

R. Dean Foreman, Ph.D.
Second Quarter 2024
June 17, 2024



Key Points

Global, U.S. and Texas Economies

- **Growth amid uncertainties.** The U.S. and China remain pivotal in driving global economic growth, which has maintained solidity so far in 2024. However, escalating U.S. household debts and increased loan delinquencies raise financial uncertainties
- **Currency impact.** The delay in U.S. interest rate cuts during Q2 2024 has strengthened the dollar, historically resulting in downward pressure on oil prices. Lower energy prices have, in turn, recently contributed to lower global price inflation

Global Oil Market

- **Demand surge.** 2024 marks a record-setting year, with developing economies expected to propel global oil demand to new heights in 2024 and 2025. This demand is fueled by the need for natural gas liquids and petrochemical feedstocks, vital for modern society
- **Production gains.** U.S. oil production has exceeded EIA's earlier forecasts, thanks to significant rig productivity improvements, with Texas and the Permian Basin leading, accounting for two-thirds of total U.S. oil and natural gas production growth so far in Q2 2024
- **Inventories and pricing.** U.S. crude oil inventories increased in Q2 2024, nearing typical historic levels, while futures prices have aligned with their historical mean

Natural Gas Markets

- **Record demand and supply.** Global demand and supply of natural gas are anticipated to reach record levels in 2024 and 2025, despite geopolitical uncertainties. U.S. natural gas production continues to grow, predominantly from the Permian Basin, linked to oil production
- **Texas has set new production records in 2024,** with February output doubling the state's consumption

Texas oil and natural gas industry

- **Industry expansion.** The oil and natural gas sector in Texas had continued to experience growth in employment and wages, bolstering the state's economic development

[Global, U.S., and Texas Economies](#)

- [The U.S. and China remain the primary global growth drivers](#)
- [With delayed U.S. interest rate cuts, the dollar's exchange value has risen so far in Q2 2024, historically adding downward pressure on oil prices](#)
- [Energy prices have recently helped spur lower global price inflation](#)
- [As U.S. household debts have reached record-highs, serious loan delinquencies have risen](#)
- [Business conditions have remained conducive to U.S. GDP growth](#)

[Oil Markets](#)

- [Developing economies could drive global oil demand to consecutive record highs in 2024 and 2025](#)
- [Building blocks of modern society – natural gas liquids and petrochemical feedstocks – have driven oil demand at every level](#)
- [Consecutive global oil supply records projected in 2024 and 2025 per EIA](#)
- [Strong rig productivity gains have enabled production growth despite lower drilling activity](#)
- [Texas has set new production records and increasingly driven U.S. supply](#)
- [U.S. crude oil inventories rose in Q1 2024 towards typical historic levels](#)
- [Crude oil prices historical mean reversion analysis: futures prices have aligned with their historical mean](#)

[Natural Gas Markets](#)

- [Global natural gas demand could reach record highs in 2024 and 2025](#)
- [U.S. natural gas production has continued to rise, mainly from the Permian Basin and associated with oil production](#)
- [Texas set new natural gas production records so far in 2024](#)
- [Texas' natural gas flows in February 2024: Production doubled instate consumption](#)
- [Near-term natural gas futures are below the historical mean reversion target](#)
- [Texas' oil and natural gas industry's jobs and wages have continued to grow](#)

Global, U.S. and Texas Economies

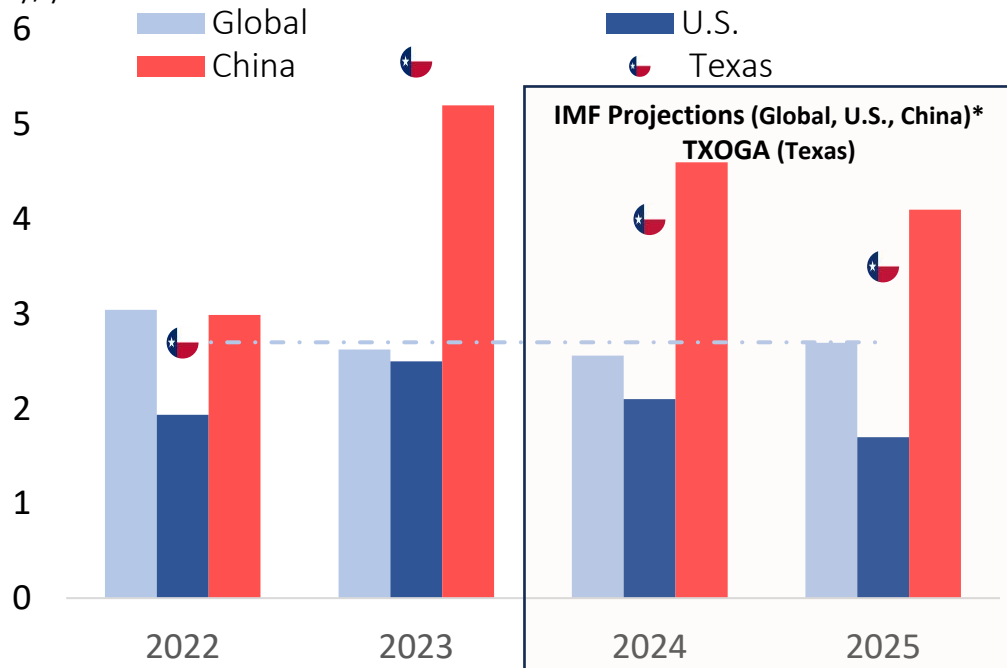


The U.S. and China remain the primary global growth drivers

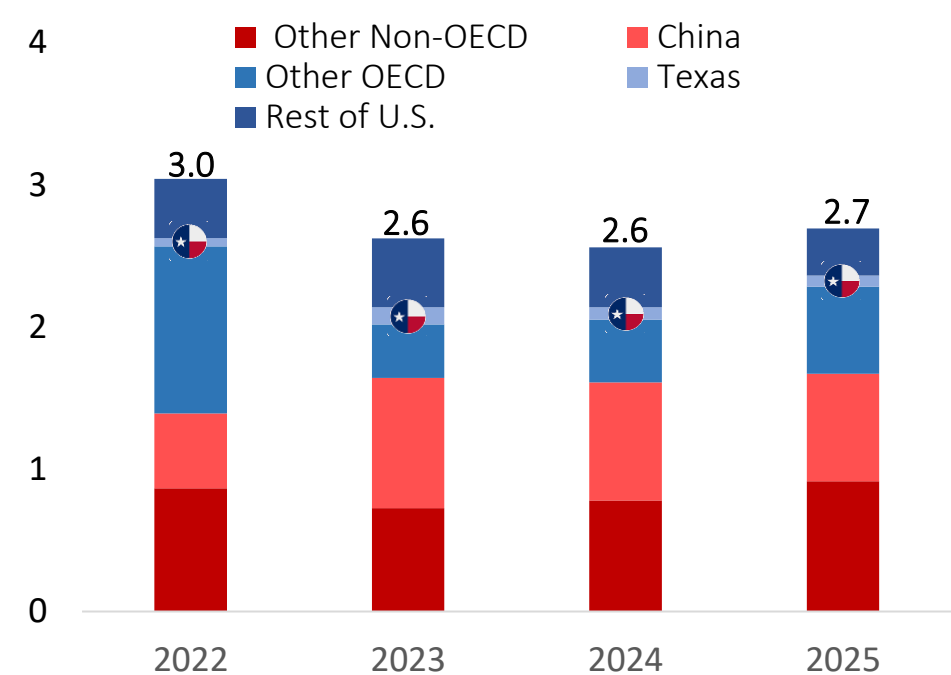


- Official projections for global GDP growth of 2.6% in 2024 and 2.7% 2025 were reduced by 0.1% in April and stand just below long-term average levels
- Although the outlook for the U.S. and China is expected to slow, together the two economies are projected to continue driving about half of global GDP growth, with increased contributions across the broader global economy
- Texas could continue to drive about one-fifth of U.S. economic growth

Real GDP growth*
y/y%



Contributions to global real GDP growth by region/country/Texas*
%

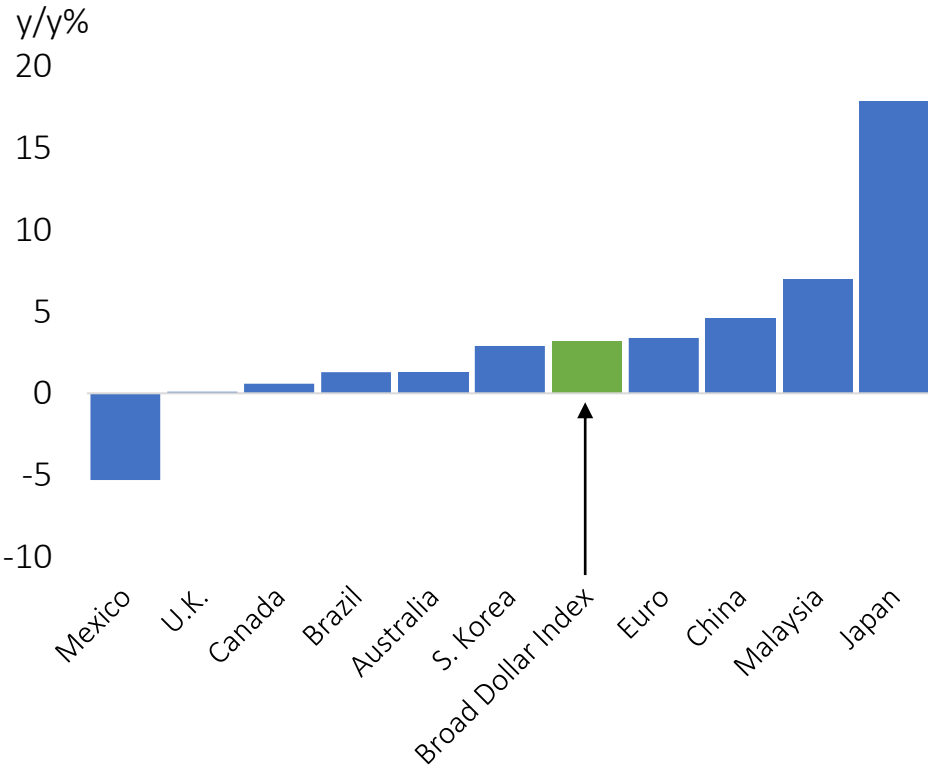


With delayed U.S. interest rate cuts, the dollar's exchange value has risen so far in Q2 2024, historically adding downward pressure on oil prices

