



November 20, 2023



TXOGA's chartbook provides a vital reference for our members as well as those who are interested in understanding data which tell the story of what's happening with the economy, oil and gas markets at the global, U.S. and Texas levels.

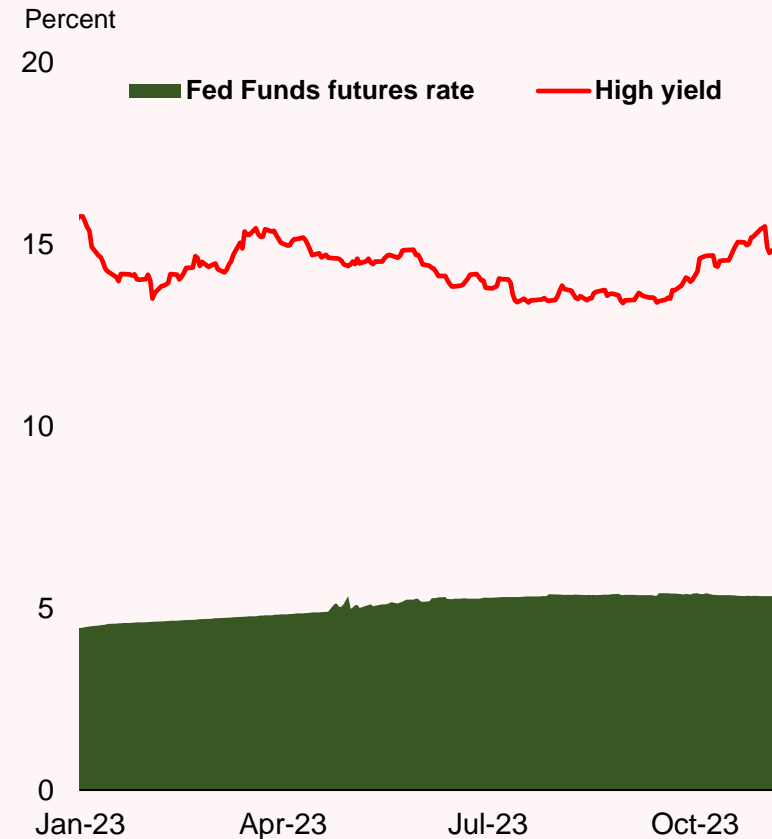
Key points for the week of November 20, 2023

- **Moderate economic indicators.** According to the ADS Business Conditions Index from the Philadelphia Federal Reserve Bank, current business conditions suggest a continuation of modest U.S. GDP growth. Additionally, the yield premium for lower-grade corporate bonds decreased by 1.0% in the first half of November, as highlighted in the [Chart of the Week](#).
- **Stable oil market dynamics.** Weekly data showed U.S. ending stocks of crude oil (excluding the Strategic Petroleum Reserve) rose by 17.5 million barrels over the past two weeks. This news, coupled with economic uncertainties, corresponded with lower oil prices. Yet, U.S. crude stocks have historically risen at this point during 10 of the past 14 years, based on data from the U.S. Energy Information Administration (EIA). U.S. ending stocks also remained the bottom of their five-year range, while domestic petroleum demand held solid and exports remained on pace for a record year.
- **U.S. natural gas sustained record exports and strong consumption, yet low prices.** U.S. natural gas prices dropped below \$3 per million Btu and fell by nearly 20% in the first half of November. Natural gas storage levels have remained historically high despite strong consumption and record exports per the EIA. With the latest price decreases, natural gas prices have fallen below their historical mean.

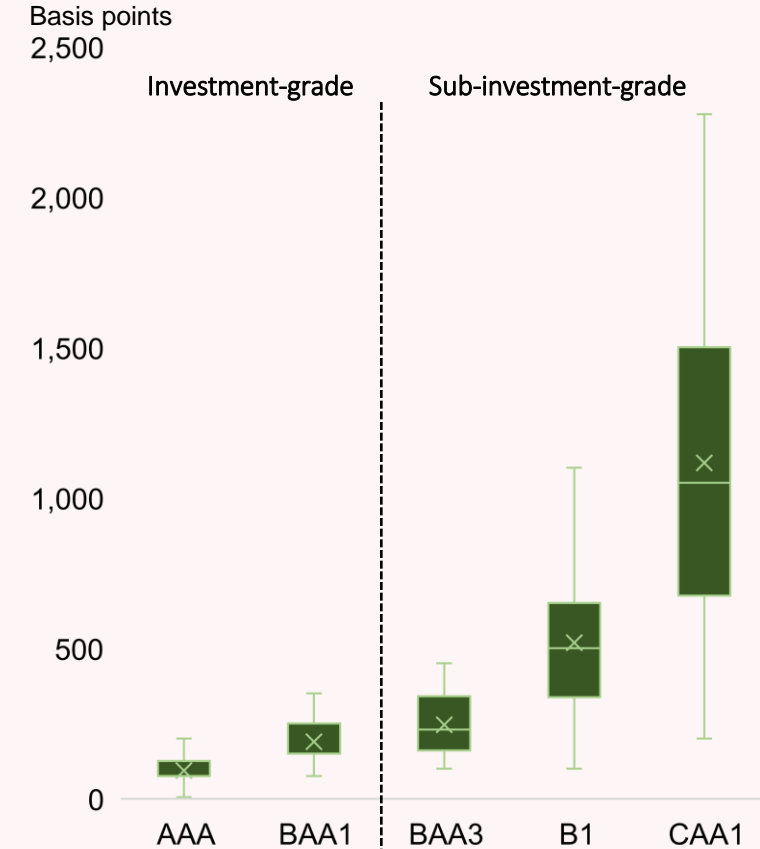
TXOGA Chart of the Week: Economic uncertainties have reduced the premium for low credit quality

- With the recent easing of U.S. price inflation, financial market attention has turned to longer-term interest rates and bond yields, some of which have risen to their highest since 2009.
- High yield (HY) rates reflect debt costs for firms with below-investment grade credit quality. HY rates have fallen by 100 basis points (that is 1.0%) in the first half of November, while market expectations have remained for the Federal Reserve to keep its policy rate steady. Consequently, the premium for below-investment grade credit quality has also fallen by 1.0% so far this month.
- When economic uncertainties rise, one usually expects high risk premia for weak quality credit. Yet, mixed economic news has recently supported keeping short-term interest rates steady, which in turn has corresponded with lower debt costs for weaker firms. Since bond yields rise exponentially with weaker credit ratings, as shown in the right panel, the easing of HY rates could help to lower debt costs and thereby alleviate pressure on firms that need to extend or refinance their debt.

