

# TXOGA Energy & Economic Outlook



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July 3, 2023

# Key Points

## Global, U.S. and Texas Economies

- At every level – global, U.S. and Texas— economic growth has **slowed** but also shown continued **resilience** with record amounts of overall activity despite unprecedented monetary policies and disruptive geopolitics over the past year
- **Texas'** economy has achieved a **record-high GDP** and **led U.S. growth for two straight quarters**, largely **driven by oil & gas**

## Oil Markets

- As economic uncertainties were amplified by interest rate hikes and consequently diminished expectations for growth, oil prices remained near \$70 per barrel, and U.S. oil drilling rig activity has fallen by 6.8% so far in Q2 2023
- Meanwhile, the U.S. Energy Information Administration (EIA) projects **record-high global demand** (102.7 million barrels per day, mb/d) in 2024; **OPEC+ supply cuts**; and the **lowest U.S. ending crude stocks in nearly 40-years**
- So far this year, **Texas has gained share among U.S. oil production** and generated **\$73.2 billion** of state export revenues in Jan. to Apr.

## Natural Gas Markets

- **U.S. natural gas production and exports currently lead the world**, and **Texas has driven** a greater share of U.S. gas production
- **Record-high U.S. gas production** has helped to sustain inventories that are near the top of their 5-year historical range, despite strong domestic consumption and record-high exports
- Texas' natural gas exports of liquefied natural gas generated **\$6.3 billion** of export revenues at premium global prices, while pipeline exports added another **\$1.5 billion** in revenues, in January through April

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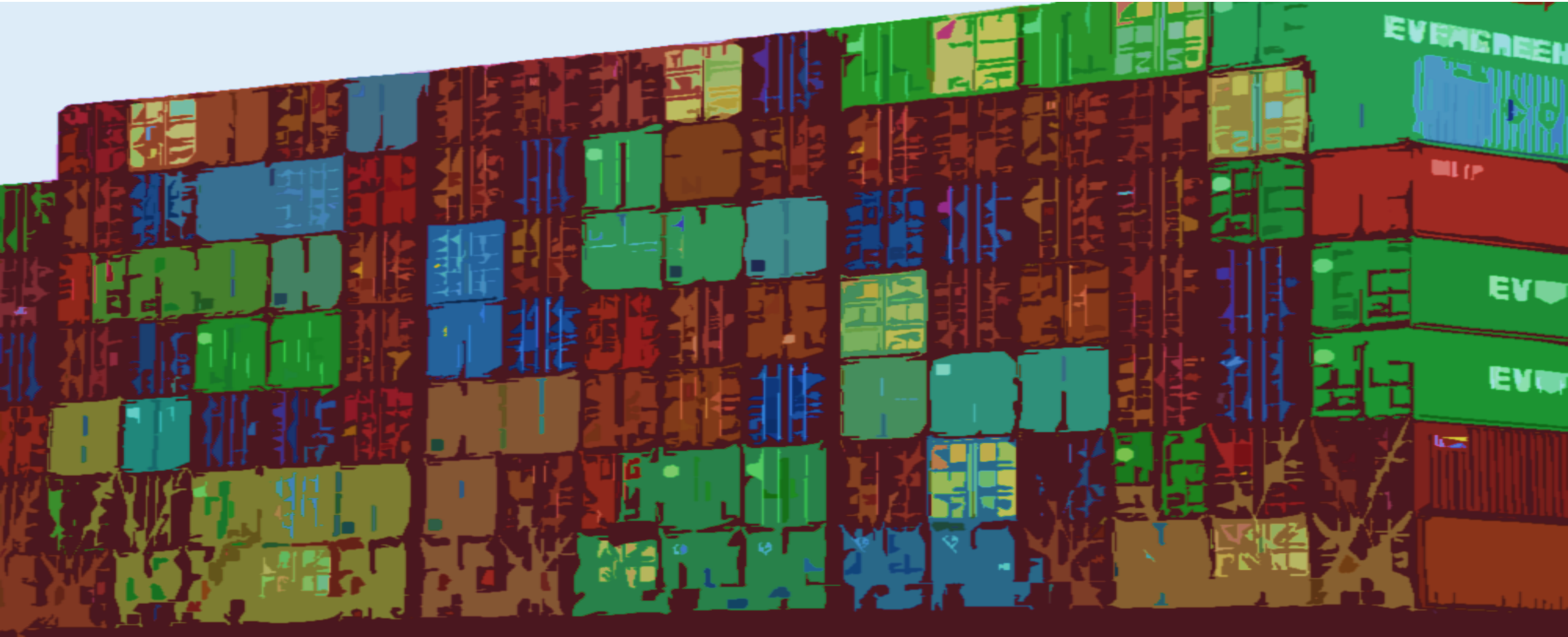
## Oil Markets

