

R. Dean Foreman, Ph.D.
September 16, 2024



Key Points

Global, U.S., and Texas Economies

- **Upgraded growth.** Global GDP growth upgrades for 2024-2025, led by the U.S. and China, raise optimism for 2025
- **Divergent U.S. consumer and industrial indicators.** Rising U.S. consumer debt shows signs of stress, but business conditions remain conducive to GDP growth
- **Increased financial market risks.** U.S. dollar strength has exerted downward pressure on oil prices, highlighting potential interest rate cuts. Profligate government spending may pose risks in 2025

Global Oil Market

- **Record-high demand.** Global oil demand of 103.4 million barrels per day (mb/d) in Q3 2024, with projected highs of 105.1 mb/d by Q4 2025, according to the Energy Information Administration (EIA)
- **U.S. leads production.** U.S. oil production remains the primary driver of global supply growth
- **Low inventories.** U.S. commercial crude oil inventories and the Strategic Petroleum Reserve remain at historic lows, increasing vulnerability to geopolitical uncertainties

Natural Gas Markets

- **Production records.** New natural gas production records were set globally, in the U.S., and in Texas levels in 2024
- **Normalized storage.** Strong consumption and exports have led U.S. natural gas storage to recede in its historical range despite record-high production
- **Texas market influence.** Texas continues to grow its influence, with increased production, consumption, and exports of natural gas

Oil and Natural Gas Industry Productivity and Employment

- **Amazing productivity.** Compared to June 2019, Texas has produced over 20% more oil and natural gas while utilizing 40% fewer rigs in 2024
- **Economic prosperity.** Texas industry wages surpassed \$20.8 billion in Q1 2024, with job growth led by upstream and pipeline services

Global, U.S., and Texas Economies

- [Global GDP growth upgrades, led by the U.S. and China, set the stage](#)
- [A strong U.S. dollar has historically exerted downward pressure on oil prices](#)
- [Risks of delayed government spending restraint: Increased current account balances could disrupt currency and capital flow movements](#)
- [Indicators of U.S. consumers' debt burden show signs of stress](#)
- [Business conditions have remained conducive to U.S. GDP growth](#)

Oil Markets

- [Global oil demand achieved a new record high in Q3 2024 and could reach consecutive record highs over the next five quarters](#)
- [Global oil production and market balance projections to 2025: A well-supplied market](#)
- [Consecutive global oil supply records projected in 2024 and 2025 per EIA](#)
- [U.S. oil production has remained the first-order driver of global supply growth](#)
- [Rig productivity gains have continued to enable production growth](#)
- [U.S. crude oil inventories have fallen to historic lows](#)
- [Crude oil prices historical mean reversion analysis: near-term futures prices currently align with their historical mean](#)

Natural Gas Markets

- [Global natural gas demand could reach another record high in 2025](#)
- [The U.S. and Texas set natural gas production records in 2024](#)
- [With strong consumption and exports, U.S. natural gas storage has receded into its historical range](#)
- [Texas' natural gas flows in June 2024: Record-high production has enabled strong consumption and exports](#)
- [Near-term natural gas futures prices have fallen below their historical mean reversion target](#)

Productivity, Jobs, and Wages

- [Oil and natural gas productivity has continued strongly across the U.S. and especially in Texas](#)
- [Texas' oil and natural gas industry wages eclipsed \\$20.8 billion in Q1 2024](#)

Global, U.S. and Texas Economies

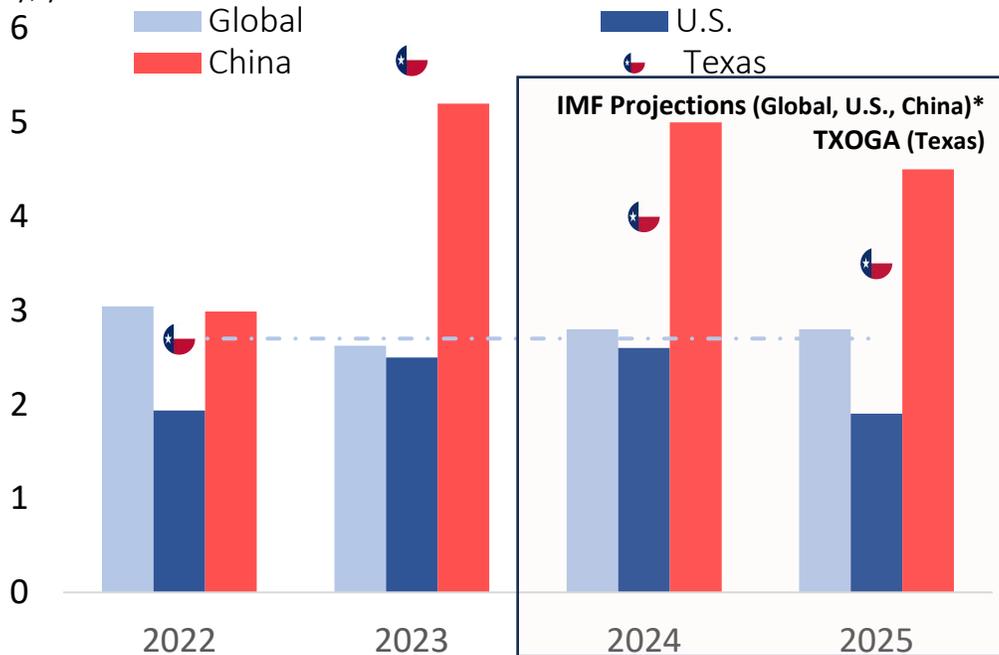


Global GDP growth upgrades, led by the U.S. and China, set the stage

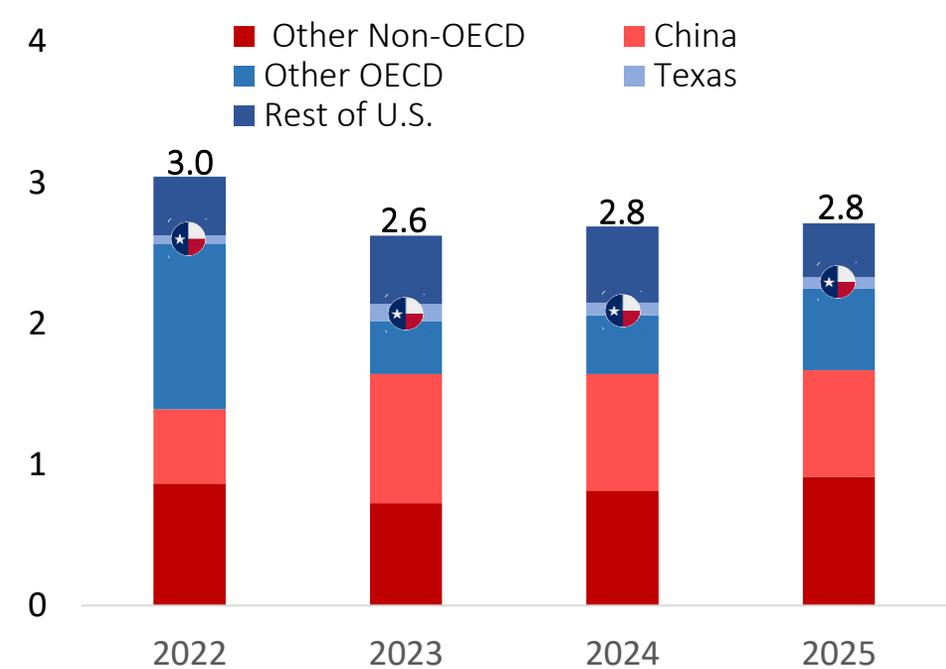


- Official global GDP growth projections were raised in July by 0.2% to 2.8% in 2024 and 2025, just above long-term average levels
- Although the outlook for the U.S. and China is still expected to slow, with recent IMF upgrades for growth of both economies, together they are projected to drive more than half of global GDP growth through 2025
- Texas stands to contribute 3% of global GDP growth between 2023 and 2025

Real GDP growth*
y/y%



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



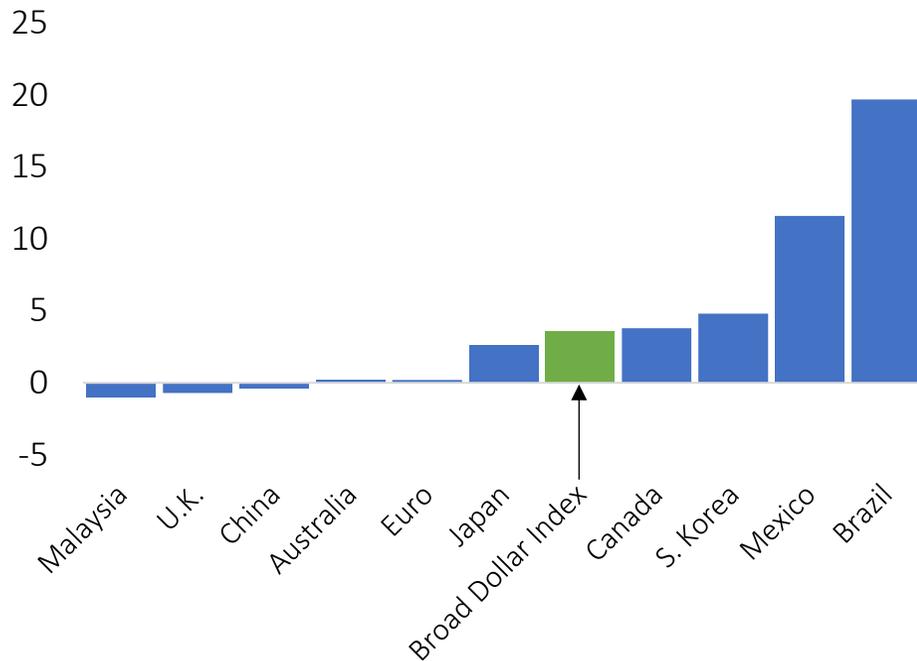
A strong U.S. dollar has historically exerted downward pressure on oil prices



- As of early August, the U.S. dollar appreciated 2.6% y/y and to the top 3% 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

