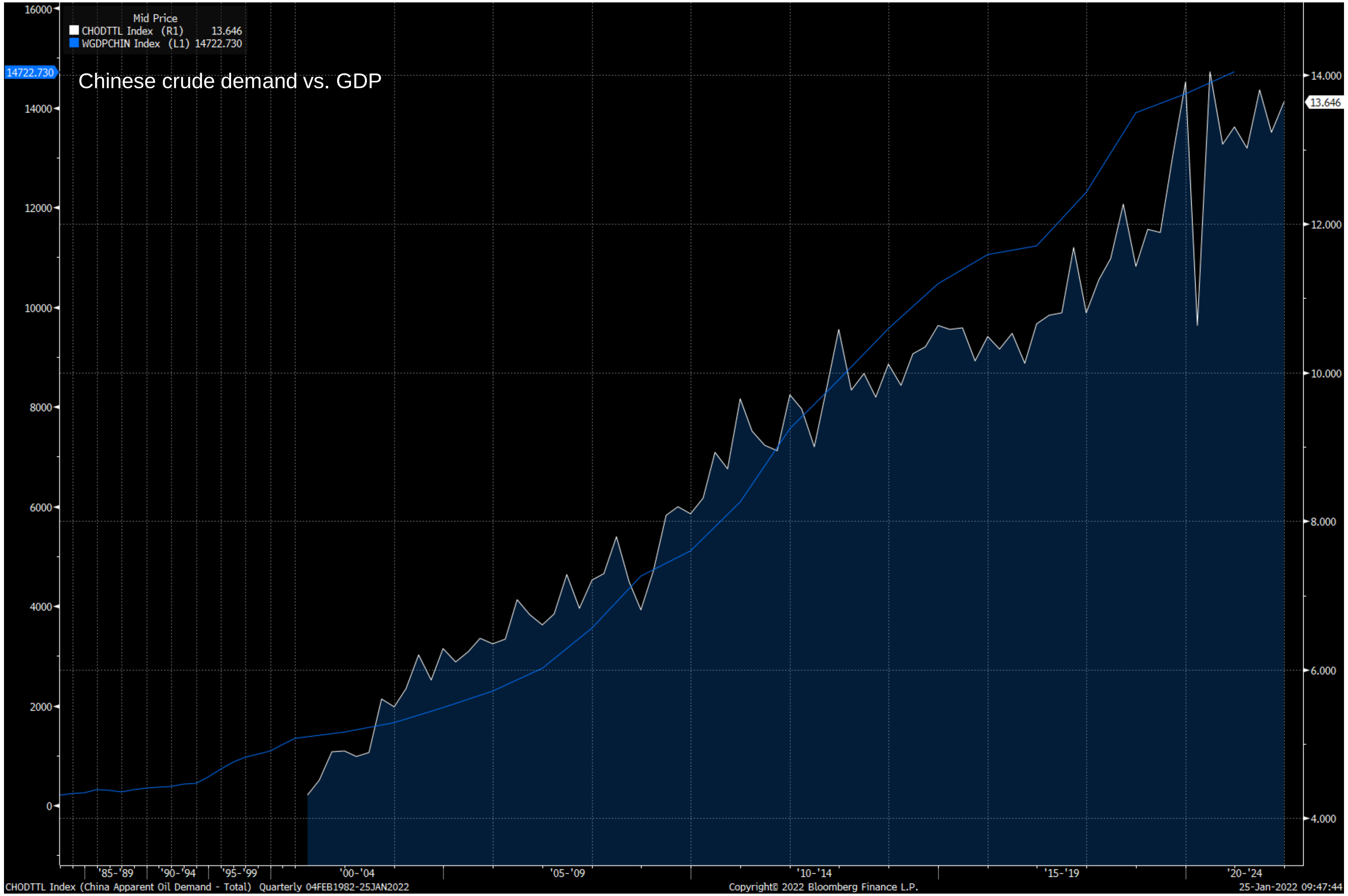
US Exports accelerating is tied to global demand balances: starting with China

Chinese crude demand is linked to absolute GDP growth in China



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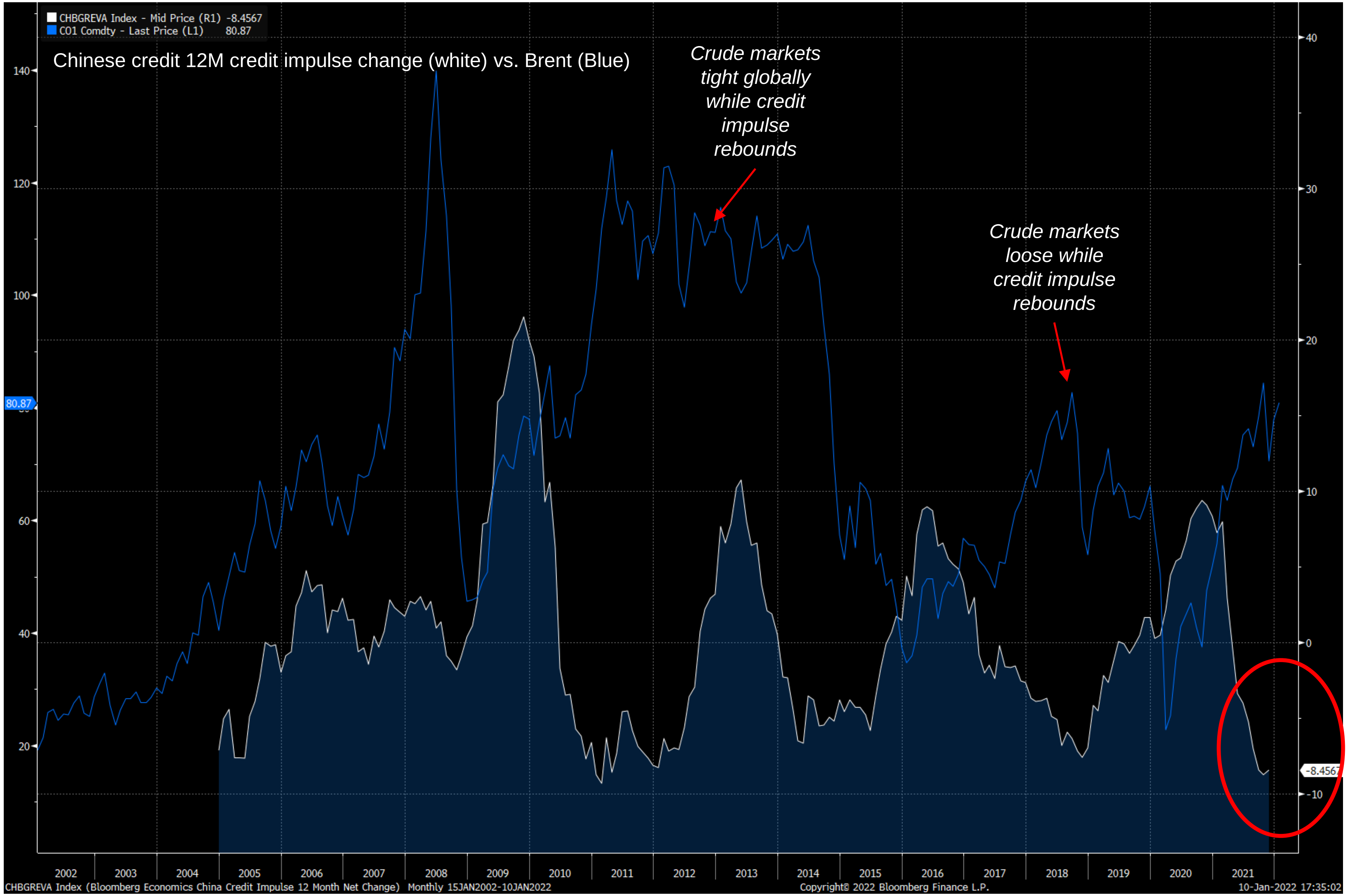
Source: Bloomberg

CHINESE CREDIT IMPULSE BOTTOMING, WITH TIGHT GLOBAL FUNDAMENTAL S/D BALANCE



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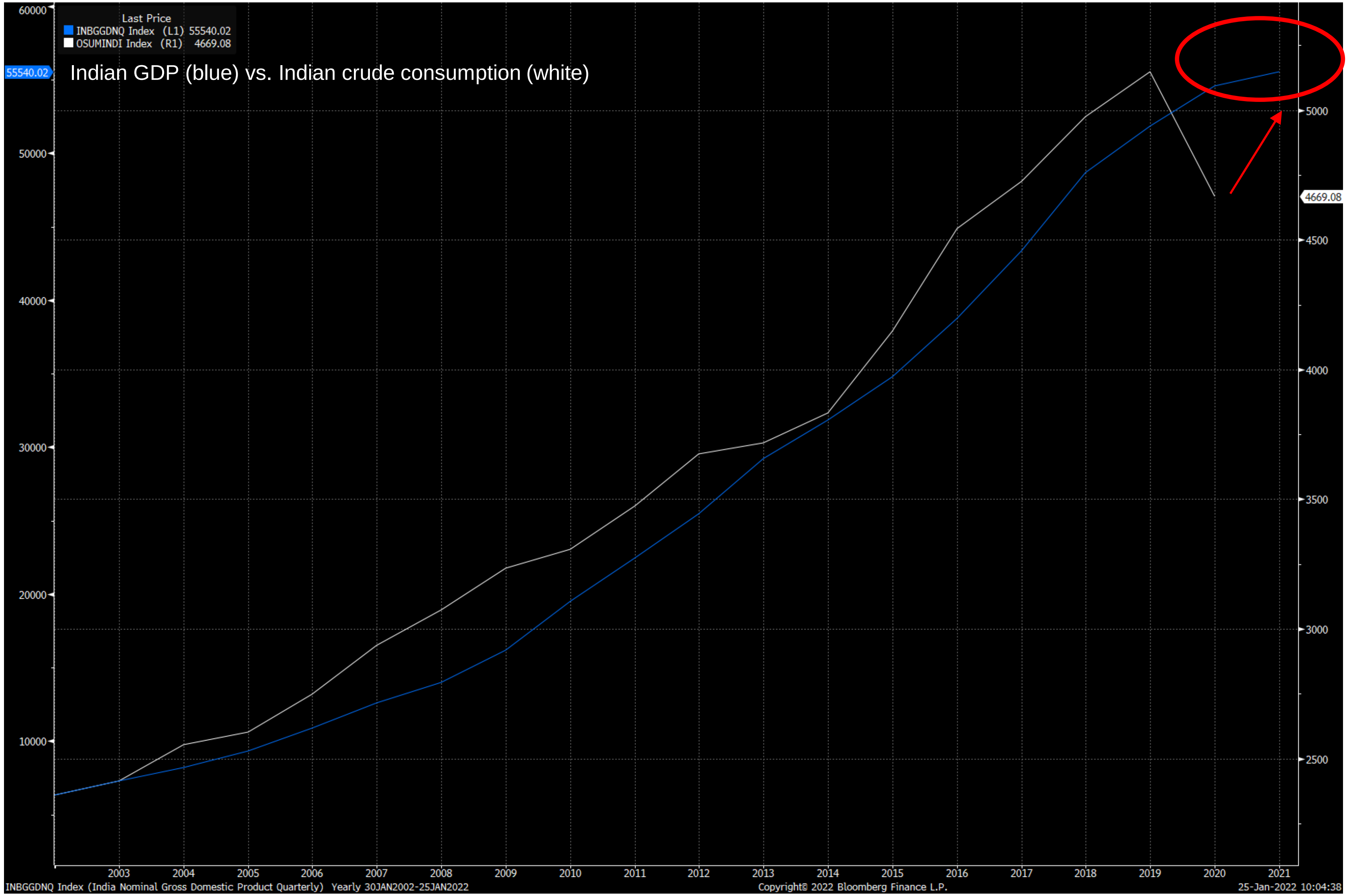
Source: Bloomberg

INDIA GDP GROWTH DRIVES OIL CONSUMPTION GROWTH –22' CRUDE GROWTH BACK TO TREND



Oil consumption likely catches up to continued GDP growth in India

*Indian oil consumption has **accelerated** relative to GDP growth over the last 10 years*

Source: Bloomberg

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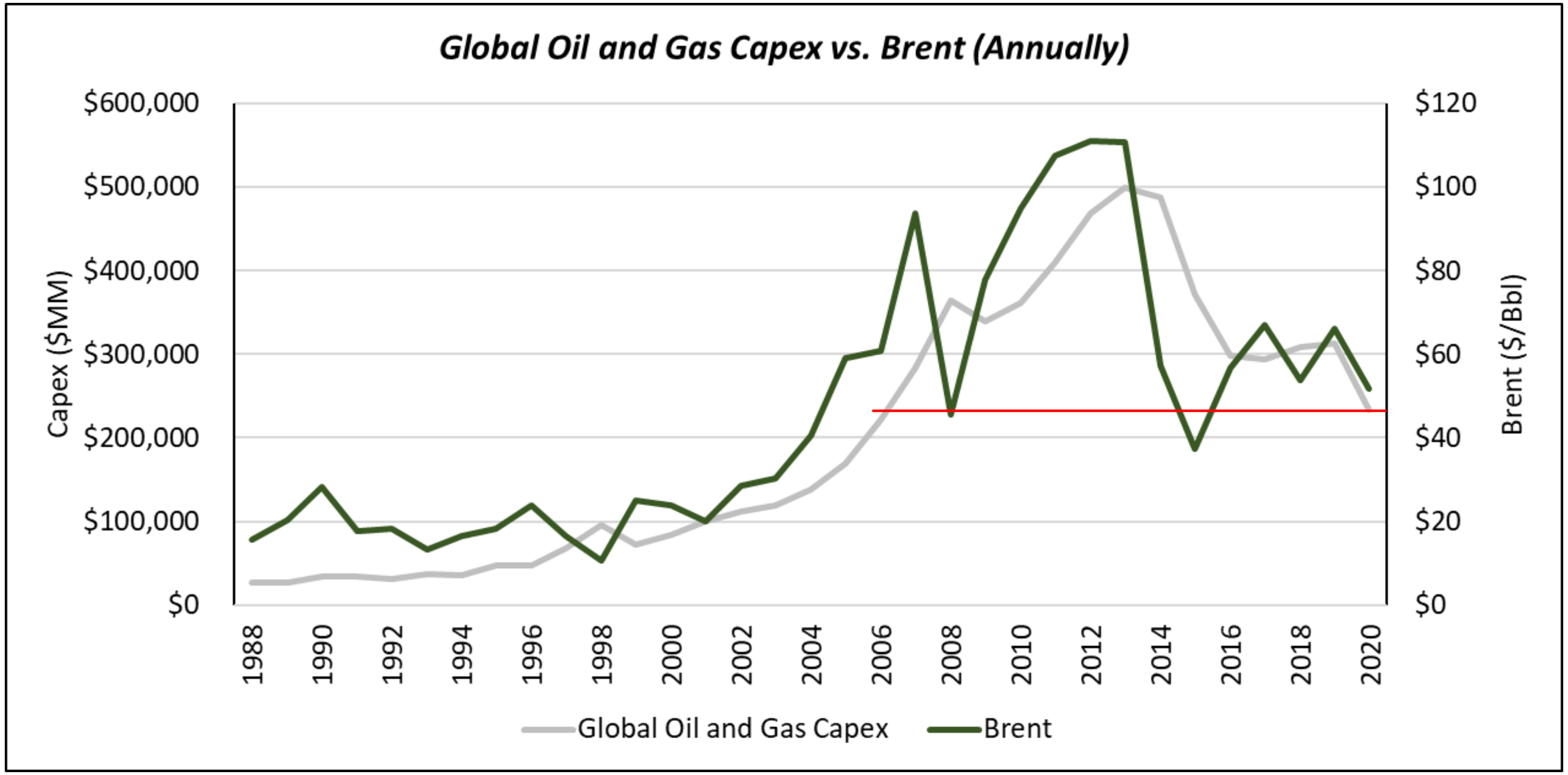
Demand heading towards pre-COVID levels (at slower pace), but what about supply?

CAPITAL STARVATION A WELL-KNOWN PROBLEM FOR OIL AND GAS – CAPEX AT 15-YEAR LOW IN 2020

Higher oil prices are highly likely to drive accelerating capex, with upcycles typically lagging price by ~12 months

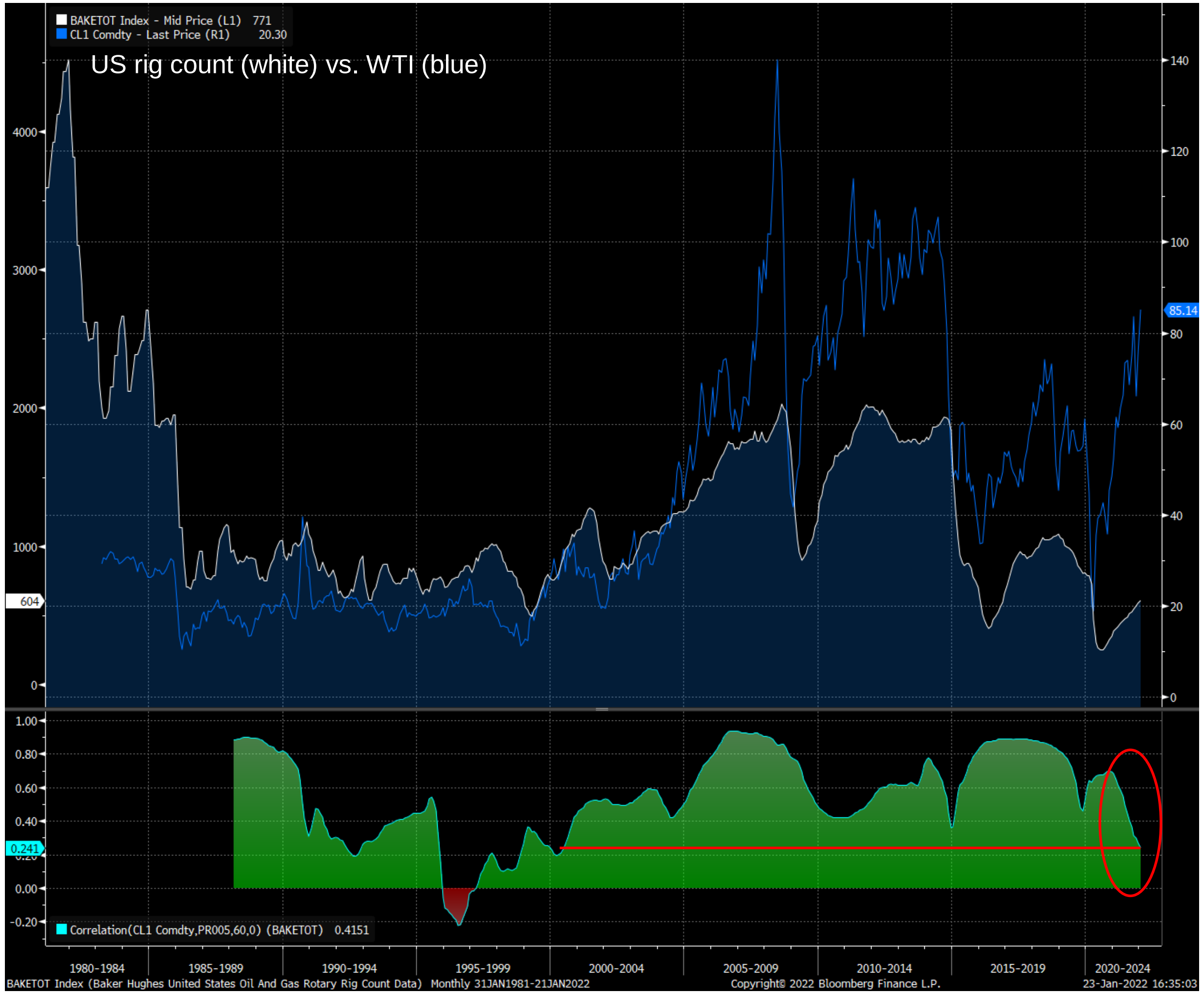


Source: Bloomberg, Donovan Ventures

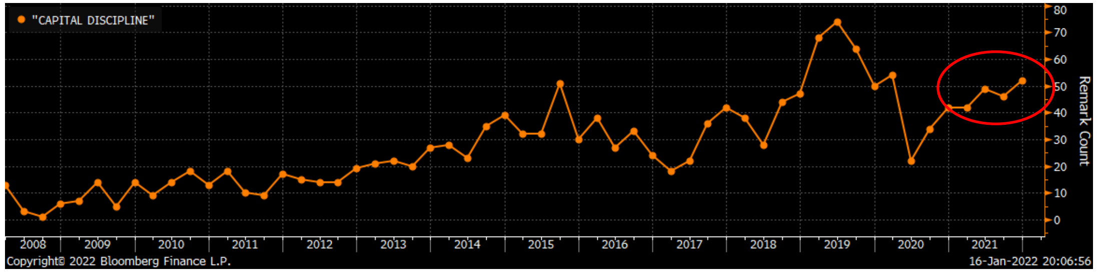
SUPPLY BATTLE GROUND #1: THE SHALE LIFE AIN'T SO EASY

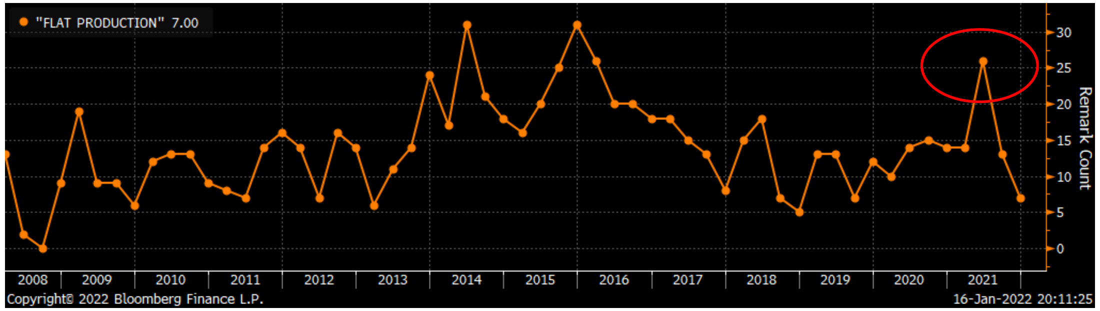
Throughout 2020 and 2021, operators increased capex at a much slower pace than prior cycles

Slowest activity response since early 2000's – rolling 5YR correlation between rigs and WTI prices is at a 20-year low



References to "capital discipline" and "flat production" by public companies reached their 2nd highest level since 2008





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Source: Bloomberg

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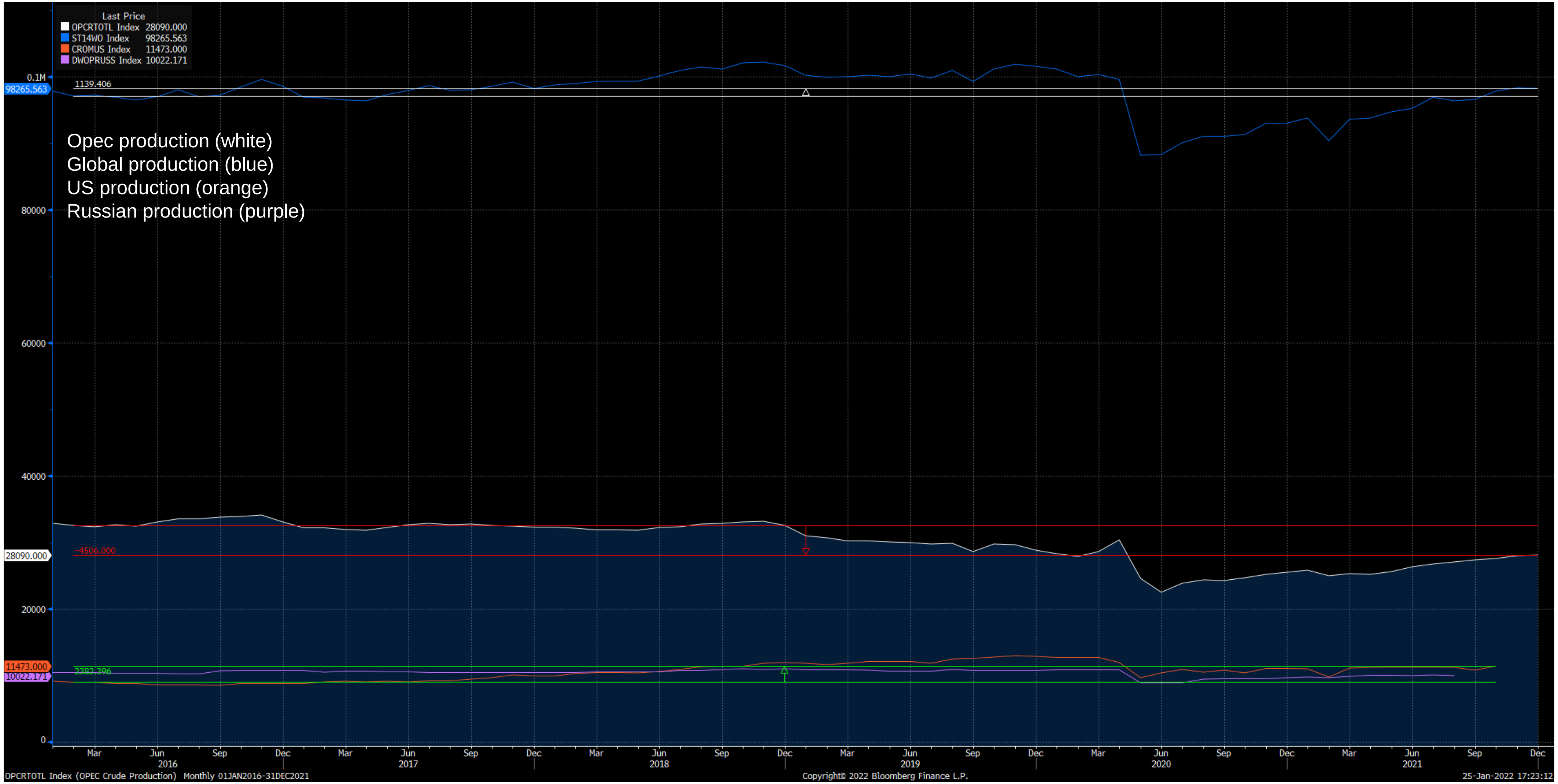
SINCE 2008, THE US HAS ACCOUNTED FOR ~50% OF THE TOTAL GLOBAL CRUDE OIL PRODUCTION GROWTH…

Currently, the US accounts for 12% of global production vs. 9% in 2016 – largest gain of any single country



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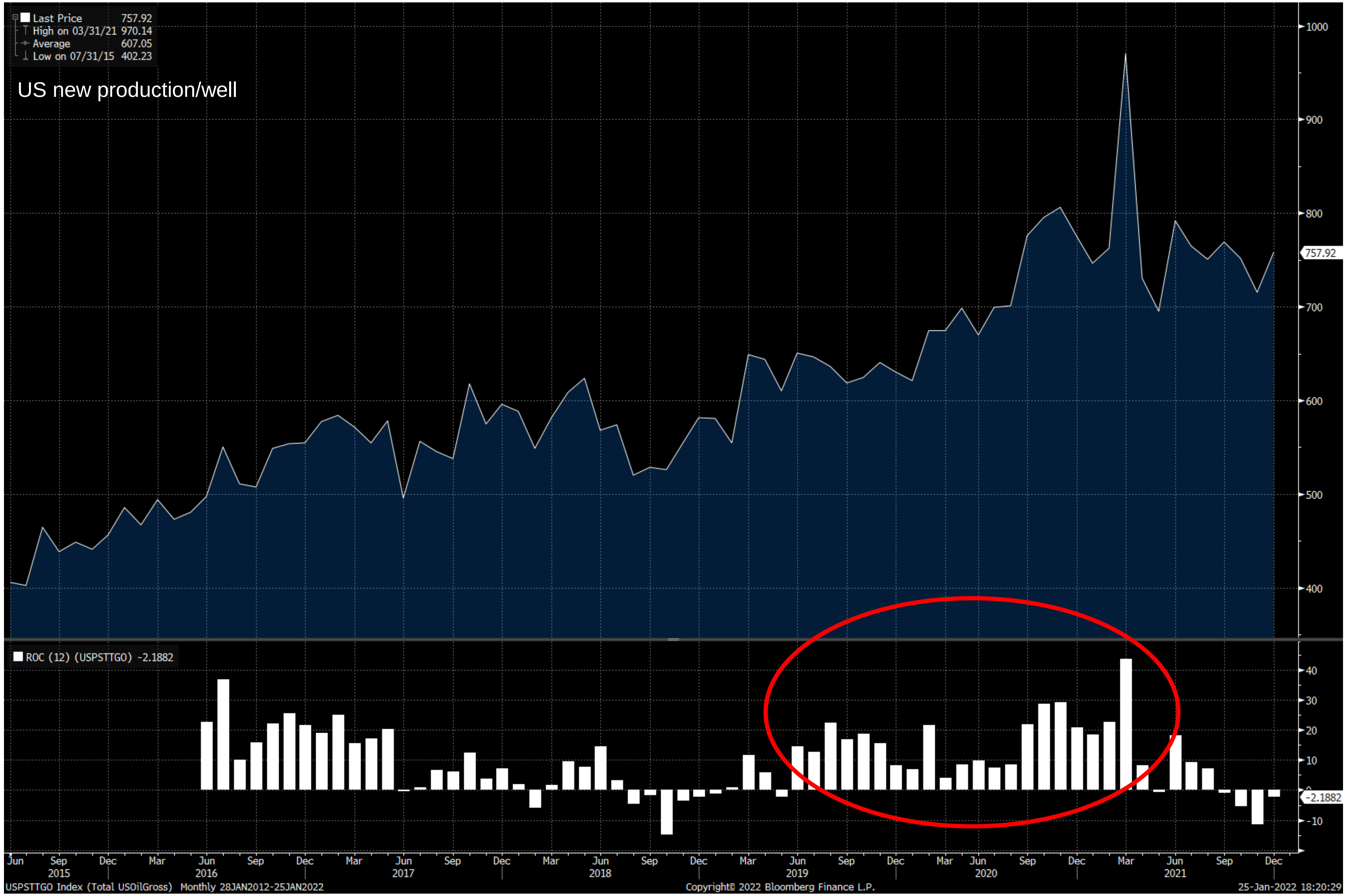
Source: Bloomberg