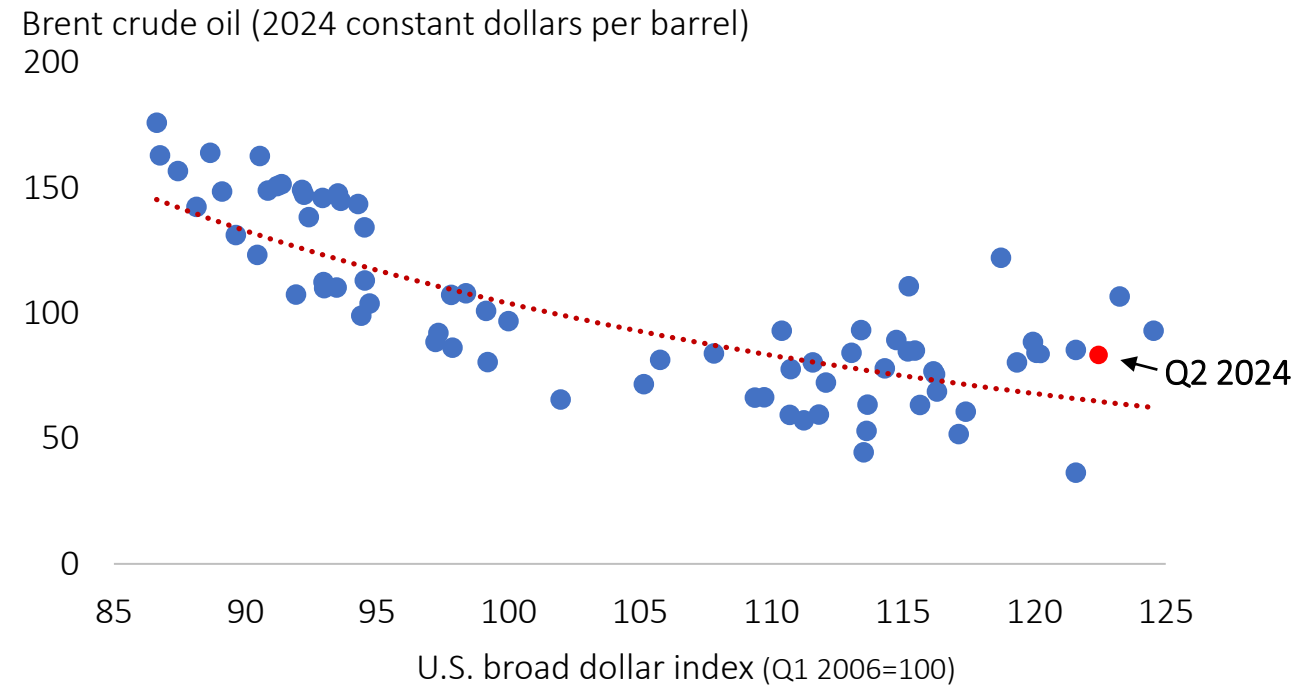


- As of early June, the U.S. dollar appreciated 3.1% y/y and to the top 4% of its values since 2006, but was marked by regional divergences
- Although myriad factors influence global oil prices, the U.S. dollar's strength versus its trading partners' currencies has historically been inversely correlated with oil prices, due to oil being priced in U.S. dollars, commodity trading dynamics, terms of trade, and indirect effects of monetary policy

U.S. dollar appreciation (depreciation) versus main trading partners' currencies, April 2024



U.S. broad dollar index and Brent crude oil prices, Q1 2006-Q2 2024

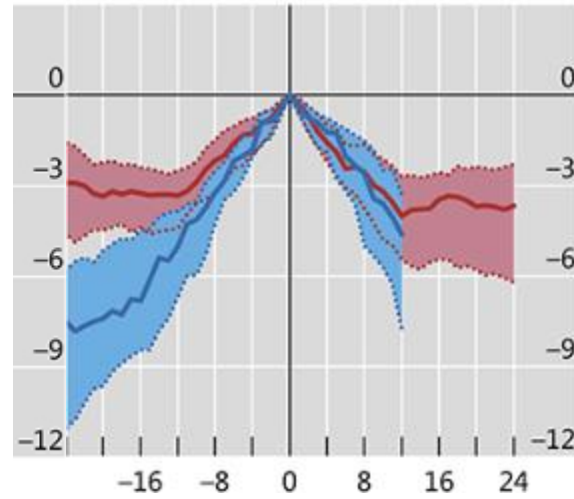


Energy prices have recently helped spur lower global price inflation

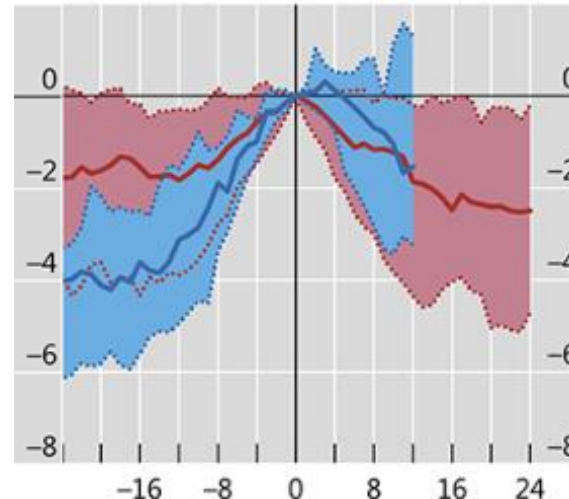


- ▶ The Bank for International Settlements (BIS) analyzed consumer price inflation for 34 economies, comparing points when the median global level began decreasing
 - Price changes for goods have been larger than for services, due to post-pandemic supply chain and inventory-related effects that were compounded by Russia's war in Ukraine affecting energy and food prices
- ▶ Services' price inflation has remained persistent, mainly due to the housing component of prices reflecting supply limitations and higher financing costs

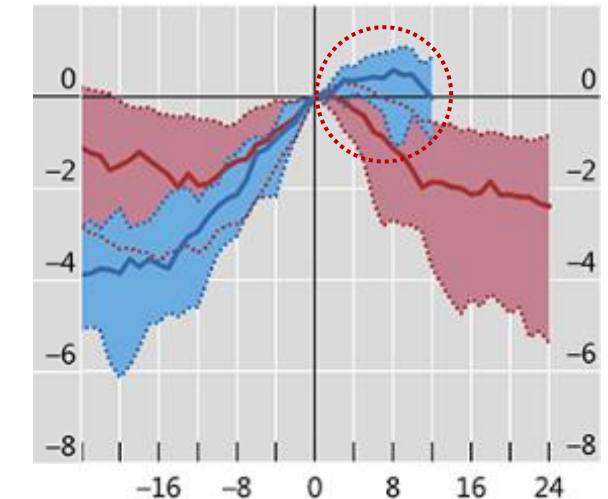
Consumer price inflation
y/y%



Goods price inflation (excluding food and energy)
y/y%



Services price inflation
y/y%



Historical: 2022-23
— Median —
■ Interquartile range ■

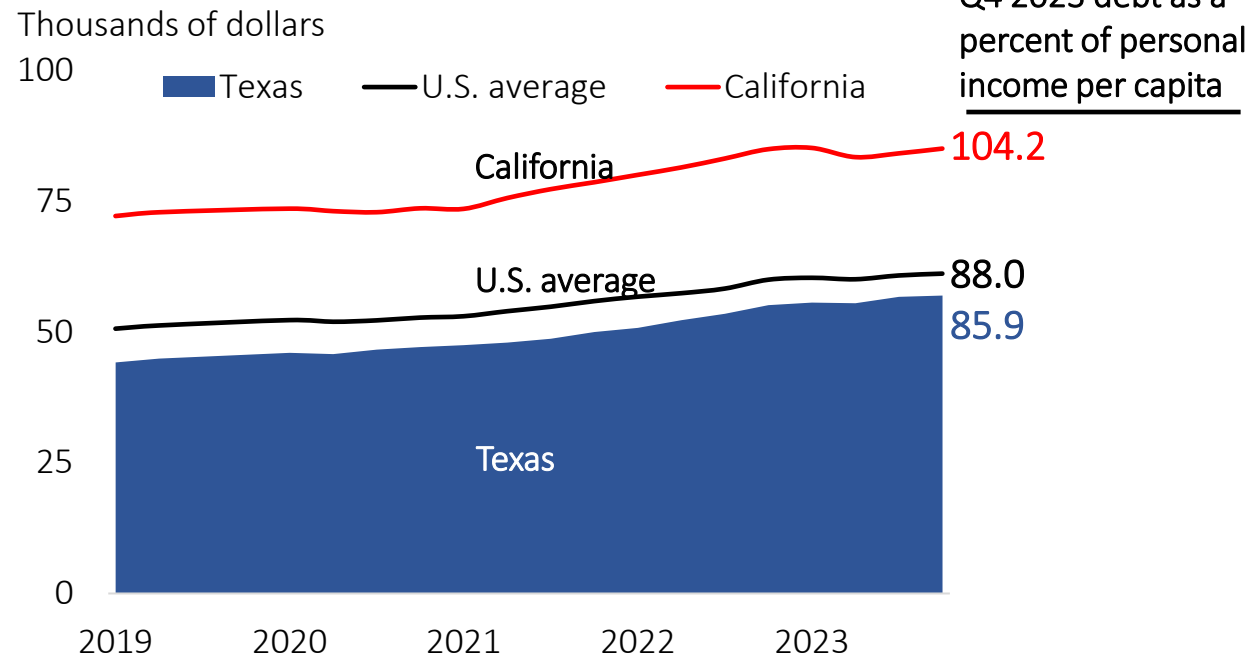
* Each start of a disinflation episode is captured when the 13-month moving average is at its peak, under the conditions that: (i) there are no other peaks in the preceding and the following 12 months; (ii) the peak is between 3 and 25%; and (iii) the peak is at least 3 percentage points higher than the lowest troughs in the preceding and the following 12 months. Month = 0 is when the actual headline inflation value is at the highest during that particular episode. Panels include data from 21 AEs and 18 EMEs, where available. Data for historical episodes are from 34 countries. For 2022-23, data are from AU, BR, CA, CH, CL, CO, CZ, DK, EA, GB, HU, IL, JP, KR, MX, NO, NZ, PH, PL, SE, SG, US and ZA.