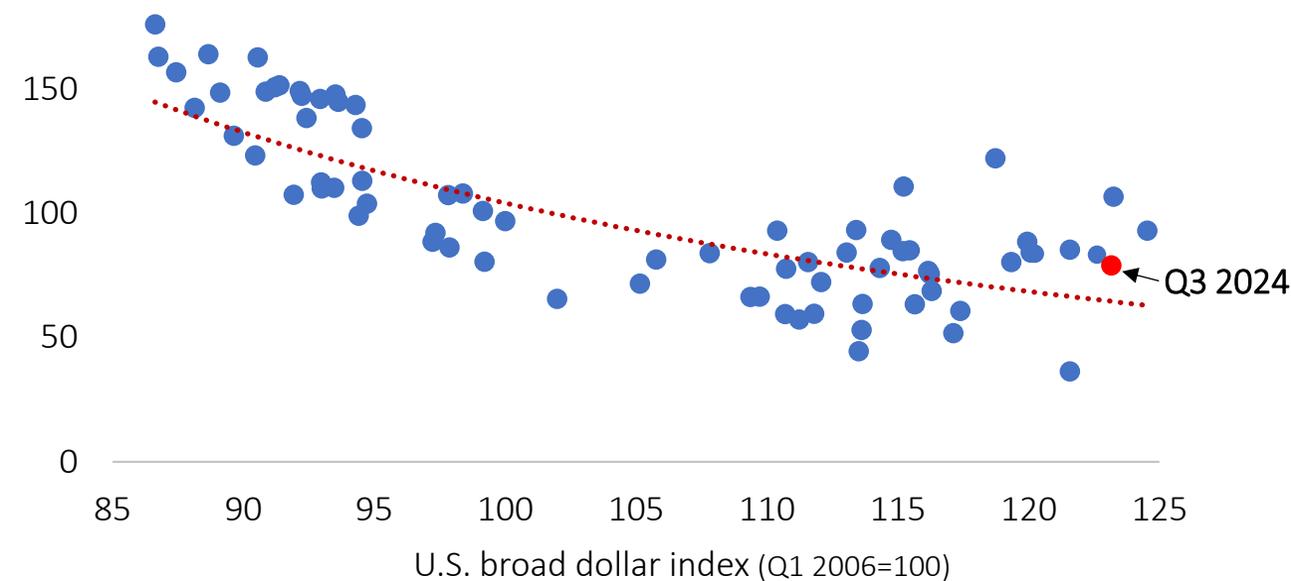
U.S. dollar appreciation (depreciation) versus main trading partners' currencies, August 2024

y/y%



U.S. broad dollar index and Brent crude oil prices, Q1 2006-Q3 2024

Brent crude oil (2024 constant dollars per barrel)

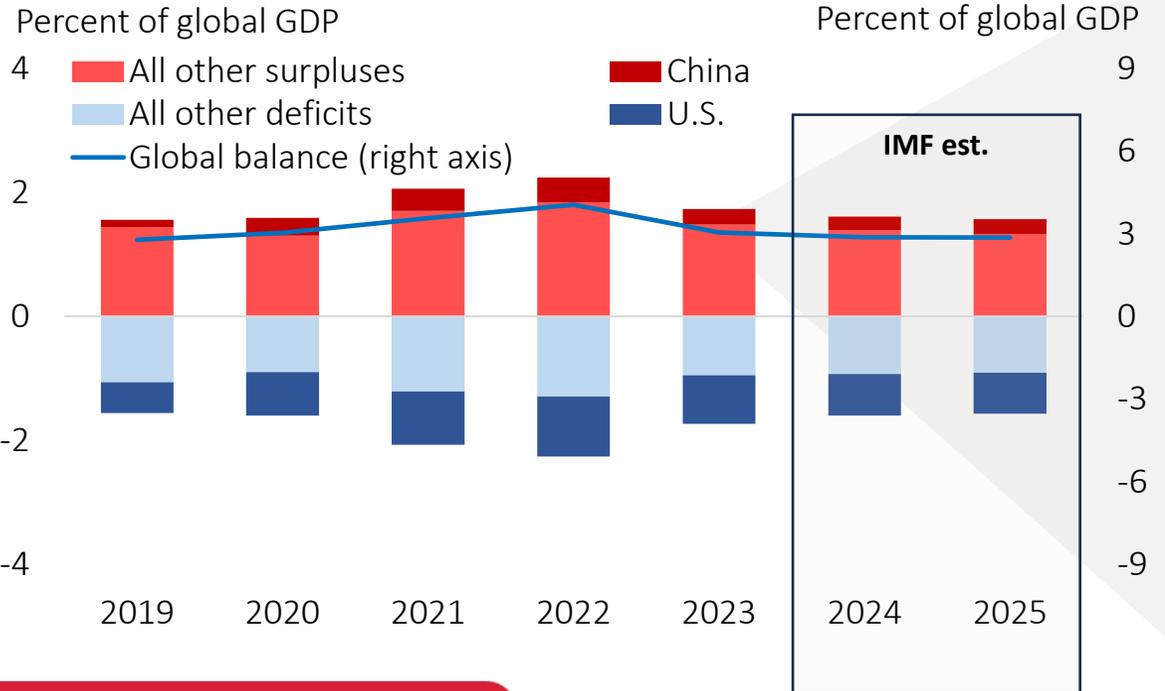


Risks of delayed government spending restraint: Increased current account balances could disrupt currency and capital flow movements

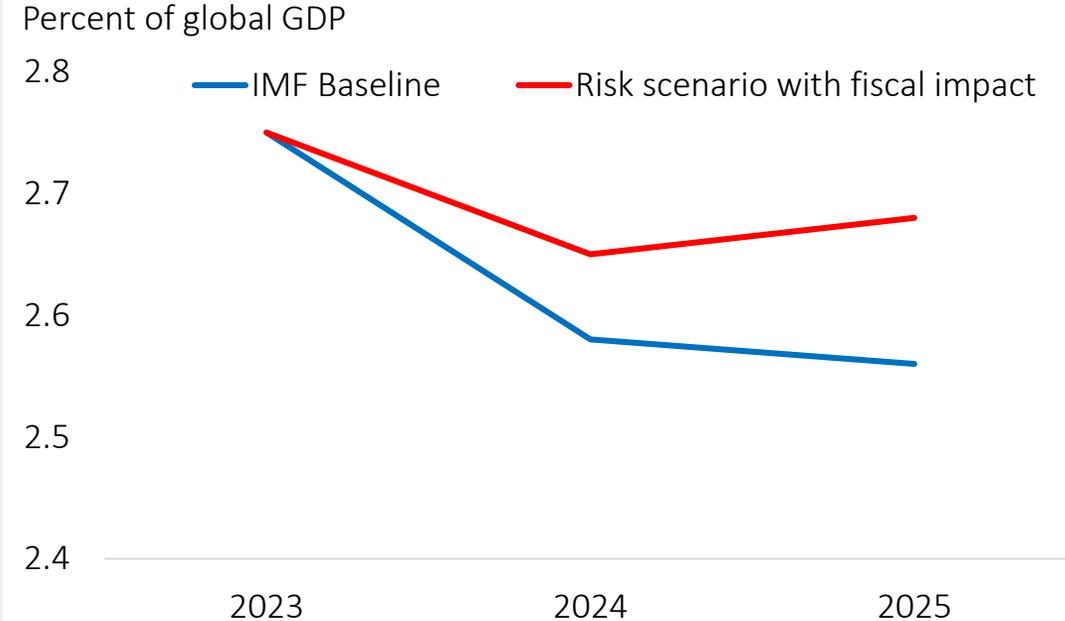


- ▶ The current account (CA) shows an economy's transactions with the rest of the world—net trade in goods and services, cross-border investment earnings, and net transfer payments. The global CA is the (nominal) sum of individual economy balances across the world
- ▶ Assuming less fiscal spending and lower commodity prices, the IMF projects the global CA balance to return to pre-pandemic levels
- ▶ Alternatively, IMF's "risk scenario" delays fiscal restraint, which magnifies sovereign debt spreads in countries with CA deficits, increases global financial stress, and heightens economic costs to debtor as well as creditor countries

Global current account balance, 2019-2025



Global current account balance fiscal impact scenarios



Indicators of U.S. consumers' debt burden show signs of stress

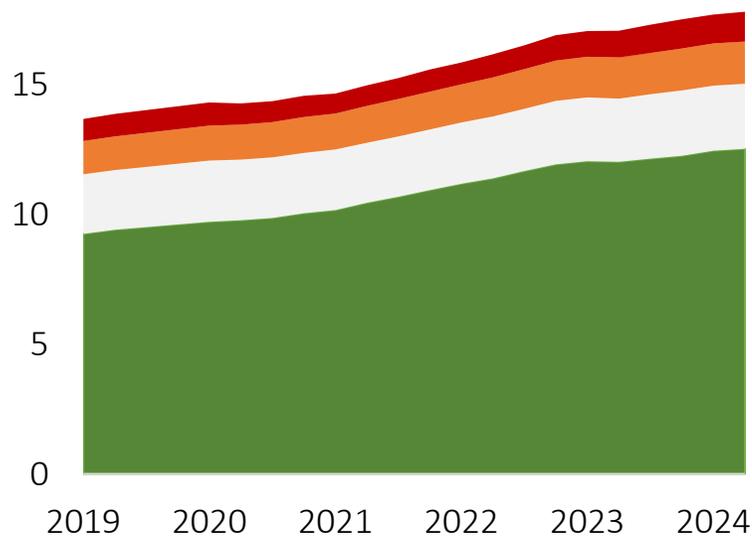


- U.S. household debt reached a record high \$17.8 trillion in Q2 2024 per the New York Federal Reserve Bank
- New auto loan and credit card delinquencies of 90+ days rose to their highest levels since 2009 and 2011, respectively
- Consumers in Florida, New York, and Texas show the greatest increases in serious delinquencies

U.S. consumer debt

Trillion dollars

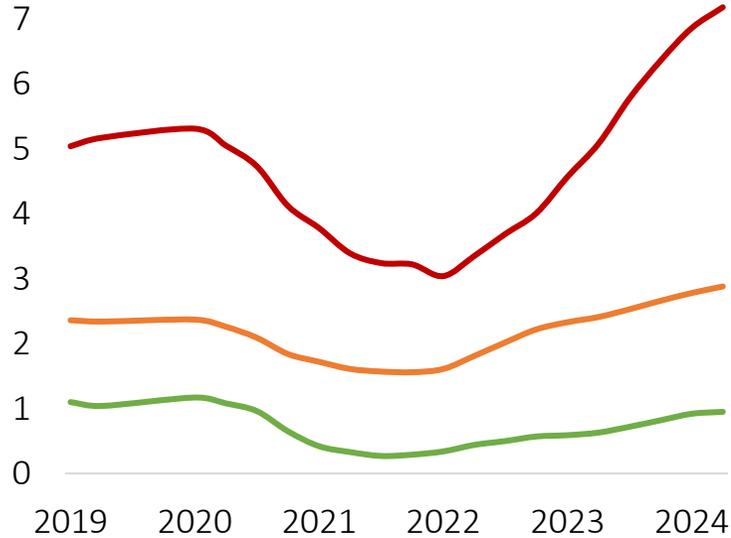
20 ■ Mortgage ■ All other* ■ Auto ■ Credit card