Fed Funds rate and CCC and lower corporate bond yields

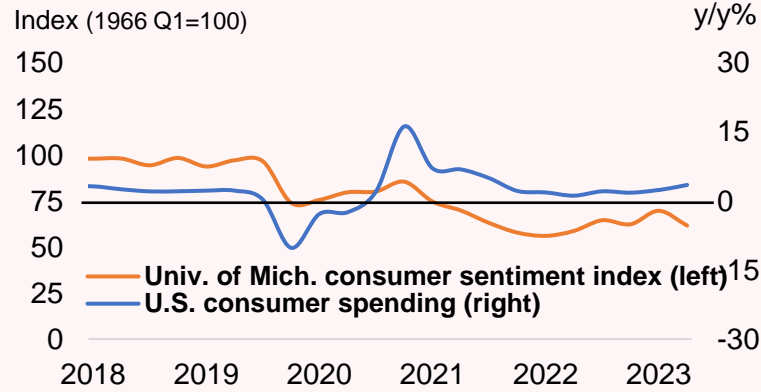


U.S. corporate bond spreads by credit ratings, Oct. 2023



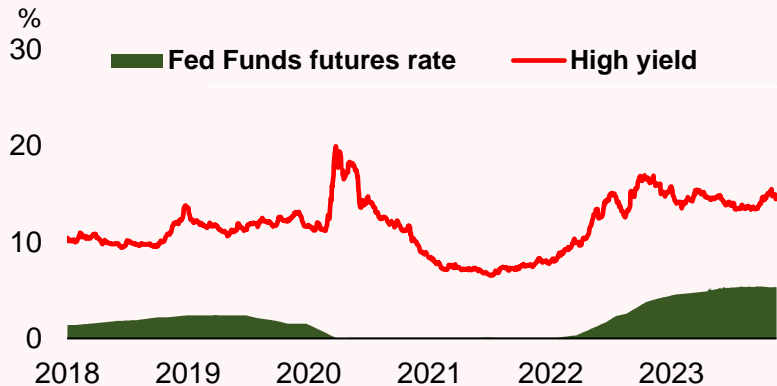
U.S. economic indicators

Consumer sentiment vs. spending



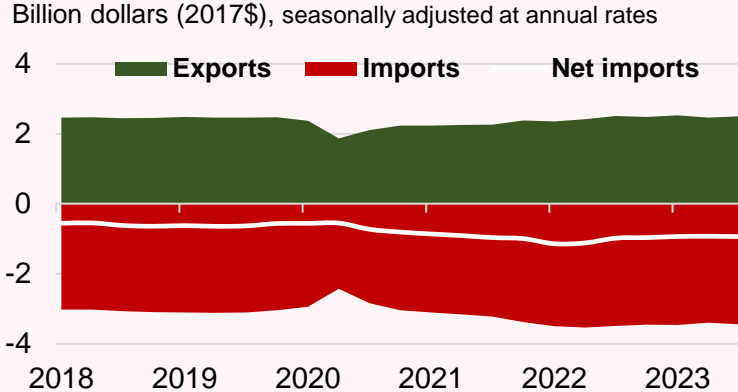
Consumer sentiment weakened entering November. In its initial reading for November, the Univ. of Michigan consumer sentiment index fell for a fourth straight month, mainly due to concerns about the negative effects of high interest rates. The index has nevertheless remained consistent with slow consumer spending growth.

Fed Funds rate and CCC and lower corporate bond yields



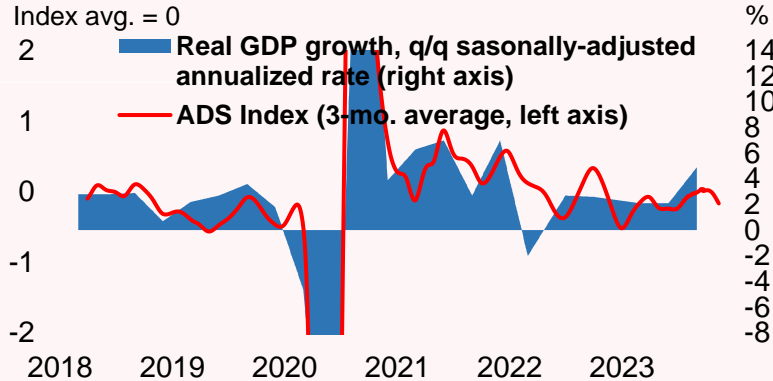
Low credit quality premium fell. High yield (HY) rates reflect debt costs for firms with below-investment grade credit quality. HY rates fell by 100 basis points (bps) between Nov. 1 and 15 to 14.45%, while the Fed Funds futures rate remained stable near 5.33%. The premium for low credit quality decreased to 9.1% as of Nov. 16.

Real net exports of goods and services



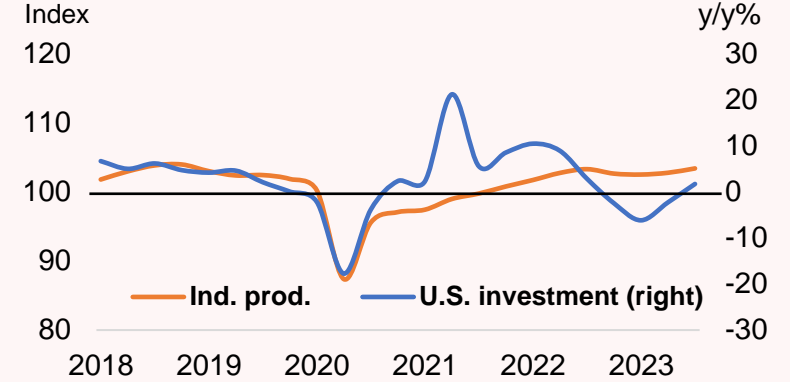
The U.S. trade deficit widened in Q3 2023. The U.S. real trade deficit ran at an annualized rate of \$938 billion in Q3 2023, per the U.S. Bureau of Economic Analysis. Petroleum and product exports of \$185 billion were partially offset by imports of \$167 billion for net surplus of \$18 billion for Q3 on an annualized basis, down \$25.4 billion in the same quarter a year ago.