... ALL THANKS TO THE MASSIVE EFFICIENCY GAINS SEEN ACROSS U.S. SHALE BASINS

Average oil per well is currently ~760bbl/d across the U.S., up from ~625bbl/d in 2019



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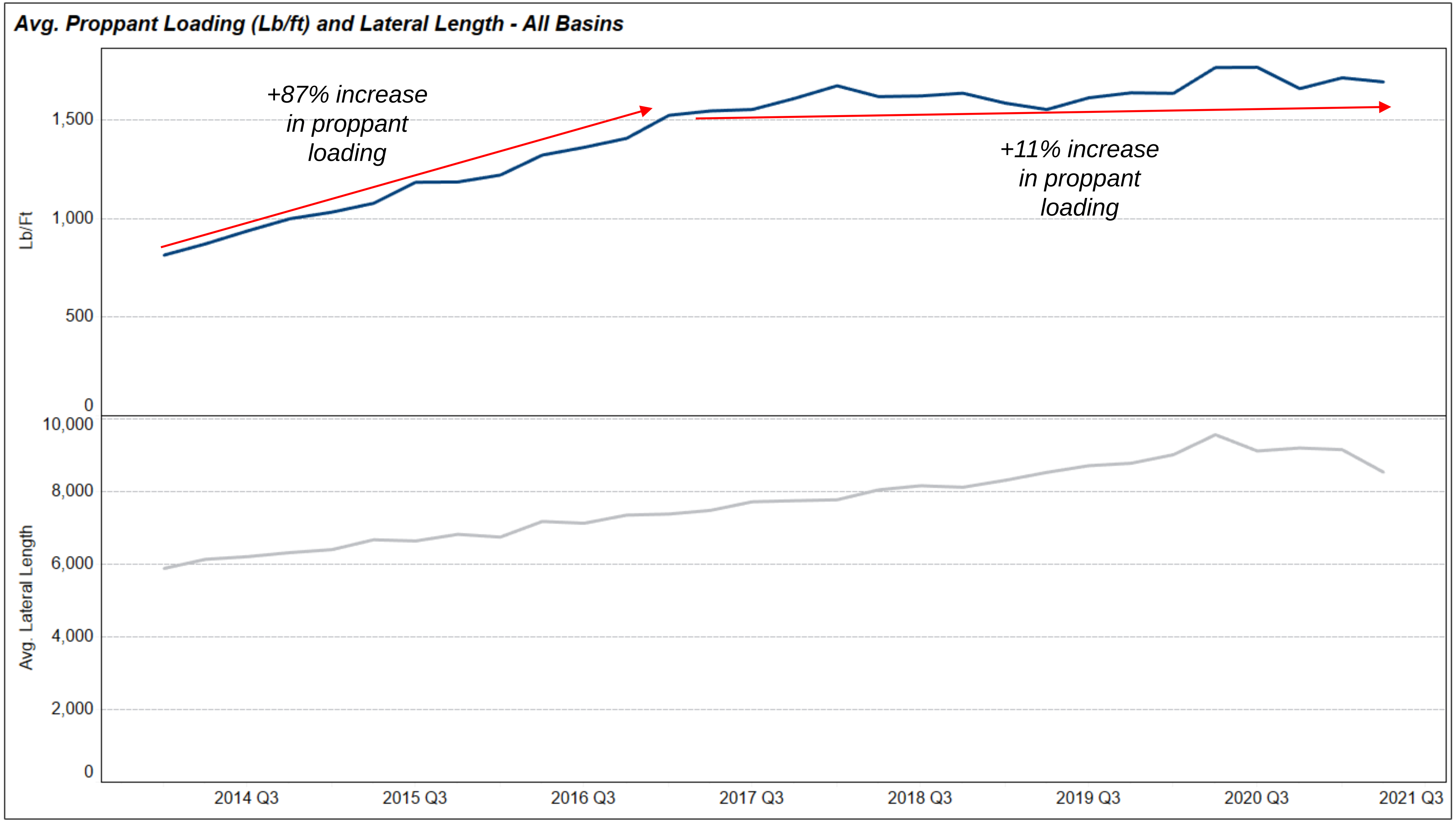
Source: Rystad, Bloomberg, Donovan Ventures

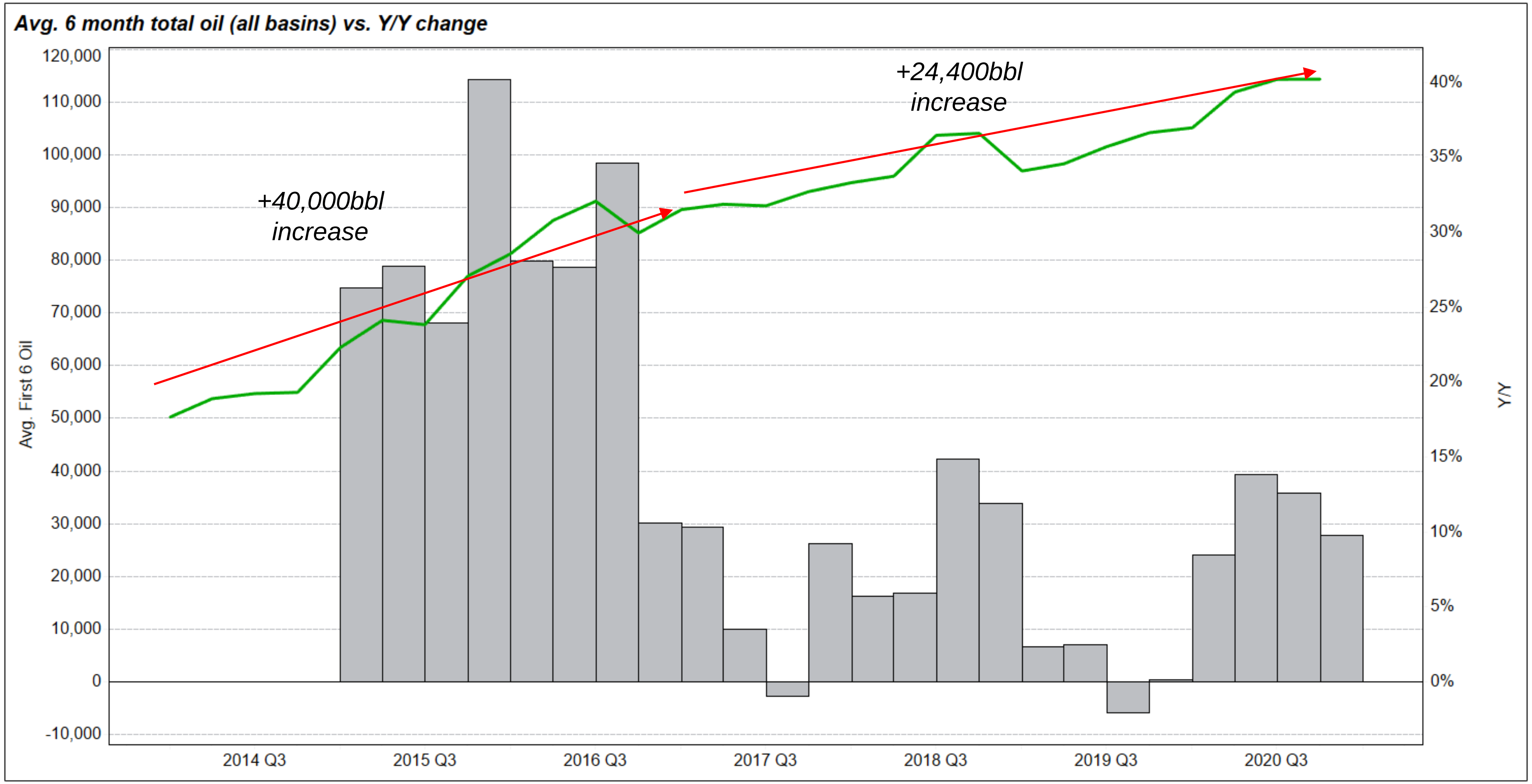
SINGLE WELL PRODUCTIVITY DRIVEN HIGHER BY MORE PROPPANT, FLUID AND LONGER LATERALS



~81% of proppant loading gains per well (on average) since 2014 occurred by 2017. Lateral lengths continue to increase, but will be limited by leasehold

Source: Well Database, Donovan Ventures

~60% OF OIL WELL PRODUCTIVITY GAINS OCCURRED FROM 2014 TO 2017 (MEASURED ON 6-MONTH CUM. PRODUCTION)



Source: Well Database, Donovan Ventures

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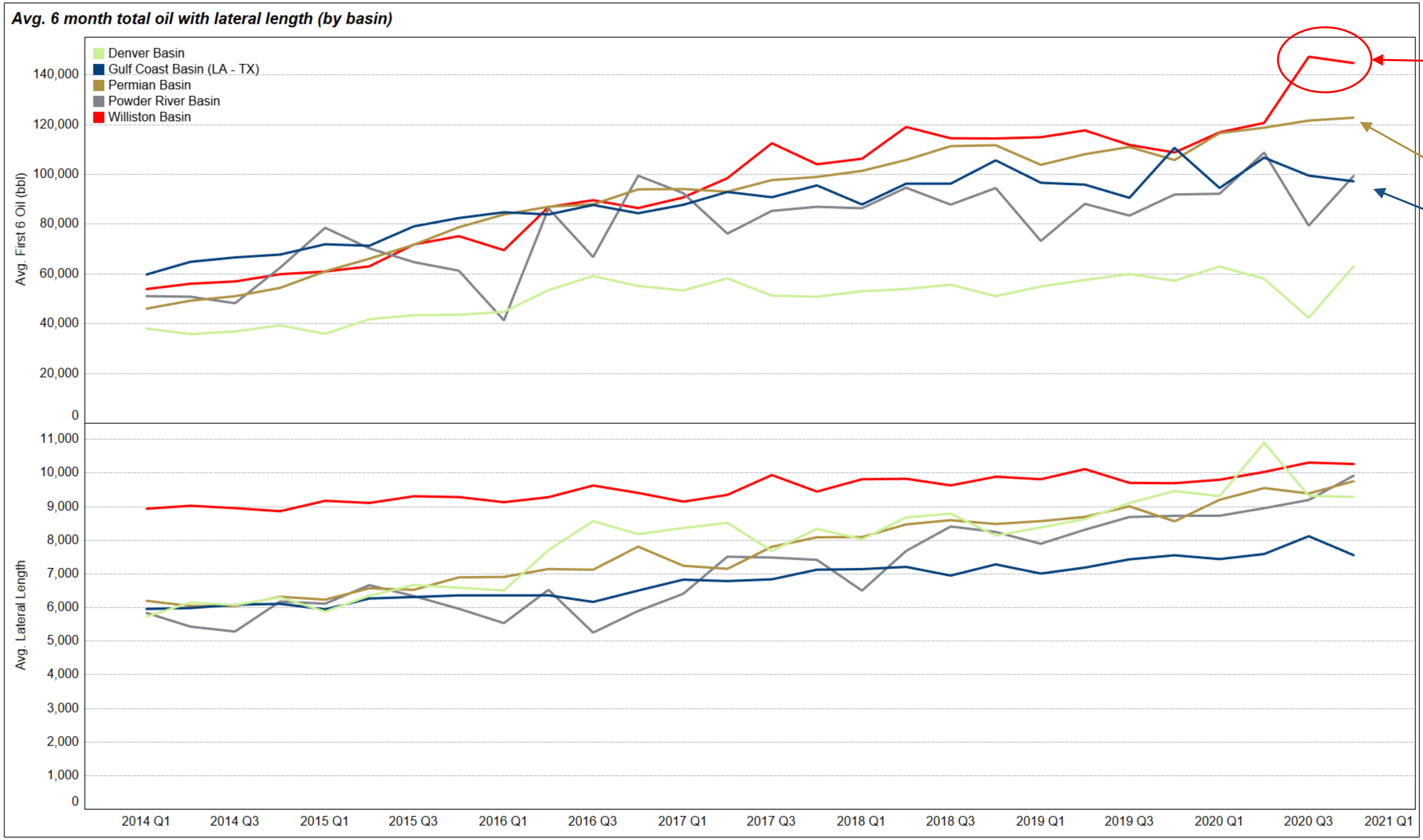
Source: Well Database, Donovan Ventures

PERMIAN CONTINUES GROWING, WHILE OTHER MAJOR OIL BASINS REMAIN RELATIVELY FLAT



Source: Well Database, Donovan Ventures

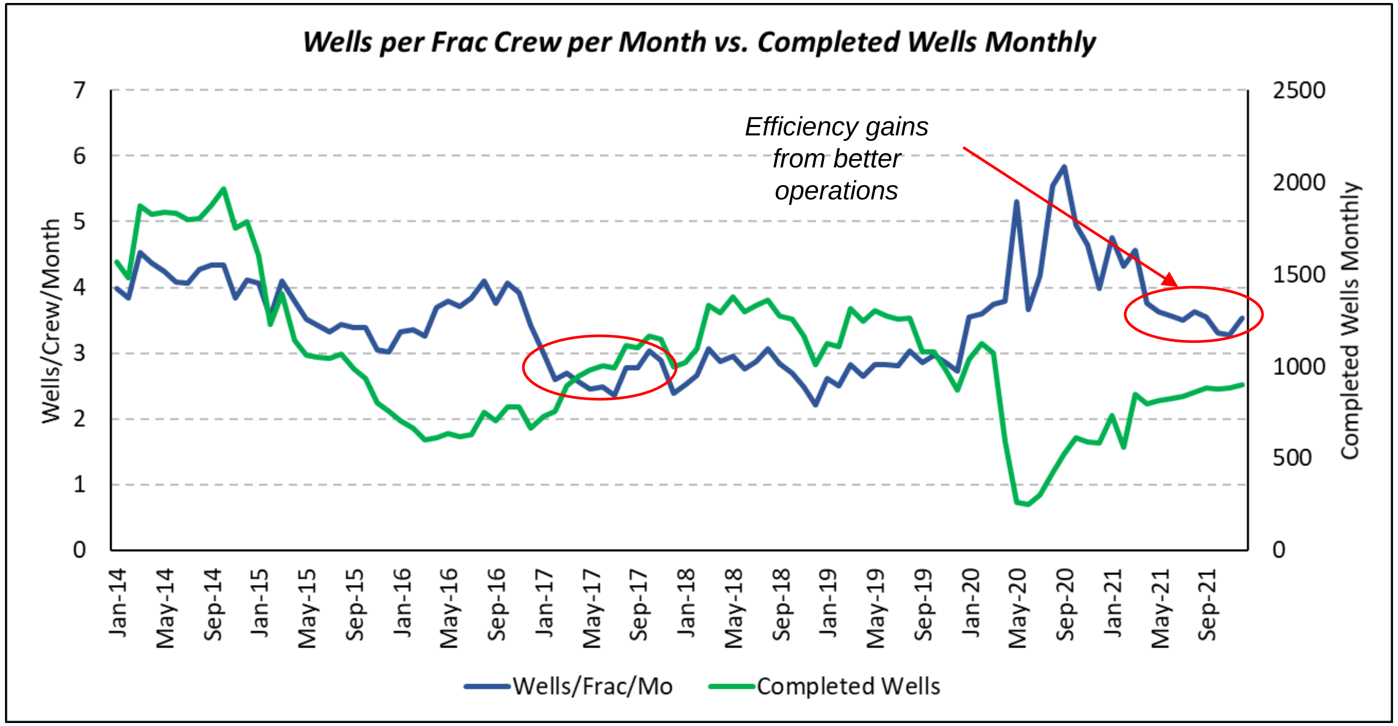
Two Bakken outlier wells drove growth, long-term trend flat

Permian sustained growth

Eagle Ford no growth

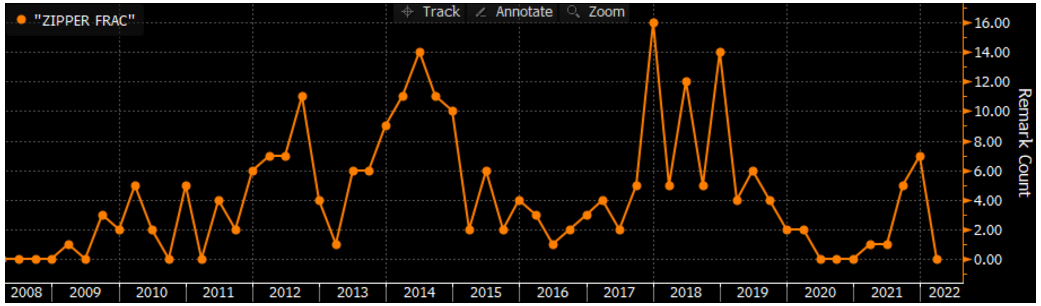
2021 SAW BETTER FIELD LEVEL EFFICIENCIES WITH THE BEST CREWS AND MOST SKILLED LABOR

Zipper frac operations allowed operators to achieve 1,000 to 1,500 ft/day of completion (~2.5 to 3 wells per month); new simul-frac technique allows operators to achieve nearly double the rate. However, only operators with large, sophisticated supply chains and significant acreage run-way can perform these operations consistently (~10-15% of Permian operators)

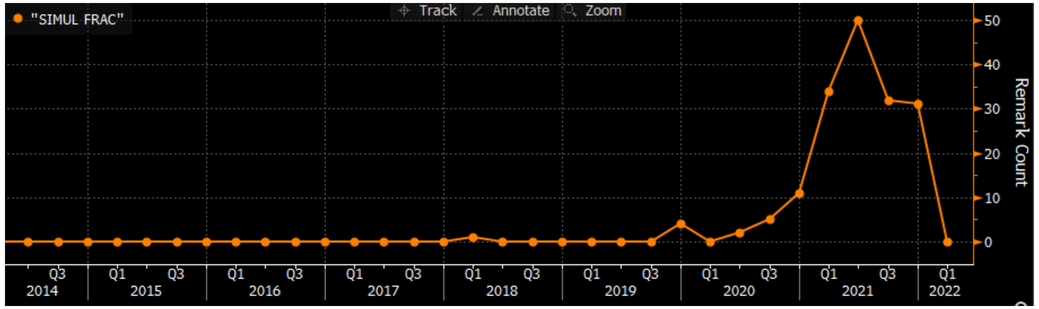


2017/2018 cycle saw crews complete ~2.75 wells/month/crew on average. Currently crews are averaging ~3.5 wells/month due to field level efficiency gains. These gains likely decline slightly to ~3.25 wells/month as unexperienced labor enters the workforce and marginal equipment is re-activated

Out with the old "zipper frac" in with the new "simul frac"

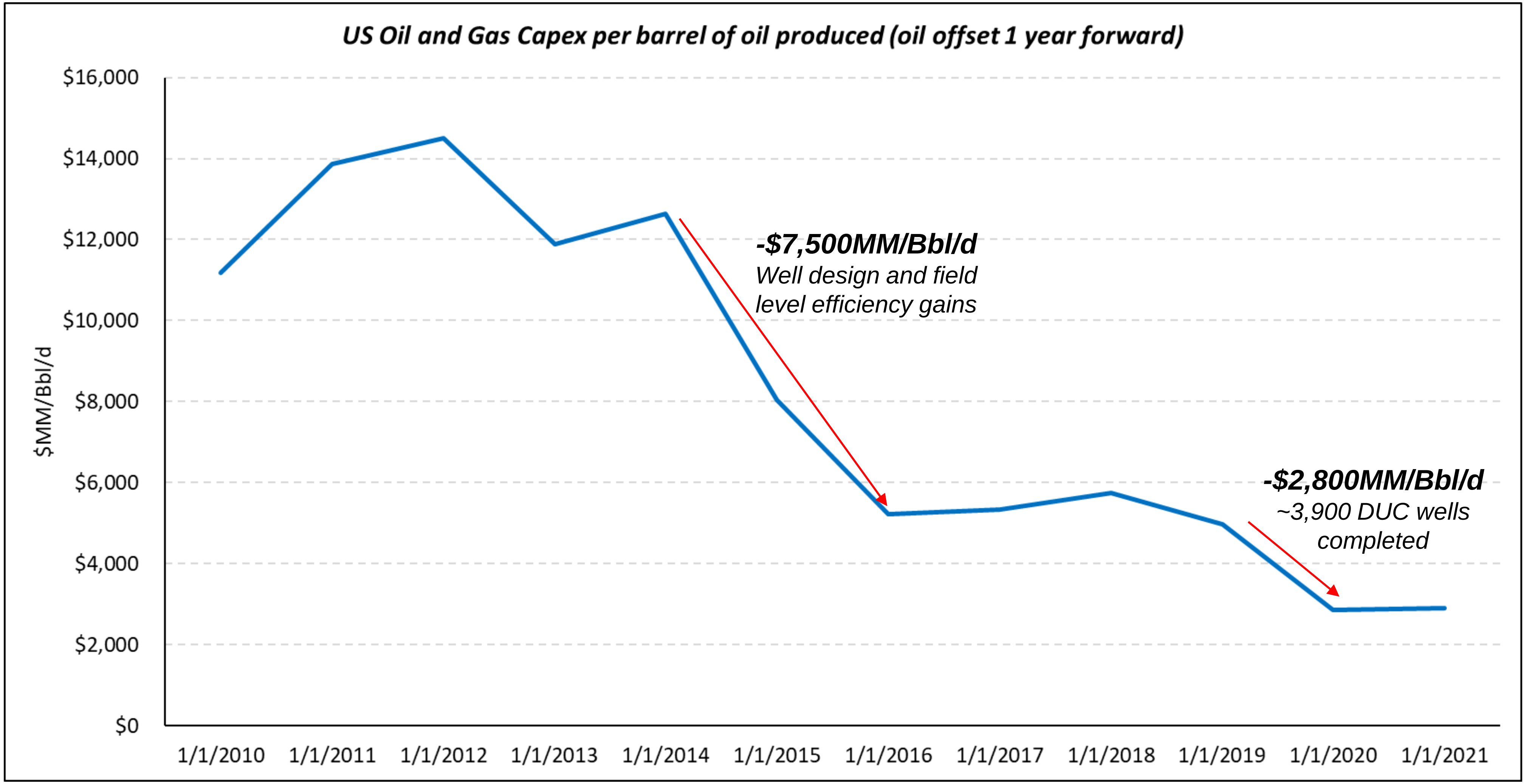


Where possible (logistically and location specific) operators are moving towards simul frac operations, allowing for 2,000+ ft/day of stimulation vs. 1,000-1,500 ft/day for zipper frac



RECENTLY, THE LARGE DUC INVENTORY ALLOWED OPERATORS TO MAXIMIZE CAPITAL EFFICIENCY

Simple metric of total capex divided by production (offset 1 year) provides insight into capital efficiency. Gains are decelerating and will require more capex going forward to maintain the same level of production growth



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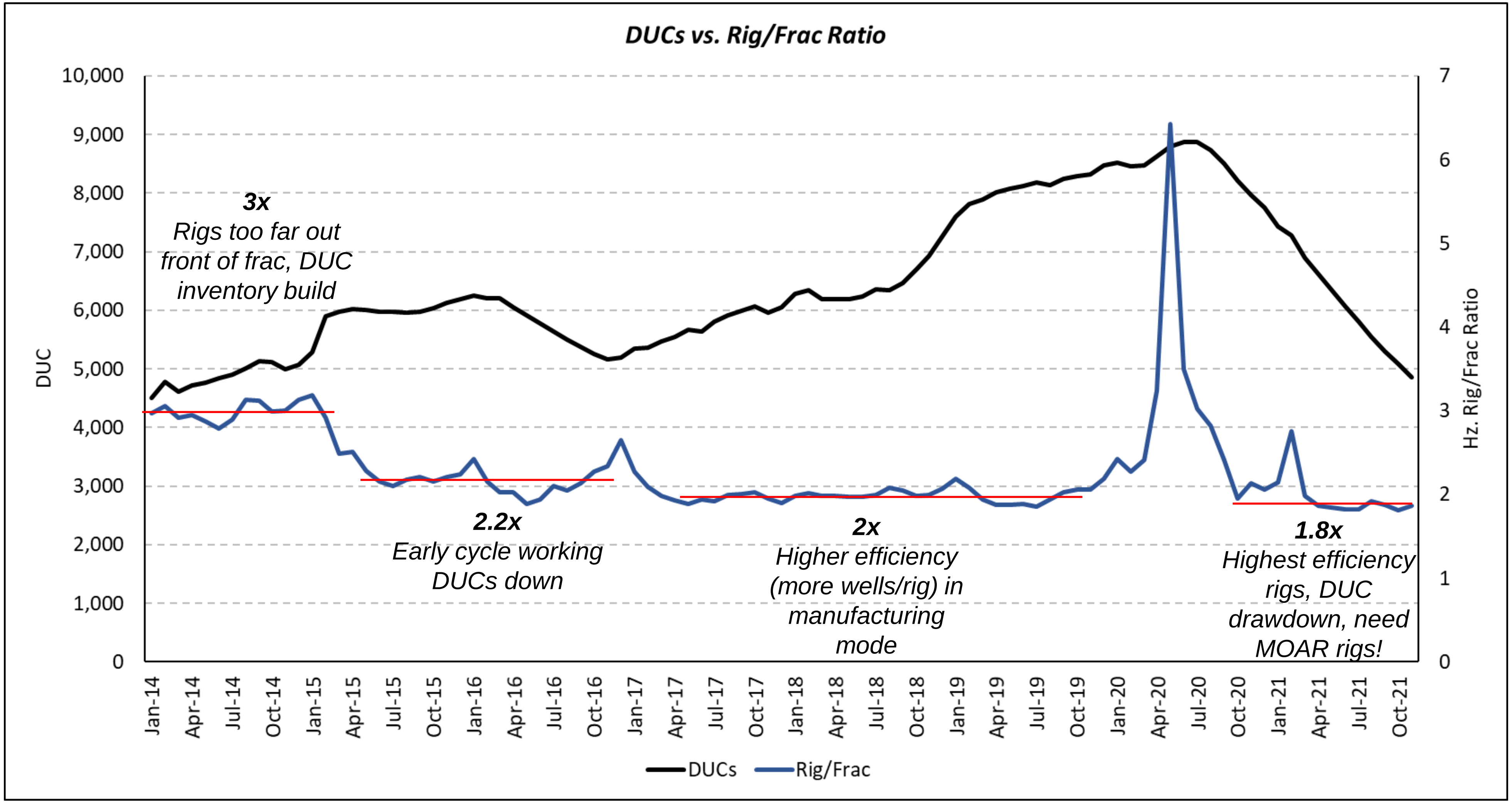
Source: Rystad, Bloomberg, Donovan Ventures

WITH DUCS NORMALIZED WE NEED RIGS, BUT CAN THEY ACCELERATE?