New seriously delinquent balances by type**

Percent of balance

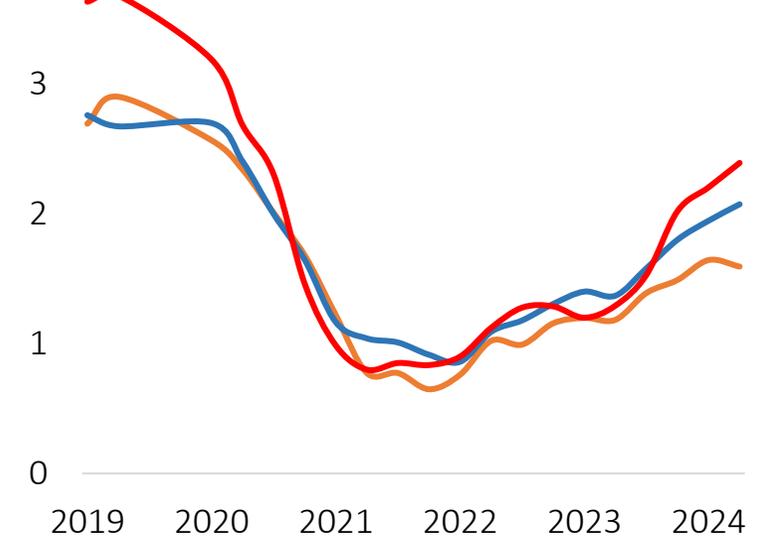
8 — Mortgage — Auto — Credit card



Transition rates into 90+ days late by state***

Percent of balance

4 — New York — Texas — Florida



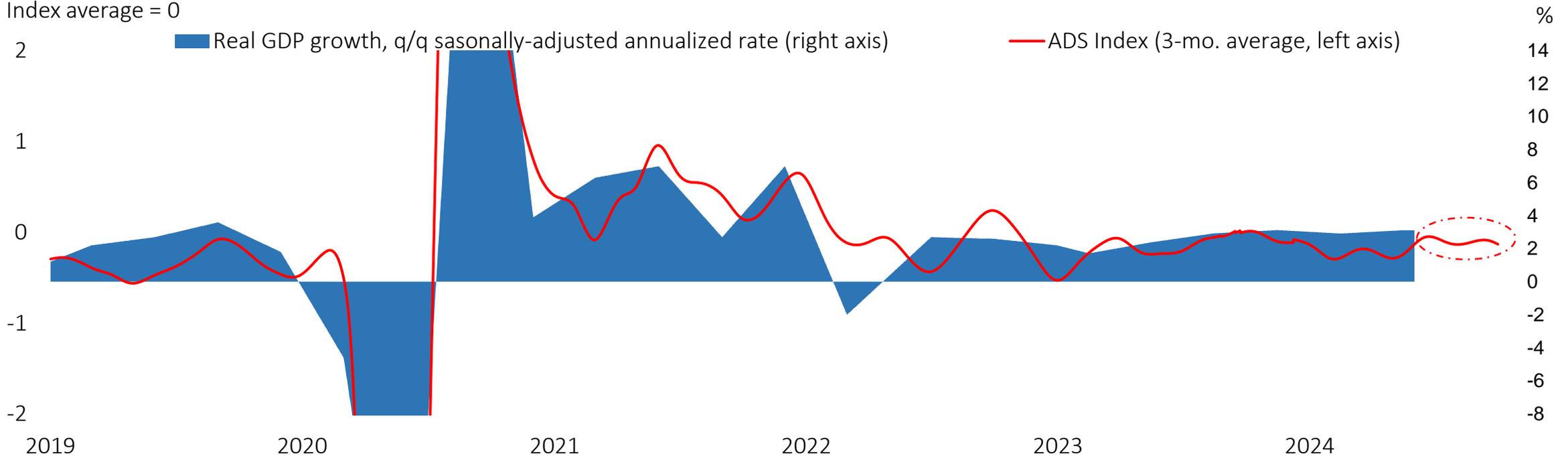
Business conditions have remained conducive to U.S. GDP growth



- 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 and Q2 2024 real GDP – and has remained consistent with continued expansion so far in Q3 2024

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

Index average = 0



Oil Markets



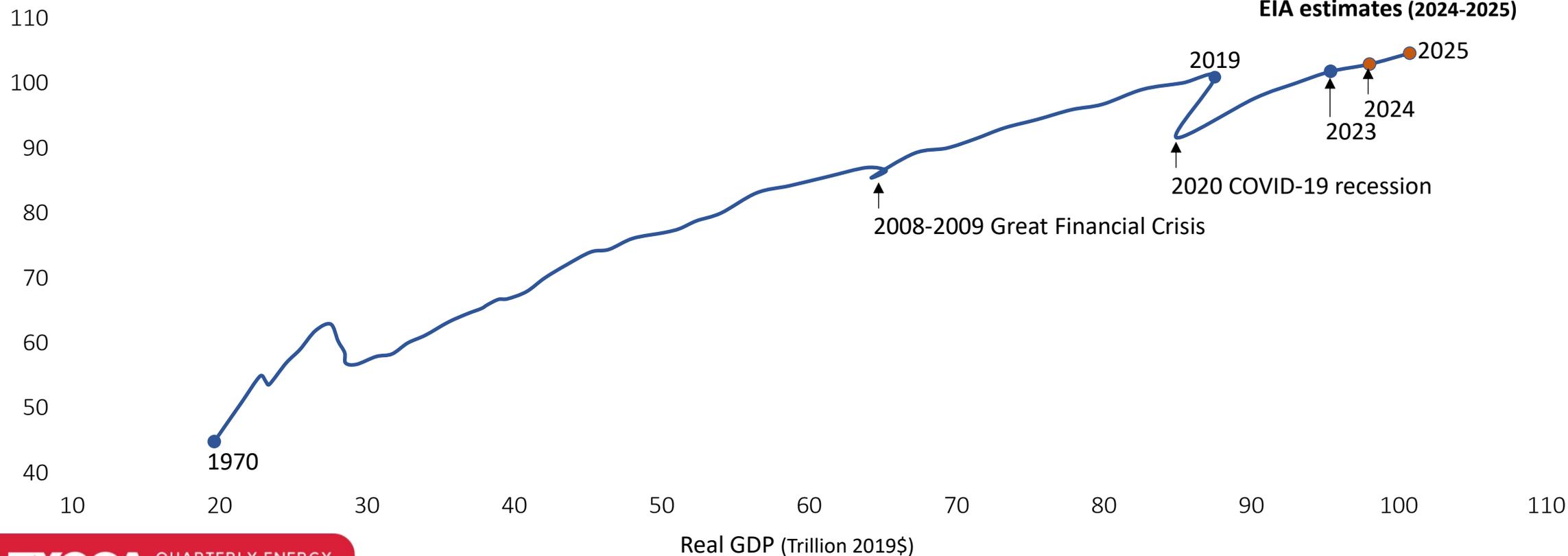
Global oil demand achieved a new record high in Q3 2024 and could reach consecutive record highs over the next five quarters



- ▶ EIA reports record-high global oil demand of **103.6 mb/d** in Q3 2024 and gradual quarterly increases to **105.6 mb/d** in Q4 2025
- ▶ Non-OECD economies are expected to drive nearly **90%** of global oil demand growth, which could add 2.2 mb/d in 2025 for total global demand of **104.6 mb/d** in 2025

Global oil demand versus GDP*

Million barrels per day (mb/d)

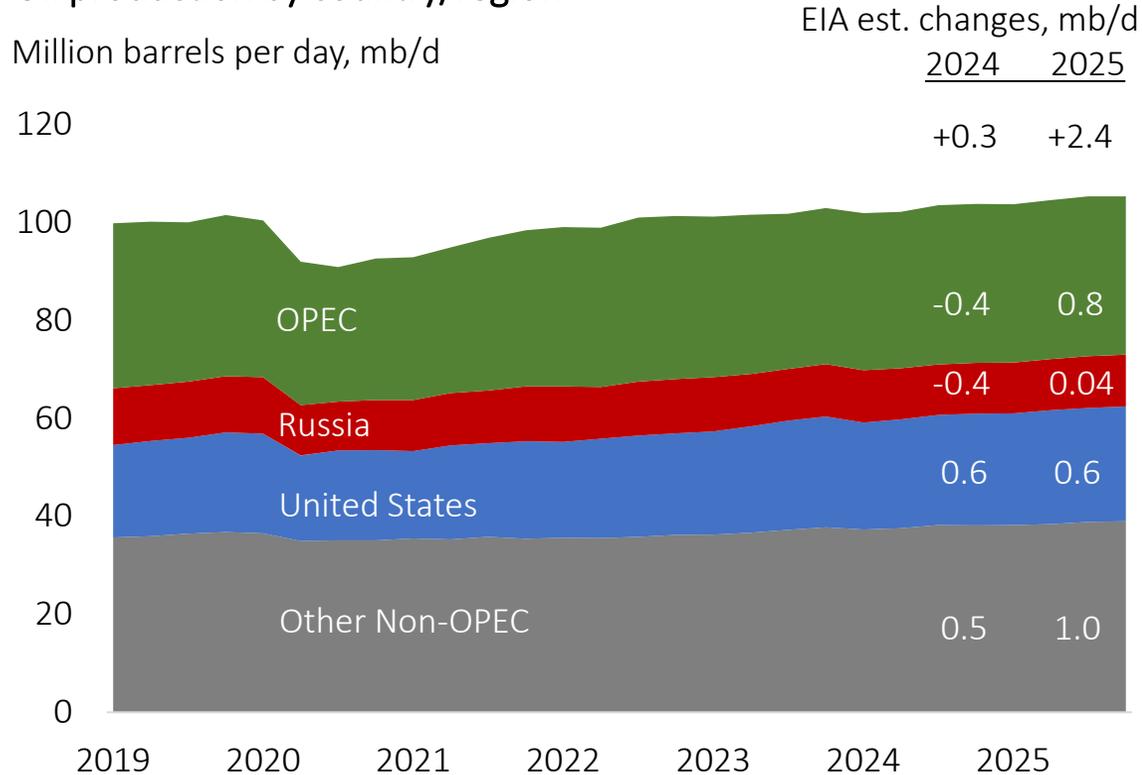


Global oil production and market balance projections to 2025: A well-supplied market