Aruoba-Diebold-Scotti Business Conditions Index (qtr. avg.) vs. U.S. real GDP growth



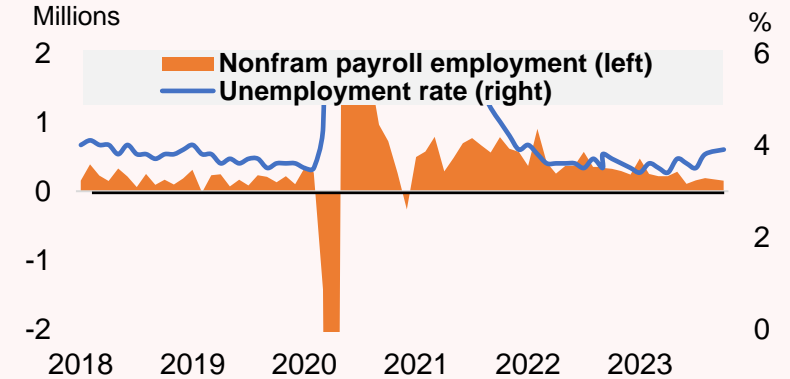
Stable growth conditions. The ADS business conditions index, published by the Philadelphia Fed. Res. Bank, is a leading indicator of GDP growth. A rolling 3-month average of the ADS index has remained solid with positive readings so far in Q4 2023, which historically corresponds with continued GDP growth.

Industrial production and investment growth



Investment resumed growth of 1.8% y/y in Q3 2023 in the initial reading of Q3 2023 GDP by the Bureau of Economic Analysis. This growth was consistent with changes in industrial production, which grew by 0.1% y/y in Sep. along with a capacity utilization rate of 79.7%.

Nonfarm payroll employment & unemployment rate

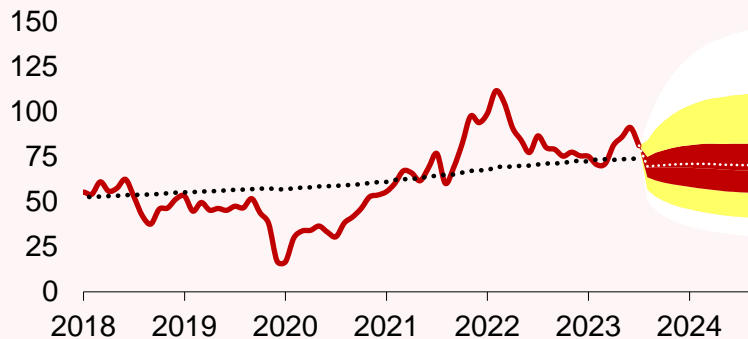


With tepid payroll increases, the unemployment rate edged up in October. The employment situation is a lagging indicator of GDP growth. The U.S. unemployment rate rose by 0.1% to 3.9% in October per BLS, while non-farm payrolls rose by 150,000, their lowest for the month of October.

U.S. oil market indicators

WTI crude oil price mean reversion analysis

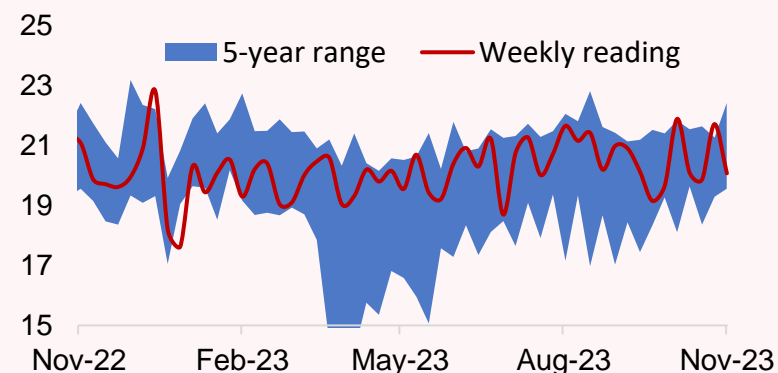
Dollars per barrel (2023\$)



Futures prices have fallen below their historical mean. Mean reversion analysis can be useful in to assess short-term market actions. As prices decreased the past two weeks, they aligned with the best-fit curve through historical prices (MR target). The futures price strip has remained below recent prices (backwardated). Confidence intervals based on past prices show the potential for greater upside than downside.

U.S. petroleum demand

Million barrels per day (mb/d)



Petroleum demand solid. U.S. petroleum demand, as measured by deliveries, ranged between 20.1 mb/d and 21.7 mb/d in the past two weeks – but on average has remained solid in the middle of the five-year range.

WTI crude prompt month futures prices

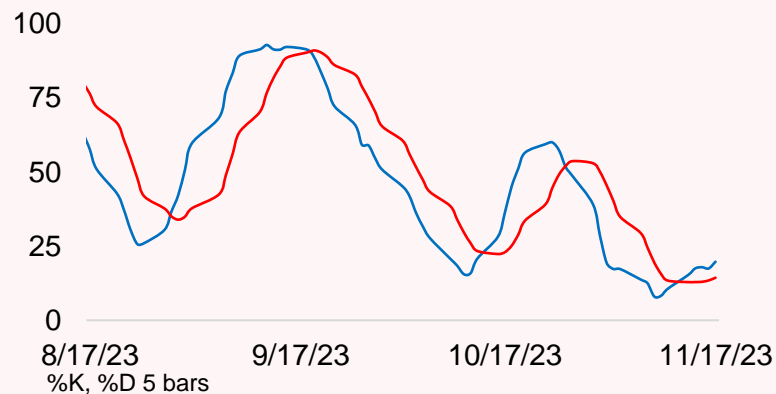
Dollars per barrel



WTI crude oil prices fell by 3% w/w to \$75 per barrel per barrel for the week ended Nov. 17 despite market fundamentals have remained tight with solid U.S. demand, strong exports, and historically low inventories.