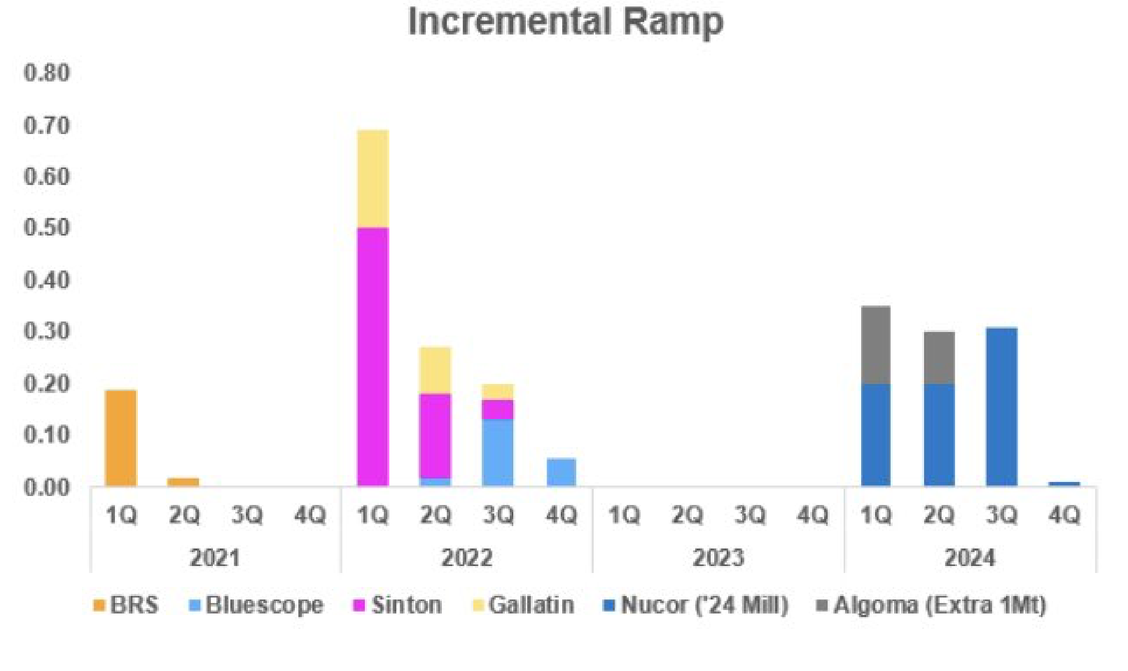
Rig requirements are a function of rig efficiency gains and staying ahead of frac. 2021 benefited from significant DUC drawdowns and the best rig crews. 2022 and beyond will likely require between 2 to 2.5 hz. rigs/frac crew to maintain sufficient inventory for completions crews

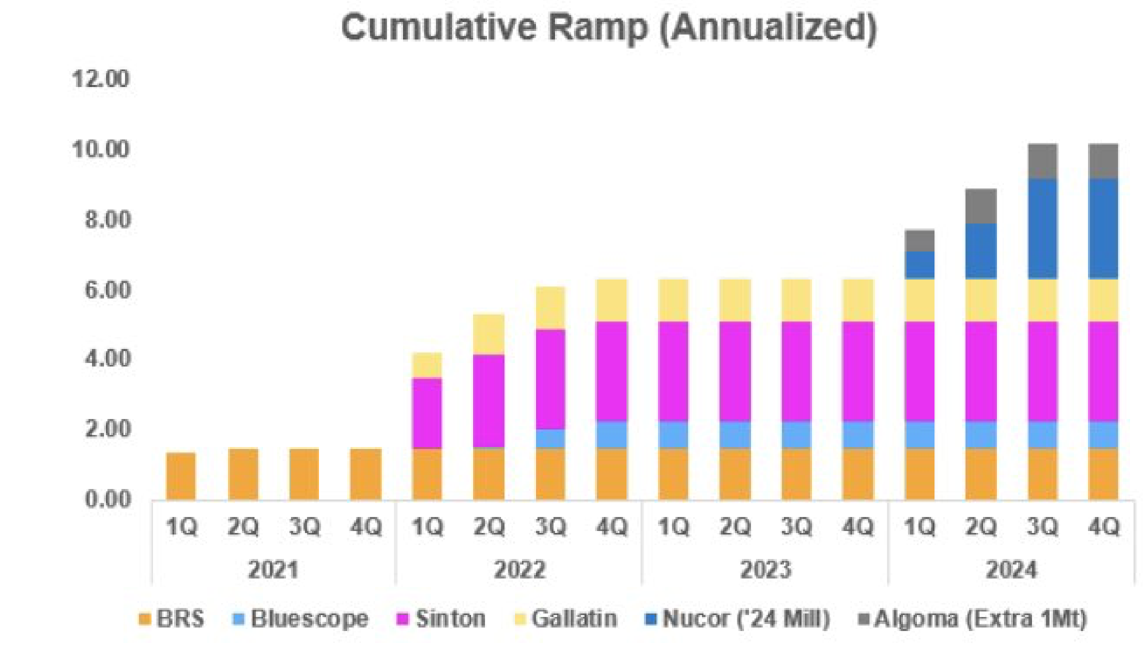
Limited OCTG availability likely a transitory problem as capacity increases

OCTG pricing follows HRC (hot rolled coil) with a slight lag. HRC is down ~25% since September 21'. Mill capacity was significantly reduced as pricing ramped to all-time highs with rising steel input costs. Those input costs are now falling quickly, and will likely allow for OCTG capacity to increase in 1H22'

Source: Bloomberg

ADDITIONAL STEEL CAPACITY LIKELY TO PROVIDE INCREMENTAL TAILWINDS FOR OCTG AVAILABILITY





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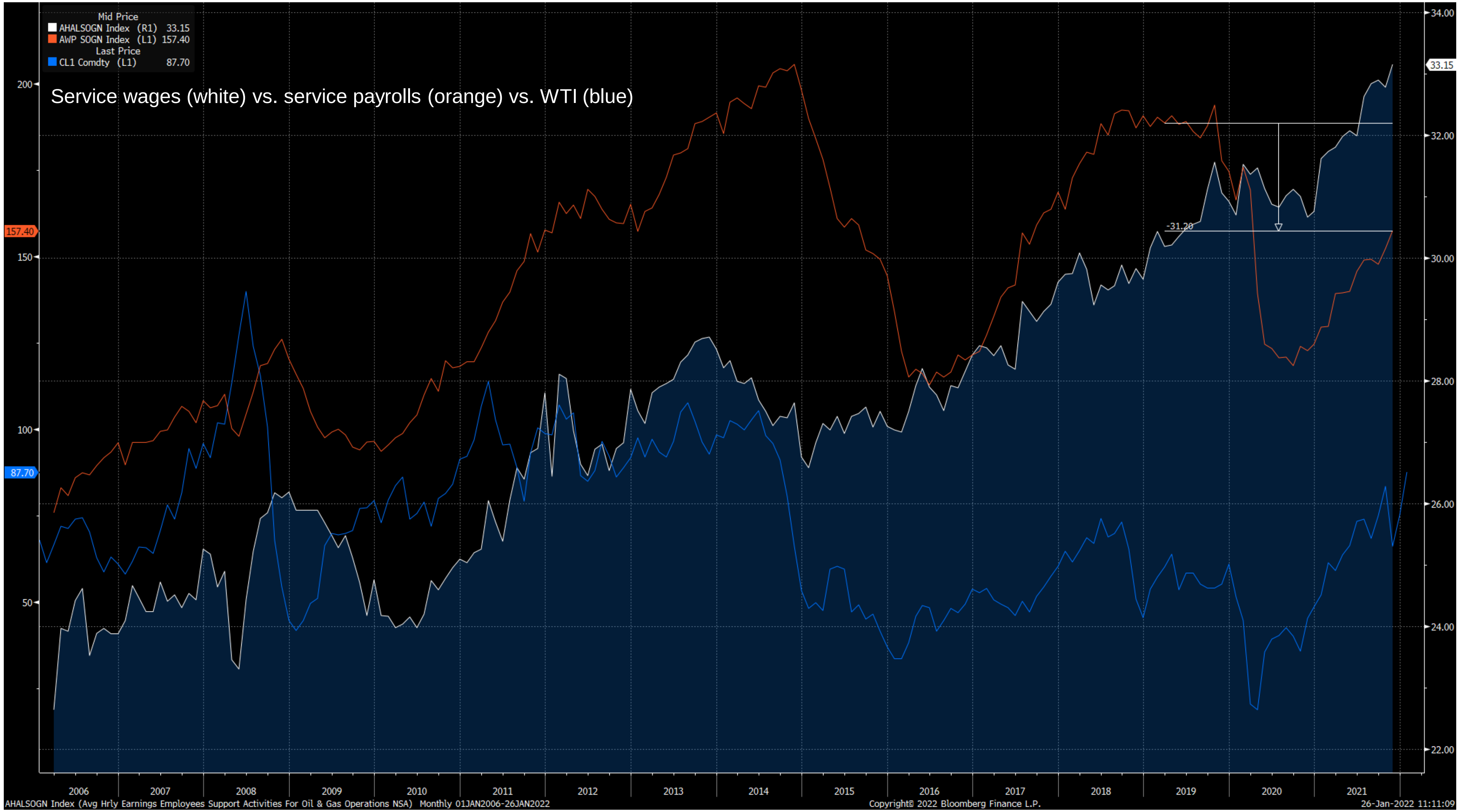
Source: Bloomberg

THE PEOPLE ELEMENT – WHERE IS THE LABOR? SERVICE SECTOR WITH 31K LESS JOBS THAN 2019…



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Source: Bloomberg

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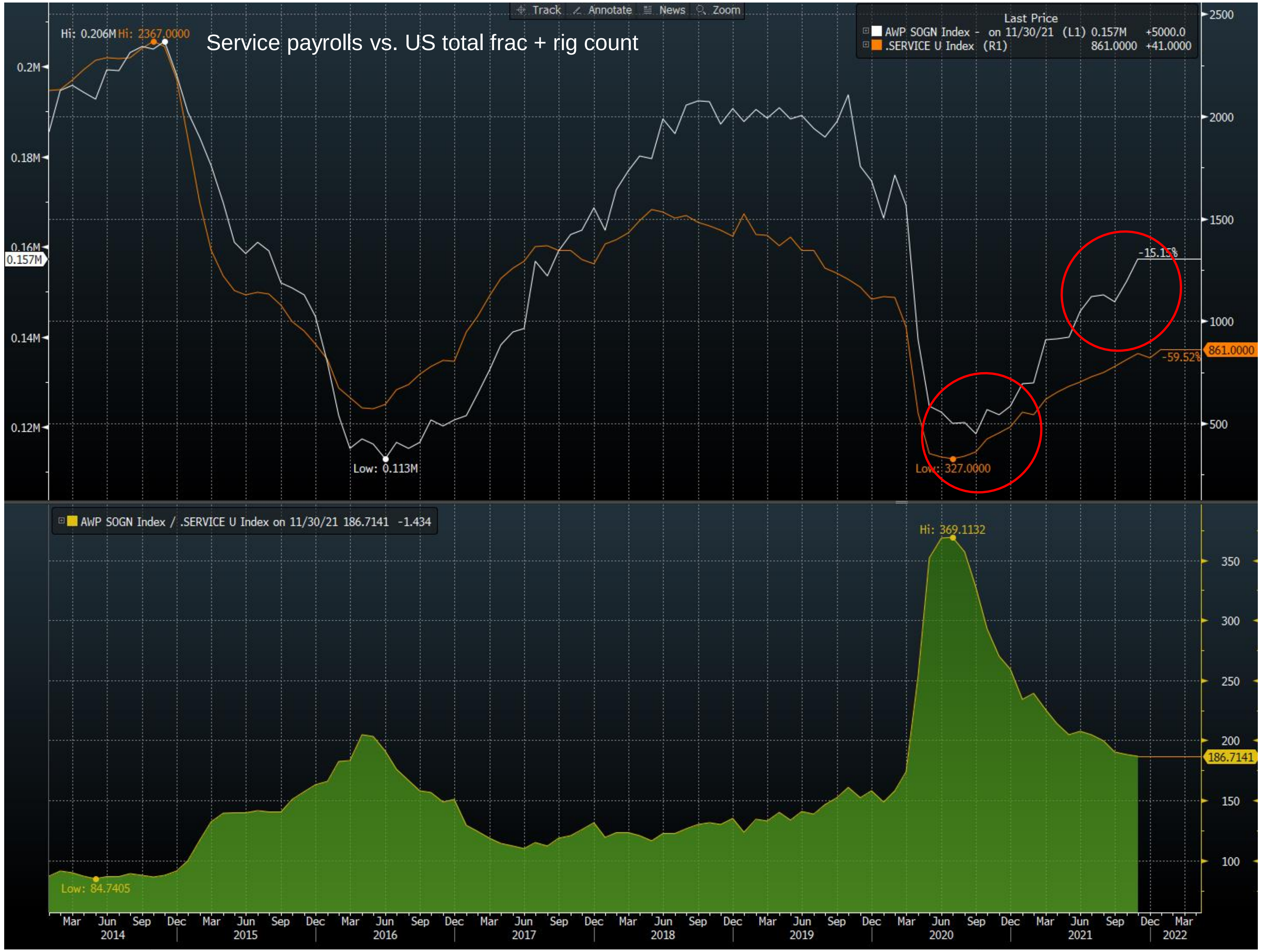
…BUT SERVICE PAYROLLS/TOTAL RIG + FRAC ARE WELL ABOVE 2017/2018 LEVELS



In early portion of downturn, service labor pool lagged frac and rig activity

Labor pool has now accelerated at a much faster pace and the industry currently has ~186 jobs per rig+frac, which is significantly higher than 2017 through 2019

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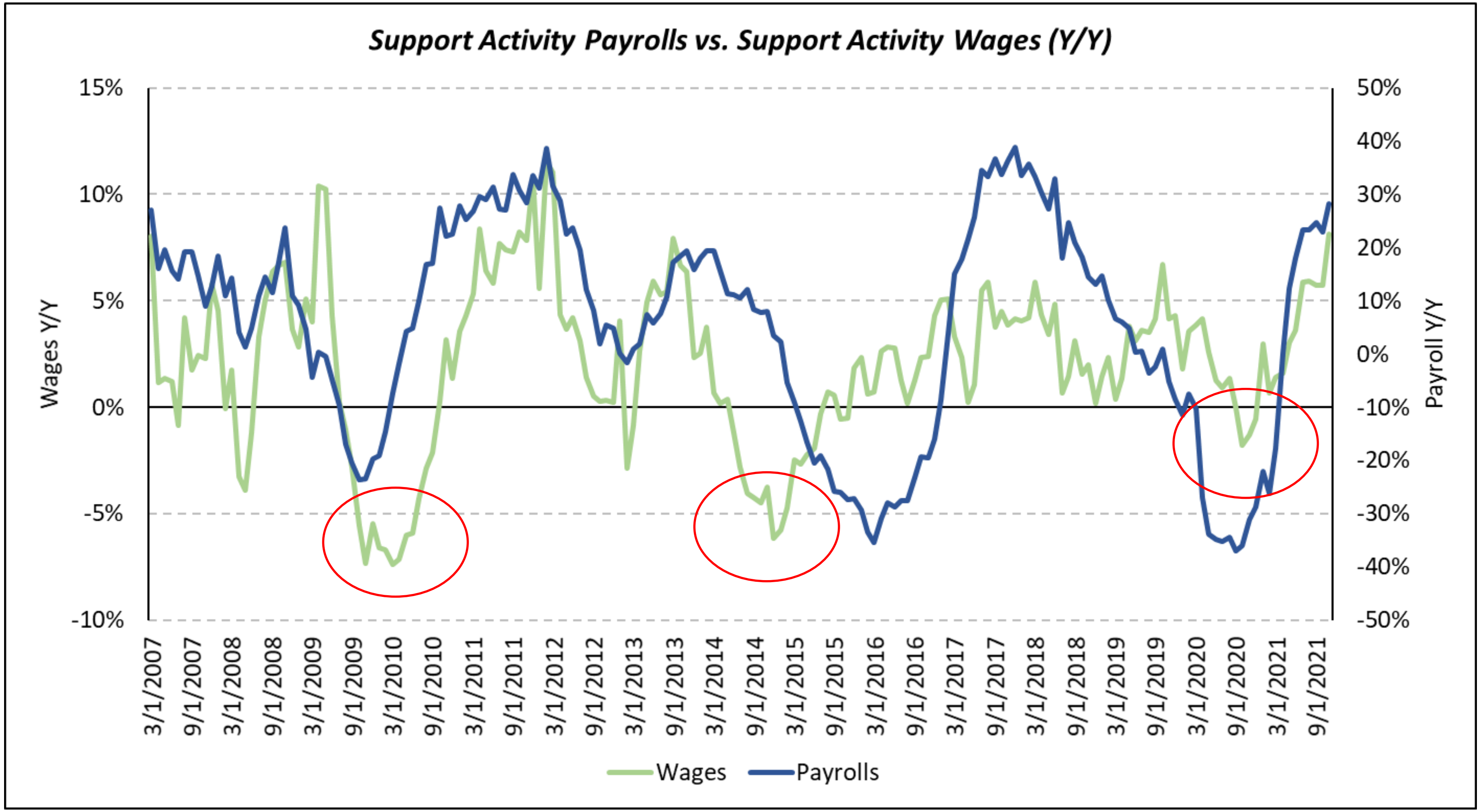
Source: Bloomberg

THE HEADWIND IS ON THE WAGE FRONT – HOURLY WAGES FOR SERVICE WORKERS GRINDING HIGHER

Historically correlated to total labor pool for service jobs, wages are starting to decouple with consistent growth even during downturns. Continued wage growth likely, which is will provide pressure to service company margins at the field level

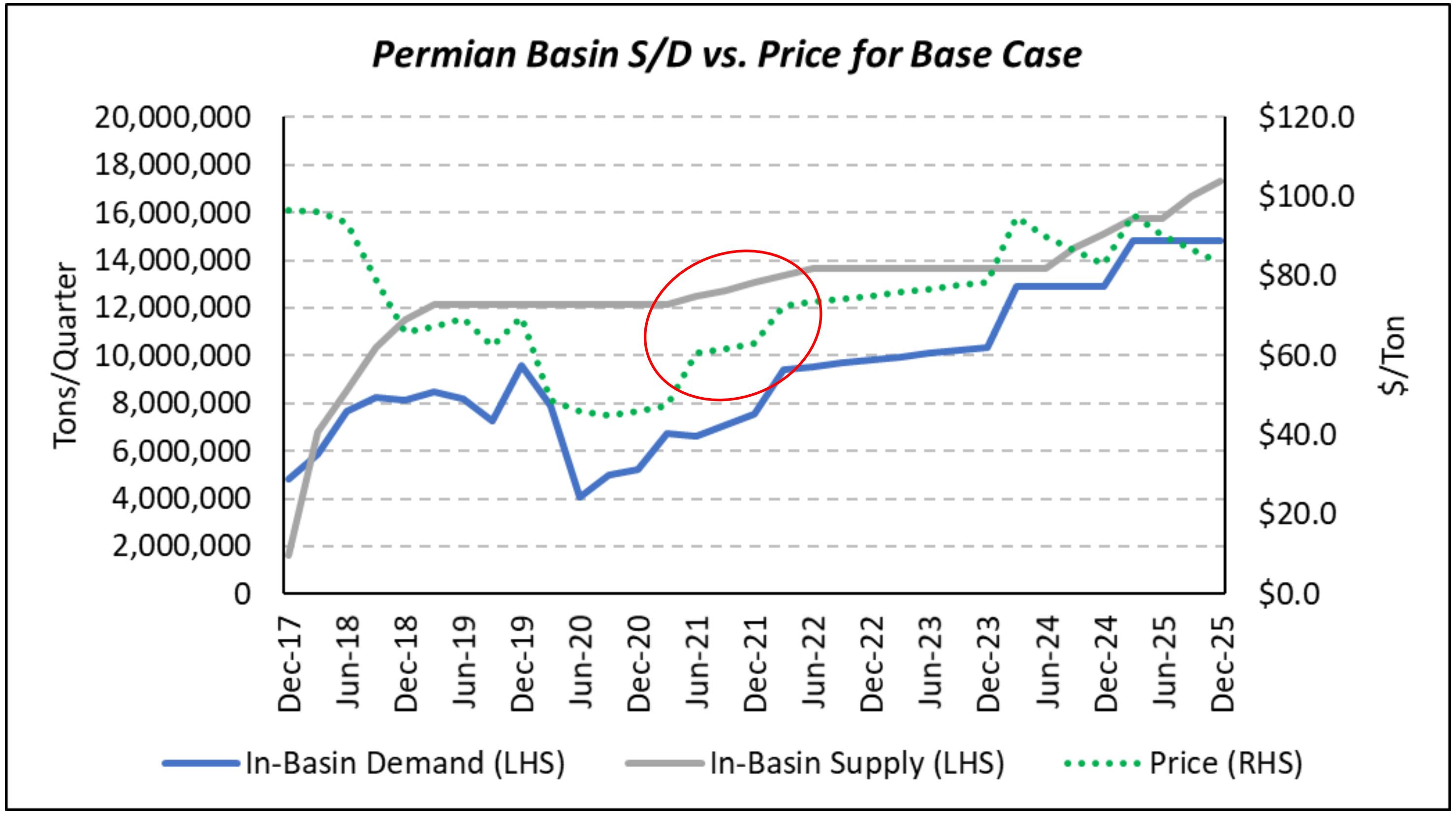


Source: Bloomberg, Donovan Ventures

SAND COSTS – THE CYCLICAL BUSINESS WITHIN A CYCLICAL BUSINESS

Marginal capacity is nearing the strike price for activation in the Permian, the largest in-basin sand market

An important element to note is expansion capacity; with delays higher pricing ($80+/delivered ton) is likely pulled forward to 2H22'. Easing supply chains globally in 1H22' is supportive of lead time reduction



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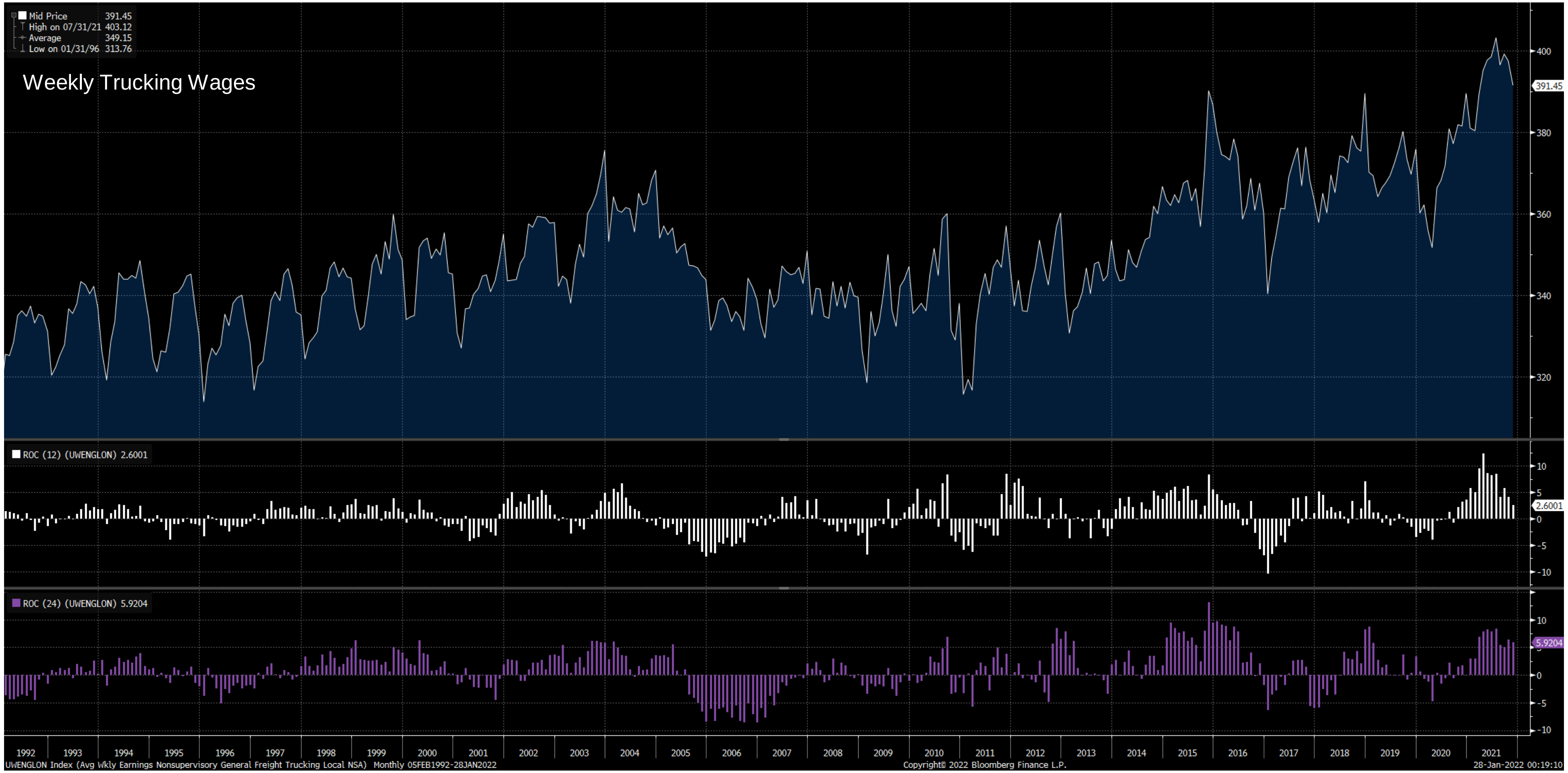
Source: Donovan Ventures

TRUCKING WAGE INFLATION DECELERATING FROM ALL-TIME HIGHS, FOLLOW THROUGH IN 22' A POTENTIAL TAILWIND

Trucking wages have decelerated off their all-time high in July 2021. While wages remain elevated, peak inflation for wages are likely behind us. Deceleration across the U.S. would represent a tailwind for the oil and gas industry.