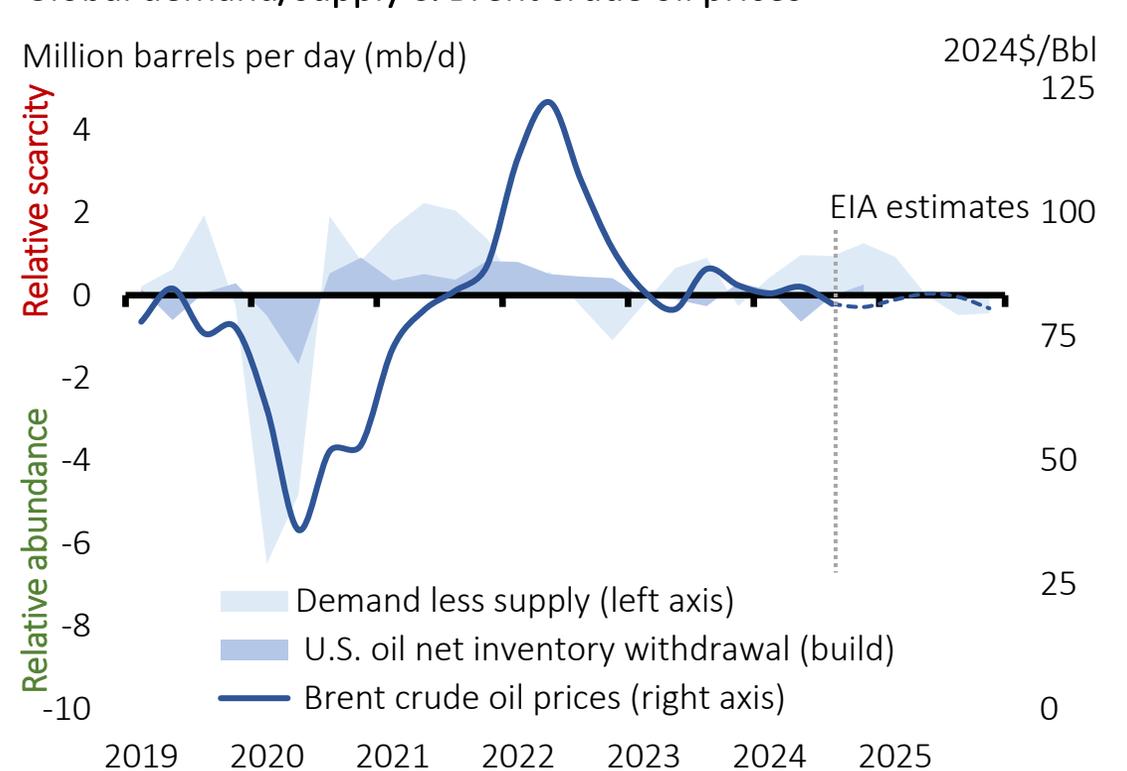


- ▶ **Solid demand.** EIA projects record highs for global annual demand of 103.1 mb/d this year and 104.6 mb/d in 2025
- ▶ **EIA projects global stock withdrawals to continue through Q2 2025**, including 1.3 mb/d in Q4 2024 and 0.9 mb/d in Q1 2025, corresponding with Brent crude oil prices of \$82 in Q4 2024 and \$84 on average in 2025, compared with \$72 per barrel currently.

Oil production by country/region



Global demand/supply & Brent crude oil prices



U.S. oil production has remained the first-order driver of global supply growth



- ▶ 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 headlines

U.S. Oil Production Extends Massive Lead Over Russia And Saudi Arabia

Forbes, July 5, 2024

OPEC Keeps Oil Output Steady While Cautiously Watching Market

Bloomberg, August 2, 2024

Russian crude exports sink to 1-year low in July as Moscow directs more oil to refiners

S&P Global, August 2, 2024

With 4.353 million boe/d, Brazilian oil and natural gas production increases in June

Brazil Energy Insight, August 2, 2024

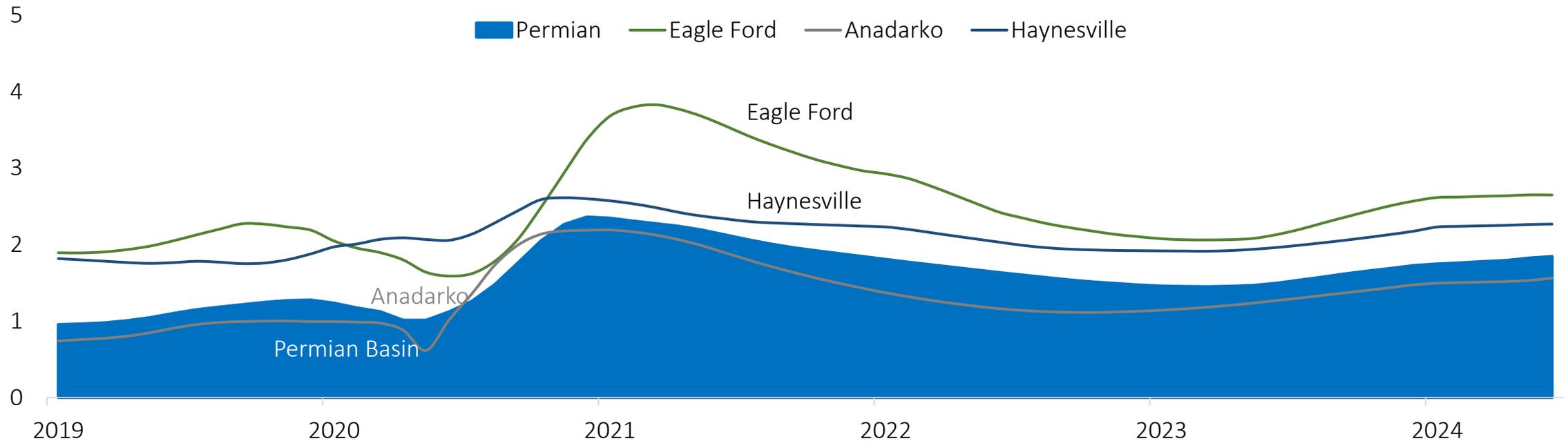
Rig productivity gains have continued to enable production growth



- EIA estimates of rig productivity for July 2024 show continued increases year-over-year across the major Texas basins, including the Anadarko (+20.1% y/y), Eagle Ford (+20.6% y/y), Permian (+20.1% y/y), and Haynesville (+13.9% y/y)

Texas rig productivity by basin – new monthly production per rig

Thousand barrels per day oil-equivalent, kb/doe



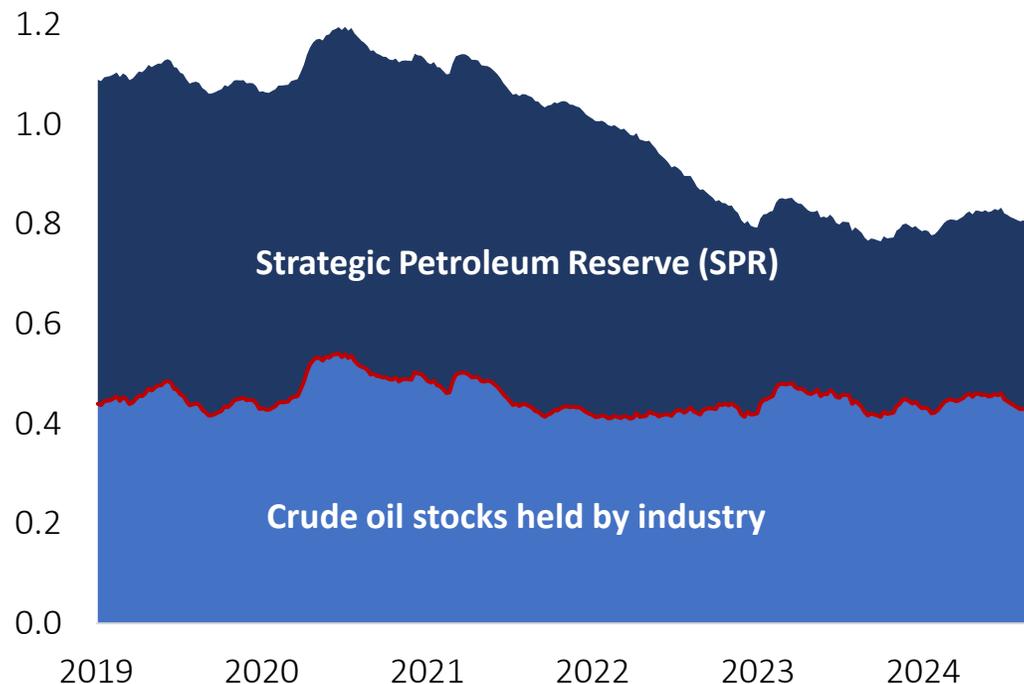
U.S. crude oil inventories have fallen to historic lows



- 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 sustaining domestic crude oil production above 13 mb/d in Q3 2024, crude oil stocks held by industry have fallen to at or below the five-year range in Q3 2024