WTI crude prompt month futures slow stochastic

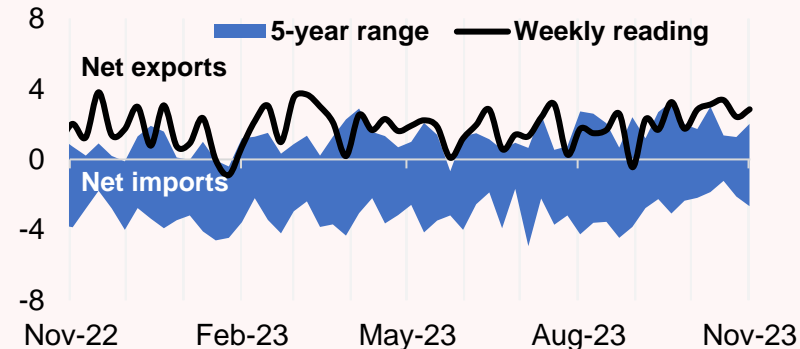
Index level



Price momentum pivoted during the week ended Nov. 17.

U.S. petroleum net exports (imports)

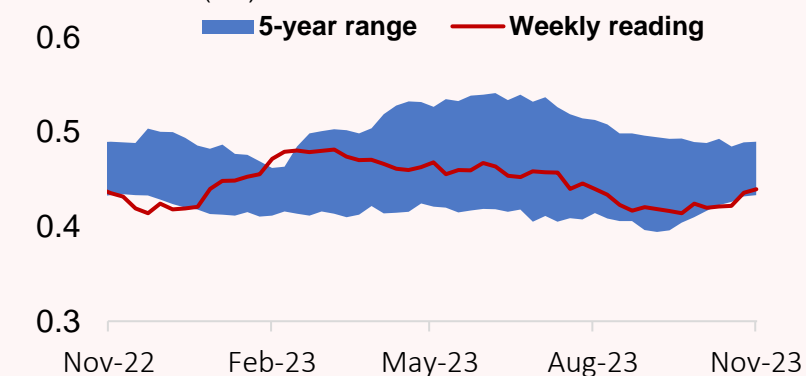
Million barrels per day, mb/d



Strong petroleum net exports continued. The U.S. was a petroleum net exporter of 2.9 mb/d for the week ended Nov. 10 and continued at a record pace for this time of the year.

U.S. ending stocks of crude oil (excluding the SPR)

Million barrels (mb)

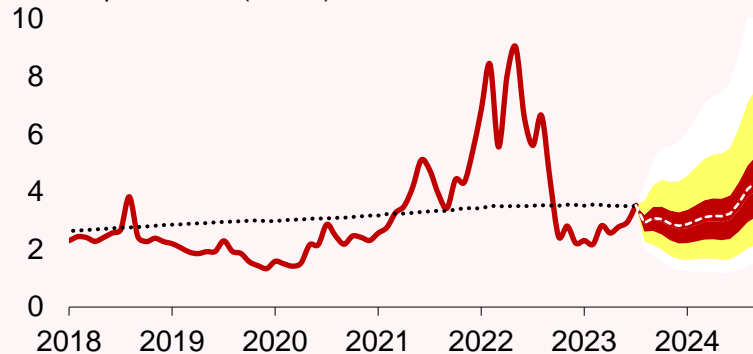


Inventories remained historically low. U.S. ending stocks of crude oil excluding the Strategic Petroleum Reserve (SPR) rose by 17.5 million barrels (mb) between Oct. 27 and Nov. 10, but since they normally rise at this time of the year remained near the bottom of the five-year range.

U.S. natural gas market indicators

Natural gas price mean reversion analysis

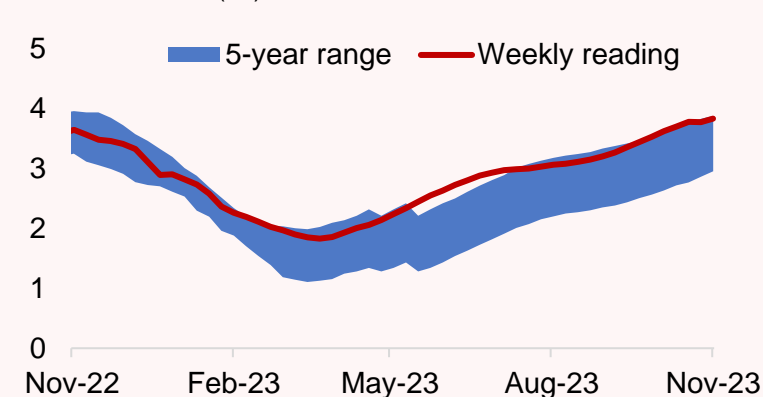
Dollars per mmBtu (2023\$)



Natural gas futures prices of \$2.95 per mmBtu for December 2023 delivery fell below their historical mean. Historical variation continued to show more potential upside than downside.

U.S. weekly working gas storage

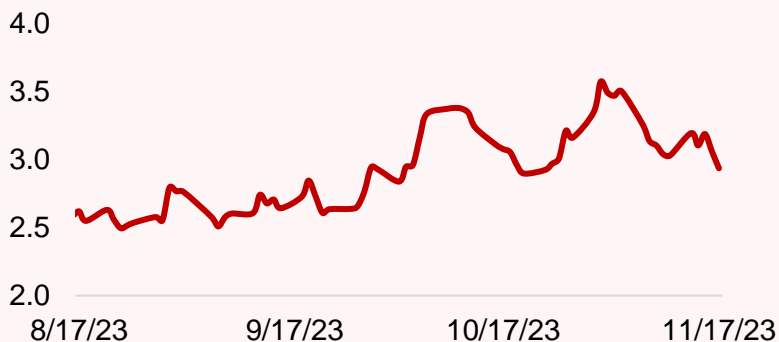
Trillion cubic feet (tcf)



Storage remained near the top of its 5-year range. Working gas in underground storage (3.83 tcf as of Nov. 10) rose by 0.7% per week over the past two weeks, and historically November has been a turning point toward storage withdrawals.