As U.S. household debts have reached record-highs, serious loan delinquencies have risen

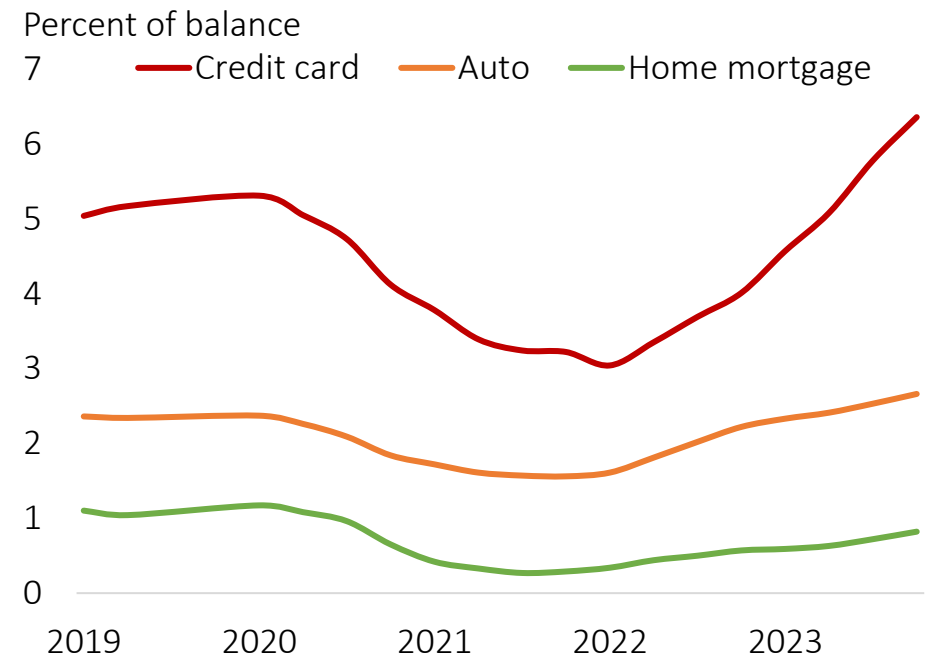


- U.S. household debt reached a record high \$17.5 trillion in Q4 2023 per the New York Federal Reserve Bank, corresponding with debt per capita exceeding \$61,000 or 88% of personal income per capita
 - Texans' debts are relatively lower but have risen towards the nationwide average since 2022
 - Californians are the most indebted in the nation with debt per capita of nearly \$85,000 or over 104% of their personal income
- Credit card, auto loan, and mortgage delinquencies of 90+ days have increased – and for credit cards and auto loans delinquencies currently exceed 2020 pandemic levels

Total debt per capita* by state



New seriously delinquent* balances by loan type



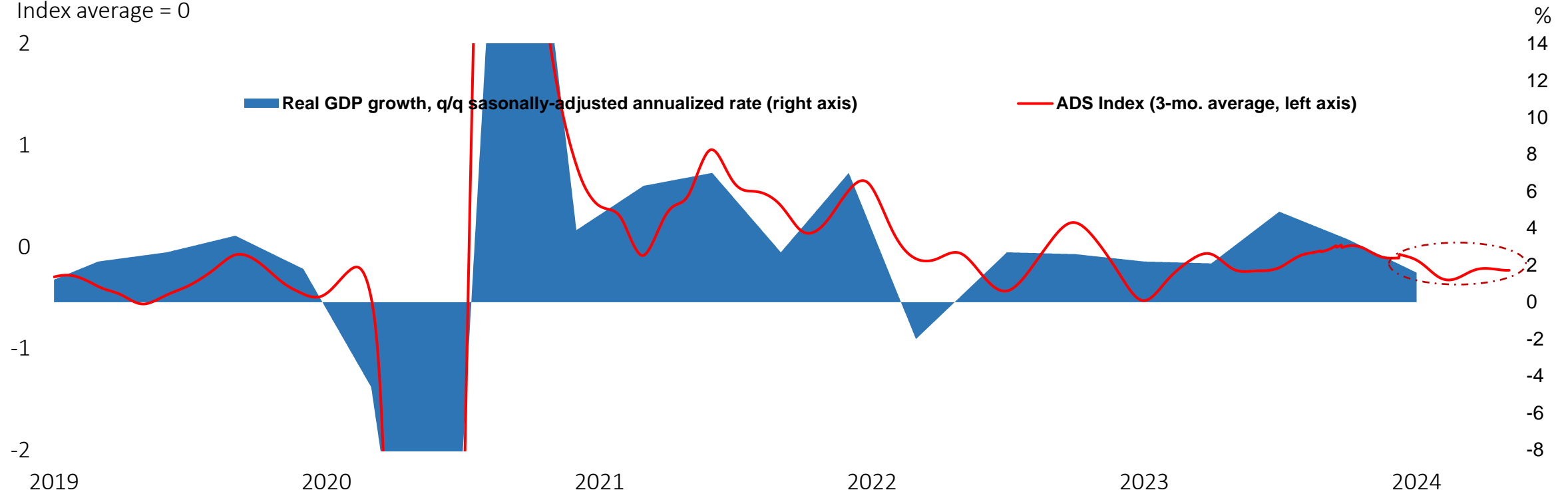
Business conditions have remained conducive to U.S. GDP growth



- ▶ The ADS business conditions index, published by the Philadelphia Federal Reserve Bank, is a leading indicator of GDP growth
- ▶ A rolling 3-month average of the ADS index accurately reflected growth in Q1 2024 real GDP and has remained consistent with continued expansion so far in Q2 2024

Aruoba-Diebold-Scotti Business Conditions Index and U.S. real GDP growth

Index average = 0



Oil Markets



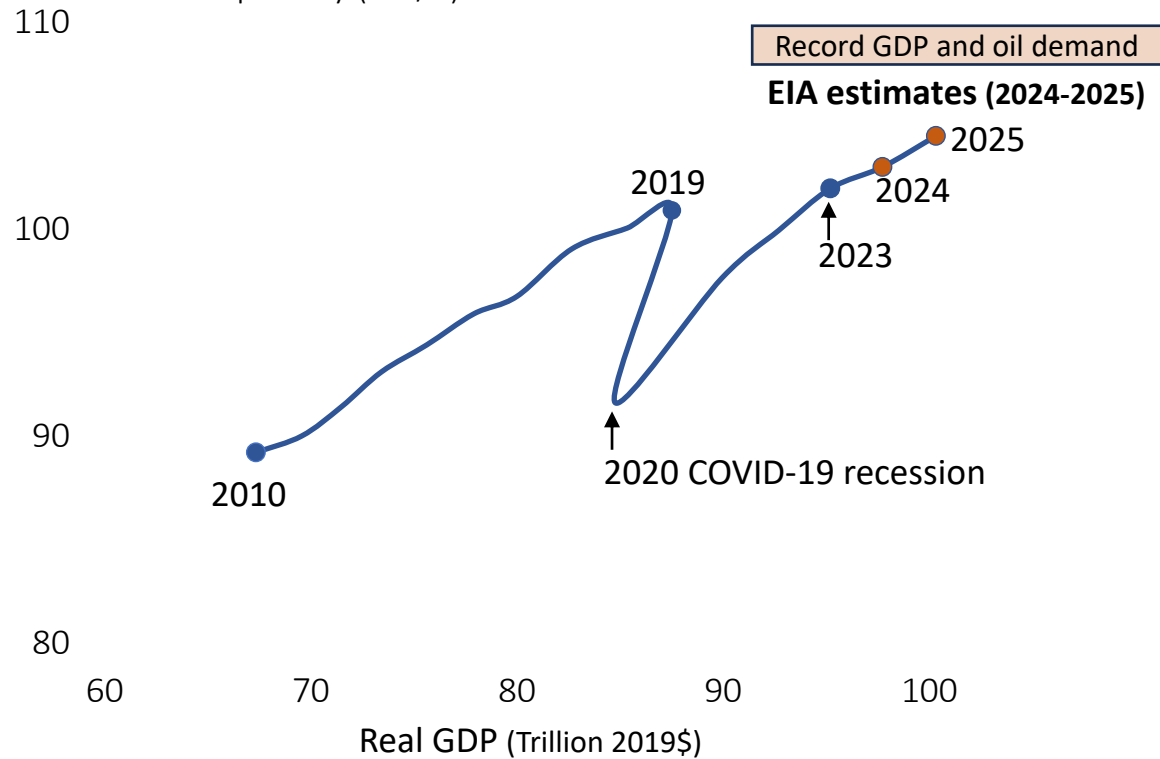


Developing economies could drive global oil demand to consecutive record highs in 2024 and 2025

- Recent EIA upgrades place global oil demand at record highs of 102.9 mb/d in 2024 and 104.3 mb/d in 2025
- Implication: China and other non-OECD economies are expected to drive global oil demand growth

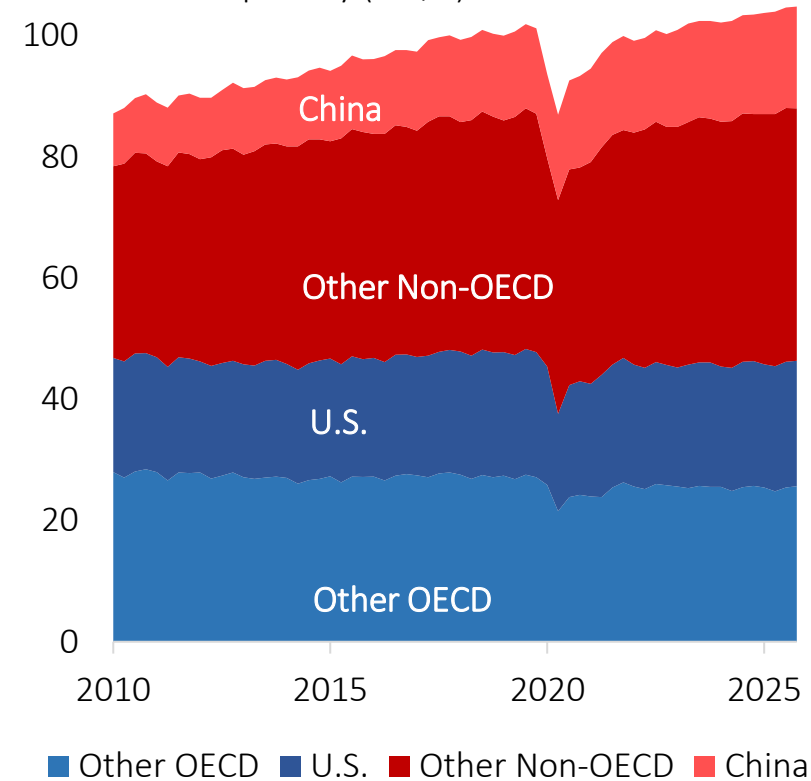
Global oil demand versus GDP*

Million barrels per day (mb/d)