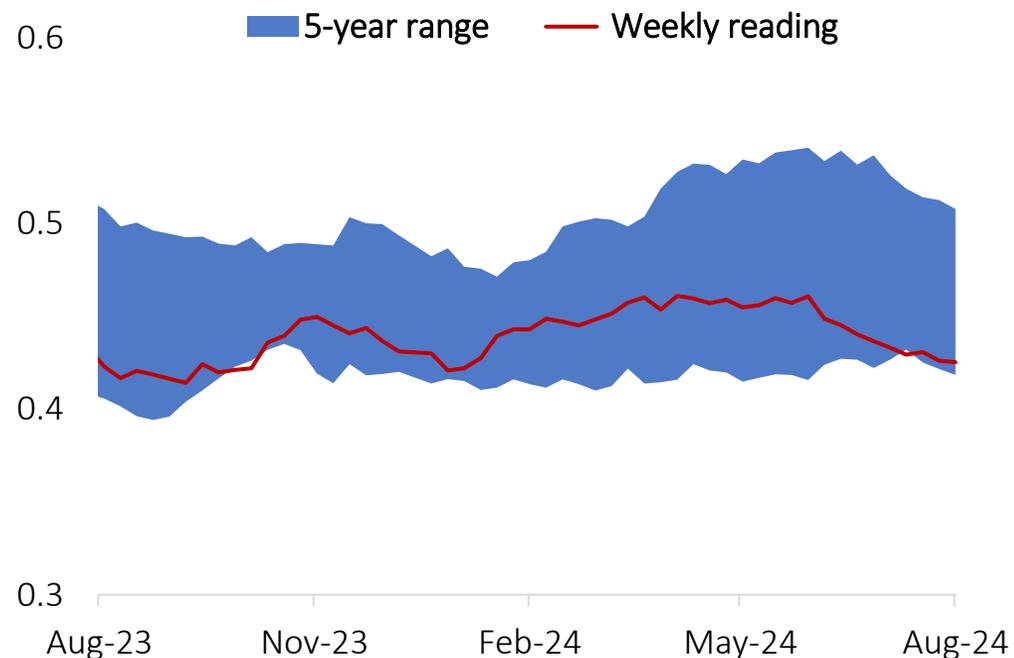
U.S. crude oil stocks

Billion barrels



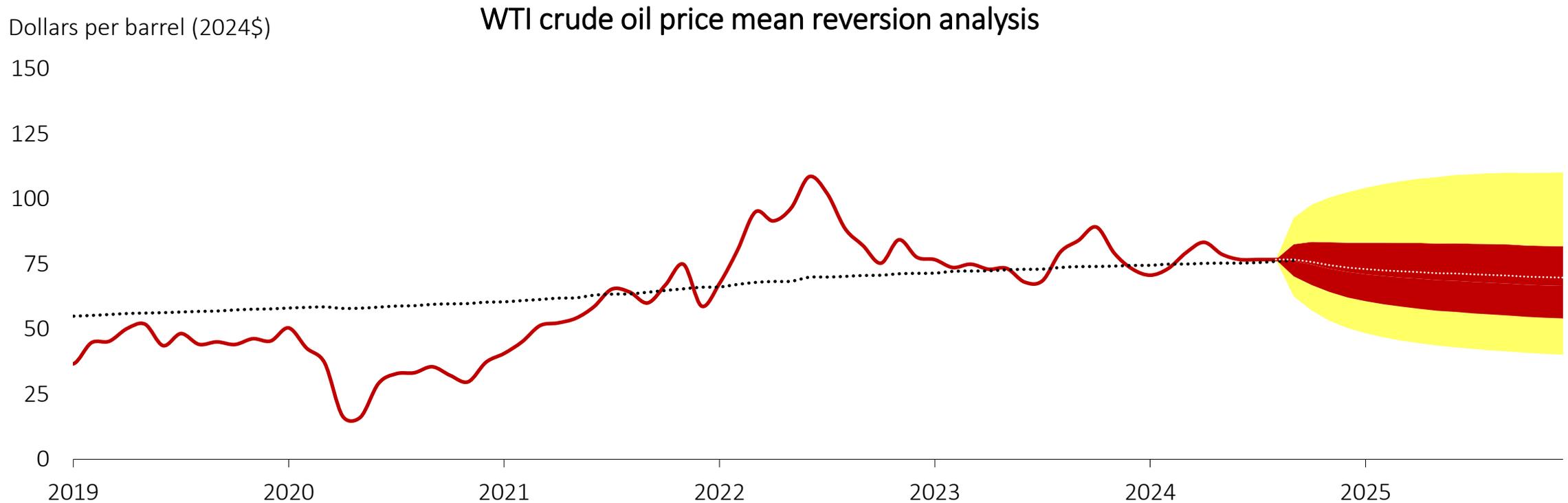
U.S. crude oil stocks held by industry

Billion barrels



Crude oil prices historical mean reversion analysis: near-term futures prices currently align with their historical mean

- ▶ 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



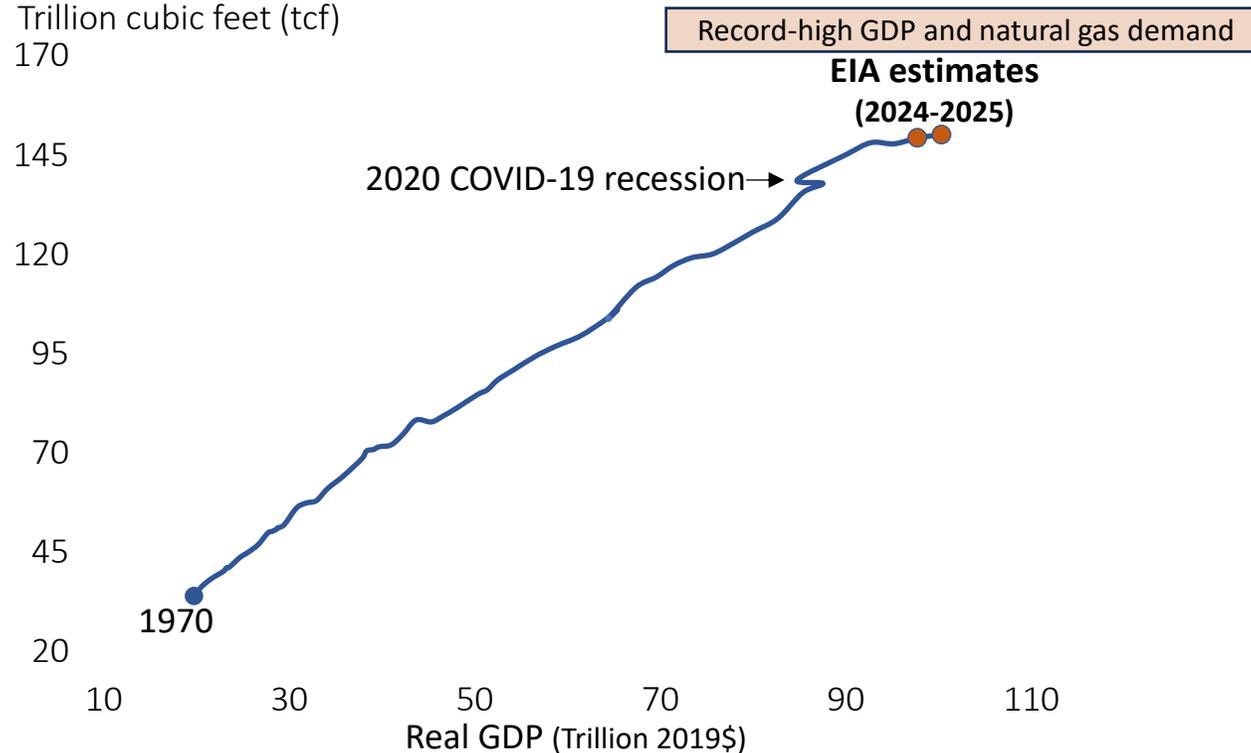
Global natural gas demand could reach another record high in 2025



- 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

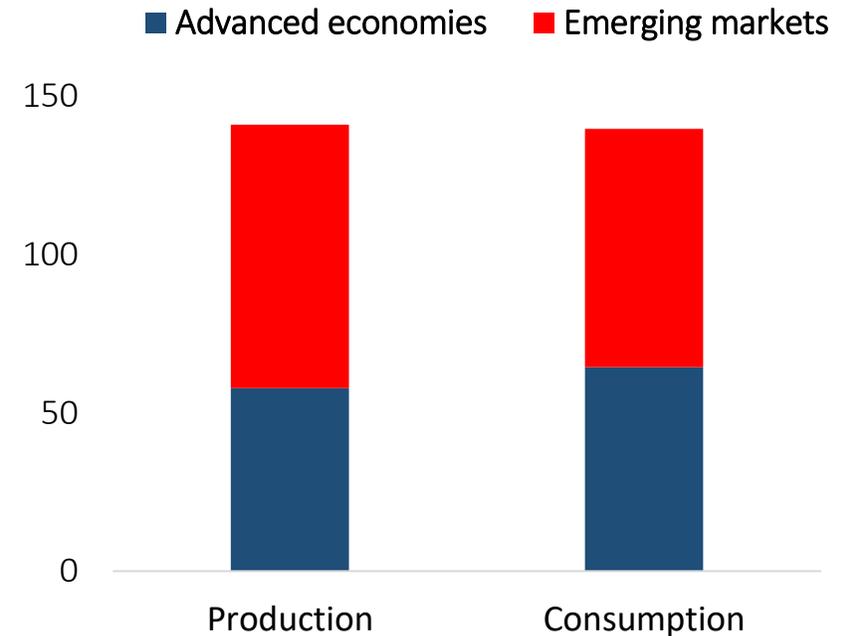
Global natural gas demand and GDP*

Trillion cubic feet (tcf)
170



2024 Global natural gas production and consumption

Trillion cubic feet (tcf)
200



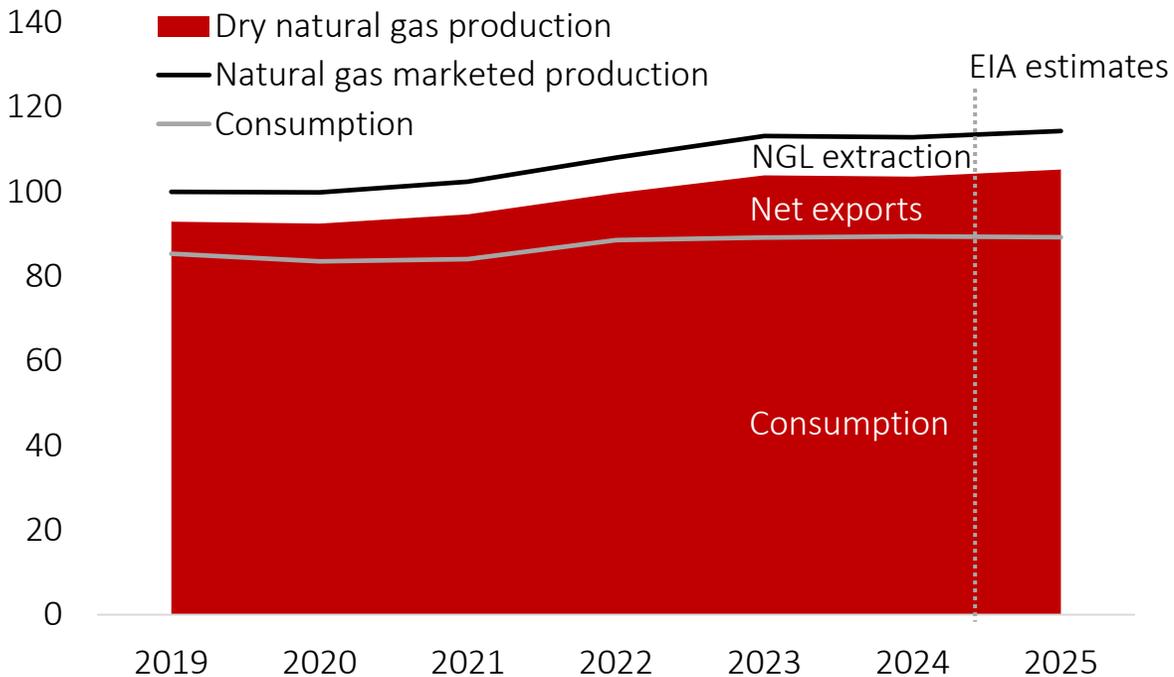
The U.S. and Texas set natural gas production records in 2024