Natural gas prompt month futures prices

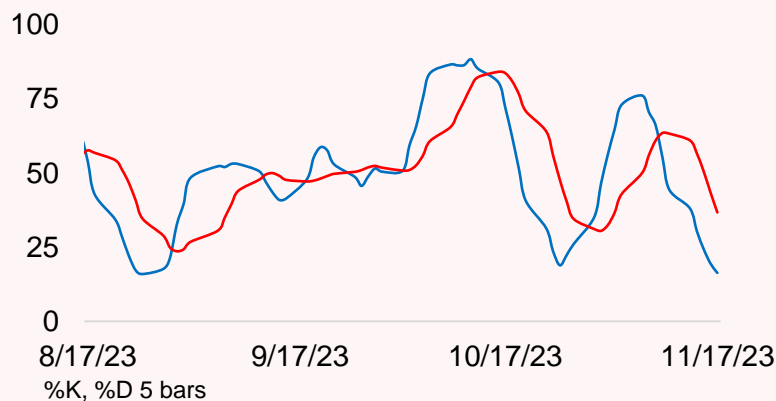
Dollars per million Btu



Natural gas prices at Henry Hub fell by 3% w/w to \$2.95 per million Btu for the week ended Nov. 17 and continued to reflect historically strong storage levels.

Natural gas futures slow stochastic

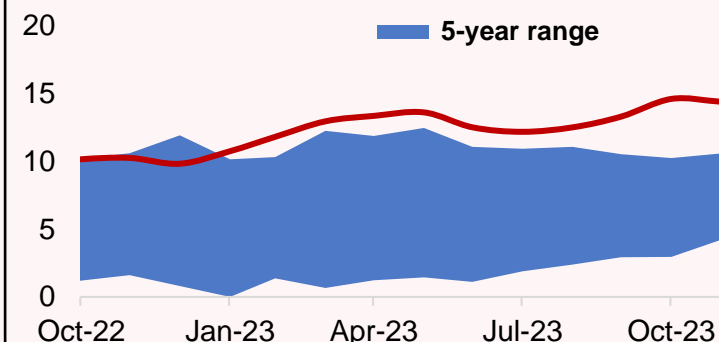
Index level



Natural gas price momentum decreased during the week ended Nov. 17,

U.S. natural gas net exports

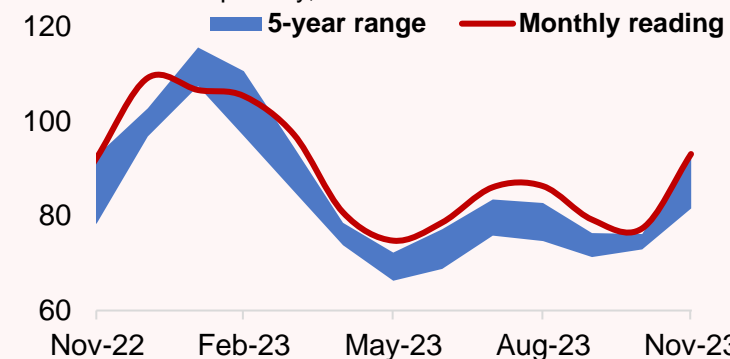
Billion cubic feet per day, bcf/d



Record high net exports. U.S. natural gas net exports are estimated to have reached 14.6 bcf/d in October and 14.4 bcf/d in November per EIA.

U.S. natural gas consumption

Billion cubic feet per day, bcf/d

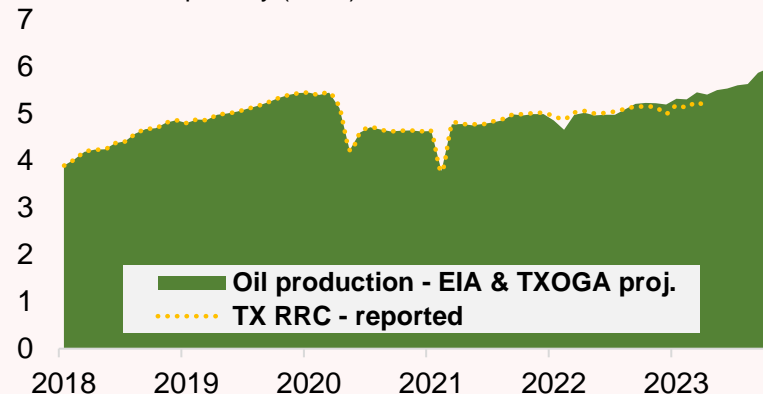


Strong consumption continued. Natural gas total consumption has remained at the top of its five-year historical range.

Texas' oil and natural gas production

Texas crude oil production, Jan. 2018 – Oct. 2023

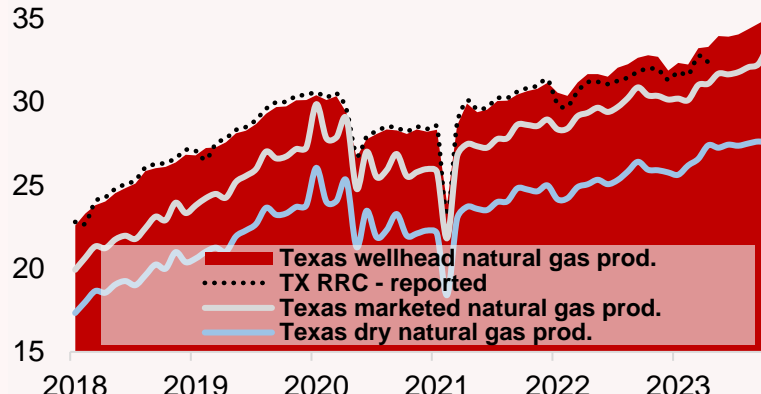
Million barrels per day (mb/d)



Record Texas oil production of 5.6 mb/d for August was reported last week by EIA. TXOGA estimates that Texas crude oil production climbed to 5.9 mb/d in September and 6.0 mb/d in October.