Global oil demand by country/region

Million barrels per day (mb/d)



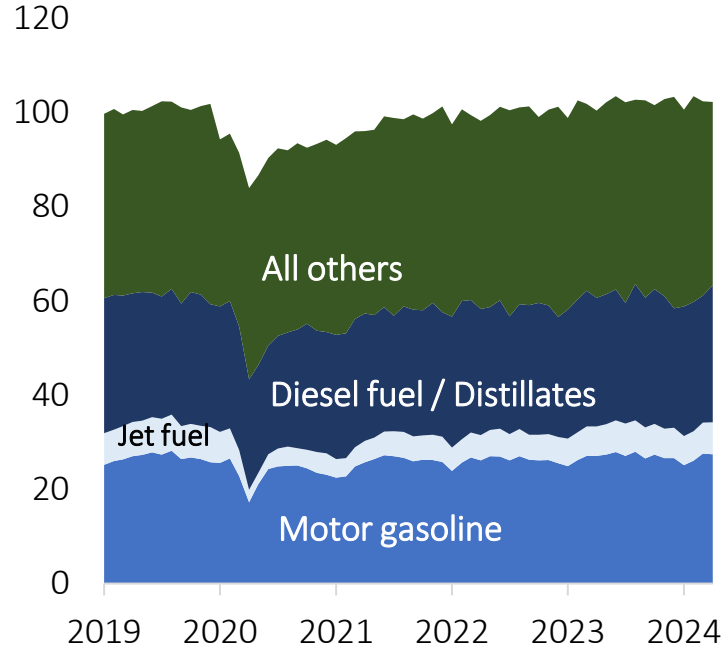
Building blocks of modern society – natural gas liquids and petrochemical feedstocks – have driven oil demand at every level



- Led by the growth of natural gas liquids and petrochemical feedstocks, global petroleum demand has achieved new record highs;
- U.S. demand has held strong, and Texas’ demand reflects remarkable industry expansions across the value chain

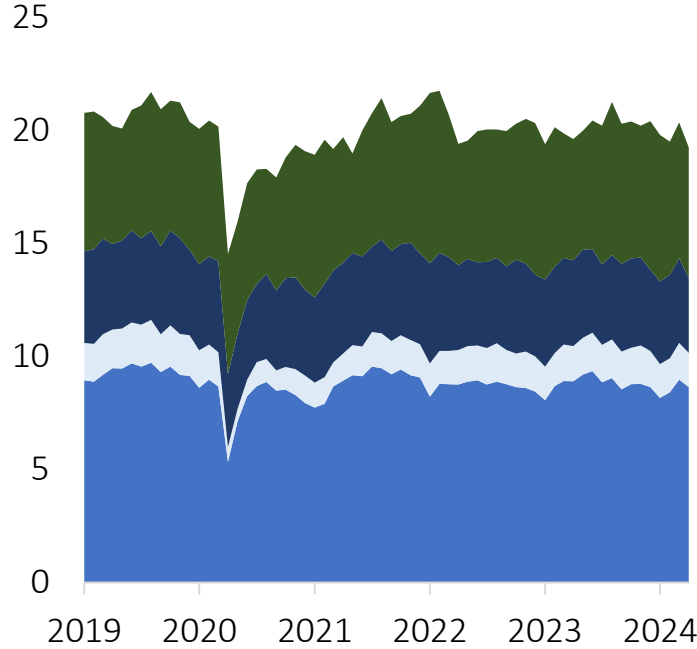
Global petroleum product demand

Million barrels per day (mb/d)



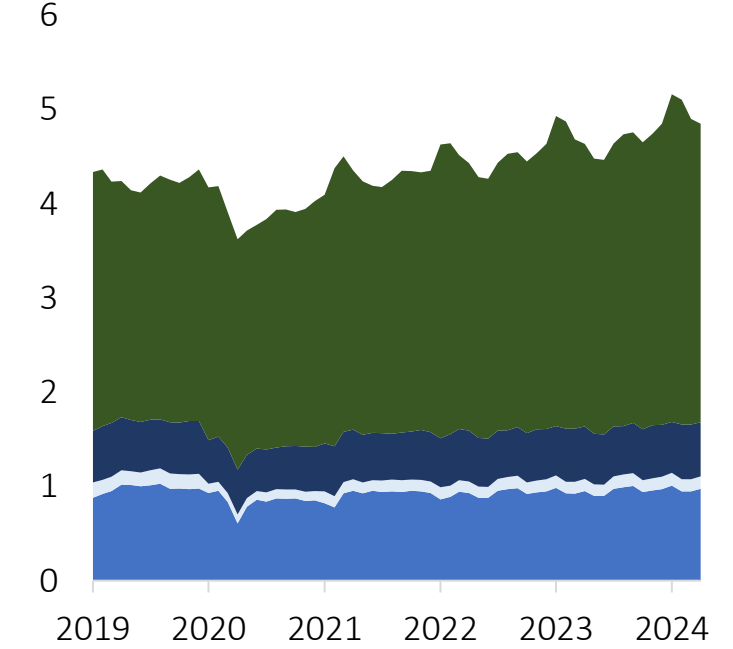
U.S. petroleum product demand

Million barrels per day (mb/d)



Texas petroleum product demand

Million barrels per day (mb/d)



■ Gasoline ■ Jet fuel ■ Diesel ■ All others (NGLs, Petrochemical Feedstocks)

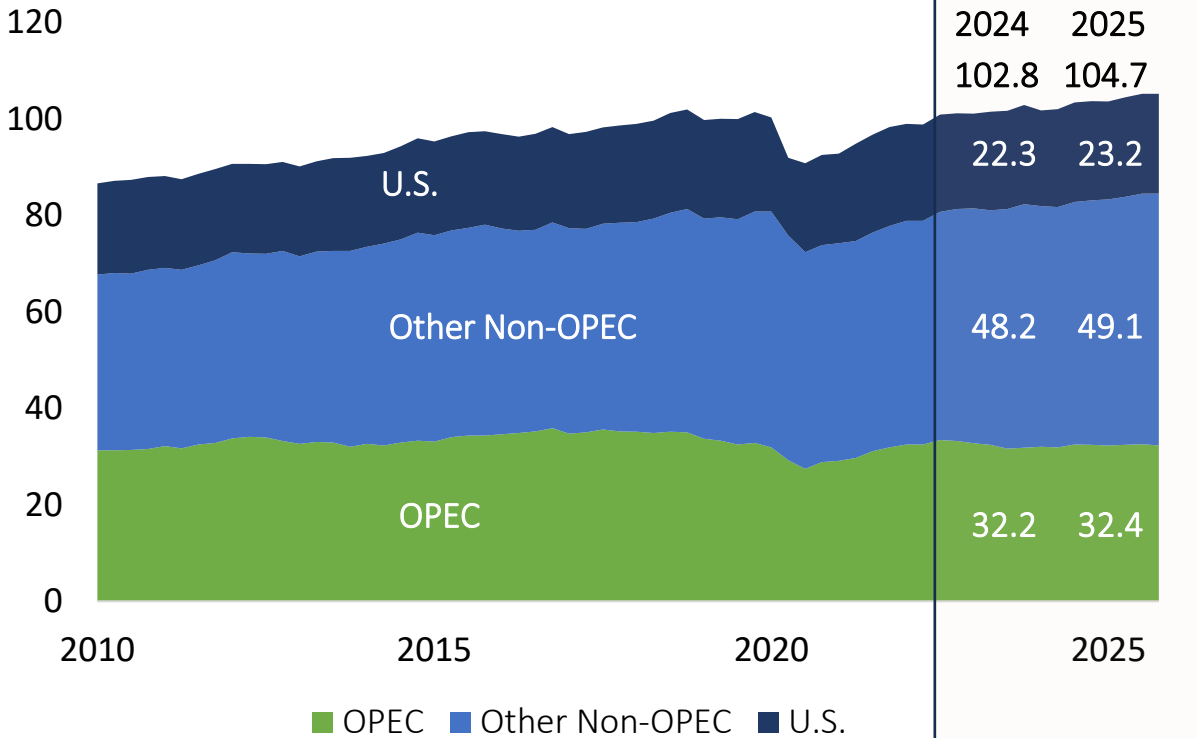
Consecutive global oil supply records projected in 2024 and 2025 per EIA



- EIA expects consecutive global oil supply records of record 102.8 mb/d in 2024 and 104.6 mb/d in 2025
- Supplies are projected to grow the most among non-OPEC producers, predicated on supply discipline by OPEC+ per EIA, which recently been drawn into question with a potential strategy by OPEC+ later this year

Global oil supply

Million barrels per day (mb/d)



Global oil supply headlines



U.S. Oil and Gas Production Continues to Shatter Records
Oilprice.com, May 5, 2024

OPEC+ switches strategy to defend market share
Reuters, June 5, 2024

Russia's Budget Is Getting Twice as Much Oil Money as a Year Ago
Bloomberg, May 6, 2024