- U.S. dry natural gas production reached a record high 113.6 bcf/d in Q3 2024 and could rise to 114.3 bcf/d in 2025 per EIA
- In Q3 2024, Texas produced record highs of 33.5 bcf/d of natural gas marketed production, including 28.0 bcf/d of dry natural gas and over 3.8 mb/d of NGL extraction by TXOGA's estimates

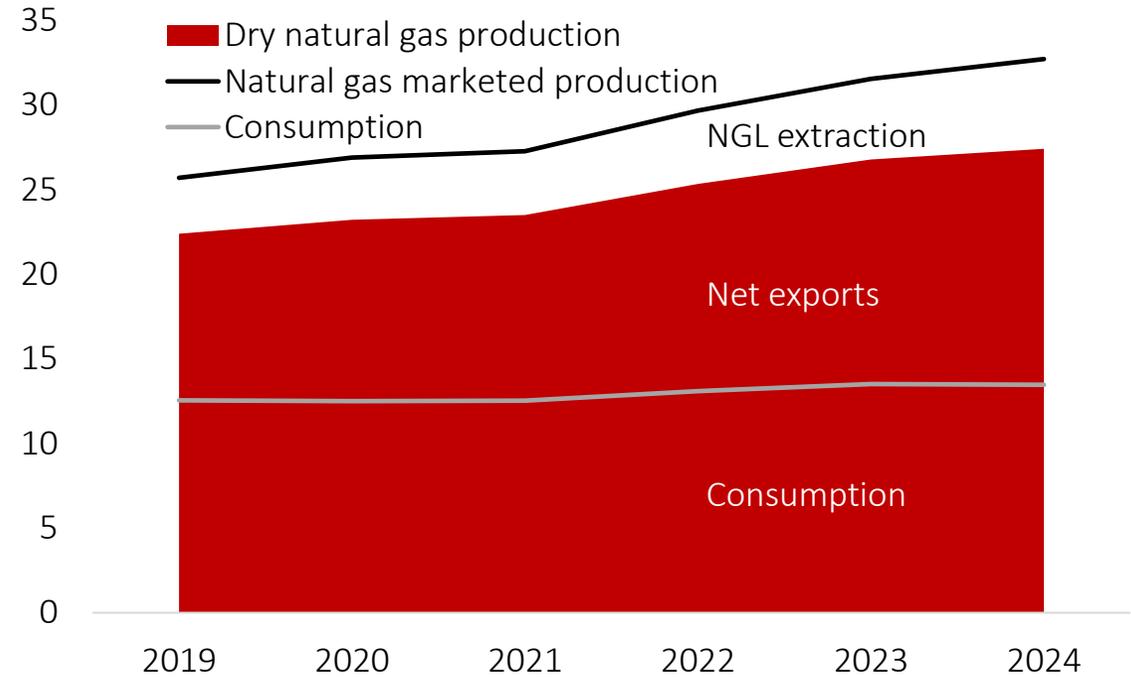
U.S. natural gas production

Billion cubic feet per day (bcf/d)



Texas natural gas production

Billion cubic feet per day (bcf/d)



With strong consumption and exports, U.S. natural gas storage has receded into its historical range

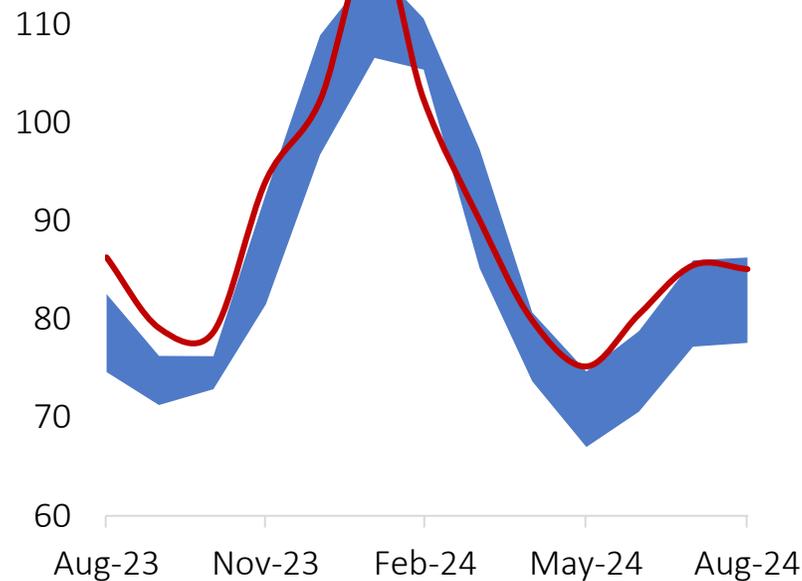


- ▶ Prior to August, record-high natural gas production outpaced consumption and exports, resulting in storage that rose to as much as 30% above the five-year average on a weekly basis
- ▶ As production growth slowed in August, seasonal injections into storage receded into the five-year range

U.S. natural gas consumption

Billion cubic feet per day, bcf/d

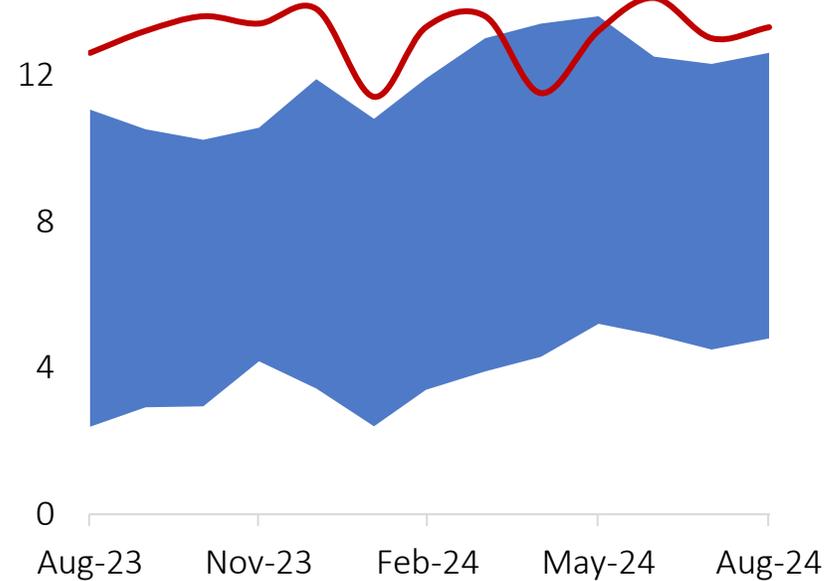
120 ■ 5-year range — Monthly reading



U.S. natural gas net exports

Billion cubic feet per day, bcf/d

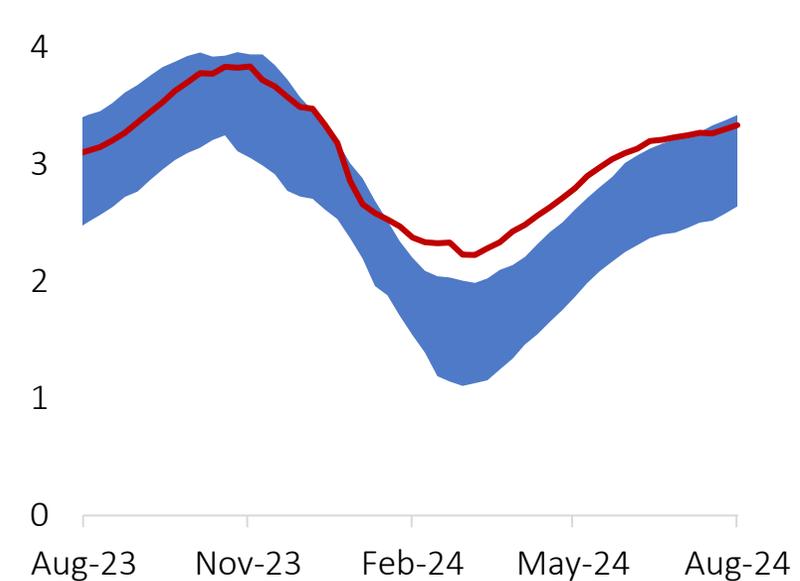
16 ■ 5-year range — Monthly reading



U.S. weekly working gas storage

Trillion cubic feet (tcf)