Texas natural gas production, Jan. 2018 – Oct. 2023

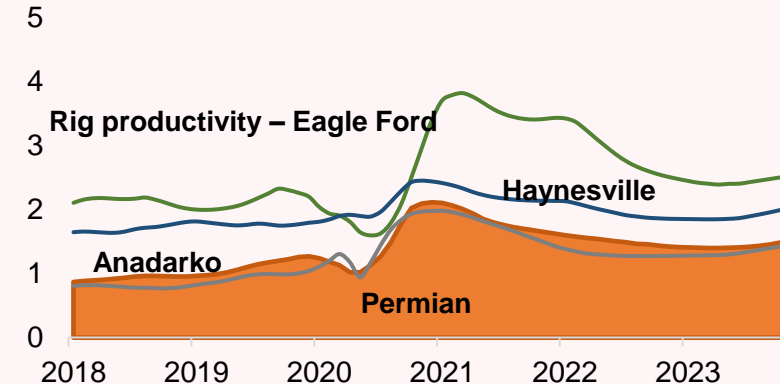
Billion cubic feet per day (bcf/d)



EIA reported for August that Texas' natural gas gross withdrawals (34.1 bcf/d) and marketed production (32.1 bcf/d) set new record highs. TXOGA estimates that in-state production has risen further to 35.0 bcf/d of gross production, including 33.5 bcf/d of marketed production, 27.6 dry gas production, and 3.3 mb/d of natural gas liquids (NGLs).

Texas rig productivity by basin – new monthly prod. per rig

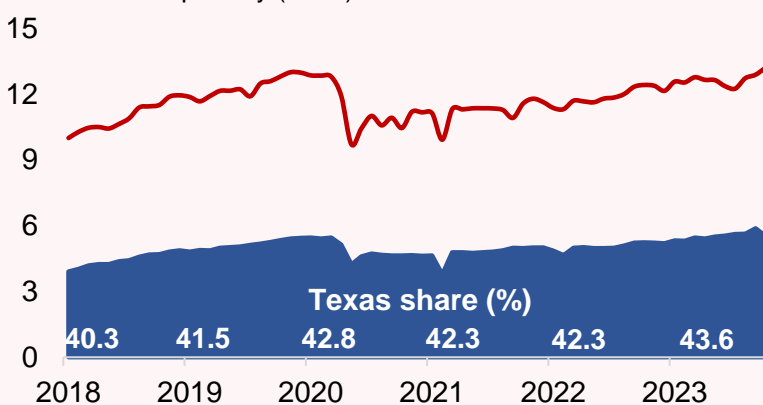
Thousand barrels per day oil-equivalent, kb/dae



EIA estimates of rig productivity for November 2023 show increases year-over-year across all of the major Texas basins, but the strongest productivity gains in the Anadarko (+13.5% y/y), Haynesville (+9.2% y/y), and Permian Basin (+6.2% y/y).

U.S. and Texas crude oil production, Jan. 2018 – Oct. 2023

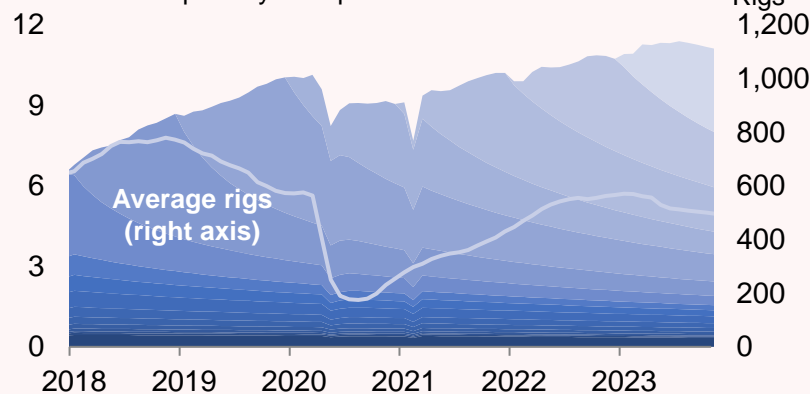
Million barrels per day (mb/d)



Through the first 10 months of the year, Texas accounted for 43.6% of U.S. crude oil production by EIA and TXOGA's estimates.

Texas shale basin wellhead oil & natural gas production

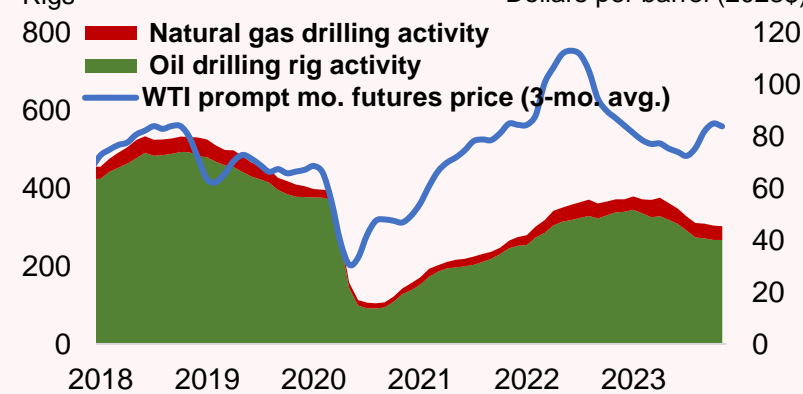
Million barrels per day oil-equivalent



EIA estimates Oct. 2023 production growth across Texas shale basins has been mixed, with strong increases year-over-year in the Eagle Ford and Permian, flat Haynesville production, and decreases in the Anadarko.