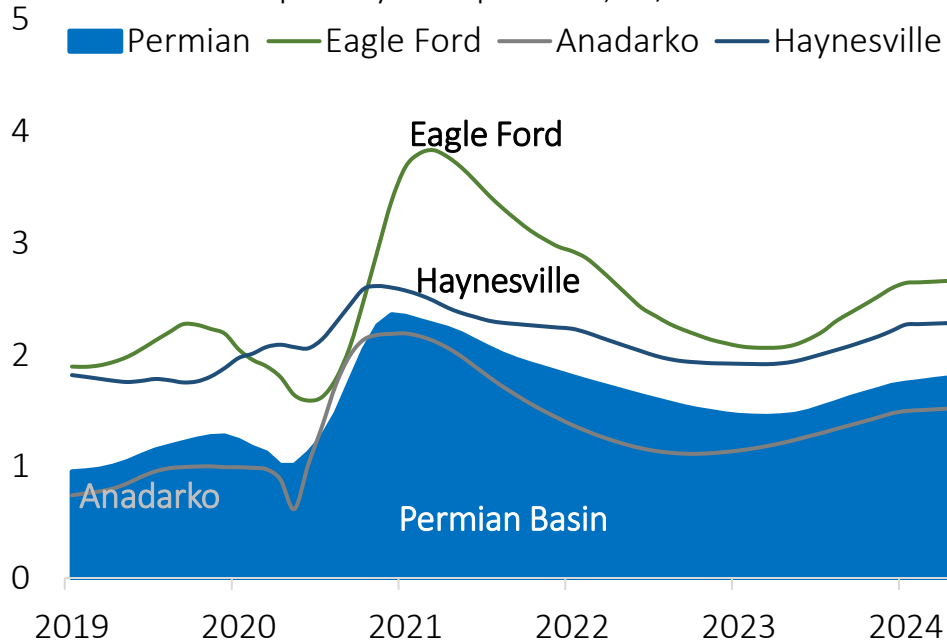
Strong rig productivity gains have enabled production growth despite lower drilling activity



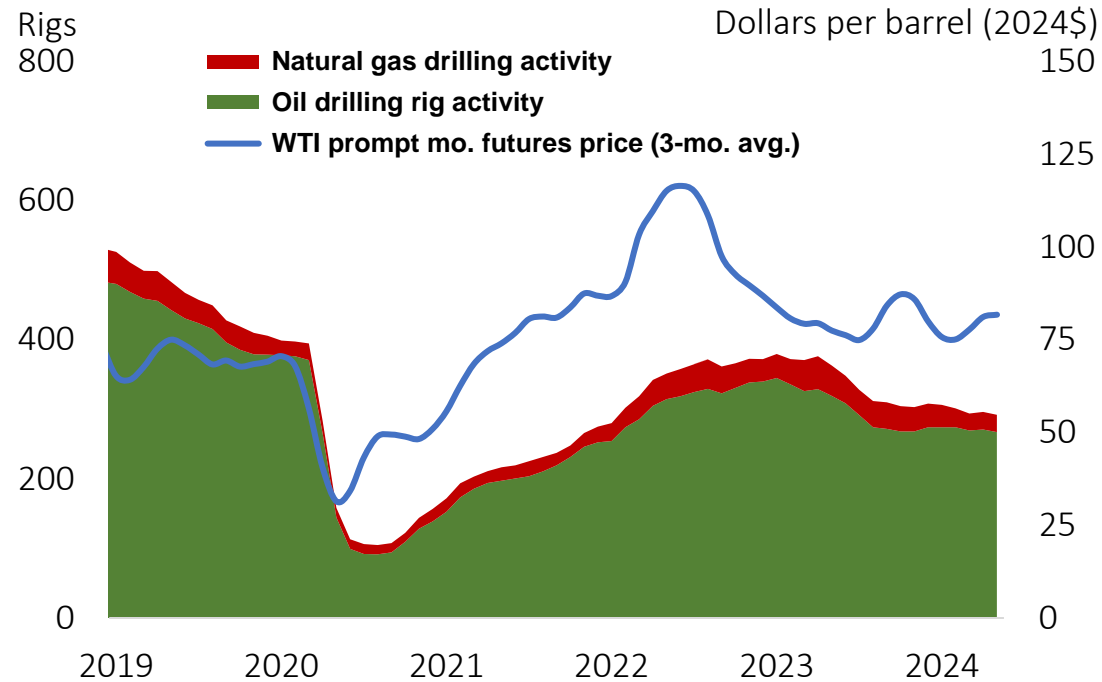
- ▶ EIA estimates of rig productivity for May 2024 showed continued increases year-over-year across the major Texas basins, including the Anadarko (+23.4% y/y), Eagle Ford (+27.1% y/y), Permian (+23.2% y/y), and Haynesville (+16.4% y/y)
- ▶ Texas' drilling rig activity as of early June fell by 16% y/y per Baker Hughes

Texas rig productivity by basin – new monthly production per rig

Thousand barrels per day oil-equivalent, kb/doe



Texas drilling activity and WTI crude oil futures prices



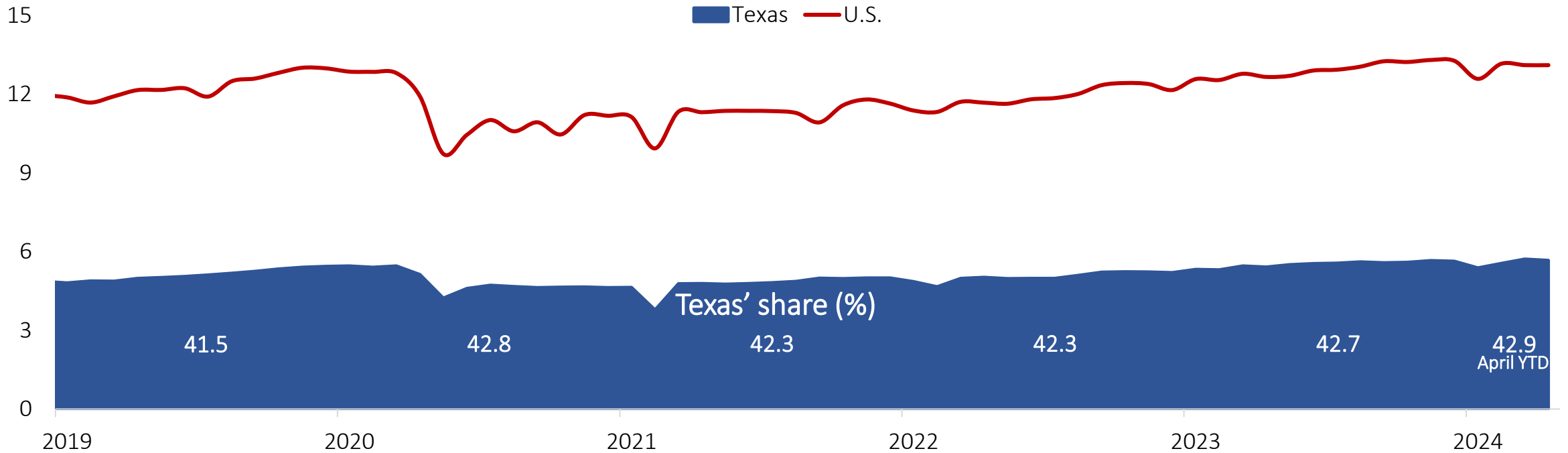
Texas has set new production records and increasingly driven U.S. supply



- In 2023, Texas accounted for 42.7% for oil production – its highest since 2020 – and 44.3% of U.S. oil production growth
- TXOGA’s projections for April 2024 showed Texas’ production remained near record levels at 5.7 mb/d of crude oil

U.S. and Texas crude oil production

Million barrels per day (mb/d)



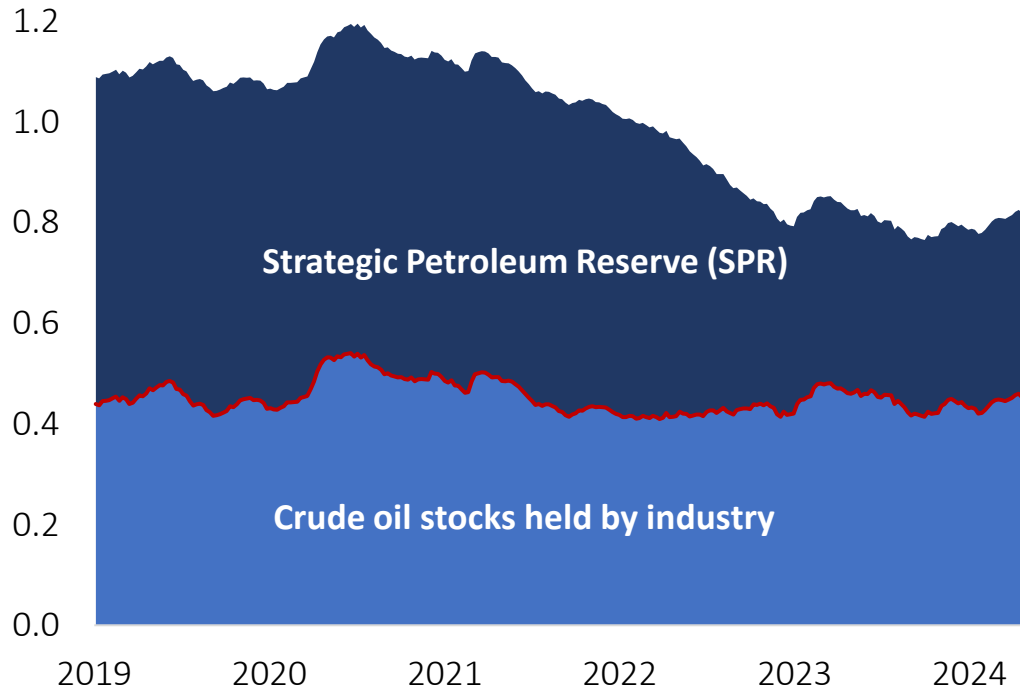
U.S. crude oil inventories rose in Q1 2024 towards typical historic levels



- At the beginning of 2024, U.S. crude oil stocks stood at the bottom of their five-year range, compounded by historically low Strategic Petroleum Reserves
- Despite strong exports and domestic consumption, production averaging over 13 mb/d so far in Q2 2024 has sufficed to augment both strategic and industry-held inventories