5 ■ 5-year range — Weekly reading

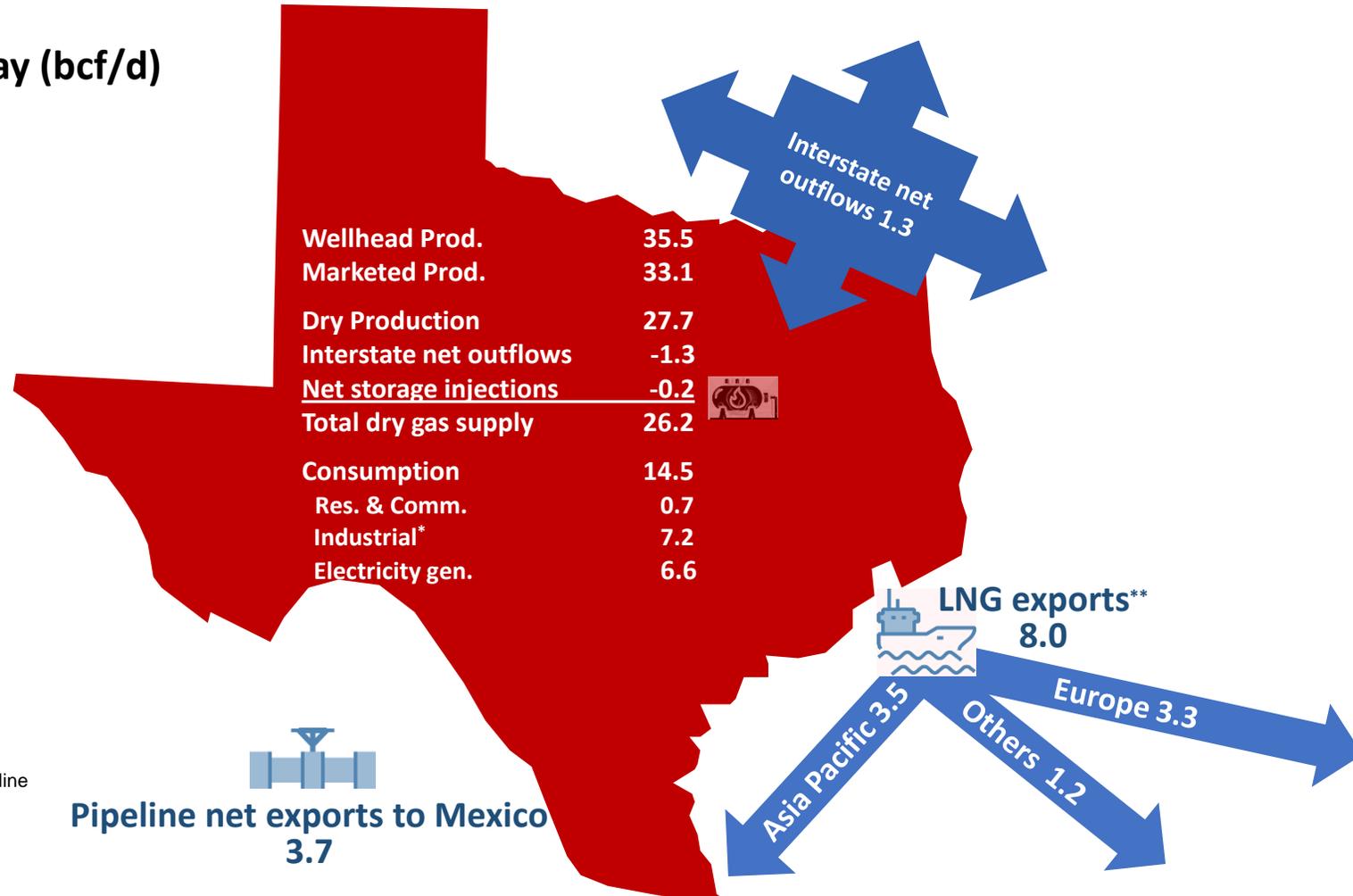




Texas' natural gas flows in June 2024: Record-high production has enabled strong consumption and exports

- ▶ Texas produced 27.7 bcf/d of dry natural gas in June 2024 by TXOGA's estimates
- ▶ Texas consumers required 14.5 bcf/d, mainly for industry and electricity generation, while 11.7 bcf/d was exported, including 8.0 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)



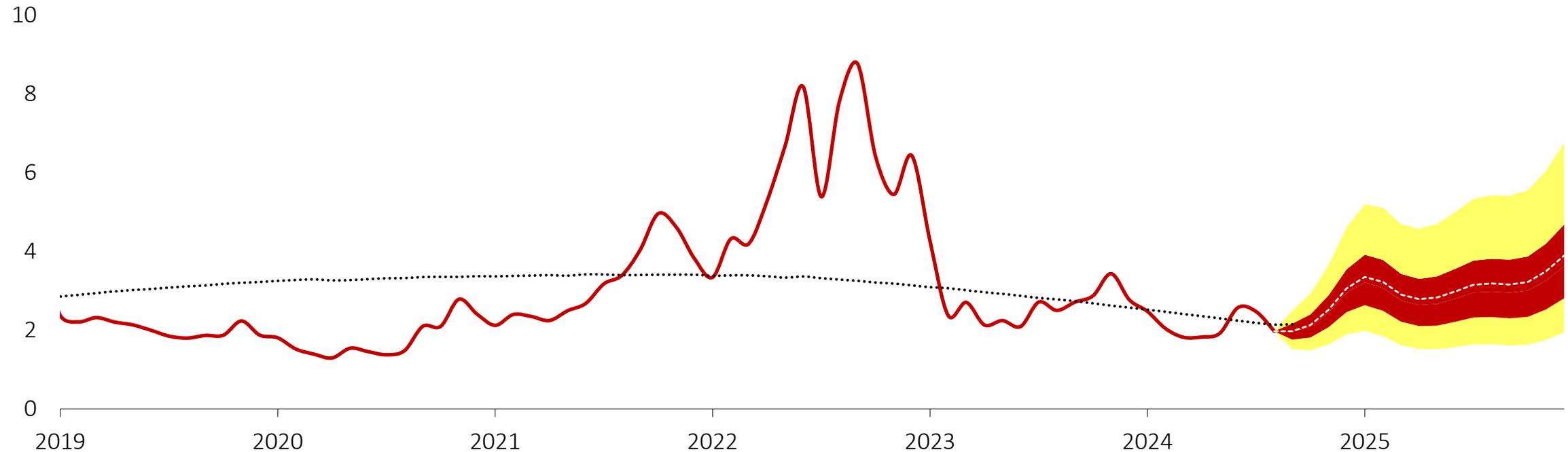
*Includes industrial end-use consumption plus lease, plant, pipeline and distribution fuel **USITC Texas export districts

Near-term natural gas futures prices have fallen below their historical mean reversion target

- ▶ As of September 4, 2024, natural gas futures prices of \$2.20 per million Btu for October delivery remained below their historical mean, and the contract for December delivery is 40% higher at \$3.08 per mmBtu
- ▶ 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\$)



Productivity, Jobs, and Wages



U.S. oil and natural gas productivity has continued strongly

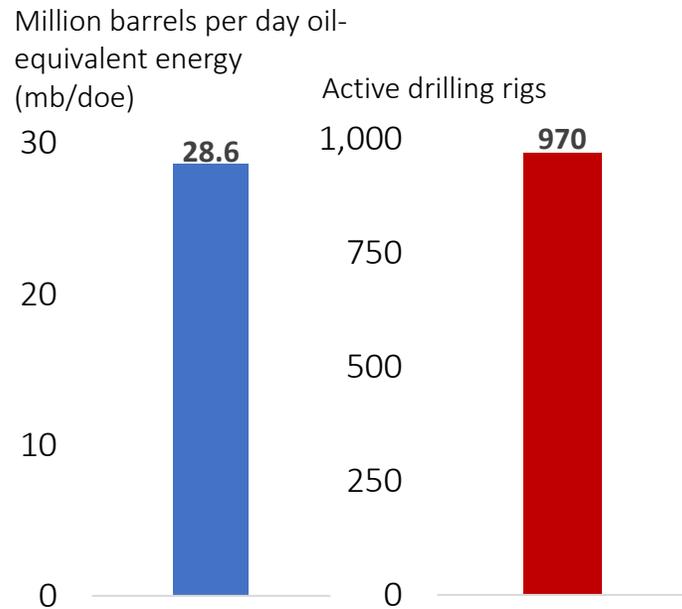


- ▶ From June 2019 to June 2024, the U.S. has produced over 12% more oil and natural gas while utilizing 40% fewer rigs – remarkable productivity
- ▶ Oil and natural gas productivity gains have accelerated since 2022, highlighting the roles of technological and process innovation

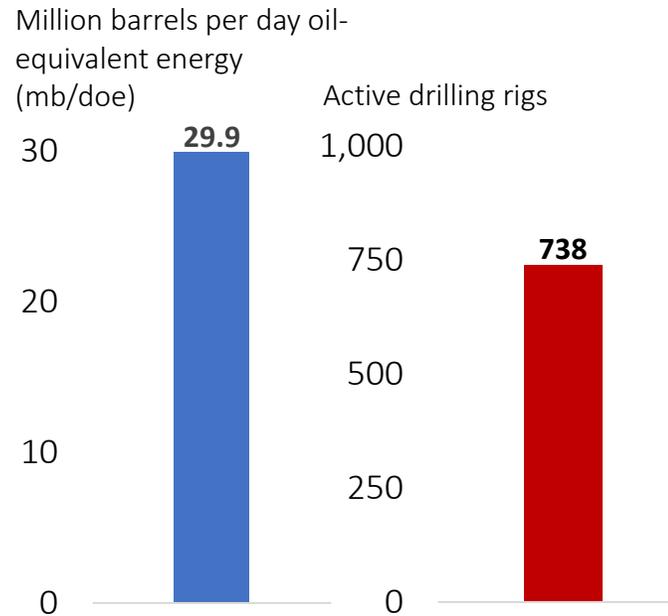
2019-2022: Pre- and post-pandemic, U.S. oil and natural gas production rose by 5%, while the number of active rigs fell by nearly one-quarter

2022-2024: U.S. oil and natural gas production rose by 7.4%, while the number of active rigs fell by over one-fifth

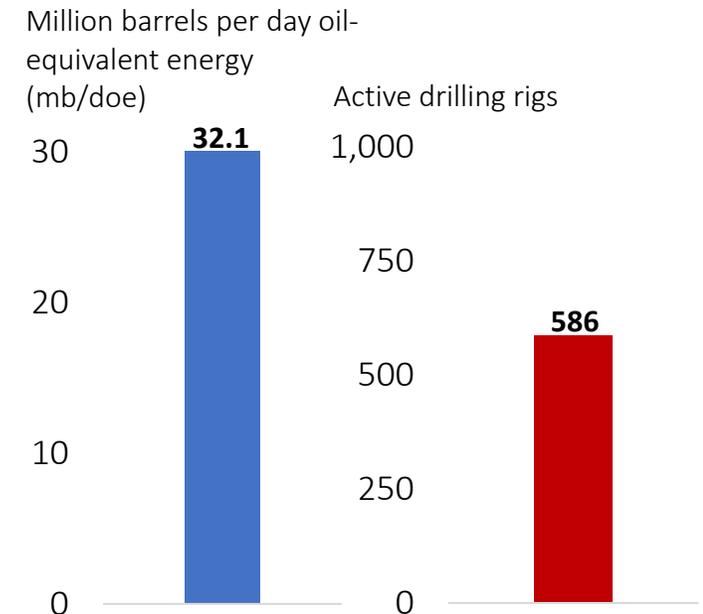
June 2019



June 2022



June 2024





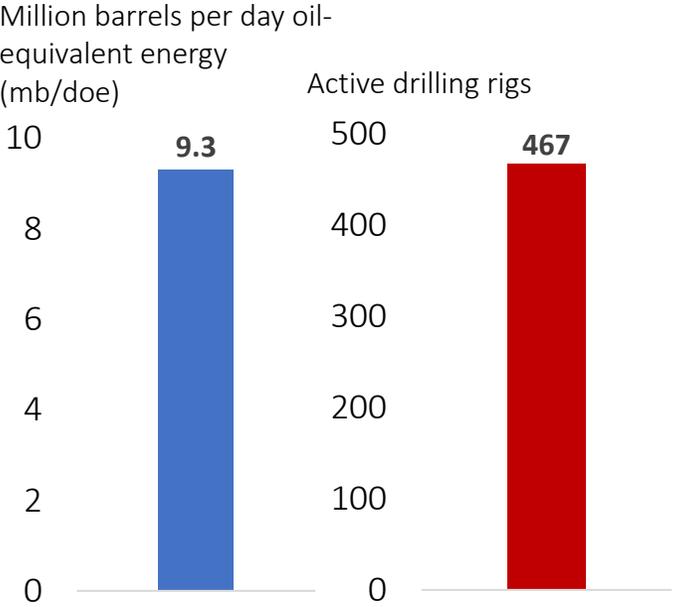
Texas' oil and natural gas productivity has accelerated and outpaced that of the U.S. overall