Texas drilling activity and WTI crude oil futures prices

Rigs (left axis), Dollars per barrel (2023\$) (right axis)



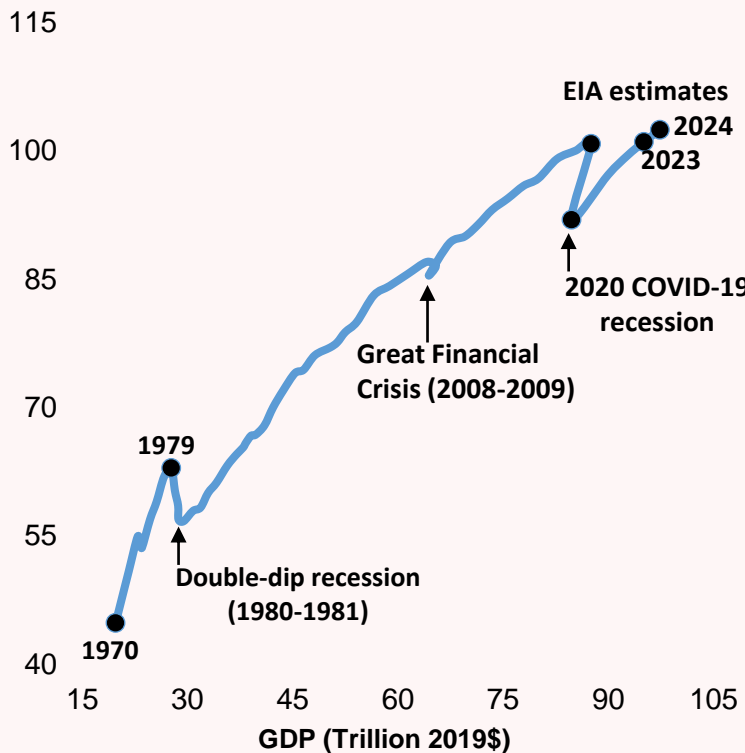
With switching between a focus on oil vs. natural gas, Texas' drilling rig activity held steady for the week ended Nov. 17 per Baker Hughes. Texas had 268 oil-directed rigs (up by 2 rigs w/w) and 34 natural gas-directed rigs (down by 2 rigs w/w).

Global oil market balance at-a-glance: EIA estimates for November 2023 show a tight oil market and project Brent at \$93 per barrel in 2024

- **October demand projections for 2023 and 2024 slipped but remain at record levels.** Global oil demand is expected by EIA to reach a record 101.0 mb/d in 2023 and 102.4 mb/d in 2024.
- **EIA raised its 2024 oil production growth** projections by 0.2 mb/d in November. These are volumes needed to balance global markets in their view. The U.S. is assumed to be largest single contributor this year
- **For oil inventories, EIA shows U.S. stock withdrawals through year-end 2023,** corresponding with Brent crude oil prices of \$87 per barrel in Q4 and averaging \$93 per barrel in 2024

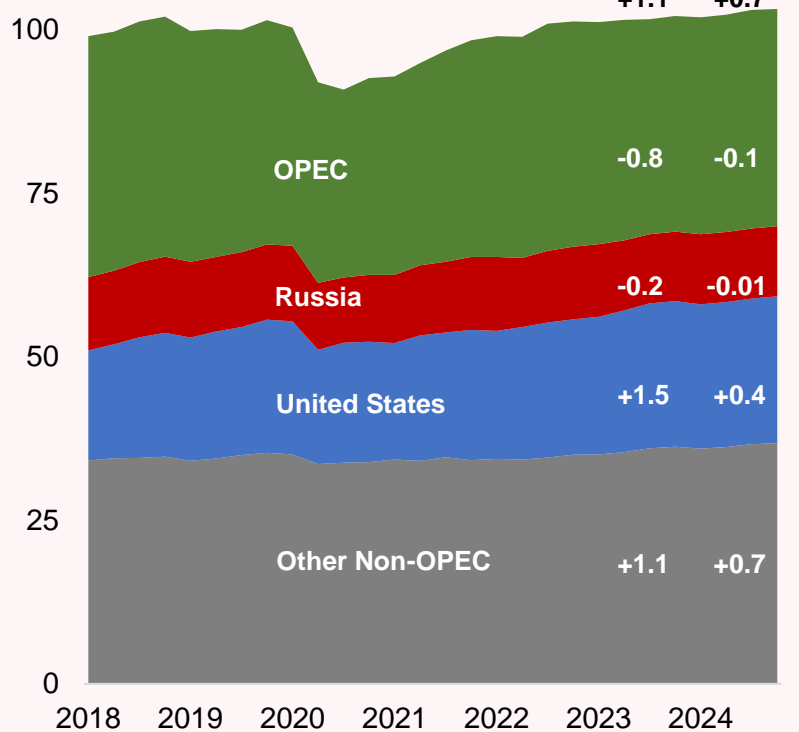
Global oil demand and GDP

Million barrels per day (mb/d)