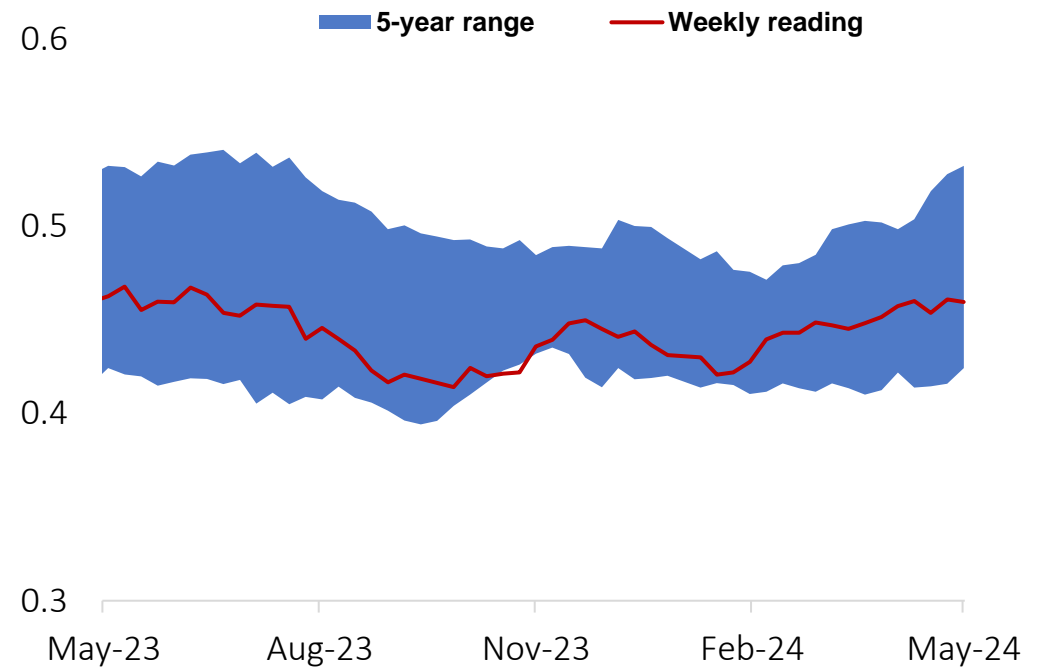
U.S. crude oil stocks

Billion barrels



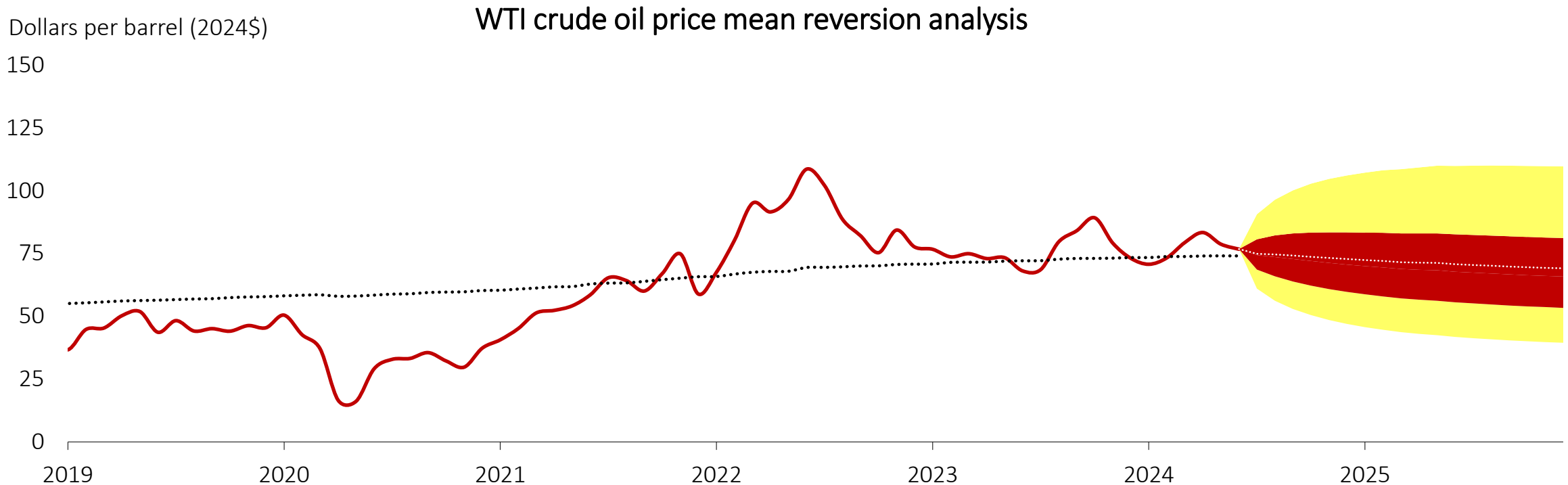
U.S. crude oil stocks held by industry

Billion barrels



Crude oil prices historical mean reversion analysis: futures prices have aligned with their historical mean

- ▶ Near-term futures prices have aligned with their historical mean, and the futures strip has remained backwardated (that is, futures prices currently are lower than spot prices)
- ▶ Confidence intervals based on past prices show the potential for greater upside than downside



Natural Gas Markets

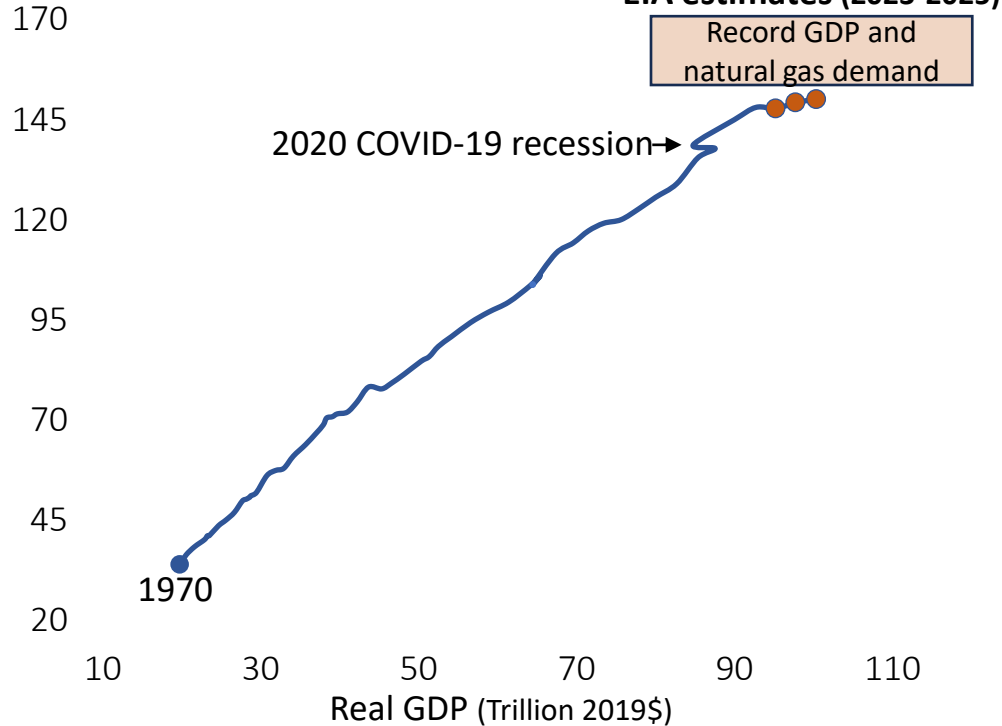


Global natural gas demand could reach record highs in 2024 and 2025

- ▶ Natural gas remains integral and global competitive in electricity generation, heating, cooking, and industrial demands – as well as environmental progress – despite myriad uncertainties
- ▶ Although the U.S. has remained the world's top natural gas producer and exporter, emerging markets collectively have the greater consumption and growth, which increasingly depends on global LNG trading

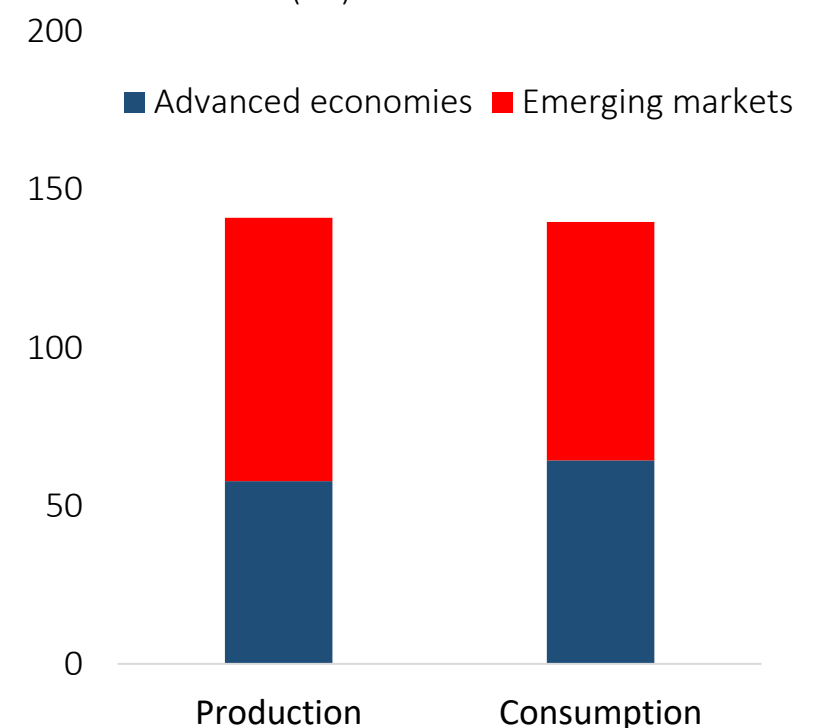
Global natural gas demand and GDP*

Trillion cubic feet (tcf)



2024 Global natural gas production and consumption

Trillion cubic feet (tcf)