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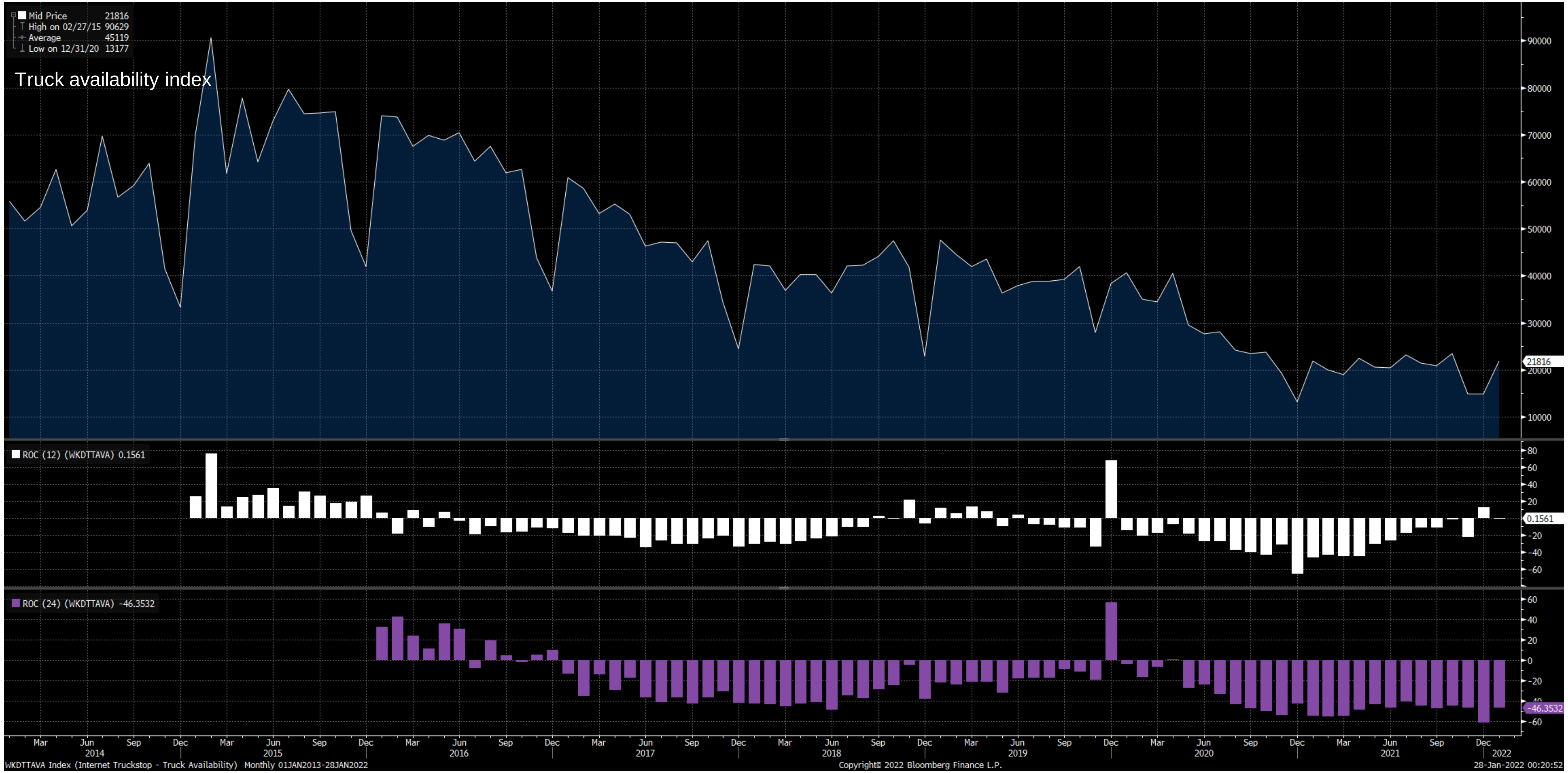
Source: Bloomberg

Trucking availability has bottomed out, and is accelerating on a Y/Y basis



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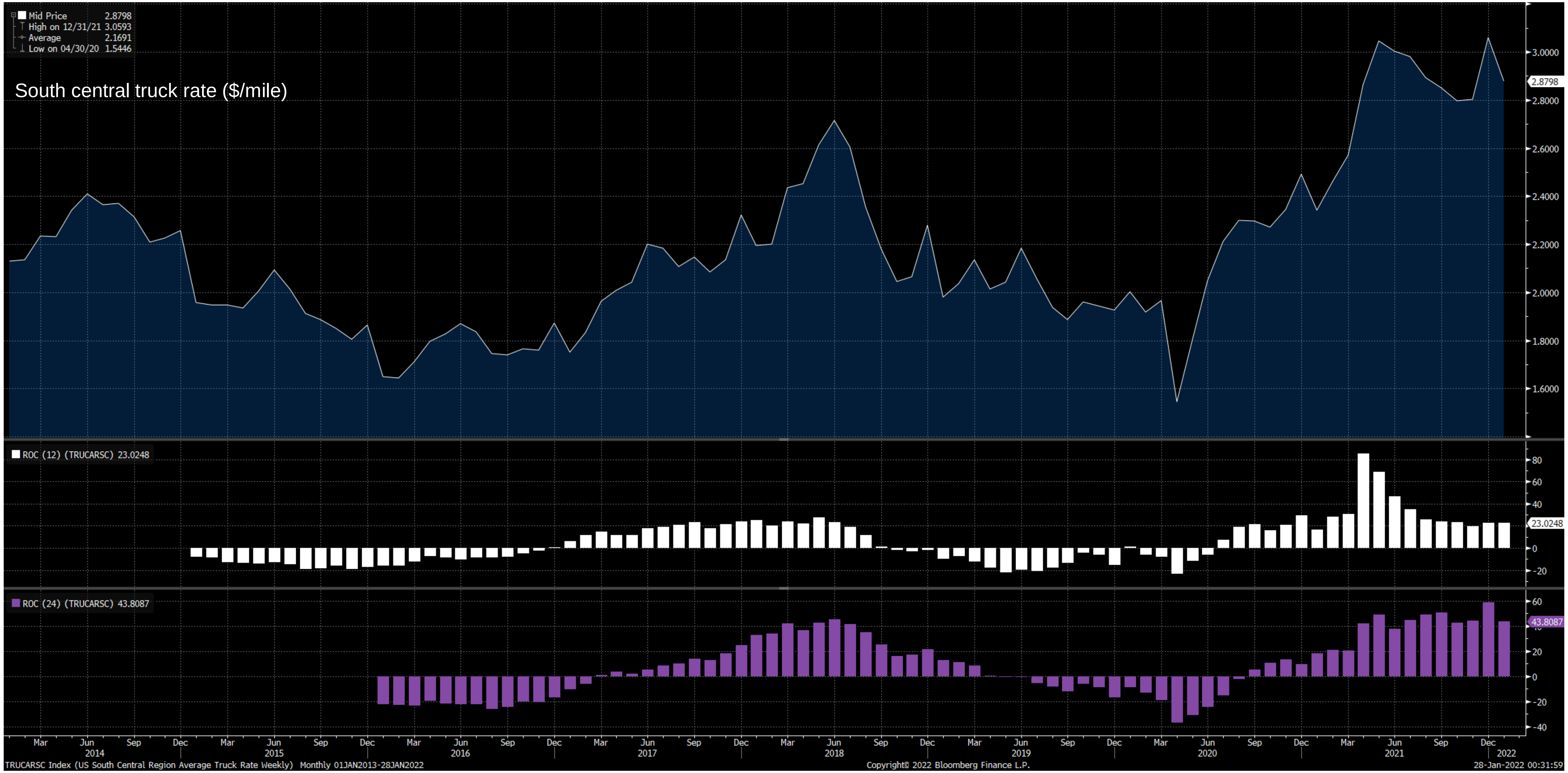
Source: Bloomberg

TRUCKING AVAILABILITY ACCELERATION + WAGE DECELERATION = LIKELY TRUCK RATE DECELERATION

*Truck rates ($/mile) peaked in December 21', a function of both labor shortages (in part due to omicron) and limited truck availability. Omicron was a transitory issue and truck availably bottomed in 2021. A **deceleration of truck rates** would be a significant **tailwind** for **cost declines across oil and gas.***



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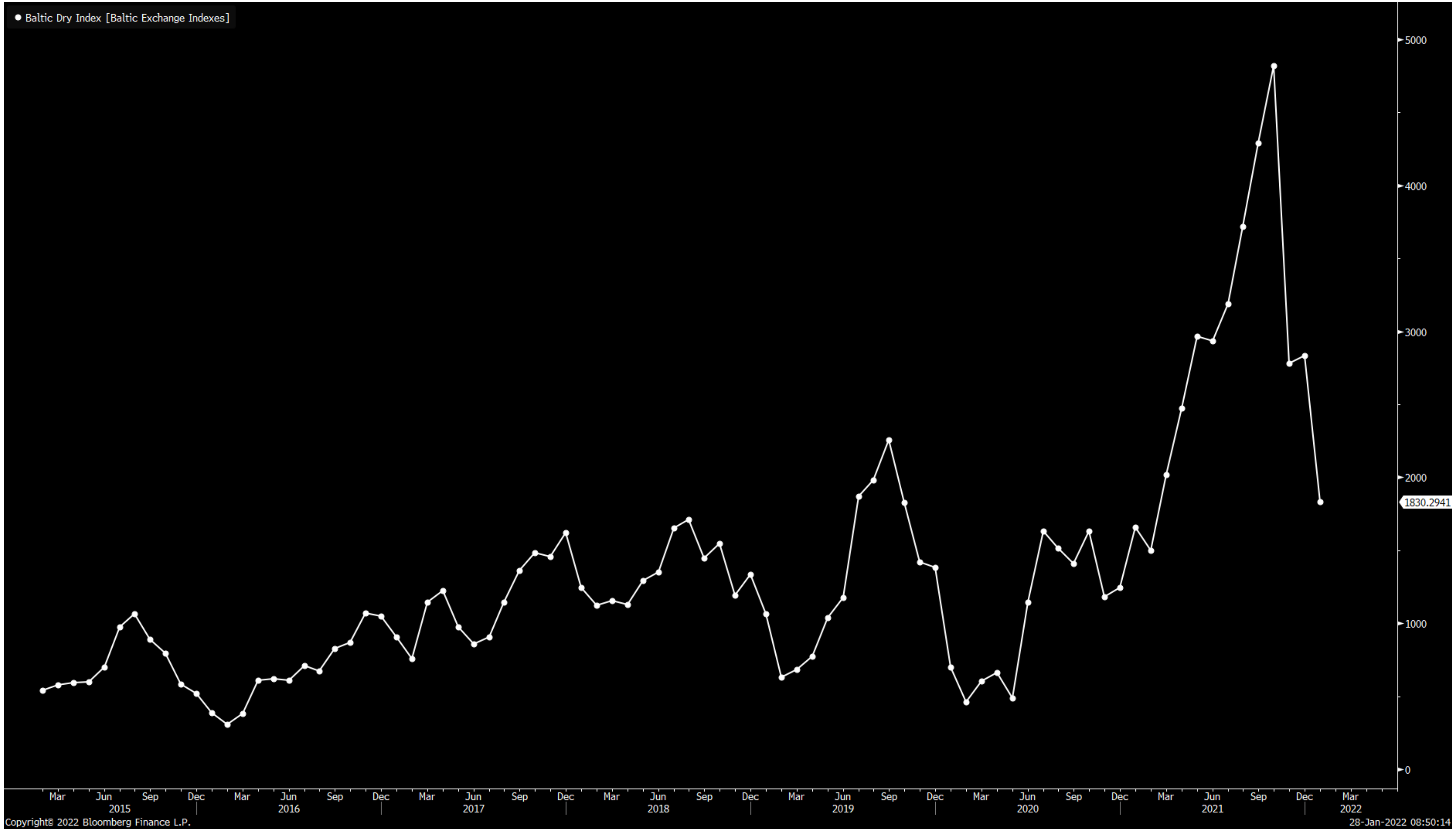
Source: Bloomberg

GLOBAL RAW GOODS SHIPPING COSTS PEAKED IN 21' (BALTIC DRY INDEX)…



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Source: Bloomberg

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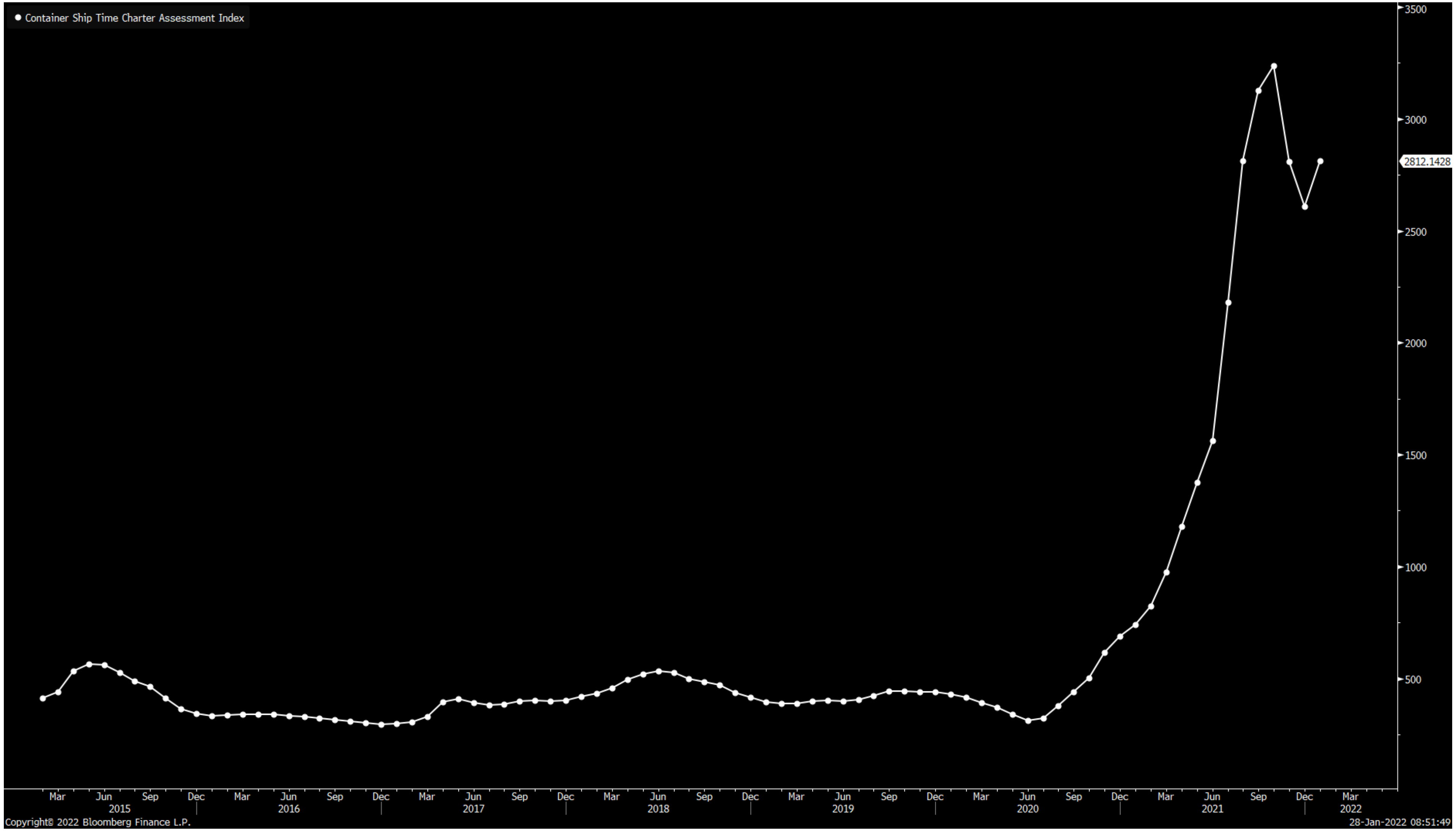
TIME CHART COSTS REMAIN ELEVATED, WITH FURTHER DECLINES REPRESENTING POTENTIAL TAILWIND IN 22’

Lingering supply chain issues holding container ship time charter costs at elevated level. Normalization in industrial supply chains across the globe in 1H22’ would provide further tailwind to delivered steel costs



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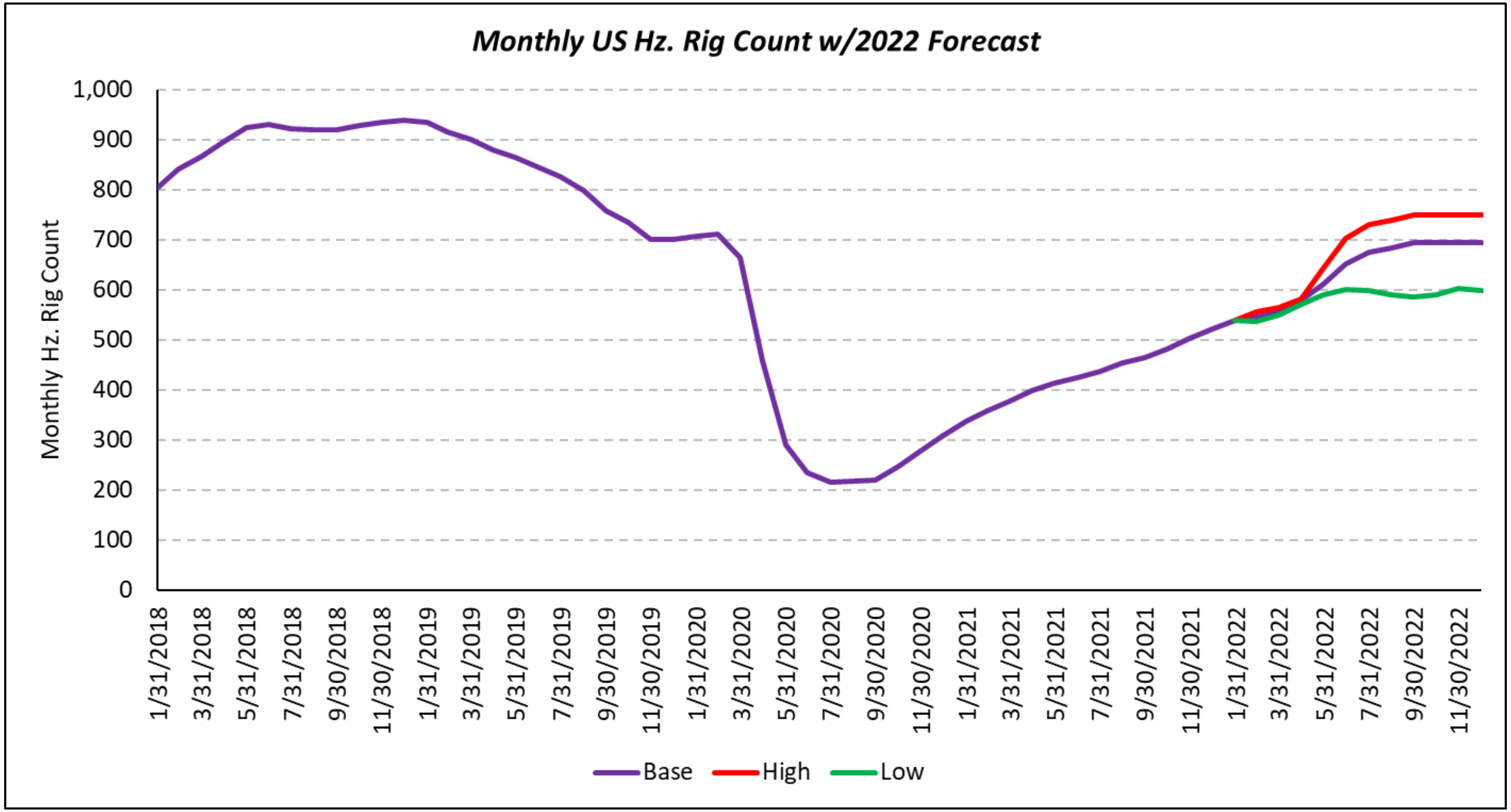
Source: Bloomberg

CASING AND STEEL BOTTLENECKS LIKELY FADING INTO MAY, RIG COUNT WILL HAVE ROOM TO ACCELERATE IN 2H22’



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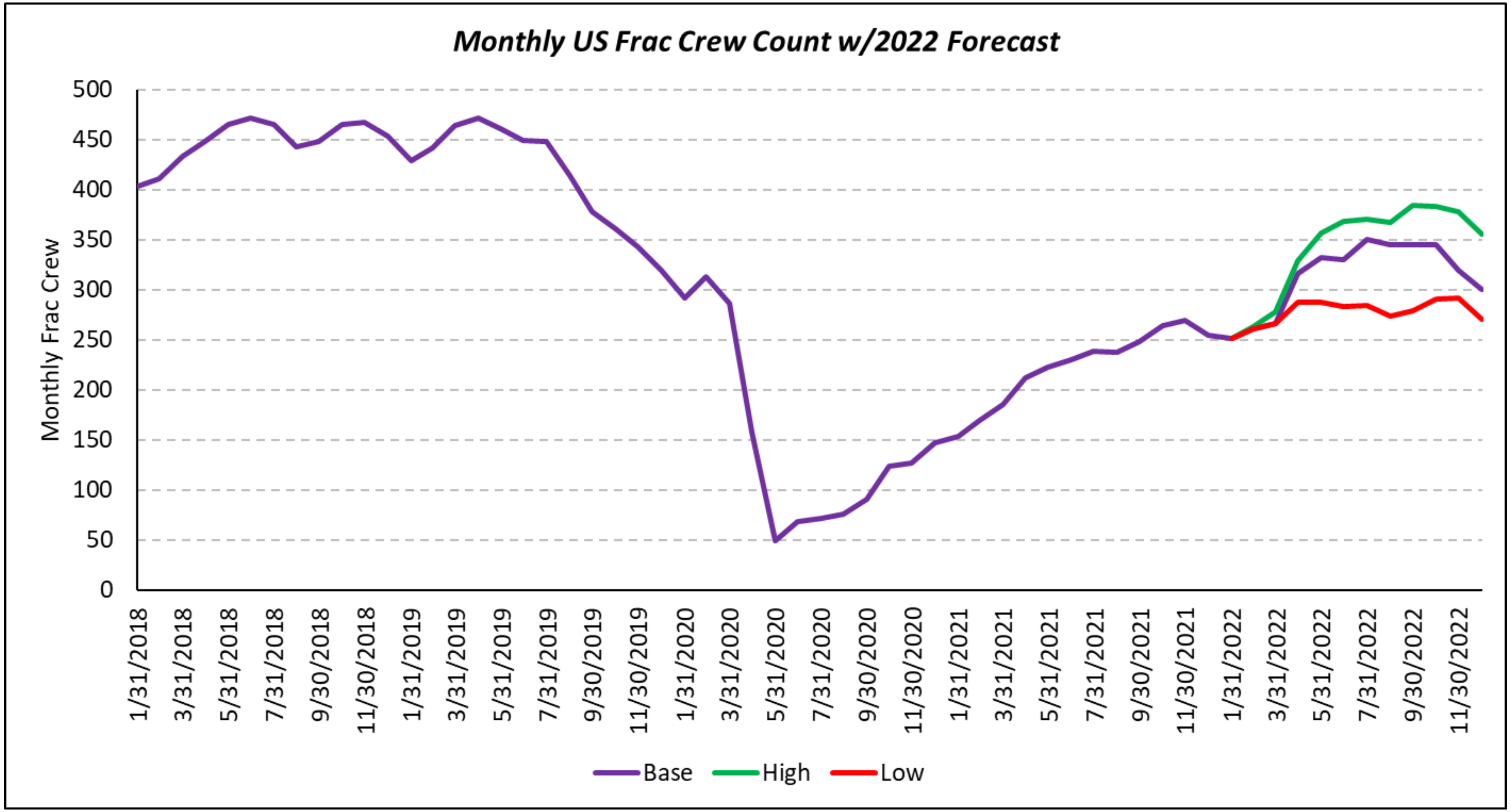
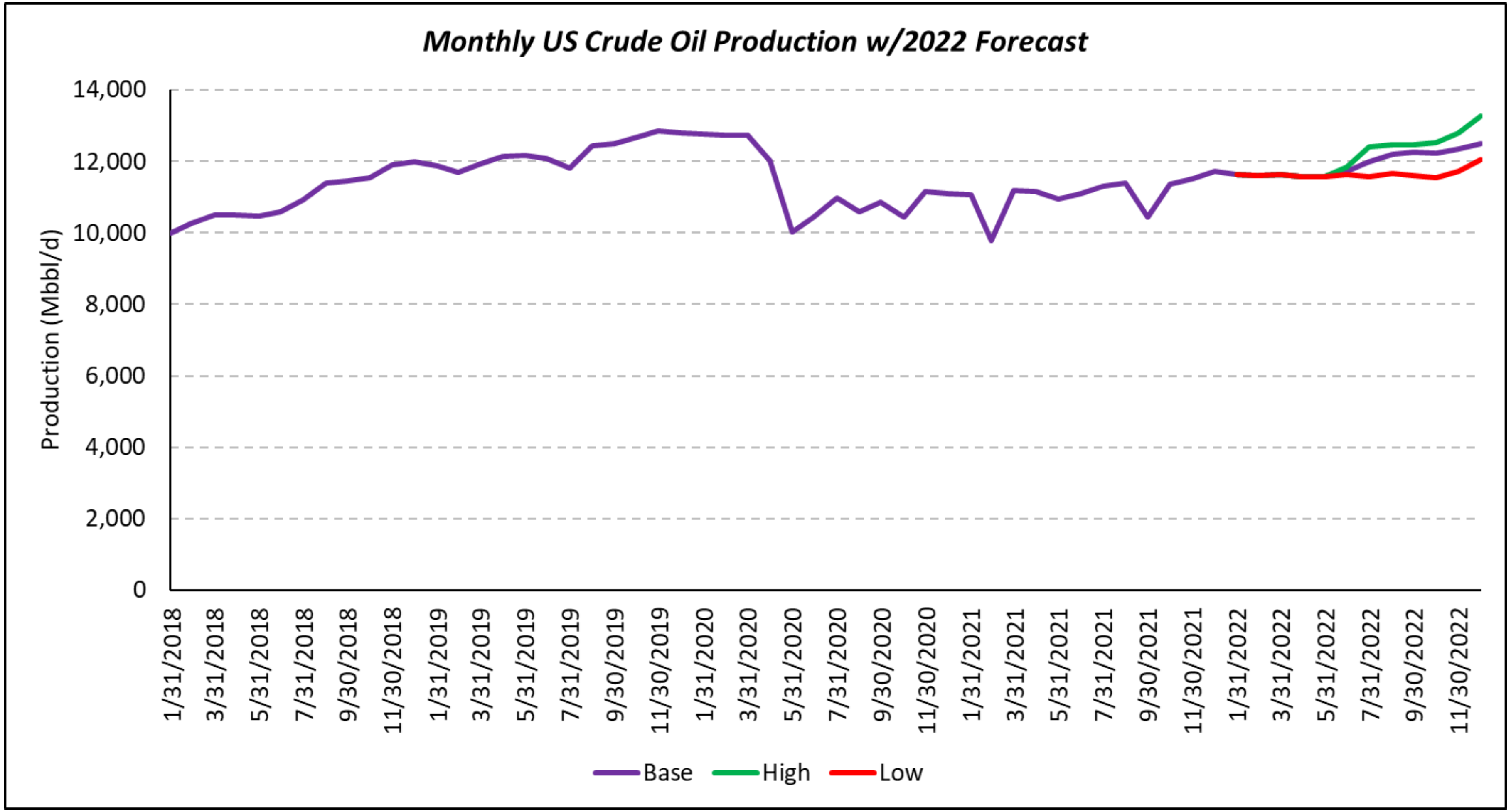
Source: Donovan Ventures, Bloomberg

AS RIGS GET AHEAD OF FRAC CREWS, RAMPING COMPLETION'S ACTIVITY IN THE SUMMER BECOMES LIKELY



Source: Donovan Ventures, Bloomberg

AS COMPLETIONS ACCELERATE INTO THE SUMMER, VOLUME GROWTH FOLLOWS DRIVING ~12.5MMBBL/D 22' EXIT



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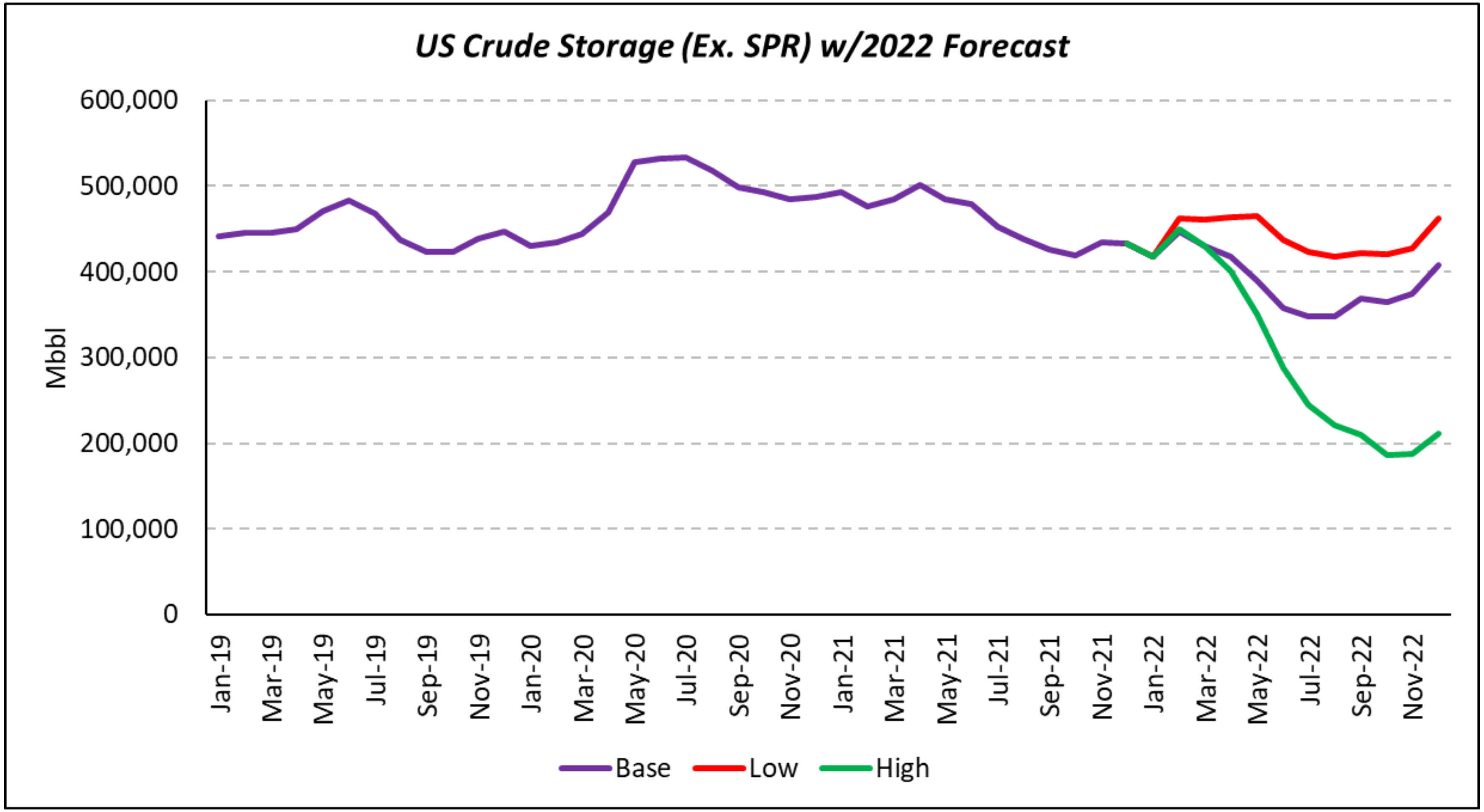
Source: Donovan Ventures, Bloomberg