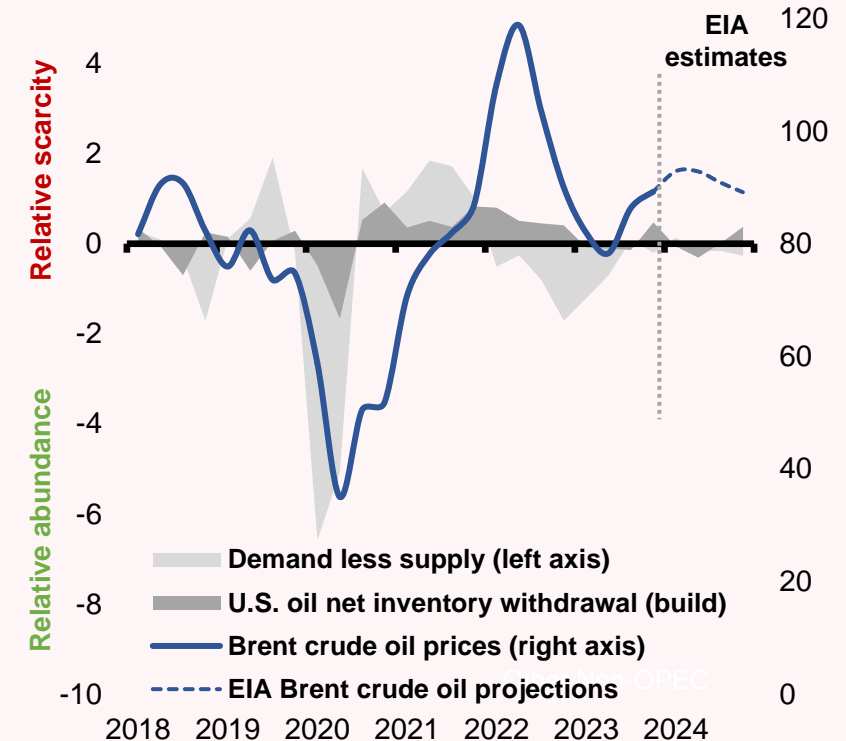
Oil production by country/region

Million barrels per day, mb/d



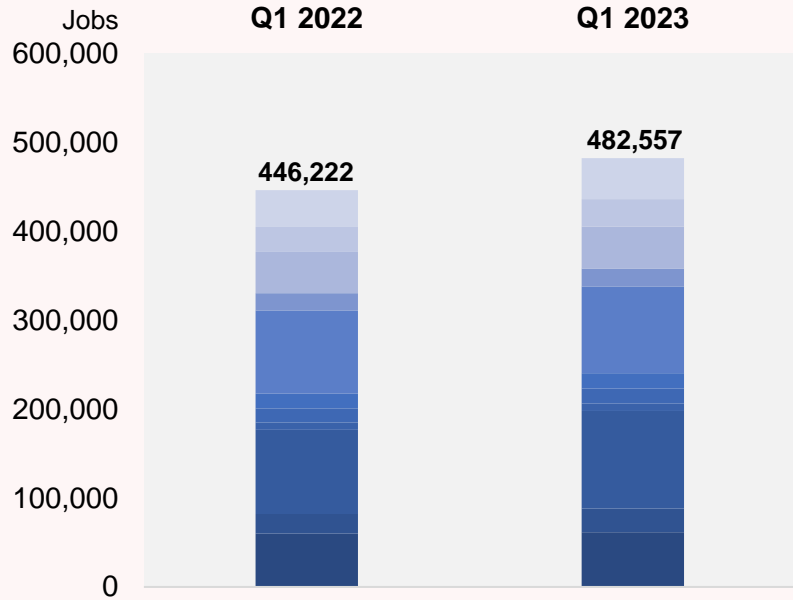
Global demand/supply & Brent prices

Million barrels per day (mb/d)

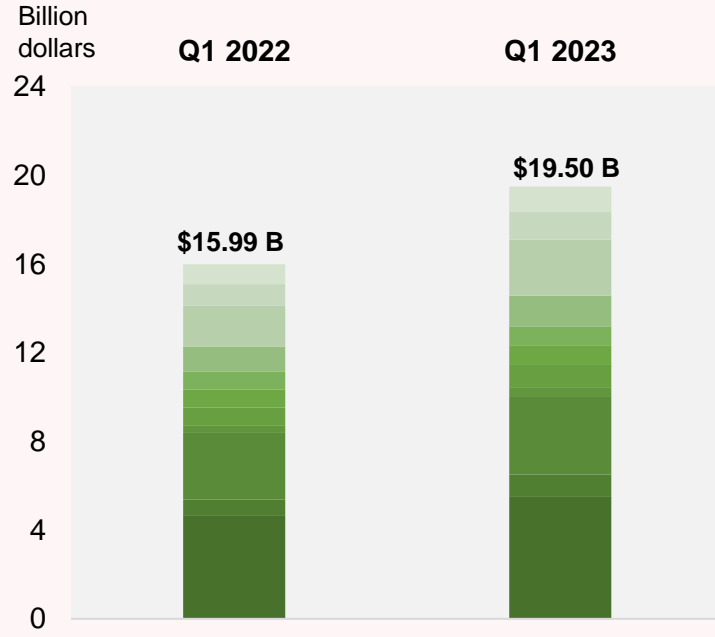


Texas' oil and natural gas industry employment and wages rose strongly

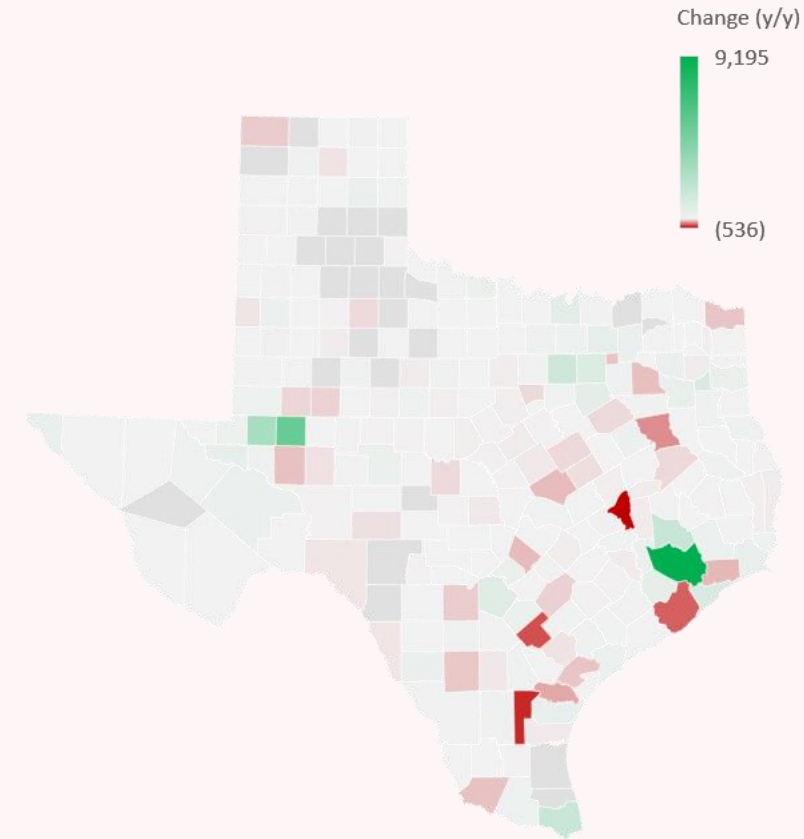
Texas Oil & Gas Industry Employment Rose by +8.1% y/y



Texas Oil & Gas Industry Wages Rose by +22.0% y/y



Heatmap of employment changes by county



- 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.

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

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