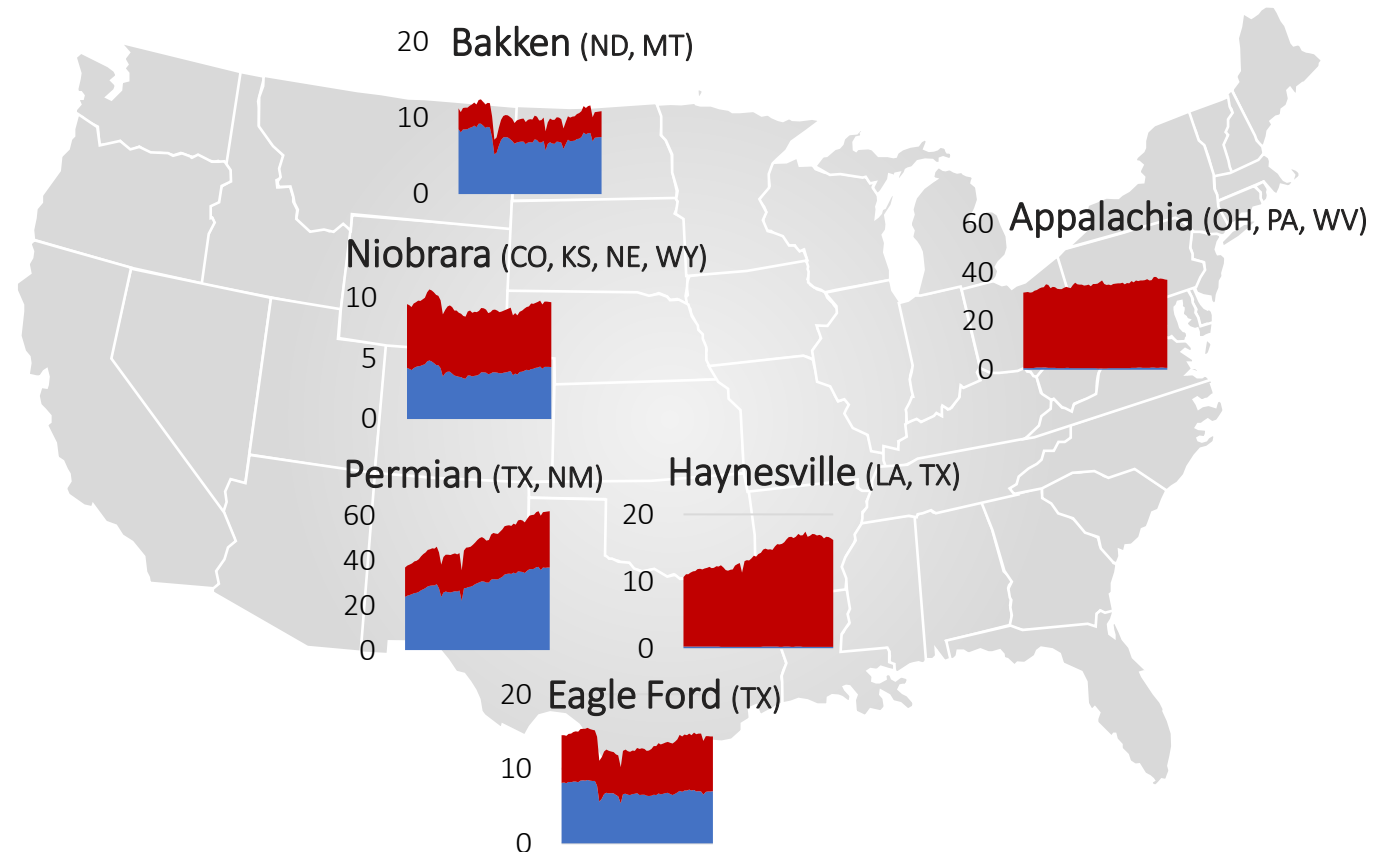
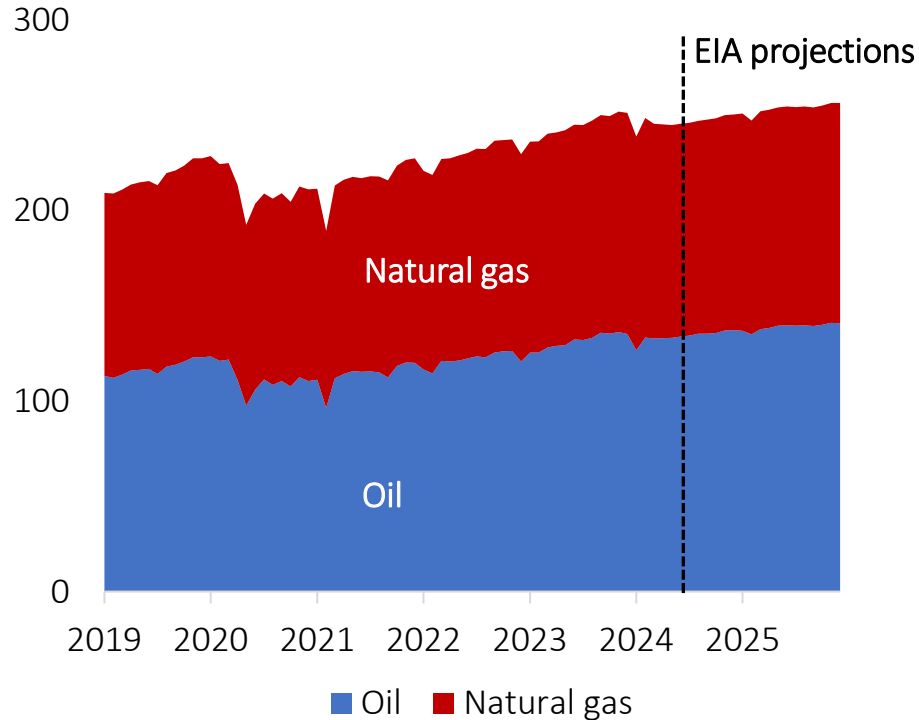
U.S. natural gas production has continued to rise, mainly from the Permian Basin and associated with oil production

- ▶ Texas has driven nearly two-thirds of total U.S. oil and natural gas production growth as of April 2024 versus a year ago
- ▶ Among major U.S. producing regions, only the Permian and Niobrara grew year-over-year per EIA, and the Permian accounted for the vast majority of total U.S. production growth

U.S. and regional oil and natural gas production on natural gas-equivalent energy basis, 2019-April 2024

United States

Billion cubic feet per day energy-equivalent (bcf/de)



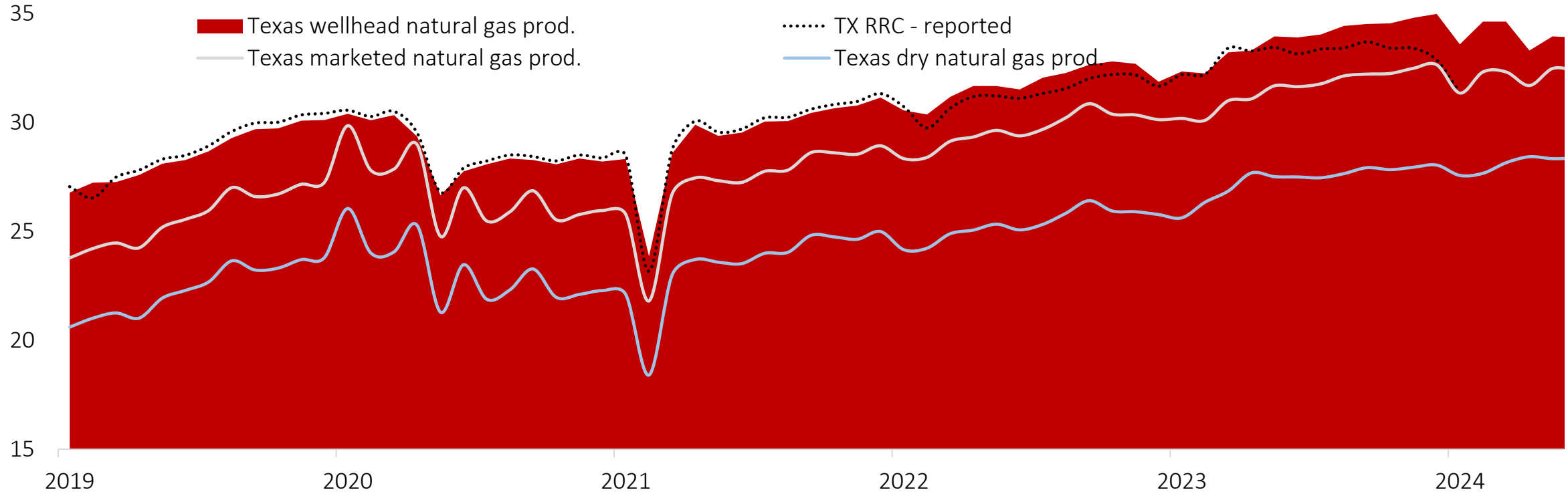
Texas set new natural gas production records so far in 2024



- ▶ Texas' natural gas production stood at of gross withdrawals of 34.6 bcf/d and 32.3 bcf/d of marketed production in March per EIA
- ▶ TXOGA estimates that production rose in May was sustained at 34.0 bcf/d of gross withdrawals, 32.5 bcf/d of marketed production, and 28.2 bcf/d of dry gas production

Texas natural gas production, January 2019 – May 2024

Billion cubic feet per day (bcf/d)