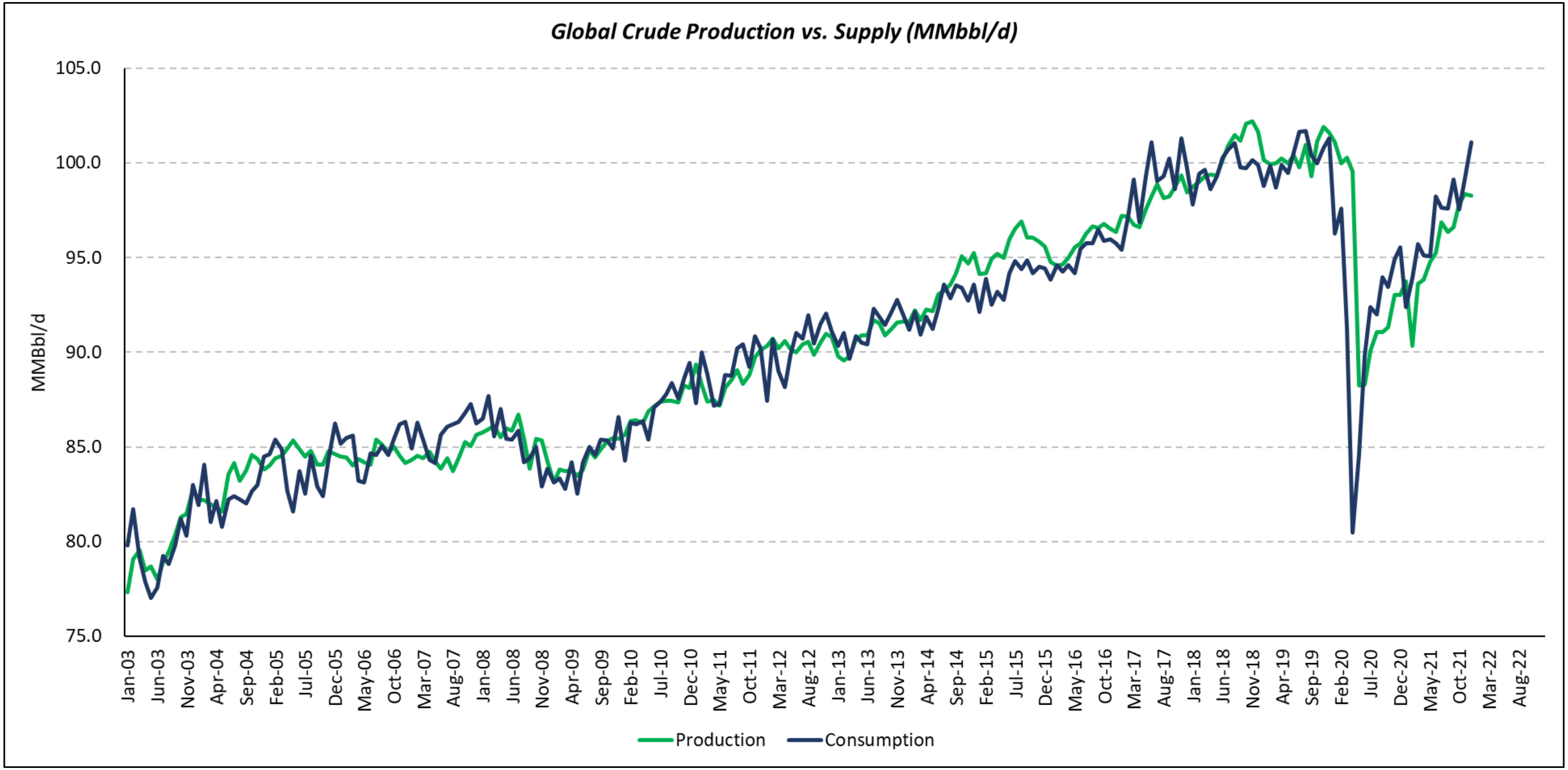
DEMAND GROWTH + DELAYED SUPPLY ACCELERATION = LOWER DOMESTIC INVENTORIES



Source: Donovan Ventures, Bloomberg

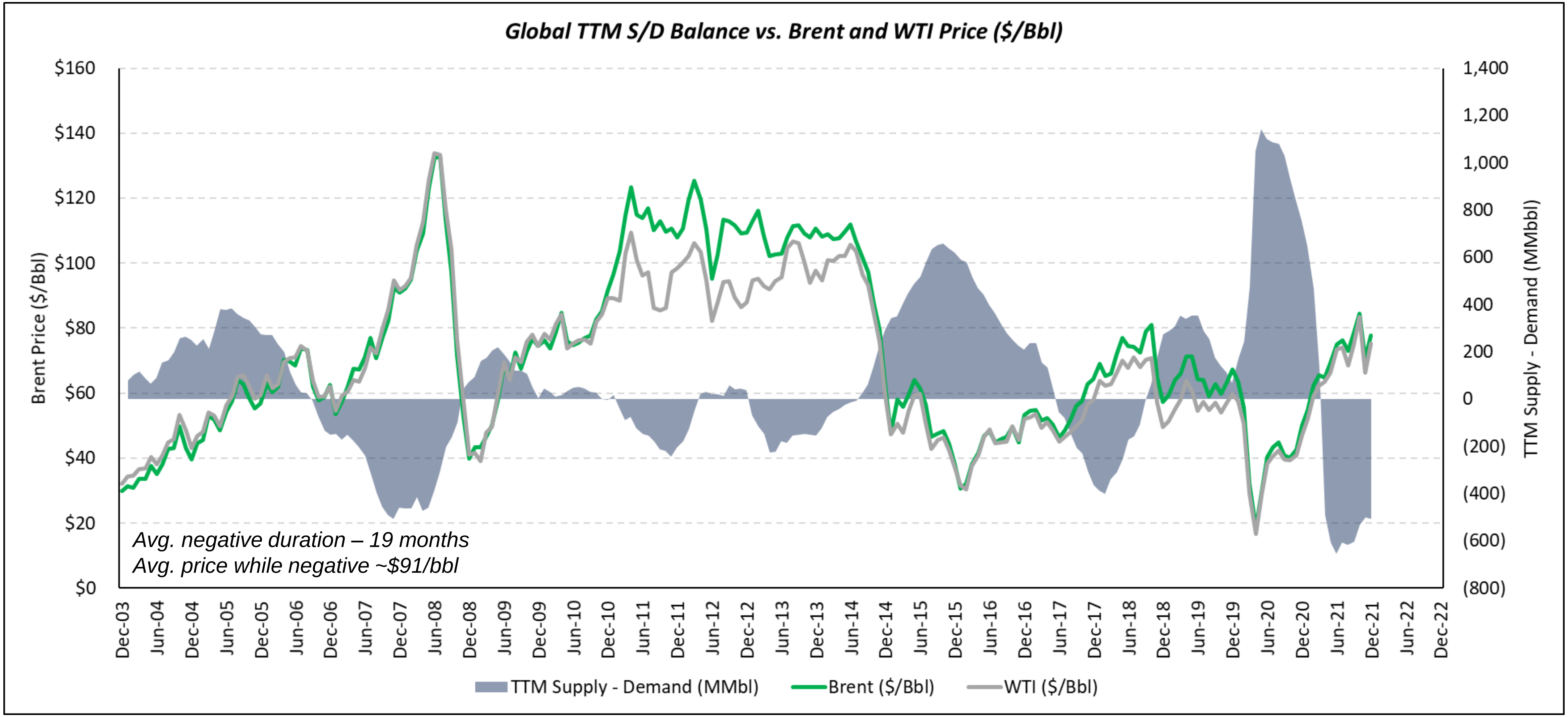
DOMESTIC PICTURE MARGINALLY BULLISH – GLOBAL?

GLOBAL CRUDE OIL BALANCE REMAINS UNDERSUPPLIED



Source: Donovan Ventures, Bloomberg

UNDERSUPPLY HAS DRIVEN SIGNIFICANT STORAGE DRAWS, DRIVING HIGHER CRUDE PRICES



*Average duration of negative TTM balance over the last 20 years is **~19 months**. We have seen **<u>9 months of negative balance</u>**.*

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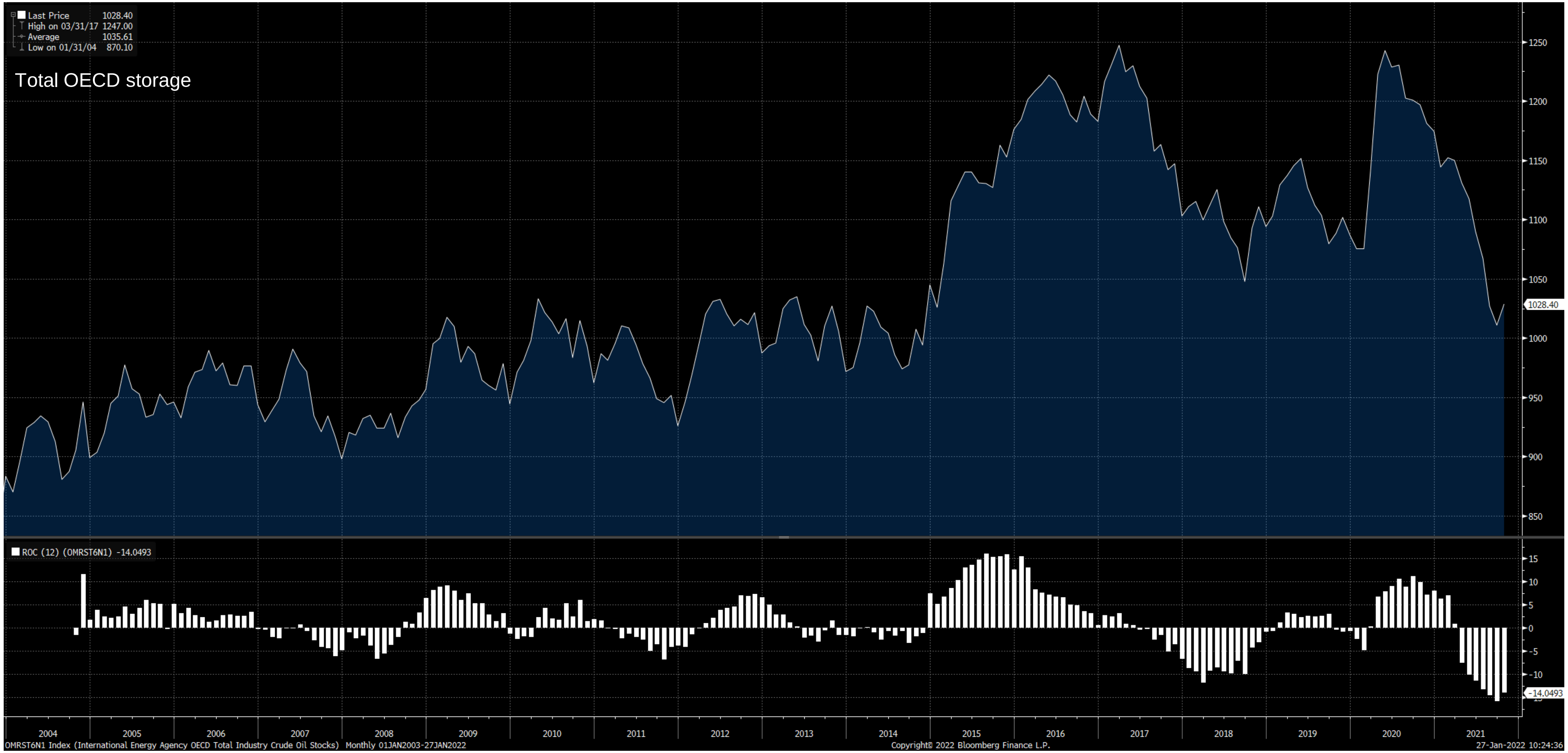
Source: EIA short-term energy outlook, Donovan Ventures

STORAGE DRAWS ERASED BUILDS FROM SHALE GLUT IN 2014/2015 AND 2018



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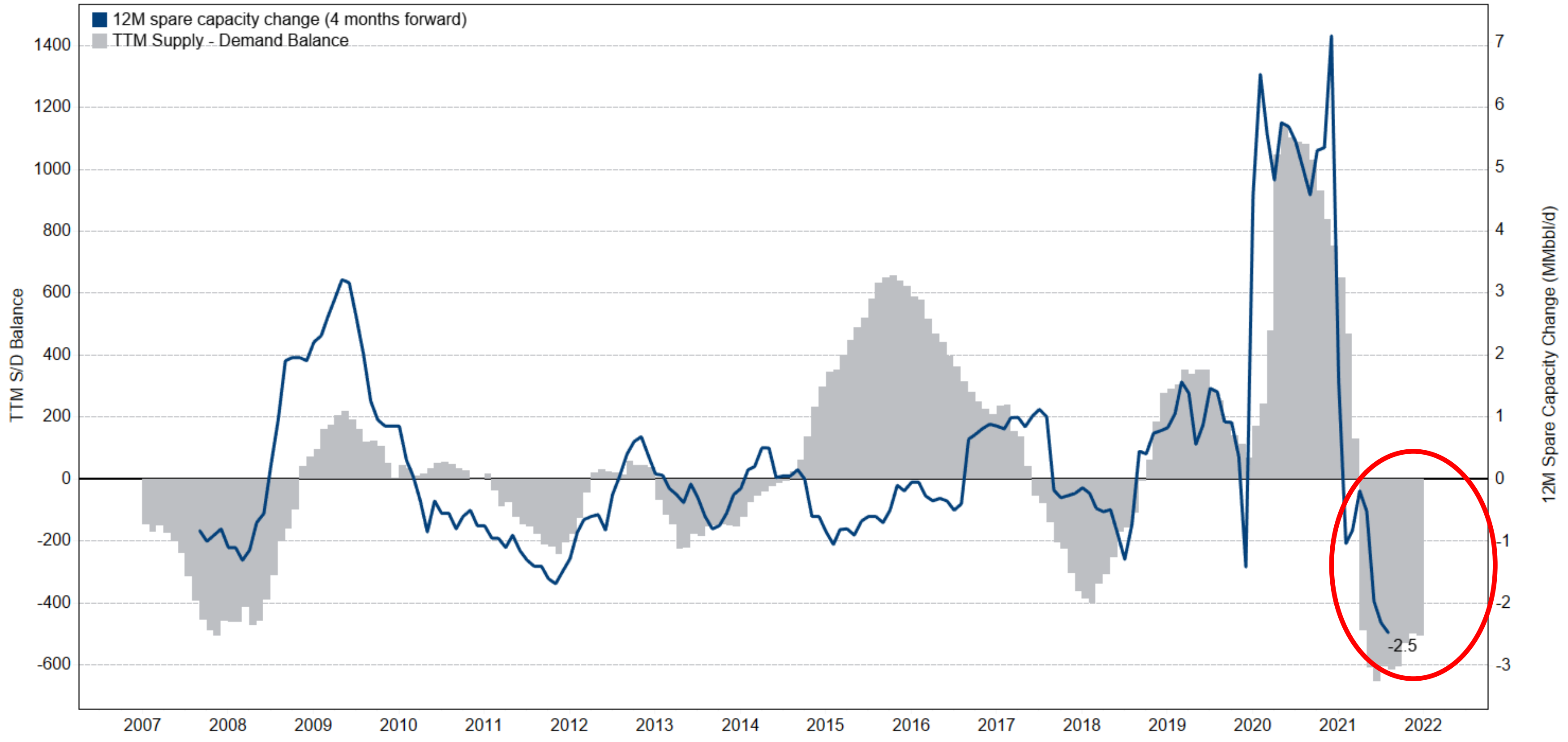
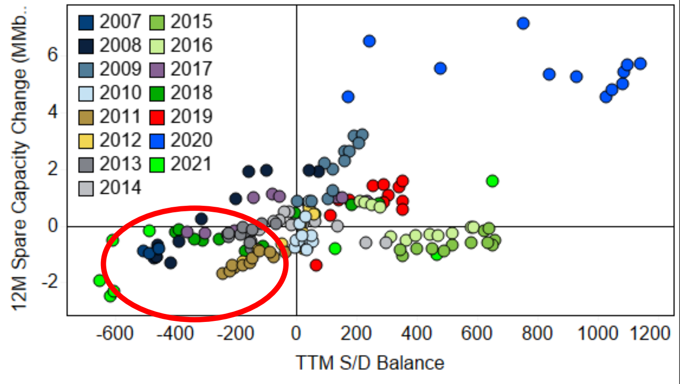
Source: Bloomberg

OPEC SPARE CAPACITY COMING DOWN INLINE WITH FUNDAMENTALS

OPEC spare capacity change vs. Global S/D Balance (time series)



OPEC Spare capacity change vs. S/D Balance (Cross plot)



OPEC spare capacity

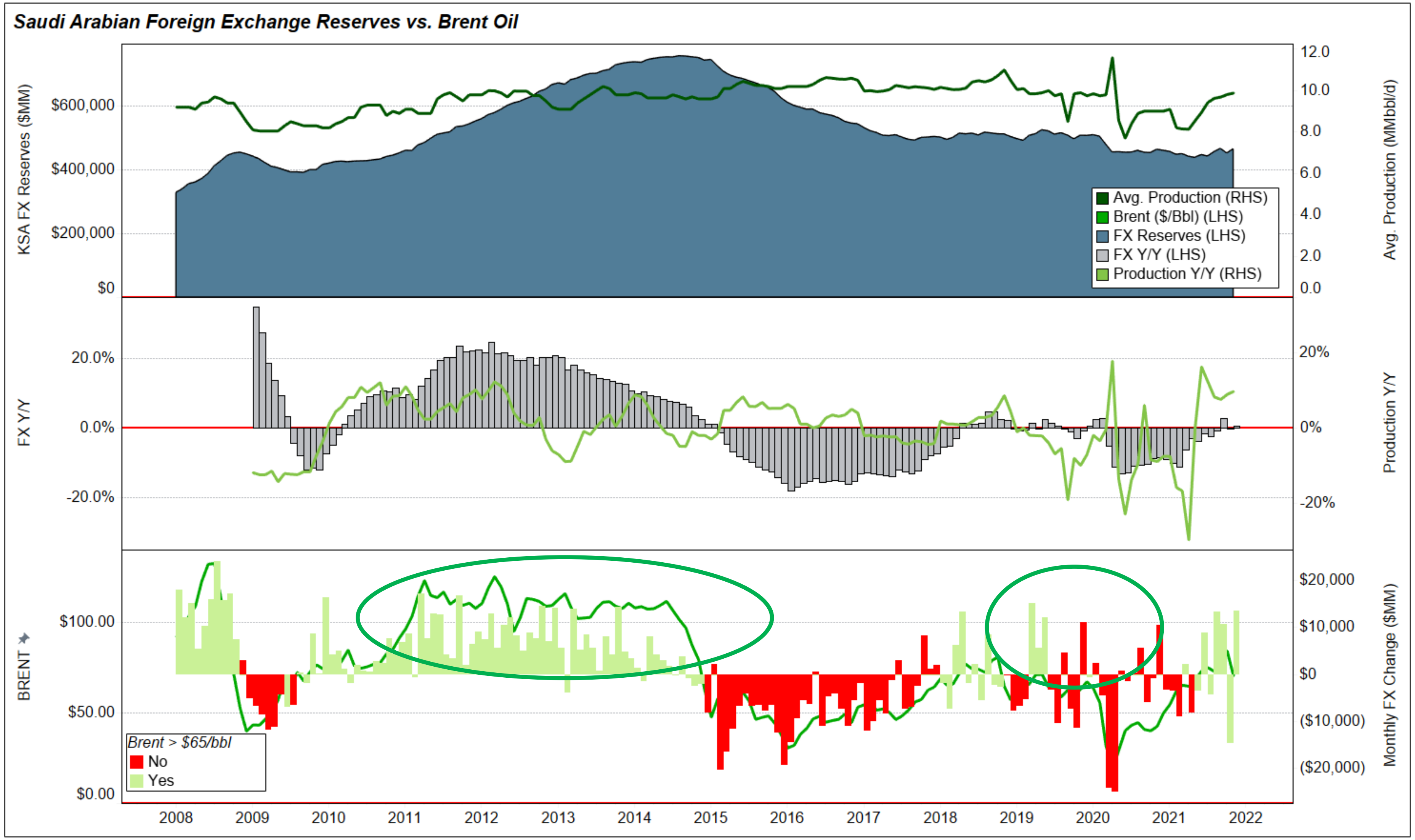
Source: Donovan Ventures, EIA short term energy outlook

Spare capacity continues to decrease inline with fundamental global balances. OPEC maintaining messaging of ~400,000Bbl/d increases in production (to be adjusted at each policy meeting)

Source: EIA, Donovan Ventures

SAUDI ARABIA REMAINS INCENTIVIZED TO KEEP BRENT >$75/BBL

Over last 15 years, __~84% of reported months__ with brent $75+ have driven __positive monthly FX change for KSA__



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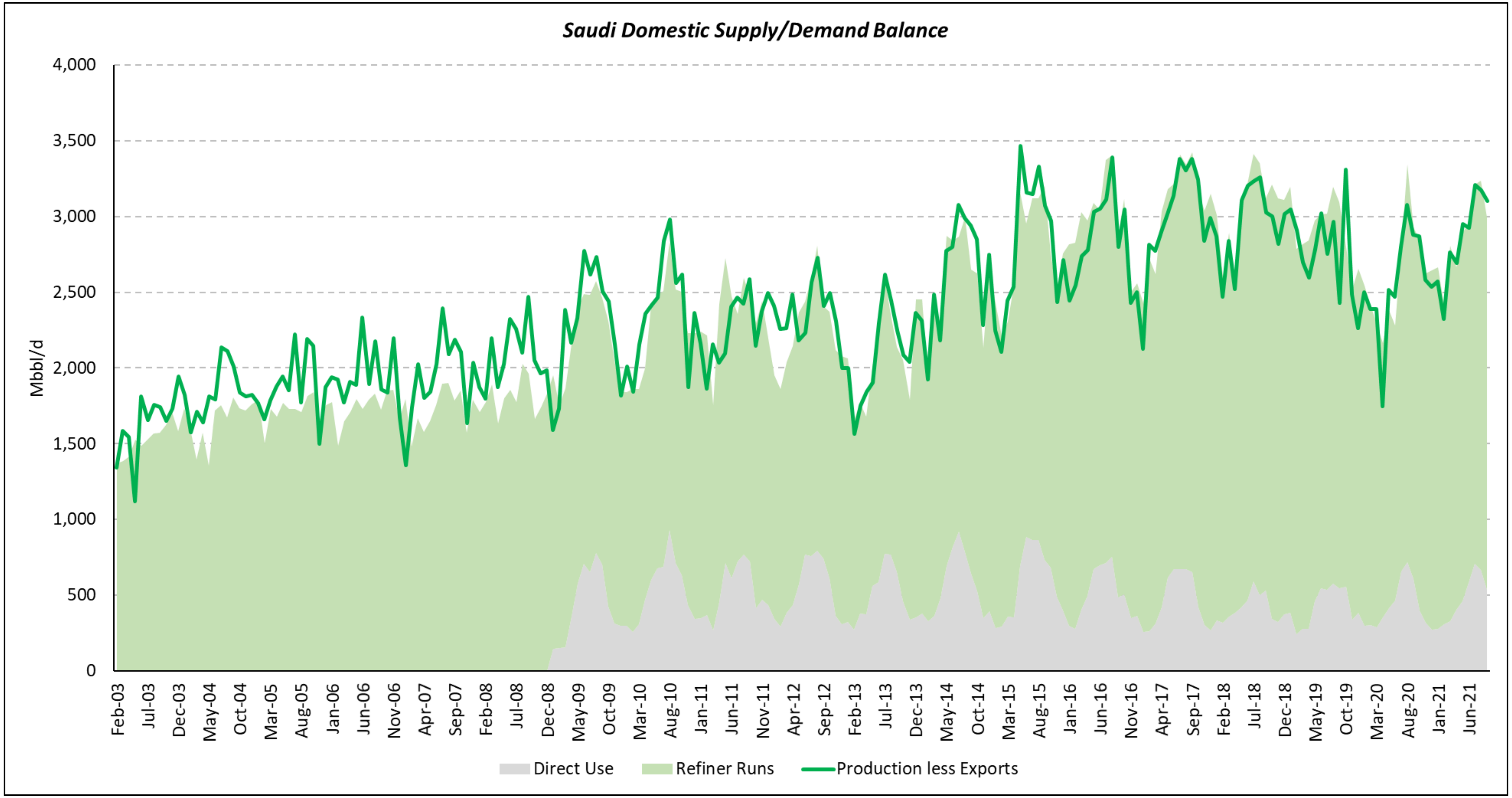
Source: KSA monthly statistical bulletin, Donovan Ventures

SAUDI DOMESTIC BALANCE VERY TIGHT, WILL REQUIRE ARAMCO TO RAMP CAPEX TO MEET ANY EXPORT GROWTH



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Source: Bloomberg

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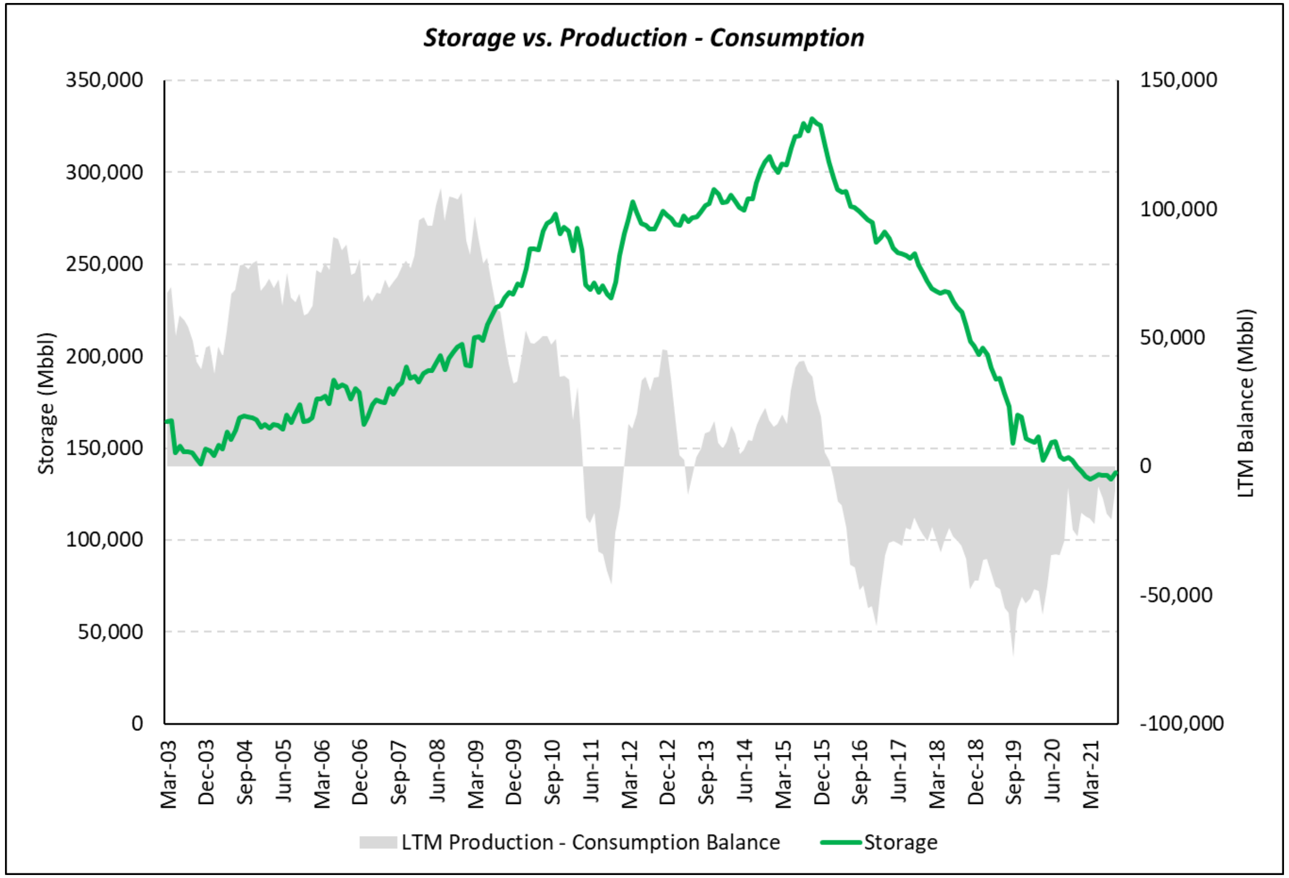
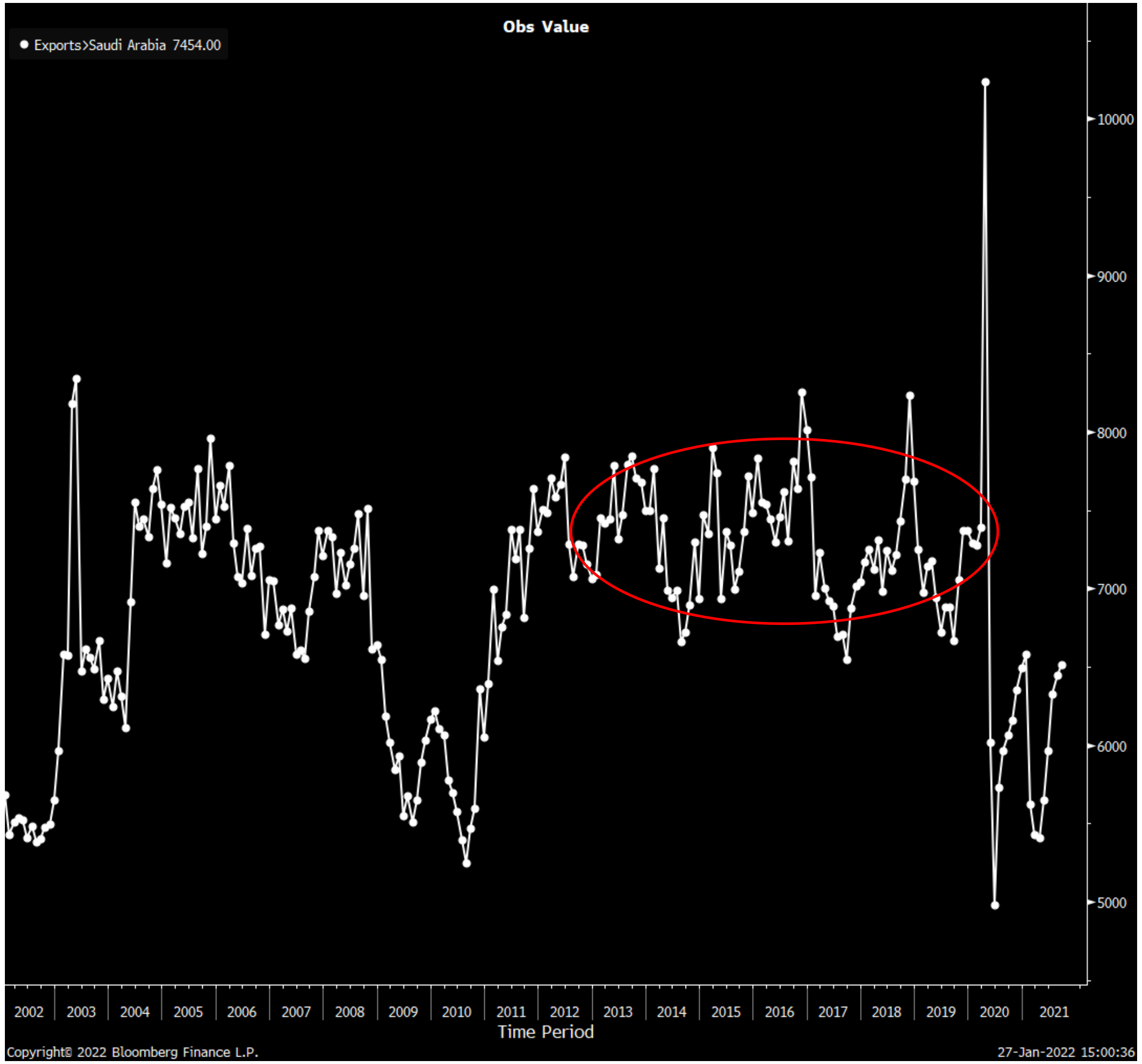
Getting back to 7mmbbl/d+ in exports will require a production ramp up to ~10.5 Mmbbl/d

Saudi Arabia showed their cards in the 2014/2015 price war. Production and export ramp was unsustainable, clearly seen by the reduction in storage. Maintaining export market share at 7.2 to 7.5mmbbl/d will require production to ramp near max capacity in order to avoid depleting storage.