- ▶ Compared with June 2019, Texas has produced over 20% more oil and natural gas while utilizing 40% fewer rigs so far this year – amazing productivity
- ▶ Texas' oil and natural gas productivity gains have accelerated since 2022, and the ratio of production to active drilling rigs in Texas has increased more than 70% faster in Texas than it has nationwide

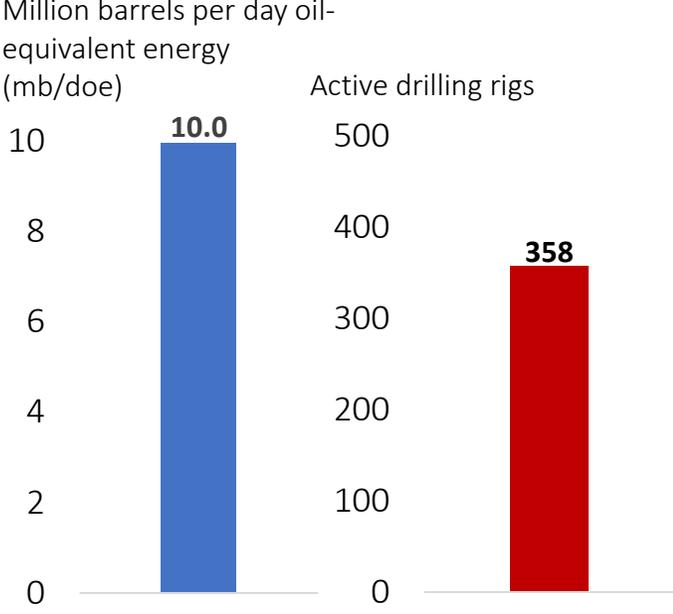
2019-2022: Pre- and post-pandemic, Texas' oil and natural gas production rose by 8%, while the number of active rigs fell by nearly one-quarter

2022-2024: Texas' oil and natural gas production rose by 13%, while the number of active rigs fell by over one-fifth

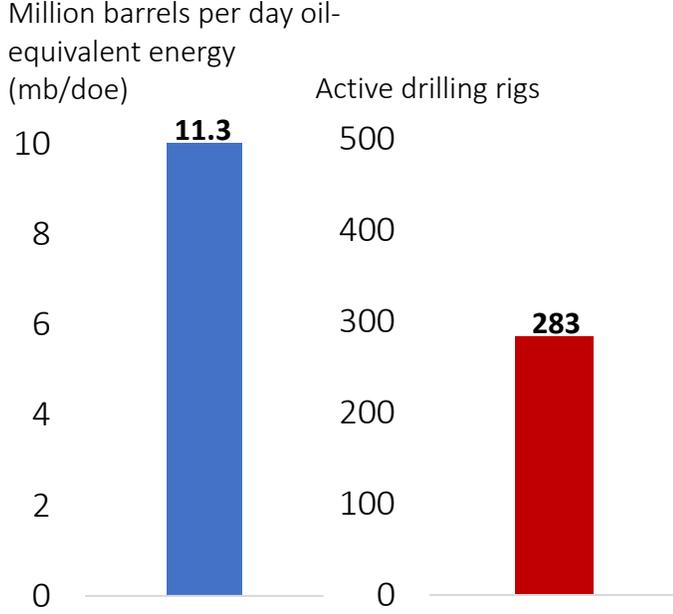
June 2019



June 2022



June 2024



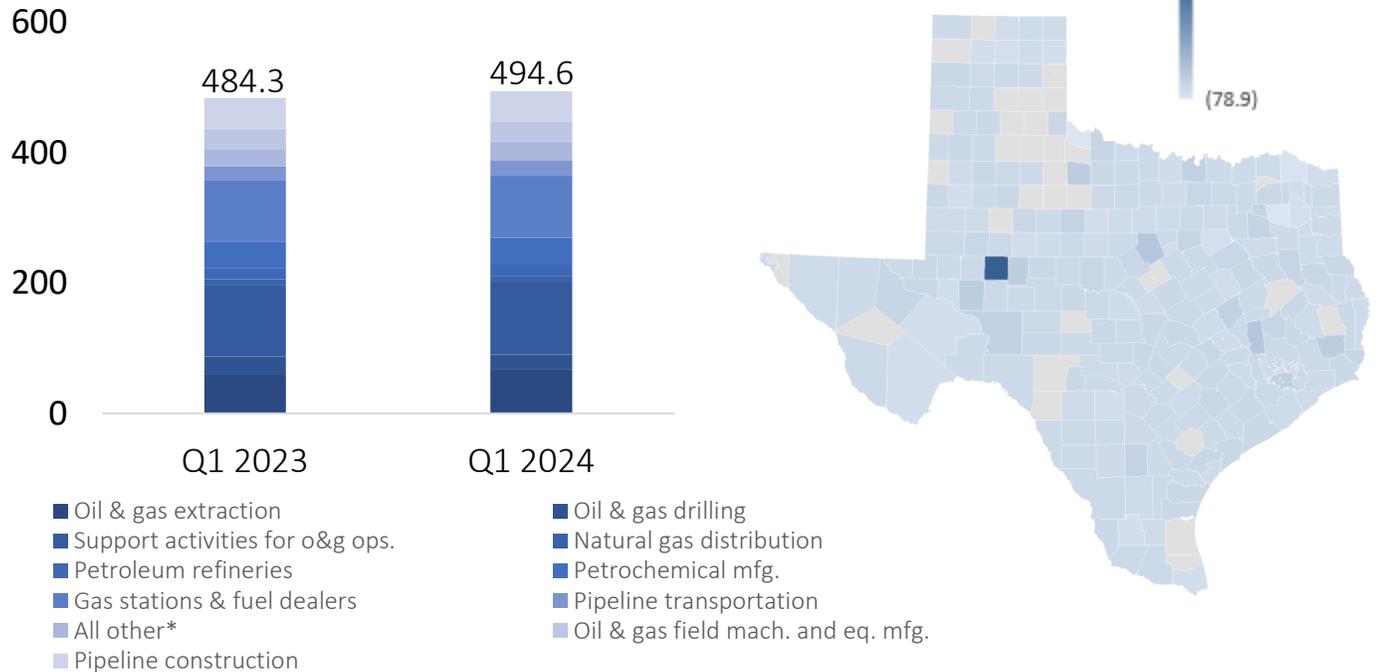
Texas' oil and natural gas industry wages eclipsed \$20.8 billion in Q1 2024



- ▶ Texas' oil and natural gas industry employment and wages grew by 2.1% y/y and 6.5% y/y, respectively, in Q1 2024, raising the totals to nearly 494,593 jobs and \$20.8 billion in wages – the highest wages since the 2020 pandemic.
- ▶ Two-thirds of the year-over-year job growth occurred in the upstream and supporting services, while another quarter of the job growth occurred in pipeline transportation per the latest data (released on August 20, 2024) from the U.S. Census Bureau and Texas Workforce Commission.

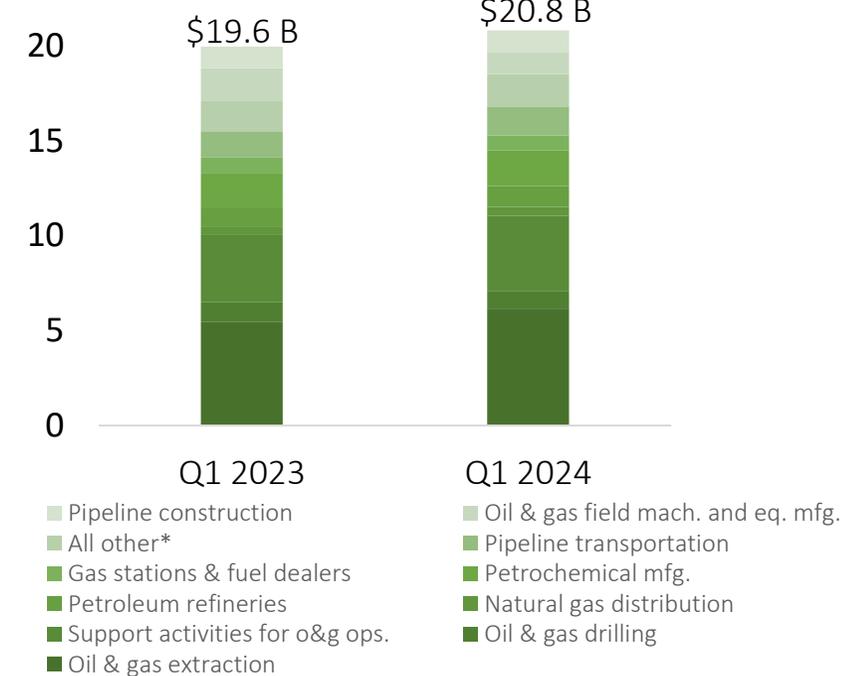
Texas oil and natural gas industry direct employment rose by +2.1% y/y in Q1 2024

Thousand Jobs



Texas oil and natural gas industry direct wages rose by +6.5% y/y in Q1 2024

Billion dollars



* 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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