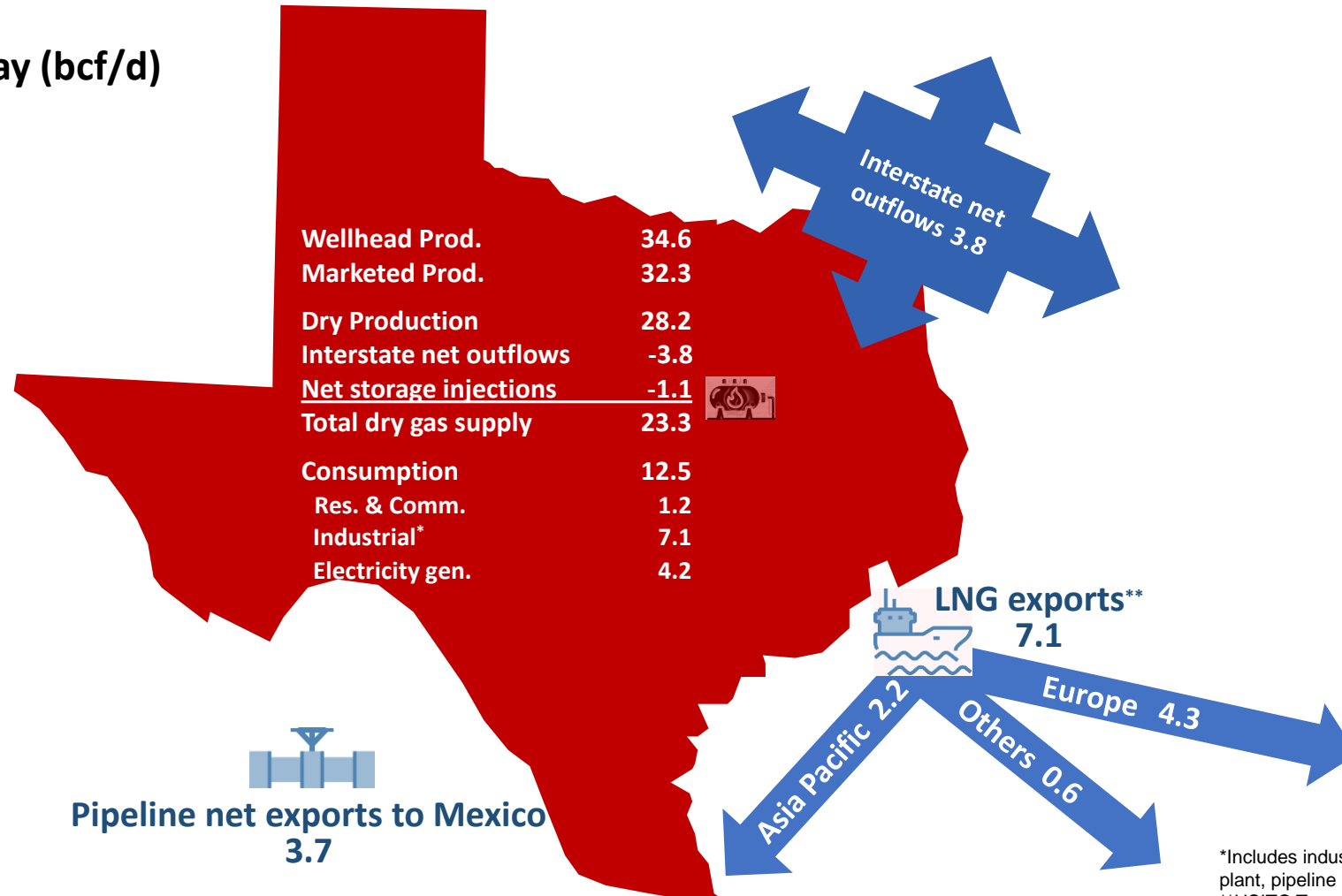


Texas' natural gas flows in March 2024: Production more than doubled instate consumption



- ▶ Texas produced 28.2 bcf/d of dry natural gas in March 2024 by TXOGA's estimates
- ▶ Texas consumers required 12.5 bcf/d, mainly for industry and electricity generation, while 10.8 bcf/d was exported, including 7.1 bcf/d of LNG and 3.7 bcf/d via pipelines to Mexico per U.S. International Trade Commission data

Billion cubic feet per day (bcf/d)



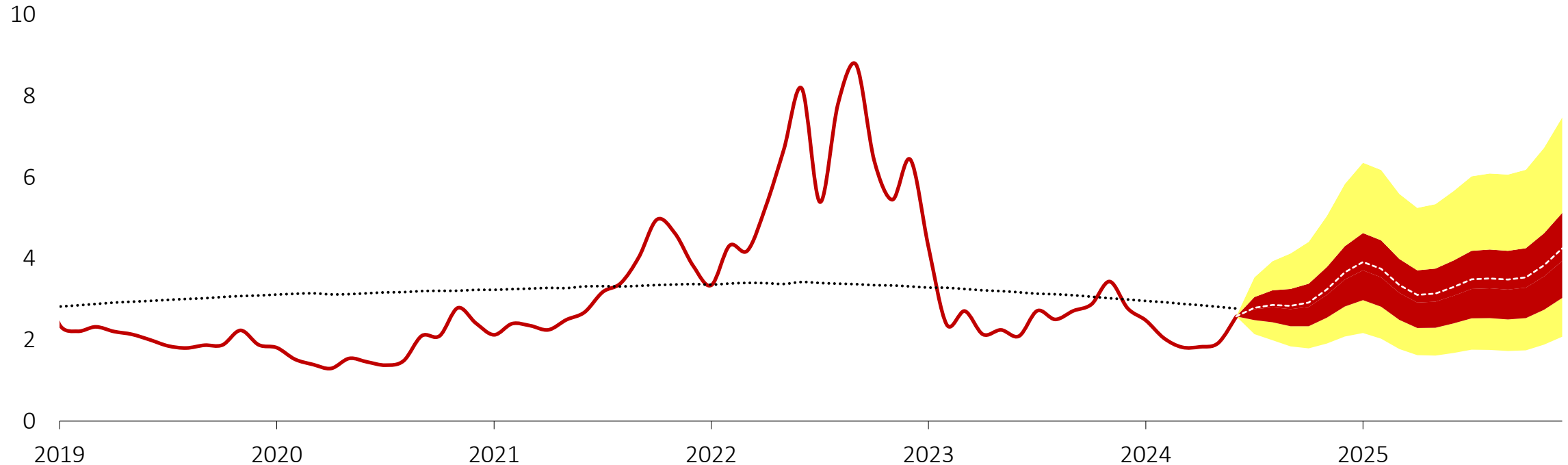
*Includes industrial end-use consumption plus lease, plant, pipeline and distribution fuel
 **USITC Texas export districts

Near-term natural gas futures are below the historical mean reversion target

- ▶ Natural gas futures prices through May 2024 are below the historical mean reversion target, and futures prices rise progressively beginning in April 2024
- ▶ Confidence intervals based on past prices show the potential for greater upside than downside

Natural gas price mean reversion analysis

Dollars per million Btu (2024\$)



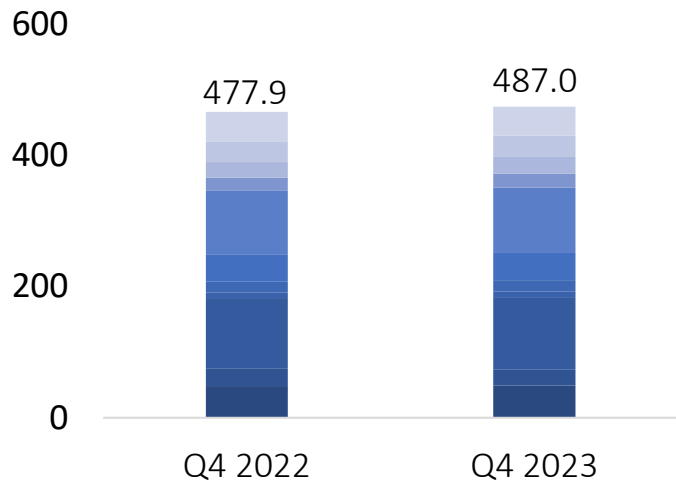
Texas' oil and natural gas industry wages reached \$14.6 billion in Q4 2023



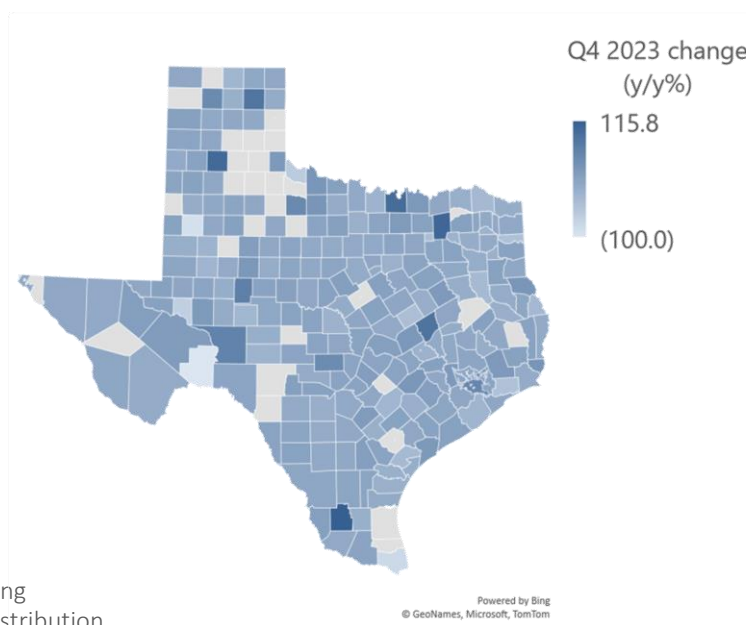
- ▶ Texas' oil and natural gas industry employment and wages grew by 1.9% y/y and 5.8% y/y, respectively, in Q4 2023, raising the totals to over 487,000 jobs and \$14.6 billion in wages – the highest fourth quarter wages on record.
- ▶ Over 40% of the job growth occurred in the upstream and supporting services, 25% in petroleum wholesale and retail trade, and 20% in oil & gas field machinery and equipment manufacturing per data the latest data (released on May 16, 2024) from the U.S. Census Bureau and Texas Workforce Commission.

Texas oil and natural gas industry direct employment rose by +1.9% y/y in Q4 2023

Thousand Jobs

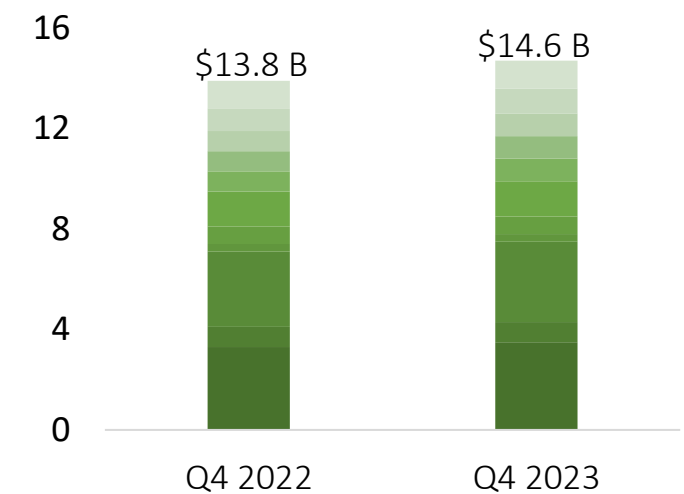


- Oil & gas extraction
- Support activities for o&g ops.
- Petroleum refineries
- Gas stations & fuel dealers
- All other*
- Pipeline construction
- Oil & gas drilling
- Natural gas distribution
- Petrochemical mfg.
- Pipeline transportation
- Oil & gas field mach. and eq. mfg.



Texas oil and natural gas industry direct wages rose by +5.8% y/y in Q4 2023

Billion dollars



- Pipeline construction
- All other*
- Gas stations & fuel dealers
- Petroleum refineries
- Support activities for o&g ops.
- Oil & gas extraction
- Oil & gas field mach. and eq. mfg.
- Pipeline transportation
- Petrochemical mfg.
- Natural gas distribution
- Oil & gas drilling

* Other industry segments include petroleum and pet. product wholesalers, lubricant mfg., asphalt mfg., industrial sand mining, nitrogenous fertilizer mfg., basic organic chem. mfg., plastics and resin mfg.

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