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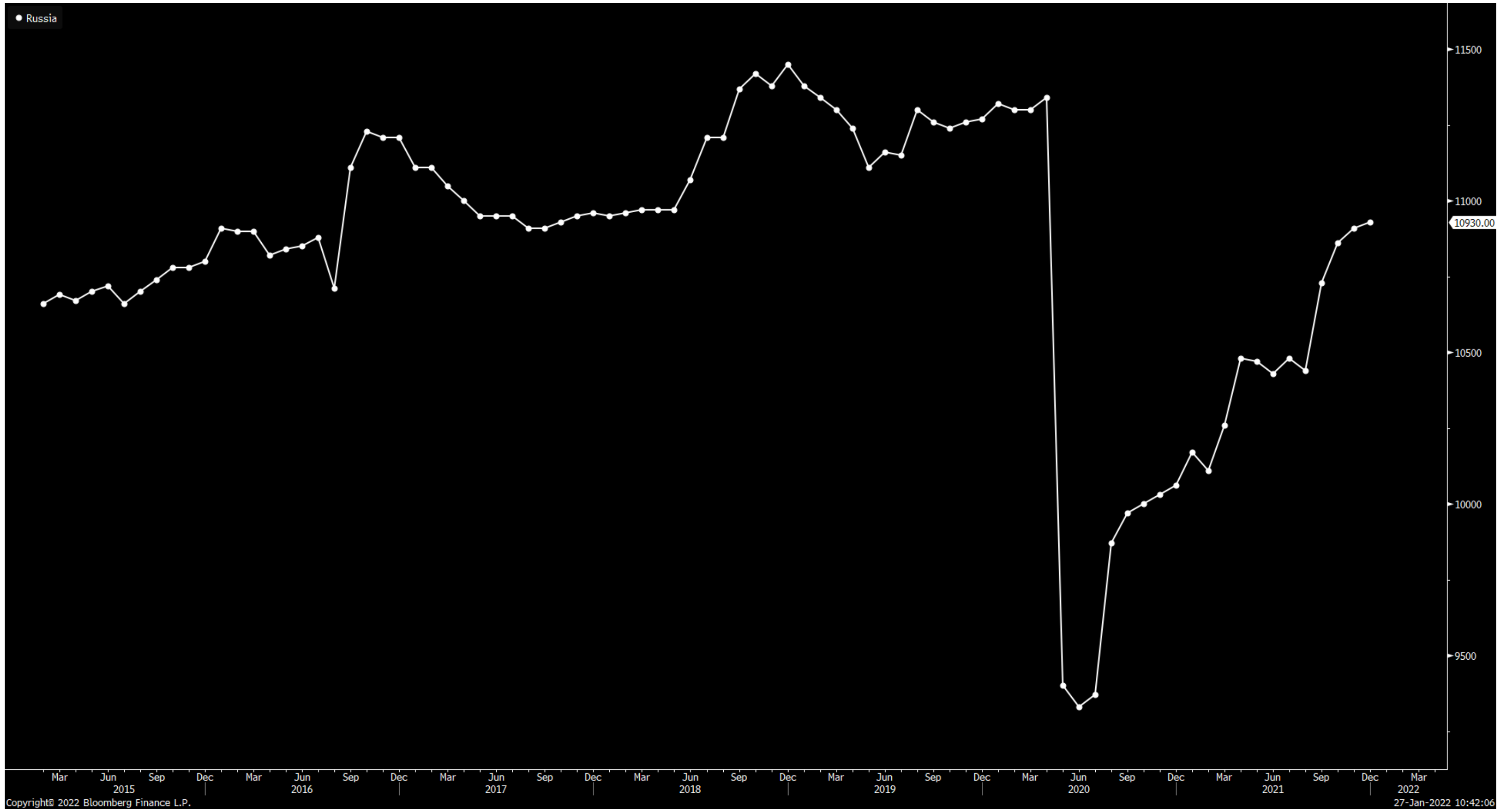
Source: Bloomberg, Donovan Ventures

RUSSIA IS ALREADY NEARING 0 SPARE CAPACITY, AND WILL REQUIRE ACCELERATING CAPEX TO GROW IN 22'



Until now, Russian producers have been raising output mainly by restoring production at wells closed in 2020 or increasing flows from operating wells. To ramp up output next year, they will need to focus on drilling new wells.

Earlier this week Lukoil PJSC, the second-largest producer in Russia, said that it has restored its production to almost 90% of pre-crisis level of the first quarter 2020. "We're close to full utilization of spare capacity and further production growth will be supported by additional drilling," Vice President for Finance Pavel Zhdanov said Nov. 24.

This echoed Gazprom Neft PJSC, who said last week that it won't have idled oil-output capacity by the end of the year and will keep increasing drilling rates to raise output. Earlier this month, Rosneft PJSC, nation's biggest oil producer, said it used ahead of time its reserve production capacity of 25,000 tons a day (some 183,250 barrels a day), which was available at the end of the second quarter, and "promptly increased crude-oil output to ensure compliance with agreed OPEC+ quotas" for Russia.

As CDU-TEK data doesn't provide a breakdown between crude and condensate, which is excluded from the OPEC+ agreement, it's difficult to assess Russia's adherence with the deal. Last month, Russia was over-producing with its compliance held at 92% in October, the International Energy Agency said in its latest monthly report.

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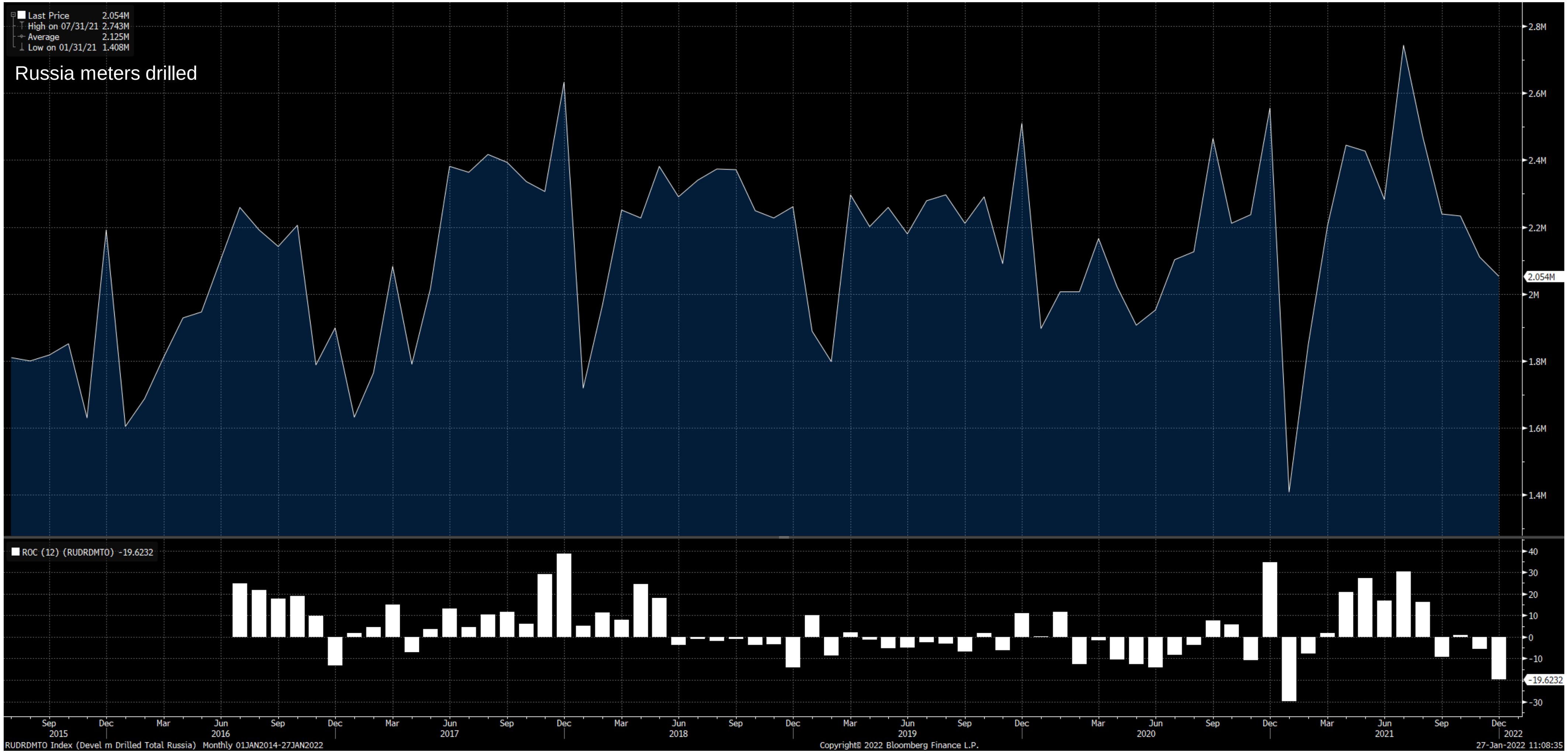
Source: Bloomberg

RUSSIAN METERS DRILLED ACCELERATED IN MID-2021, BUT DECELERATED INTO YEAR END (WINTER PAUSE)



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Source: Bloomberg

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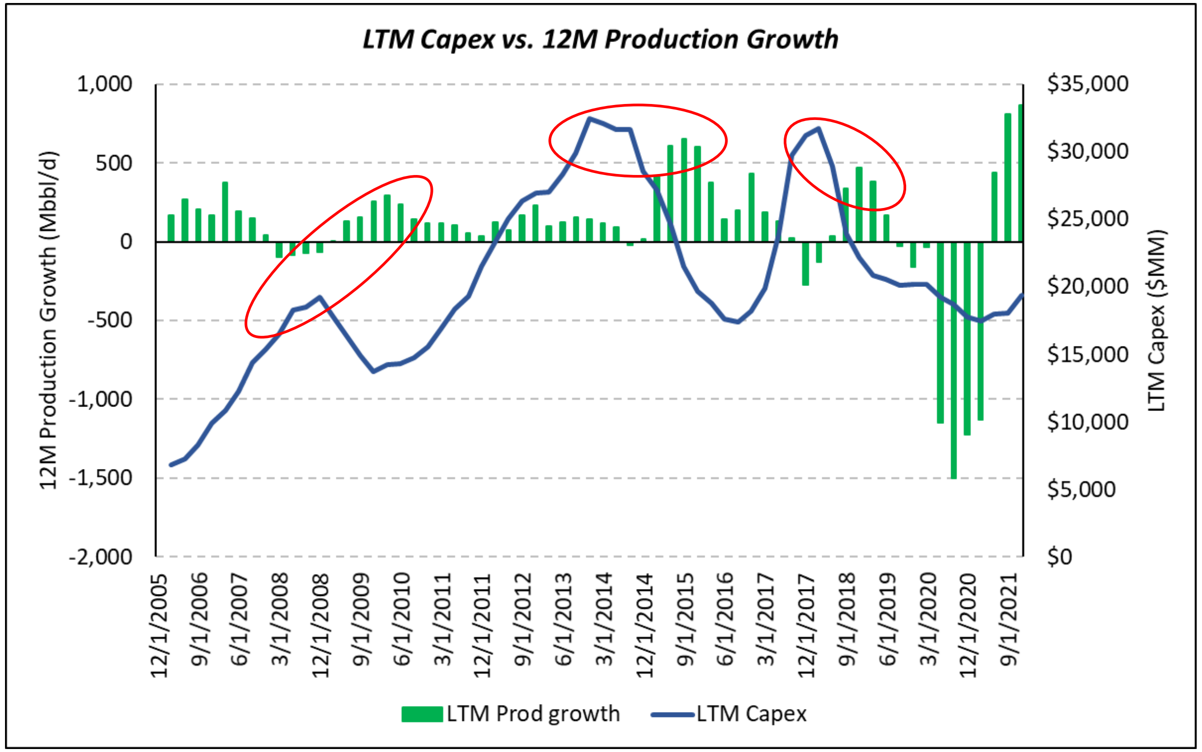
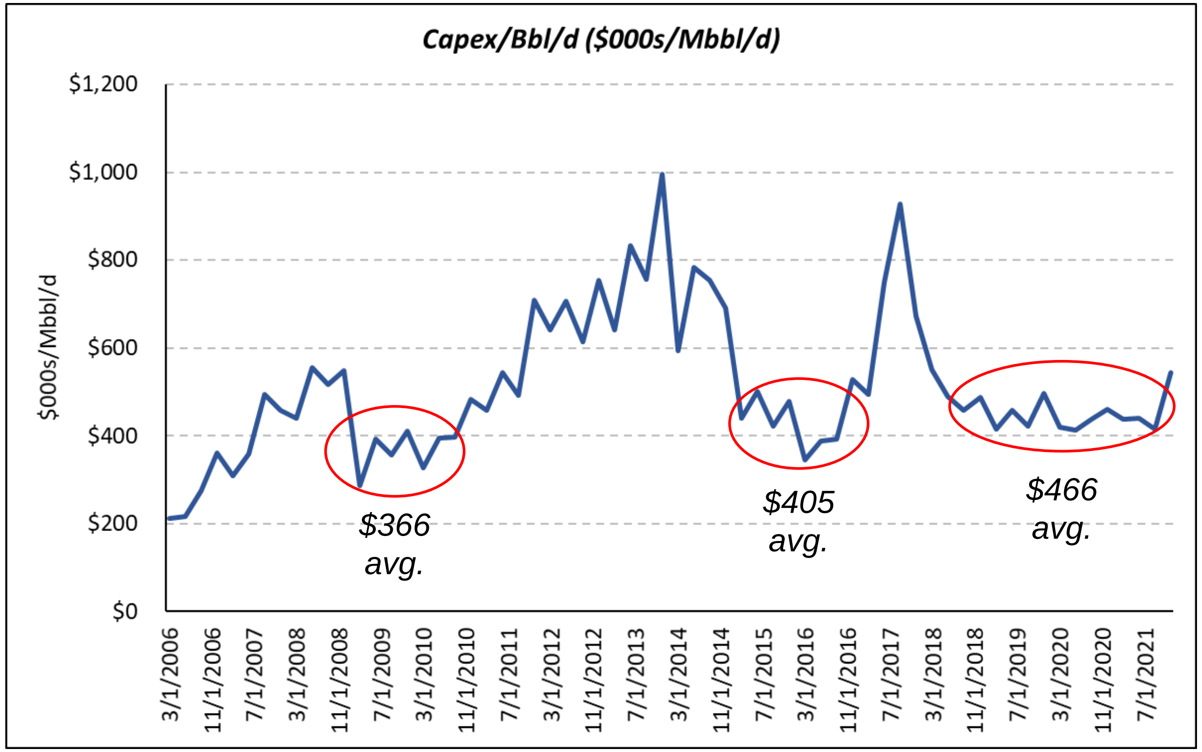
RUSSIAN CAPEX LEADS PRODUCTION BY ~3-4 QUARTERS, WITH BASE MAINTENANCE CAPEX INCREASING EACH CYCLE





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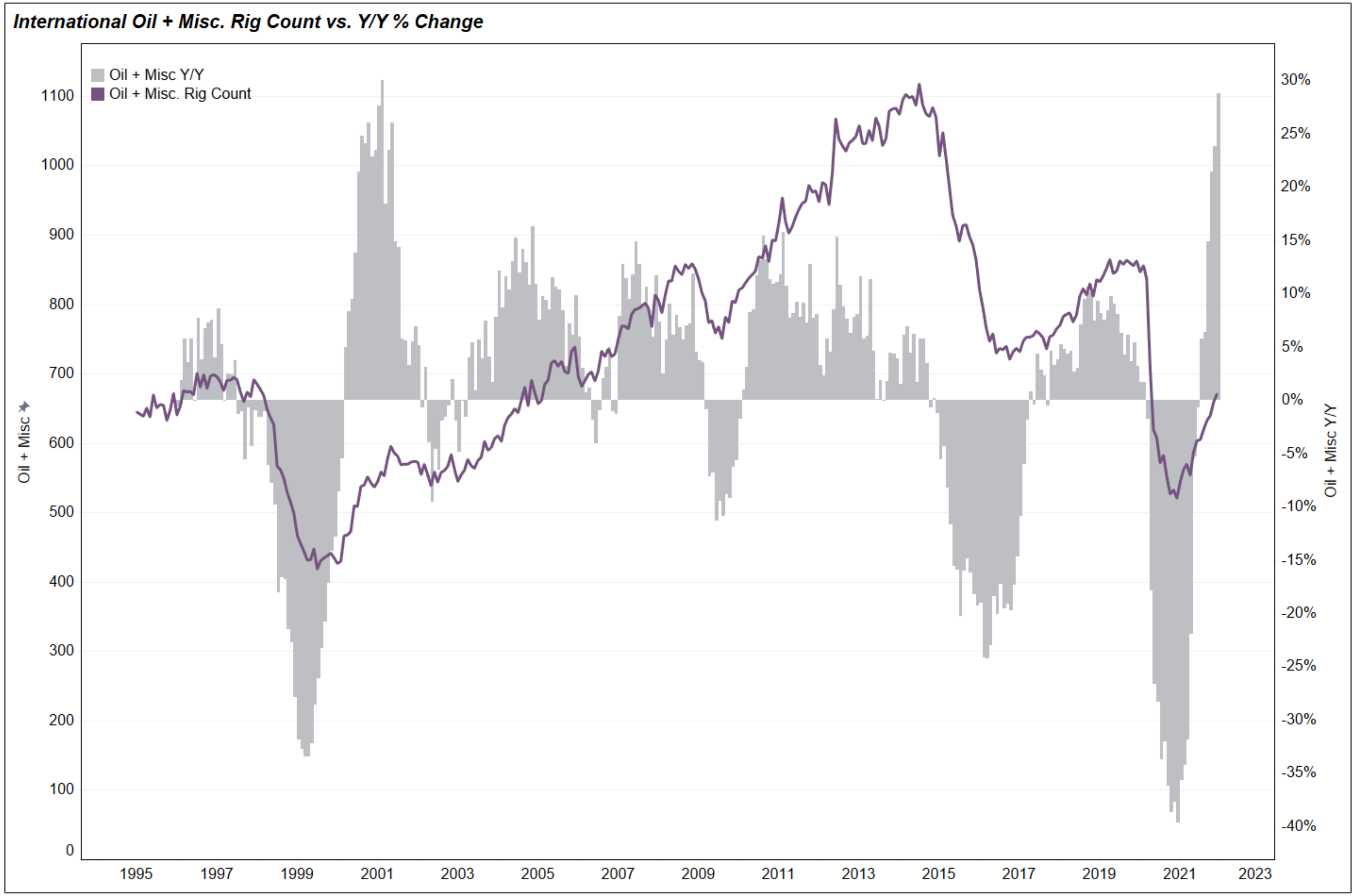
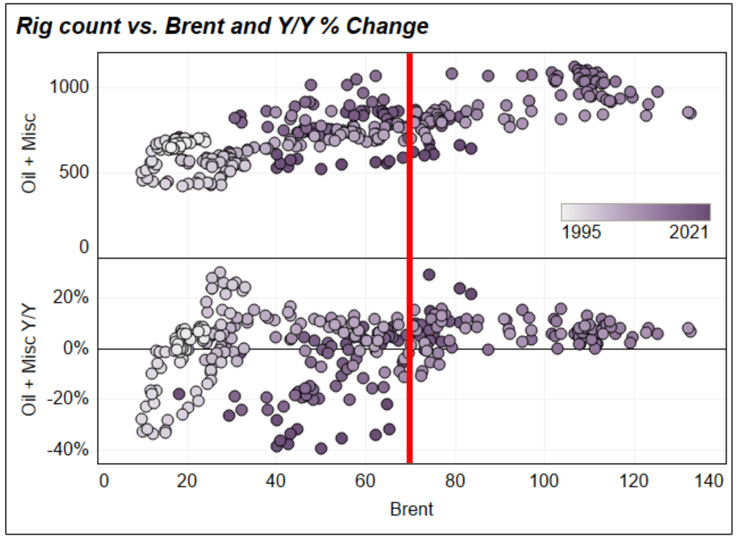
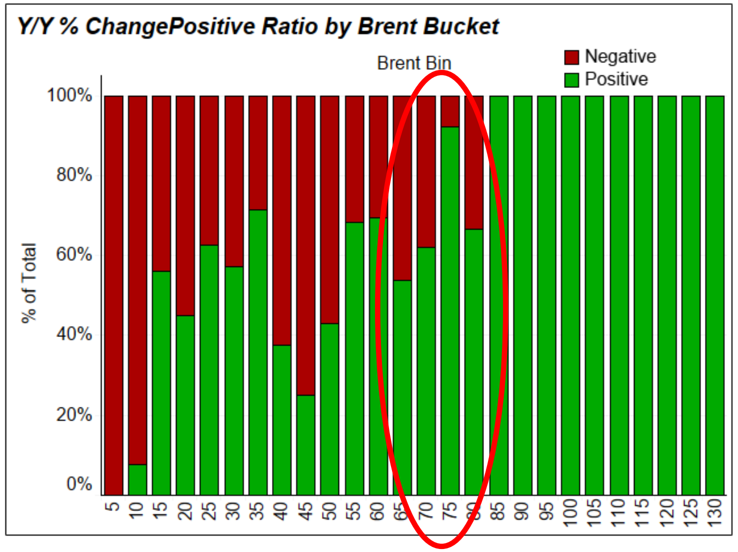
Source: Bloomberg, Donovan Ventures

Total international activity continuing to accelerate with Brent >$70/bbl

International rig count starting to accelerate with Brent crossing the key $70/bbl threshold, but relative to pre-covid levels rig count is still ***down ~22%***







Source: Donovan Ventures, Baker Hughes international rig count

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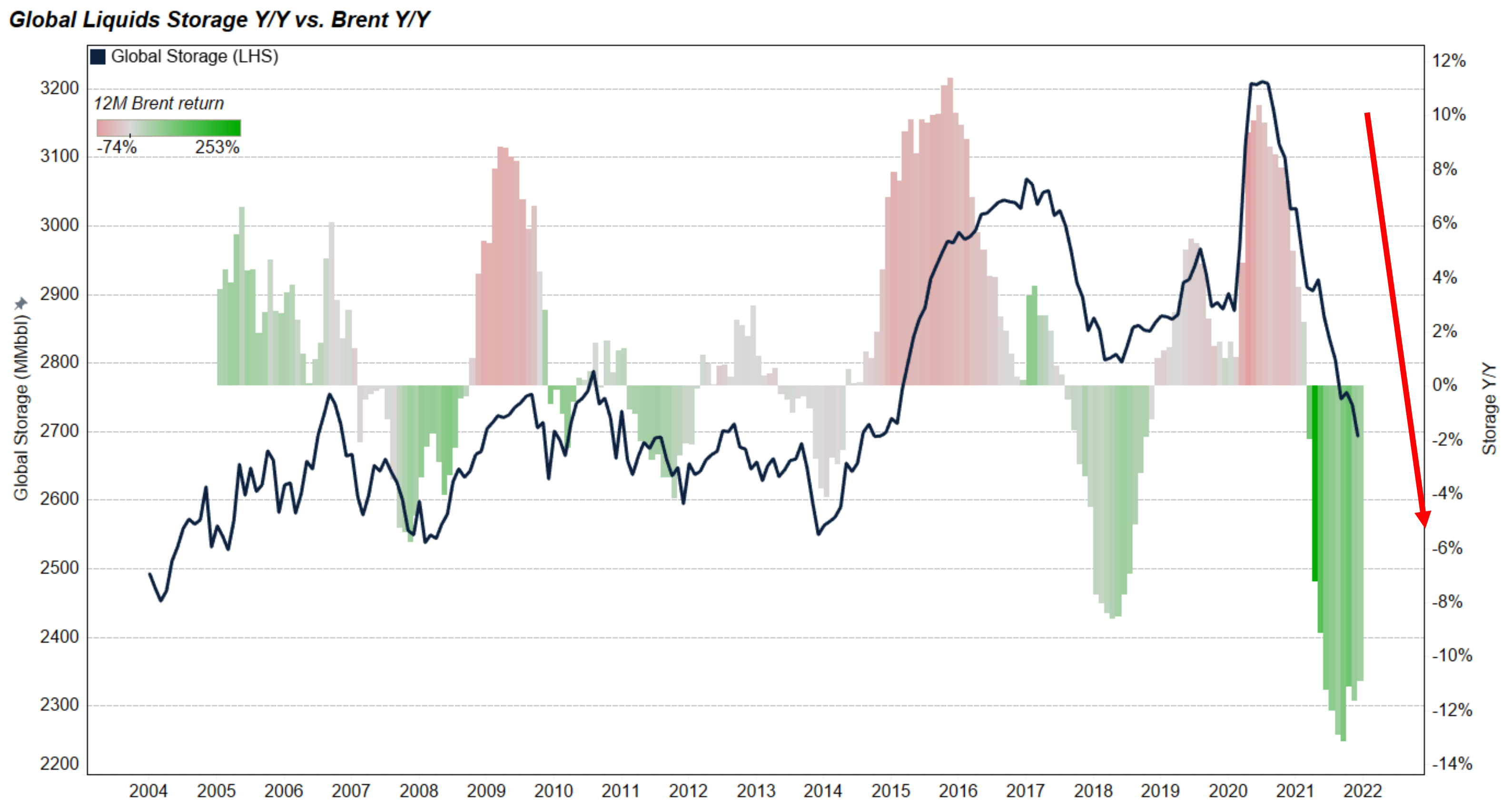
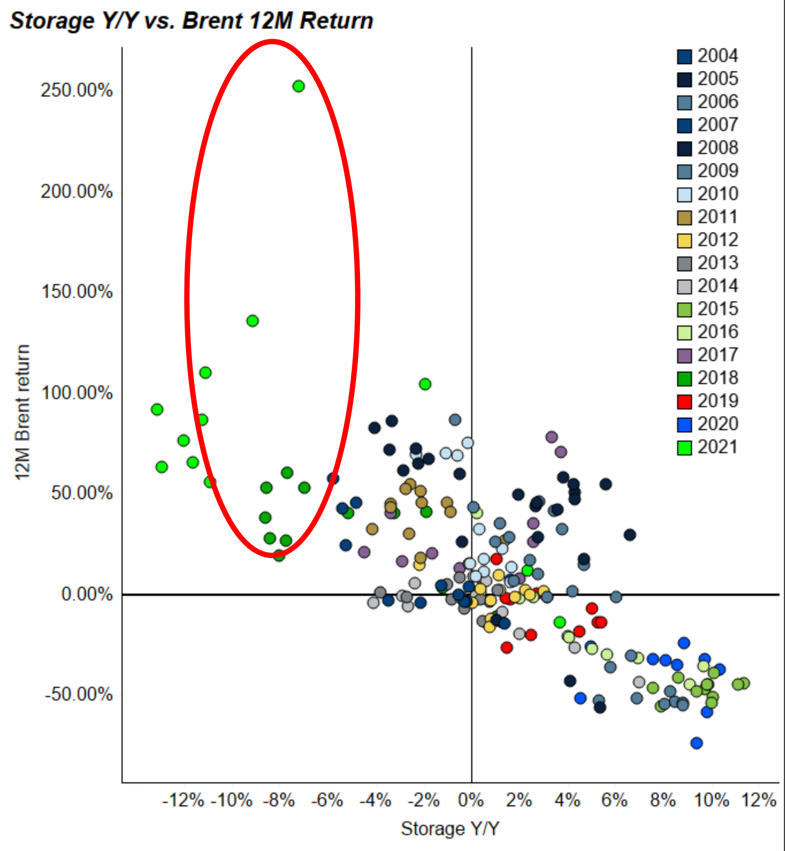
Source: Baker Hughes, Donovan Ventures

NEGATIVE INVENTORIES Y/Y IS LIKELY TO DRIVE CONTINUED PRICE ACCELERATION

*Brent price has a **positive 12M return ~83%** of months reported when storage is negative Y/Y (data since 2004); the **average 12M return is ~41%** (min: -7%, max: +252%, median: +40%)*





Source: Donovan Ventures, EIA Short Term Energy Outlook, Bloomberg

BRENT REMAINS ELEVATED, WITH STEEP COMPS - SIGNIFICANT PRICE UPSIDE REMAINS

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Source: Bloomberg

MARKET DYNAMICS – WILL MARKET PLAY NICE?

Everyone loves rate of change in macro! Negative rate of change isn't always bad for crude

Macro analysts typically cite negative outlooks for crude oil during periods when growth (GDP) and inflation (CPI) are decelerating on a Y/Y basis

	Historical CL1 Returns*				
	1M	3M	6M	9M	12M
ALL US STORAGE SCENARIOS					
D					
AVG	0.2%	-5.7%	-10.2%	-7.9%	-4.5%
MIN	-54.2%	-66.5%	-68.1%	-67.8%	-70.5%
MAX	88.4%	91.7%	38.8%	59.1%	86.5%
% Positive	55.3%	36.8%	32.9%	40.8%	40.8%
Typically worst environment					
I					
AVG	-0.7%	3.4%	7.2%	14.3%	22.7%
MIN	-20.8%	-27.8%	-37.7%	-44.0%	-52.0%
MAX	20.7%	45.5%	45.9%	80.7%	148.0%
% Positive	47.1%	57.1%	61.4%	67.1%	67.1%
G					
AVG	2.3%	3.7%	8.5%	5.2%	2.4%
MIN	-22.2%	-28.5%	-31.5%	-42.6%	-50.1%
MAX	29.7%	48.1%	66.6%	136.9%	68.7%
% Positive	59.0%	57.4%	68.9%	65.6%	54.1%
Overall best environment					
R					
AVG	2.7%	11.9%	19.5%	24.7%	26.3%
MIN	-11.3%	-25.3%	-21.9%	-34.1%	-33.9%
MAX	36.6%	113.7%	96.4%	177.1%	237.5%
% Positive	64.2%	79.0%	80.2%	74.1%	74.1%

	Historical CL1 Returns*				
	1M	3M	6M	9M	12M
ALL US STORAGE SCENARIOS					
D					
AVG	0.2%	-5.7%	-10.2%	-7.9%	-4.5%
MIN	-54.2%	-66.5%	-68.1%	-67.8%	-70.5%
MAX	88.4%	91.7%	38.8%	59.1%	86.5%
% Positive	55.3%	36.8%	32.9%	40.8%	40.8%
POSITIVE Y/Y US CRUDE INVENTORY (EX SPR)					
D					
AVG	0.7%	-7.9%	-17.3%	-18.2%	-18.9%
MIN	-54.2%	-66.5%	-68.1%	-67.8%	-70.5%
MAX	88.4%	91.7%	35.4%	49.5%	54.9%
% Positive	54.7%	32.1%	22.6%	26.4%	22.6%
NEGATIVE Y/Y US CRUDE INVENTORY (EX SPR)					
D					
AVG	-0.9%	-0.9%	6.2%	15.8%	28.7%
MIN	-32.6%	-45.3%	-40.2%	-35.5%	-28.7%
MAX	17.9%	34.0%	38.8%	59.1%	86.5%
% Positive	56.5%	47.8%	56.5%	73.9%	82.6%
SPREAD BETWEEN NEGATIVE AND POSITIVE Y/Y					
AVG	-1.6%	7.0%	23.6%	34.0%	47.7%
MIN	21.6%	21.1%	27.9%	32.3%	41.9%
MAX	-70.5%	-57.8%	3.4%	9.6%	31.6%
% Positive	1.8%	15.8%	33.9%	47.5%	60.0%

**Monthly frequency from 1998 to 2021*

Note: Macro regime as defined by 42Macro; CL1 data from BBG

*Yes, reflation is the typically the best environment for crude and deflation is bad (across **ALL** storage cycles)…*

*…But, in deflationary cycles with **positive** crude fundamentals (rare yes, but negative Y/Y rate of change) where the market is undersupplied, crude has a **positive expected return***

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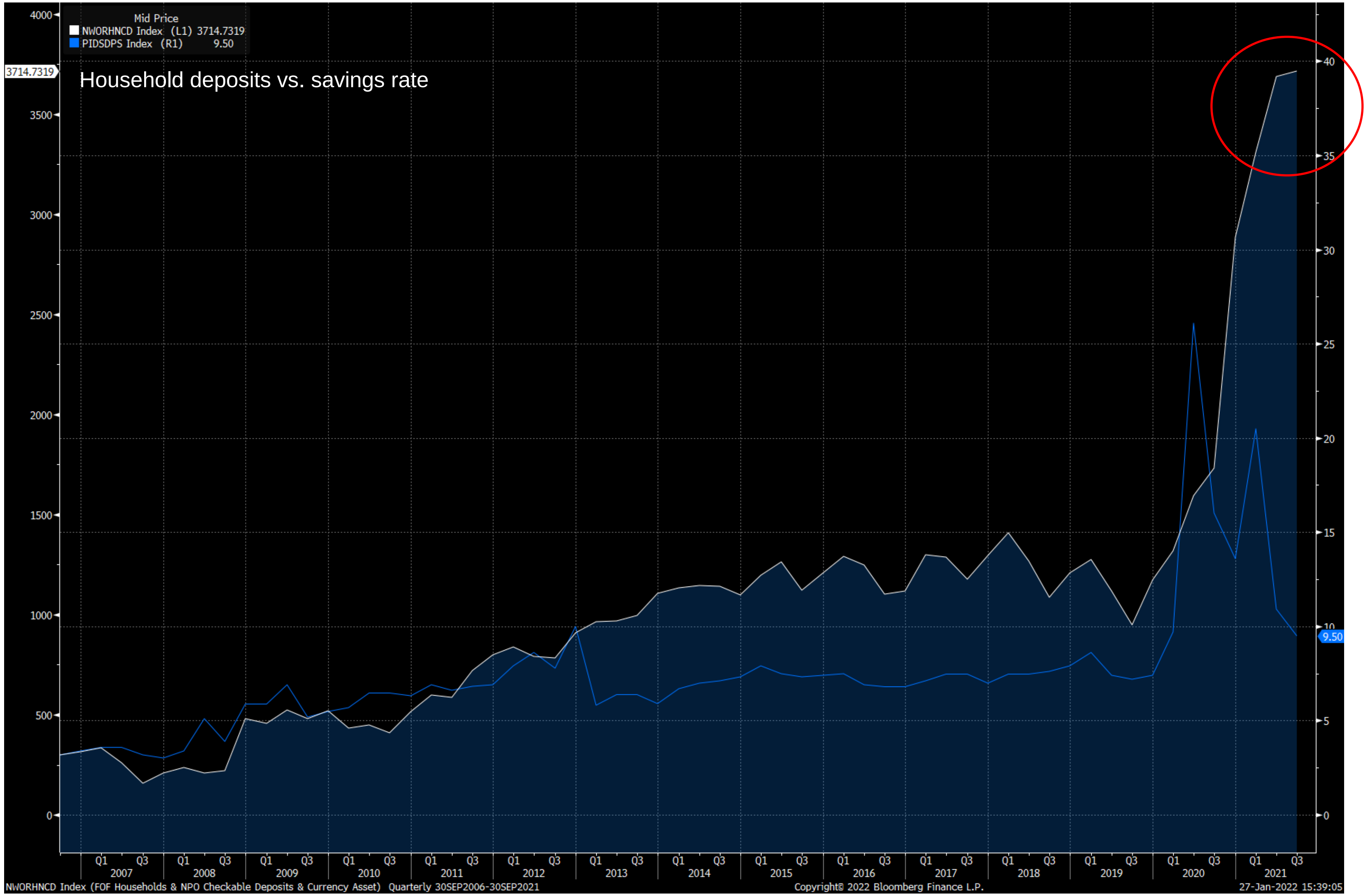
Source: Bloomberg, 42 Macro, Donovan Ventures

A QUICK LOOK AT CONSUMPTION CAPACITY IN THE U.S. – CONSUMER DEPOSITS AT ALL-TIME HIGHS

Unprecedented monetary and fiscal support drove record personal savings rate and levels. While the savings rate is normalizing, total household and non-profit deposits are at record levels (ie. pent-up consumption capacity)



Deposits at record levels, likely to decline from here as cash enters the economy

Savings rate normalizing

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Source: Bloomberg

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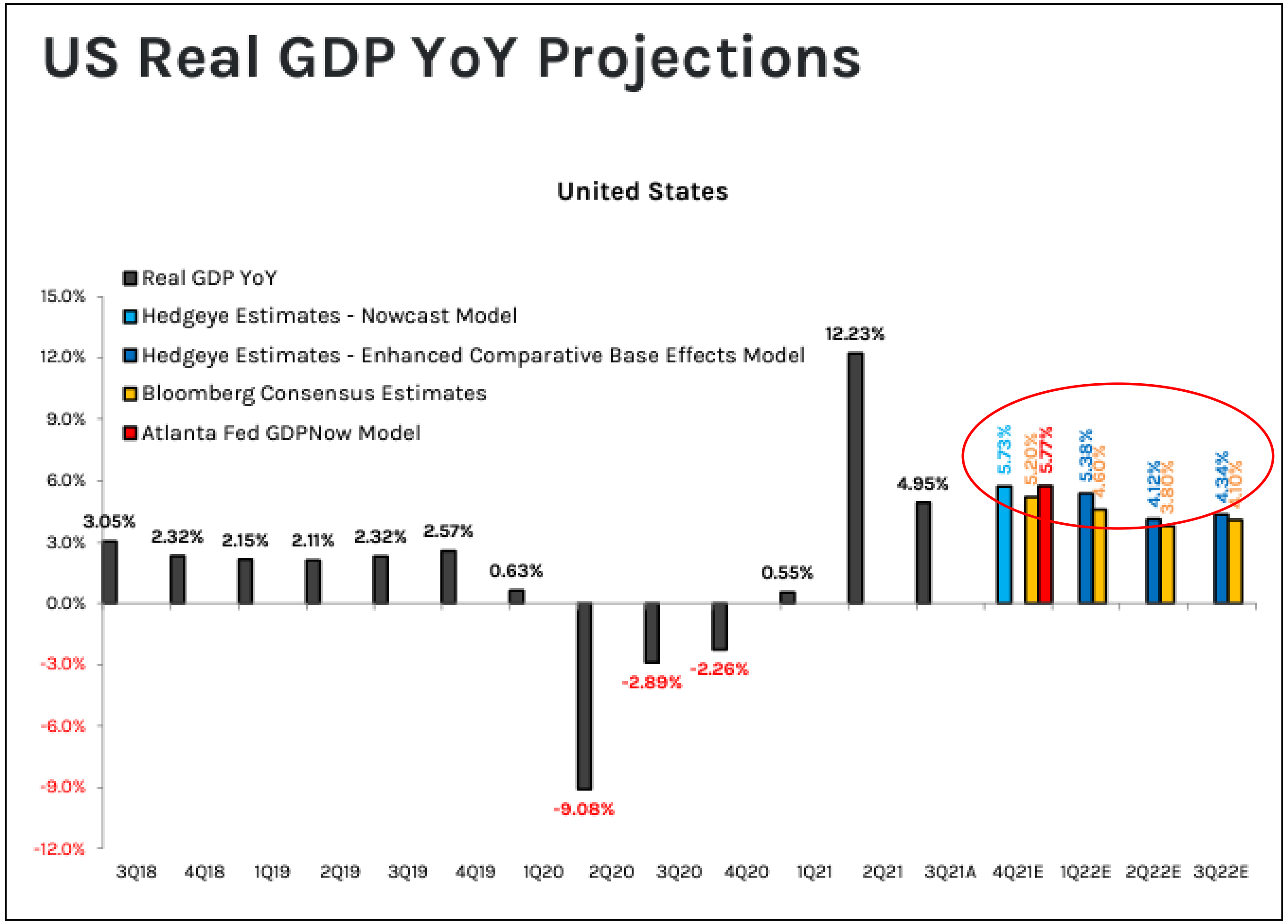
22' GDP ESTIMATES HAVE COME DOWN, BUT ARE STILL >4% Y/Y



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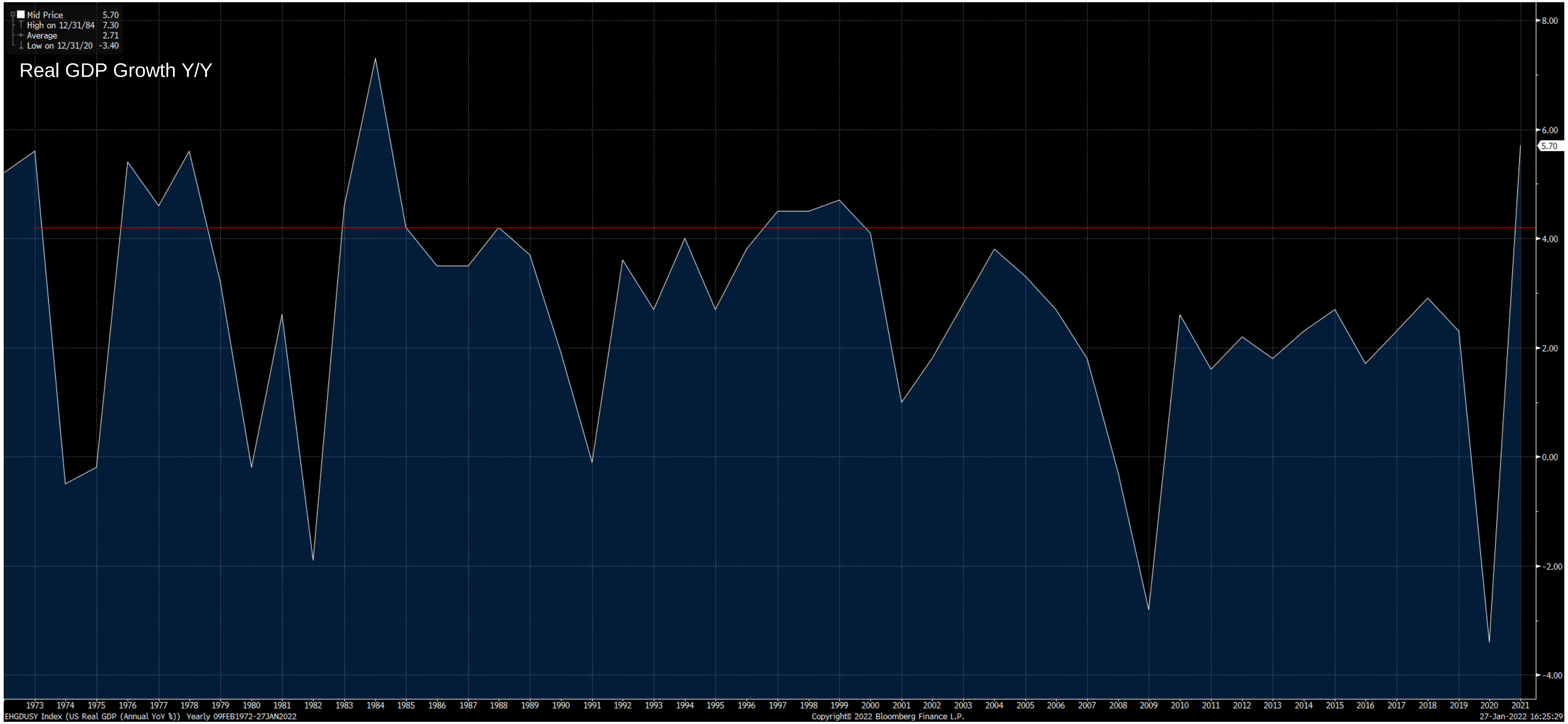
Source: Hedgeye Risk Management

OUTSIDE OF 2021, THE US HASN'T SEEN REAL GDP GROWTH >4% SINCE 1999



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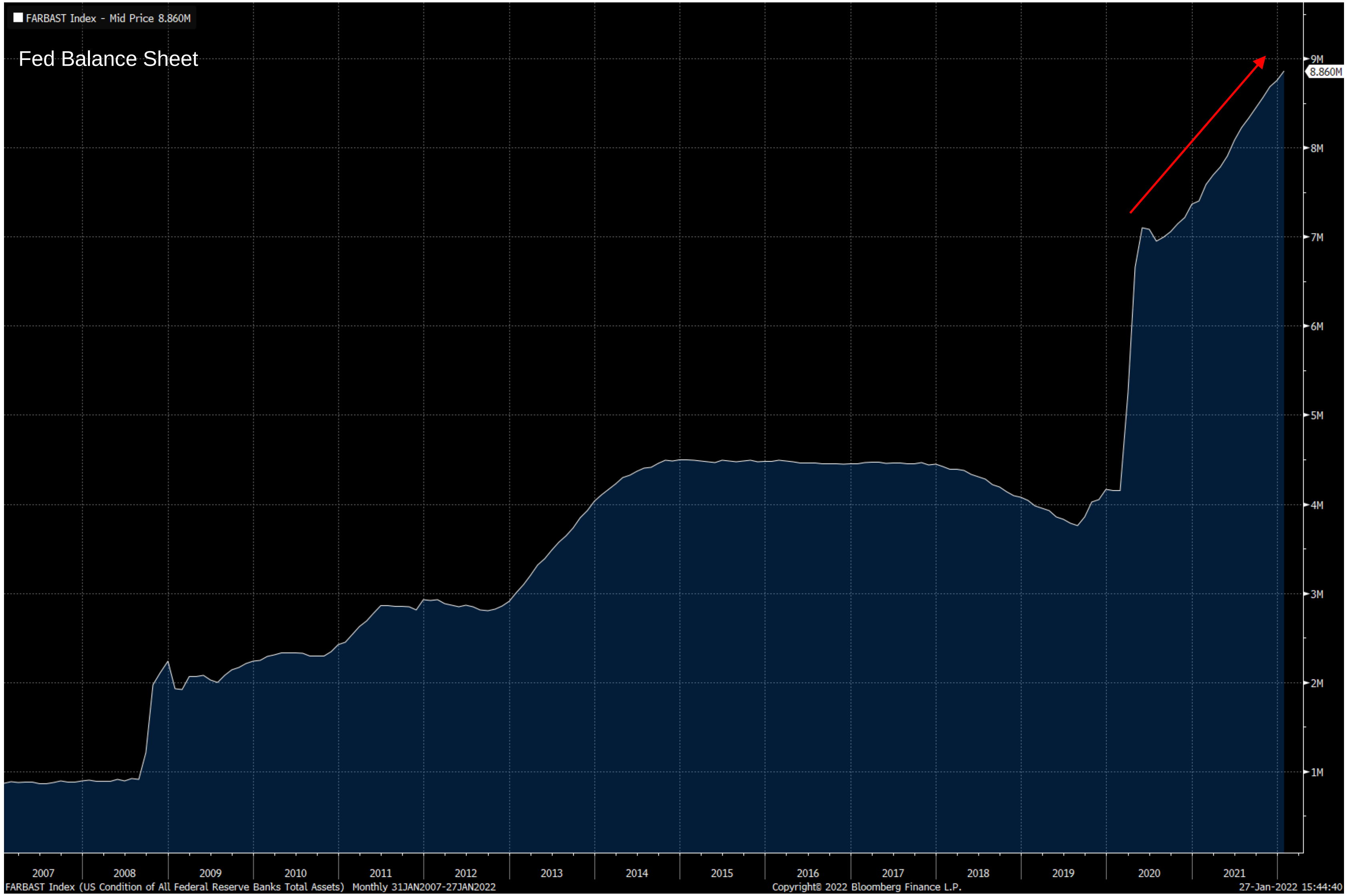
Source: Bloomberg

GDP GROWTH WAS DRIVEN BY A CTRL + PRINT FED AND CONGRESS…



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Source: Bloomberg

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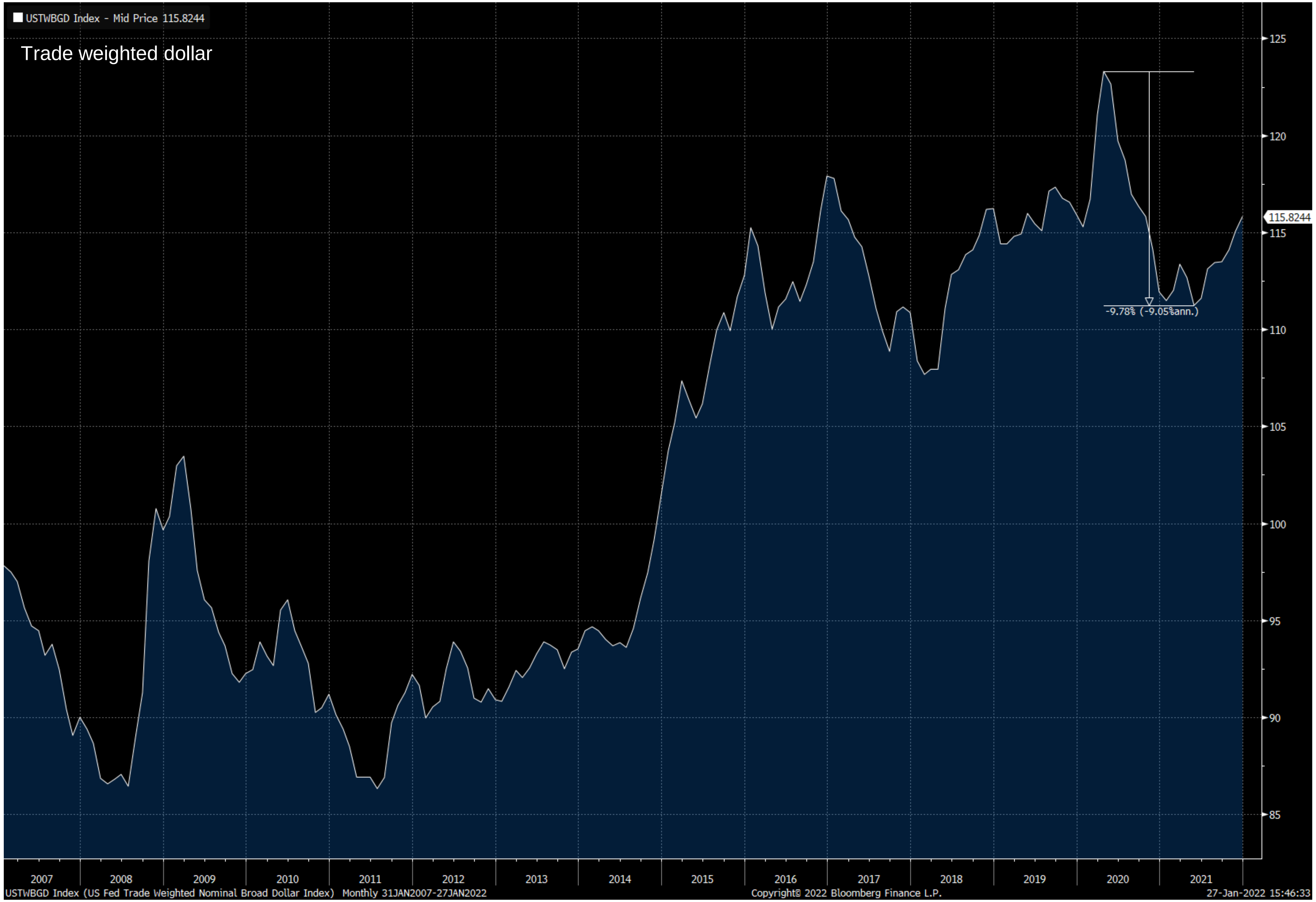
…THAT MONEY PRINTING MACHINE DROVE DOLLAR LOWER BY ~10% AT ITS TROUGH IN 21'…



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Source: Bloomberg

… AND COMMODITIES MUCH HIGHER

CRB index finished 2021 up ~30%, with the Y/Y rate of change peaking at ~+55% in June 2021

CRB index is a basket of 19 commodities, including crude oil, natural gas, heating oil, RBOB gasoline, etc.

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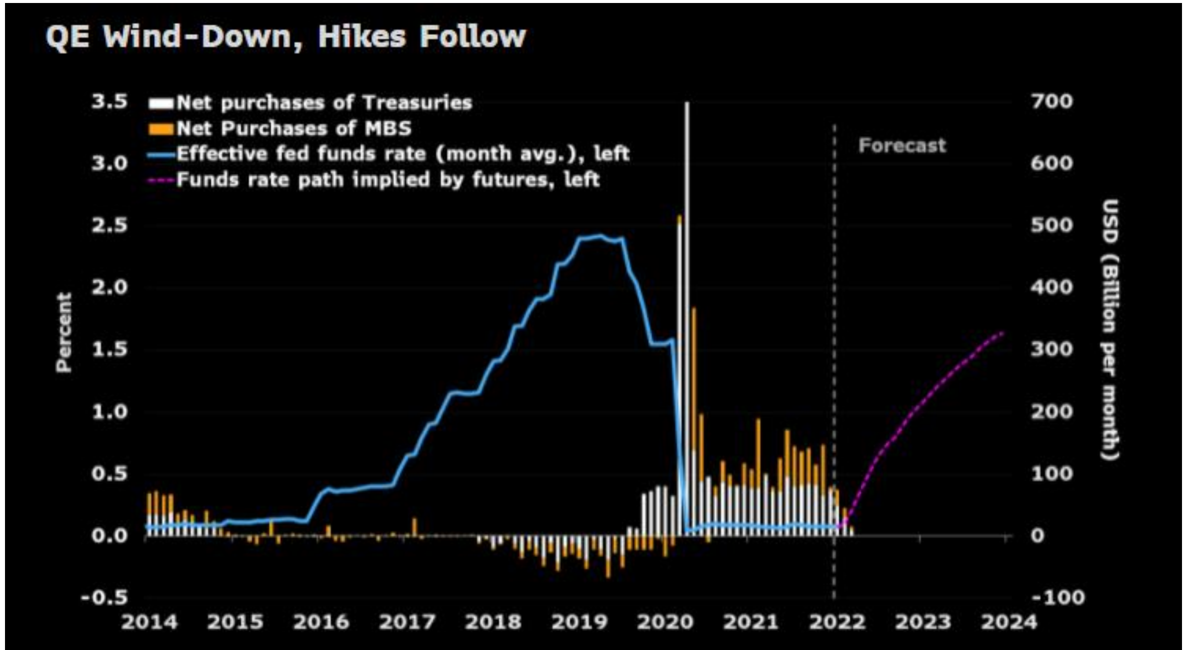
Source: Bloomberg

HOWEVER, MR. POWELL JUST TOLD THE MARKET YOUR MONEY PRINTER IS GOING TO STOP



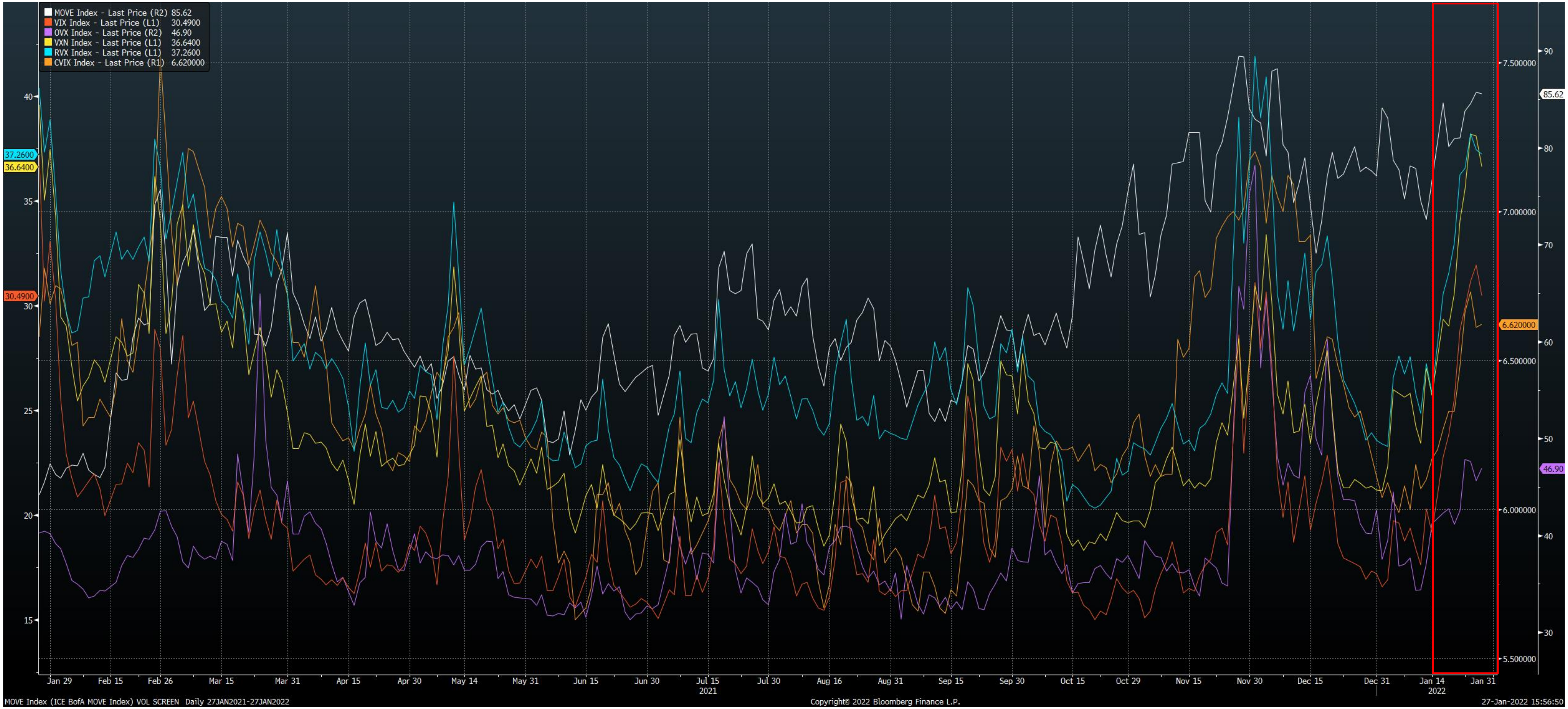
Bloomberg Economics, Federal Reserve, Bloomberg. Note: Purchases summed to $1.2 trillion in April 2020

Powell Sounds Very Hawkish

Chairman Powell clearly telegraphed a rate hike at the Fed's March meeting at the press conference. He also made several relatively hawkish comments.

- First, he said the majority of the committee favor raising rates in March. And when asked whether hikes at consecutive meetings are in play, he did not rule it out.
- Second, since December Fed staff have probably increased their inflation forecasts, as Bloomberg Economics expected. Powell said that he would be inclined to lift the core PCE by a "few tenths" of a percentage point. In our view, this implies that, based on today's information set, the FOMC would have anticipated four rate hikes for 2022 instead of three as set out in its December projections. Furthermore, he said that inflation risks are tilted to the upside, particularly given the spread of omicron in China and geopolitical conflict in Europe. Bloomberg Economics expects five rate hikes by the end of the year as the FOMC realizes by mid-year that price growth is running hotter than is consistent with its 2% inflation mandate.
- Third, when asked about the FOMC's reaction to the recent equities rout, Powell implied the market is exactly where the Fed wants it to be. This indicates if the selloff does not have a material impact on the real economy, then the Fed will overlook it. Powell also added that there's room for financial conditions to tighten without hurting the labor market, which he characterized as "very, very strong," and perhaps the tightest "ever".

With the coming expectation of a hawkish acceleration by the Fed, market volatility spiked



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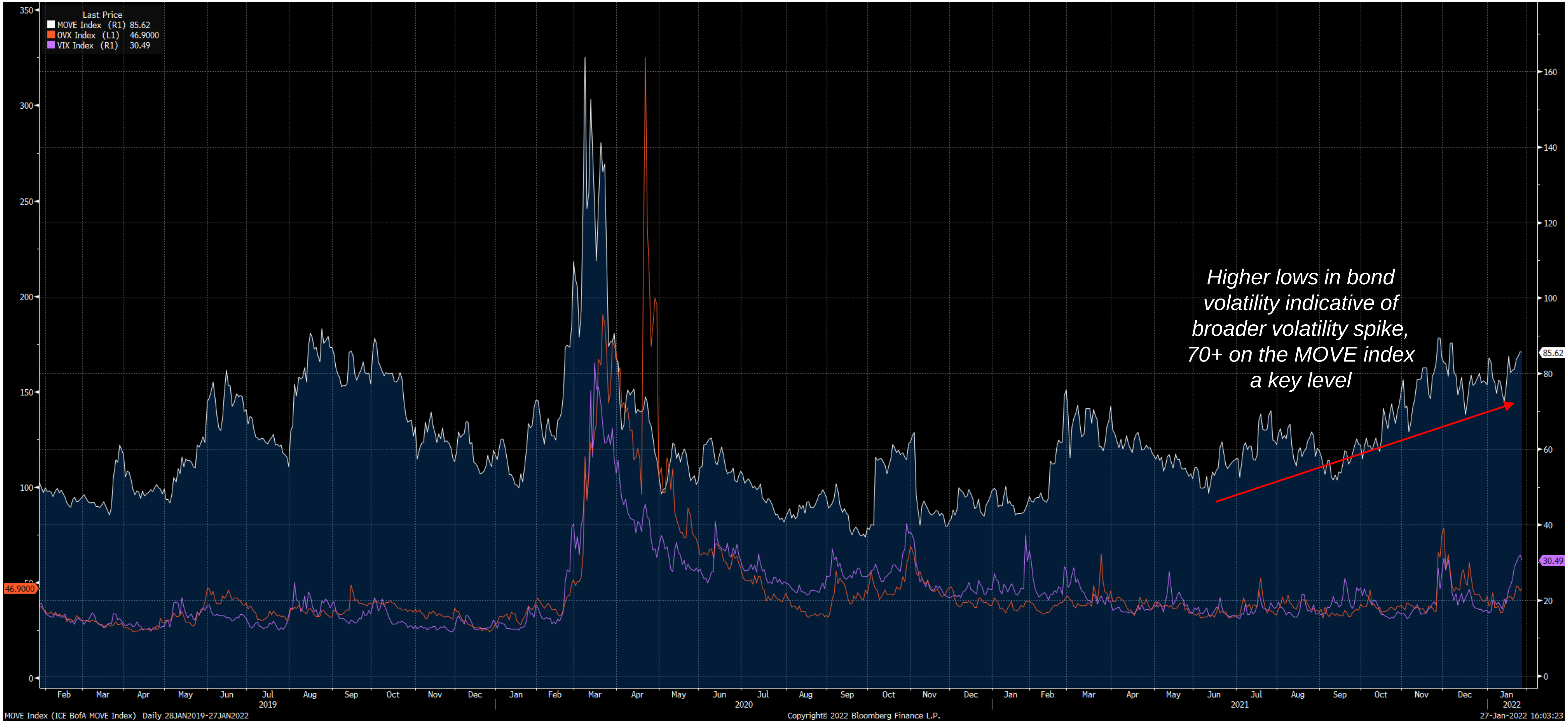
Source: Bloomberg

WE CLOSELY FOLLOW THE MOVE INDEX, WHICH OFTEN PRESAGES MOVES IN EQUITY AND COMMODITY VOL



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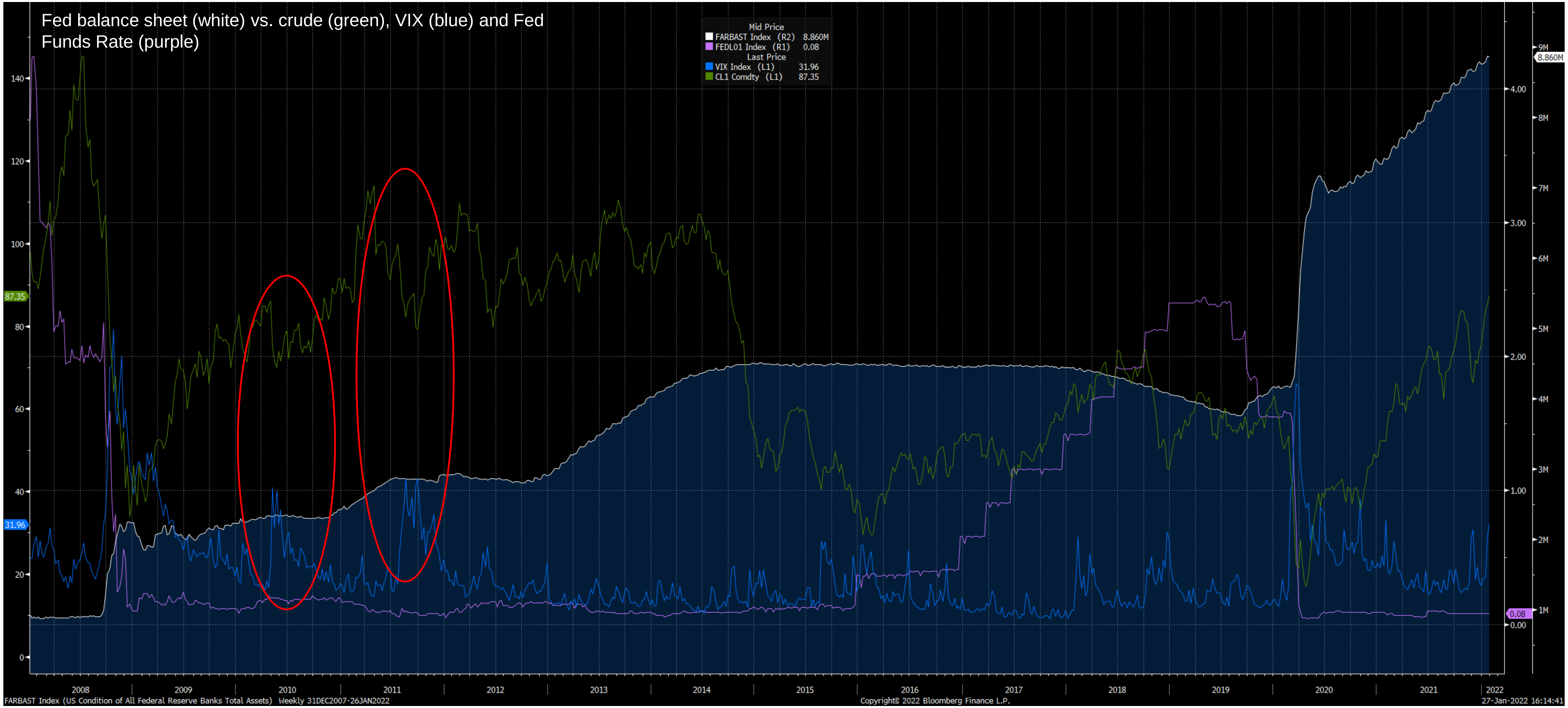
Source: Bloomberg

THE BIGGEST QUESTION IS WHEN WILL THE FED PULL BACK FROM THE HAWKISH STANCE?

In 2010 and 2011, the start/stop of balance sheet reduction by the Fed and slight raises in the Fed funds rate drove significant spikes in equity volatility. In 2010, WTI pulled back ~18% on the first reduction, and the second pause drove a ~30% correction.



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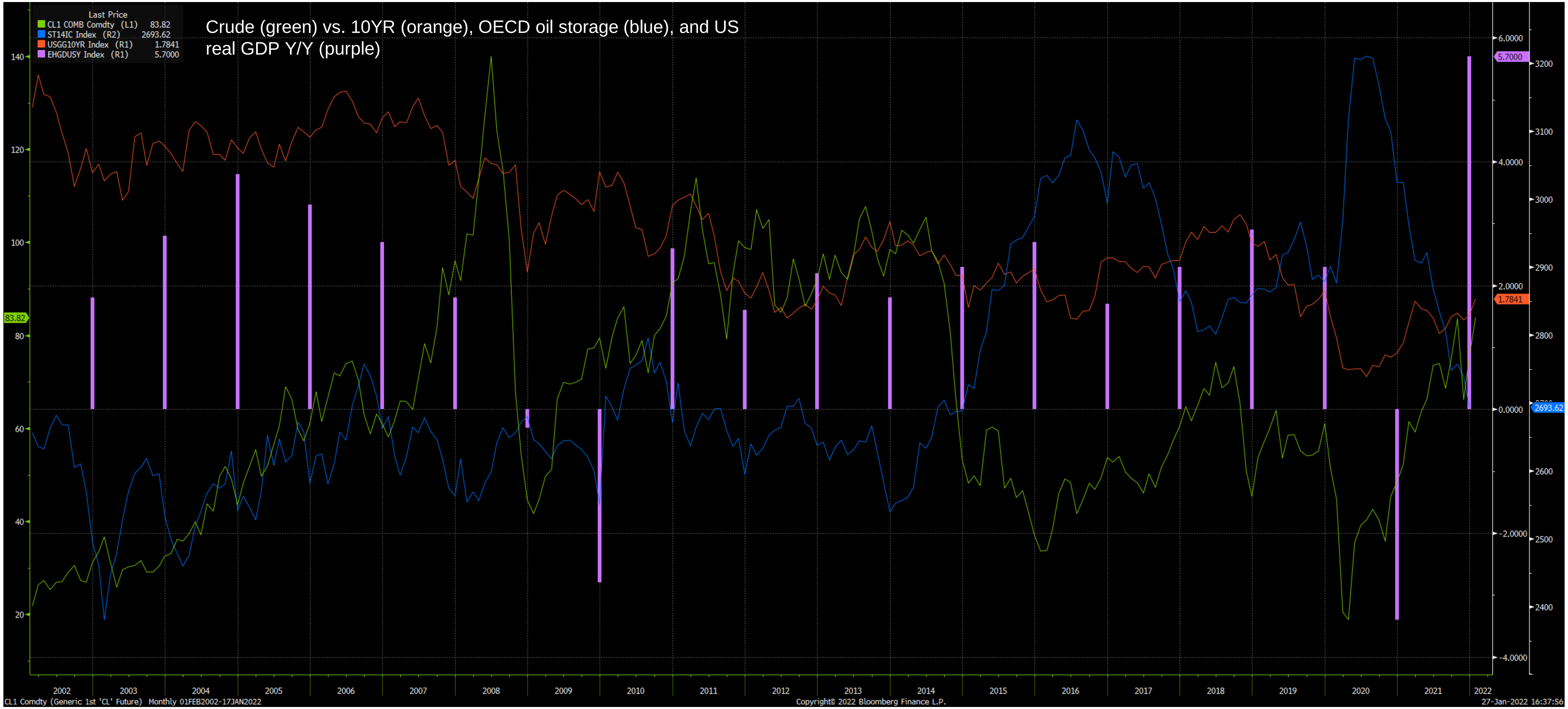
Source: Bloomberg

Volatility spikes in commodity markets likely represent opportunities to add long exposure in 1H22'…

Every cycle is different, but the current supply demand balance is like 2011 when the market was significantly undersupplied oil as demand rebounded into tightening monetary policy and decelerating GDP growth. Demand has accelerated much faster this cycle, and capex is increasing from a much lower base.

The likely case is for inventories to remain negative Y/Y, supporting accelerating crude prices in 1H22'



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Source: Bloomberg

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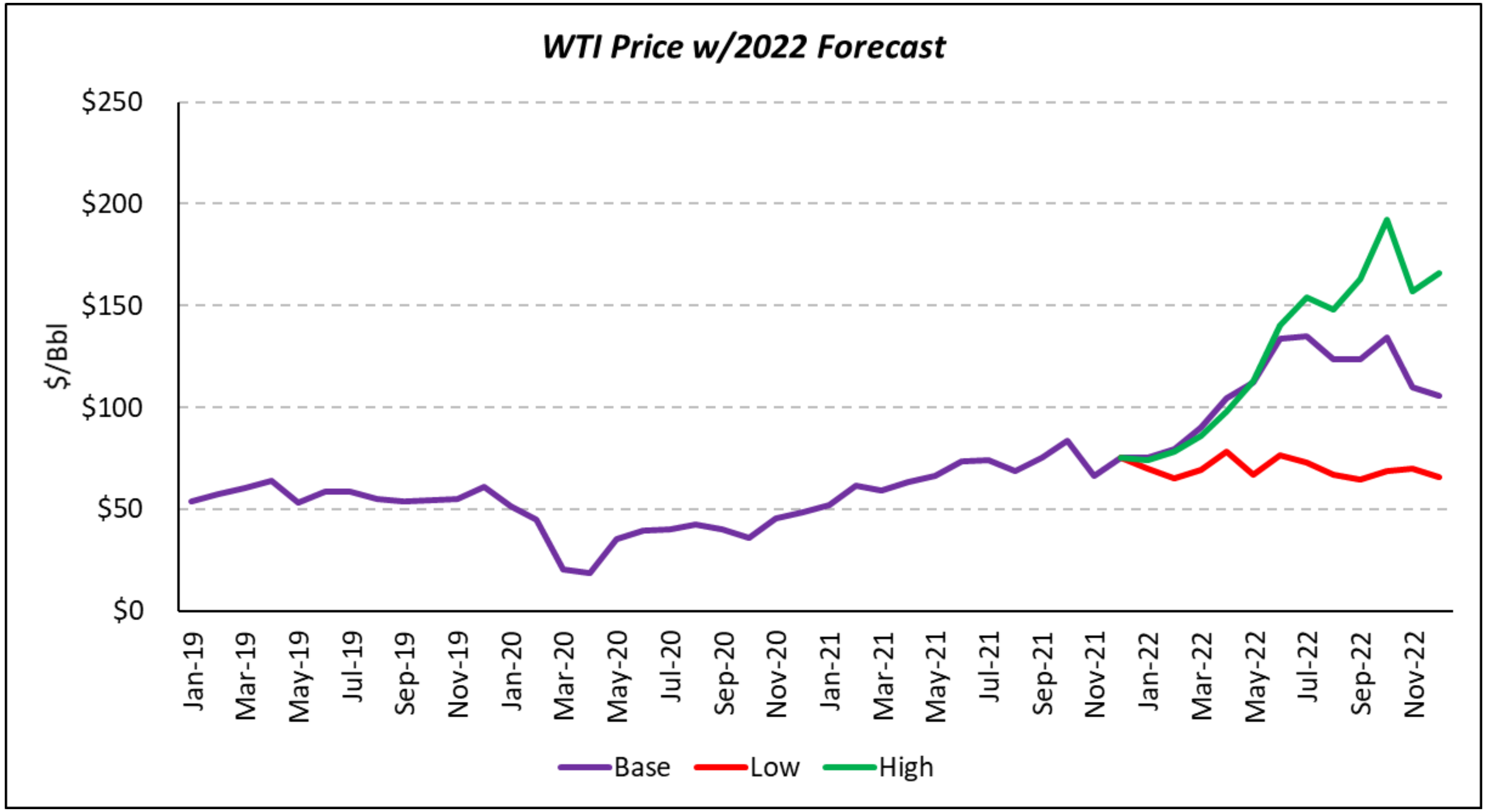
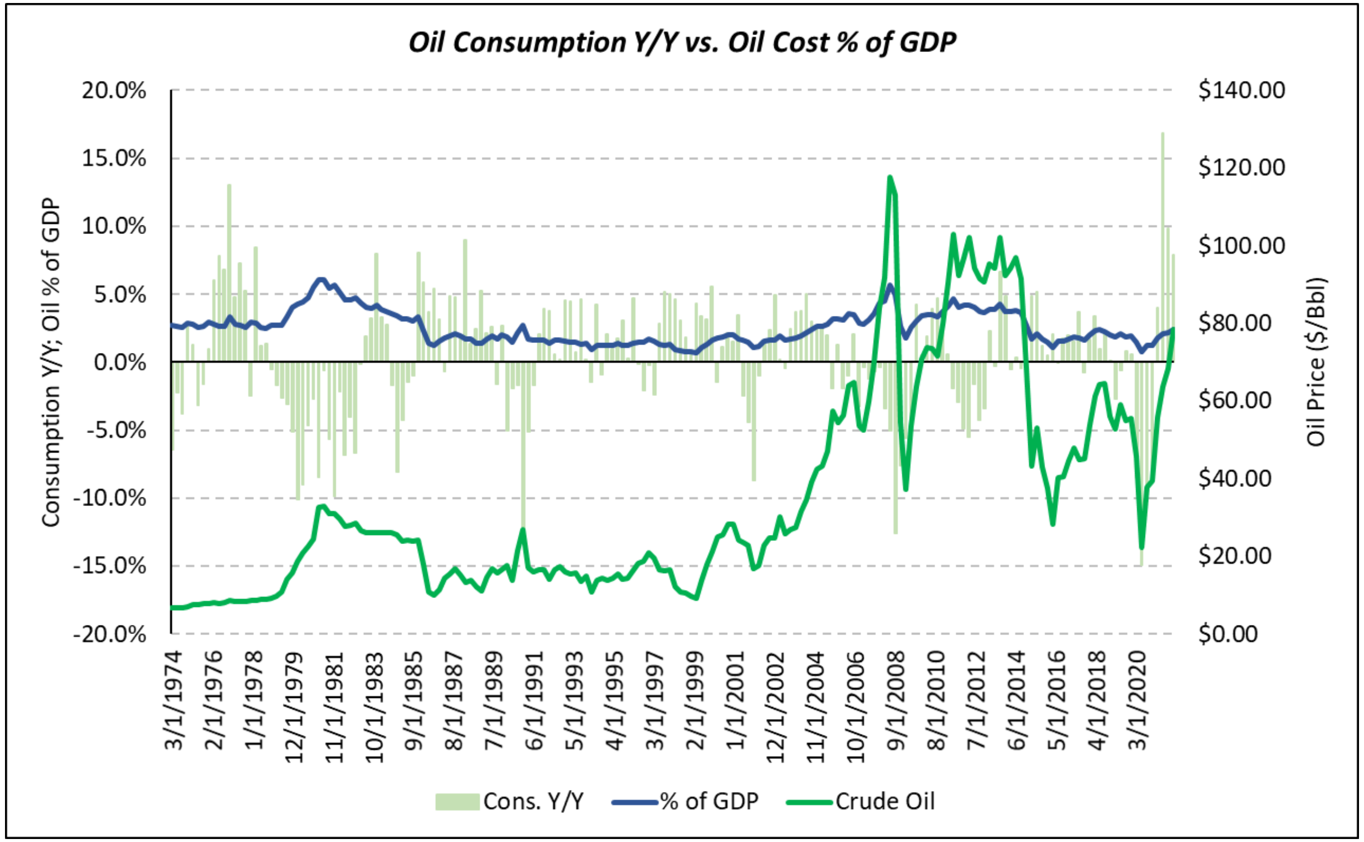
GRAND FINALE – WTI PRICE FORECAST…

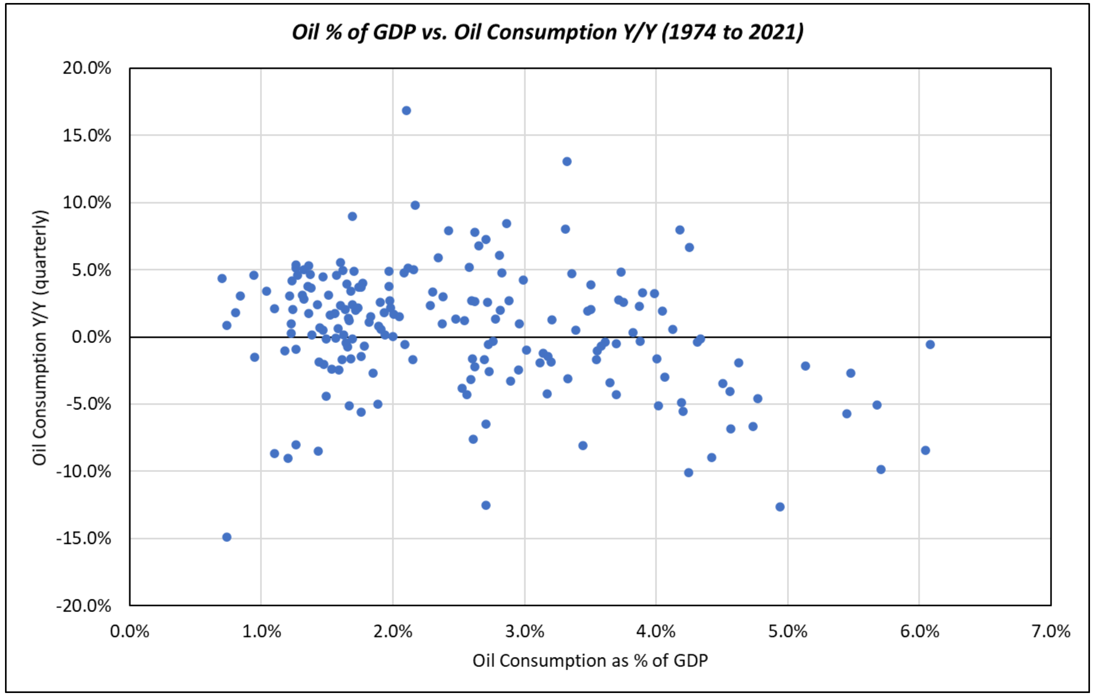


Source: Donovan Ventures, Bloomberg

… BUT TIME FOR THE CATCH – DEMAND DESTRUCTION

*Since 1974, ~**<u>75% of quarters following</u>** a quarter where oil expenditures as a % of GDP are **<u>greater than 4%</u>** have seen negative Q/Q oil consumption. When using 5% (% of GDP) as a threshold, **<u>~84%</u>** of quarters have negative consumption Q/Q.*





*Base case forecast assumes 2022 peak WTI near the 4% threshold (at ~$130/bbl) , which is likely to impact crude oil demand negatively. The magnitude of the impact is hard to model, but a **<u>negative inflection in prices</u>** subsequently is a probable outcome.*

2022 Case Commentary

Model input	Base case	High case	Low case
Monetary policy	◦ Balance sheet growth decelerates in 1H22' with first rate hikes commencing, dovish pivot in mid-22'	◦ Fed pulls back on hawkish commentary and stance in early 2Q22'	◦ Fed maintains hawkish stance and does not pull back commentary or policy in 22'
Dollar	◦ Dollar continues to strengthen in 1H22', likely peaks in mid-22'	◦ Dollar strengthens with hawkish Fed until dovish pivot and then pulls back through year-end	◦ Dollar continues to make new cycle highs through 22'
OPEC + supply	◦ Spare capacity normalized in 1Q22' ◦ Production increases to ~30mmbbl/d by mid-22' ◦ Reduces call on US exports	◦ Spare capacity normalized in 1Q22' ◦ OPEC + attempts to accelerate production, but lead time from activity to first production pushes volume growth to 2H22'	◦ Spare capacity normalized early 1Q22' ◦ OPEC+ accelerates capex and production growth, Iran volumes return in 3Q22'
US Supply	◦ Slow ramp due to 1H22' supply chain issues ◦ Supply chain issues alleviate mid-2Q' and allows for supply to ramp ◦ US exits at ~12.5mmbbl/d	◦ US maintains flat production and is unable to ramp due to supply chain issues (12Mmbbl/d exit)	◦ US supply chains ease in late 1Q22', private operators ramp 10-15% Y/Y and public operators accelerate capex (13.2Mmbb/d exit)
Demand	◦ US accelerates at slower pace Y/Y than 21', but reaches ~17.1mmbbl/d (refiner net inputs) in summer 22' ◦ Global demand accelerates to between 102 and 103Mmbbl/d	◦ US demand accelerates Y/Y at slightly reduced pace than 21' (~75%) ◦ Global growth accelerates to 103MMbbl/d by summer 22'	◦ Y/Y growth moderates at a slower pace than 21' ◦ Global economy decelerates in 2Q22' due to significant supply chain problems and limited fiscal impulse

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