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## Natural Gas Markets

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5. Natural gas price historical mean reversion analysis

# Global, U.S. and Texas Economies

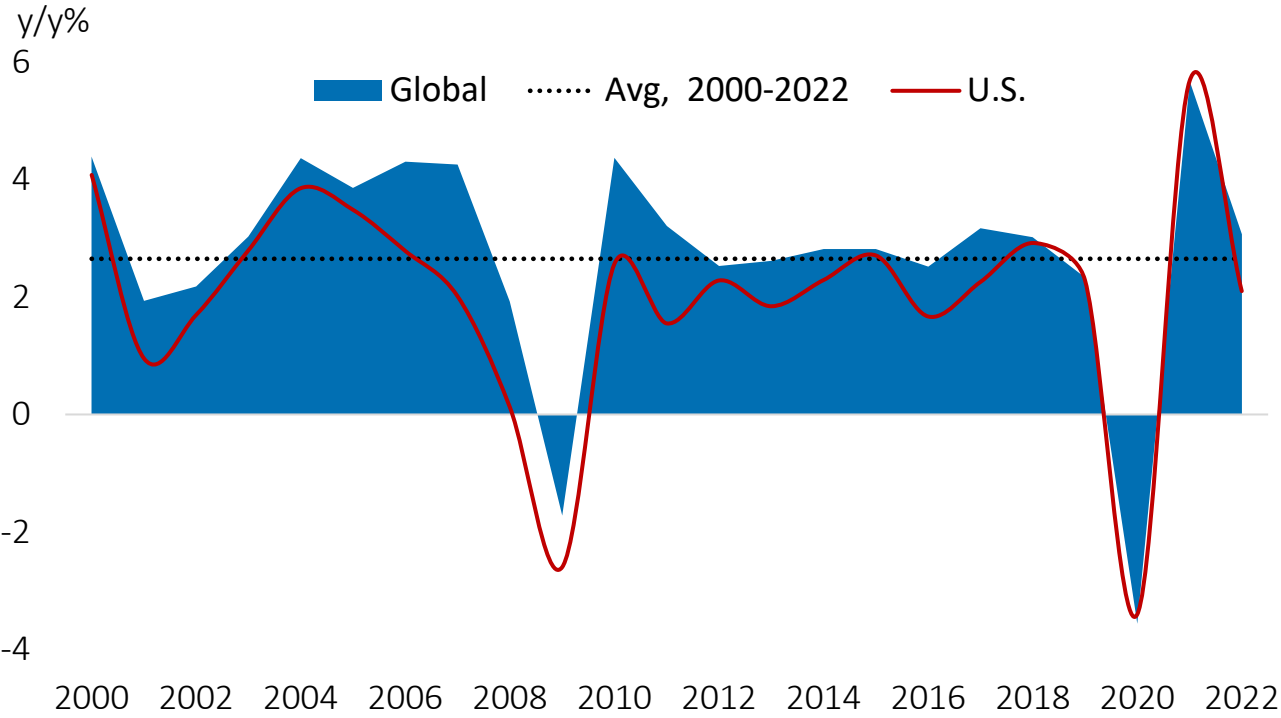


# Global GDP growth is broadly expected to return to its long-term average rate by 2024 despite relative U.S. weakness

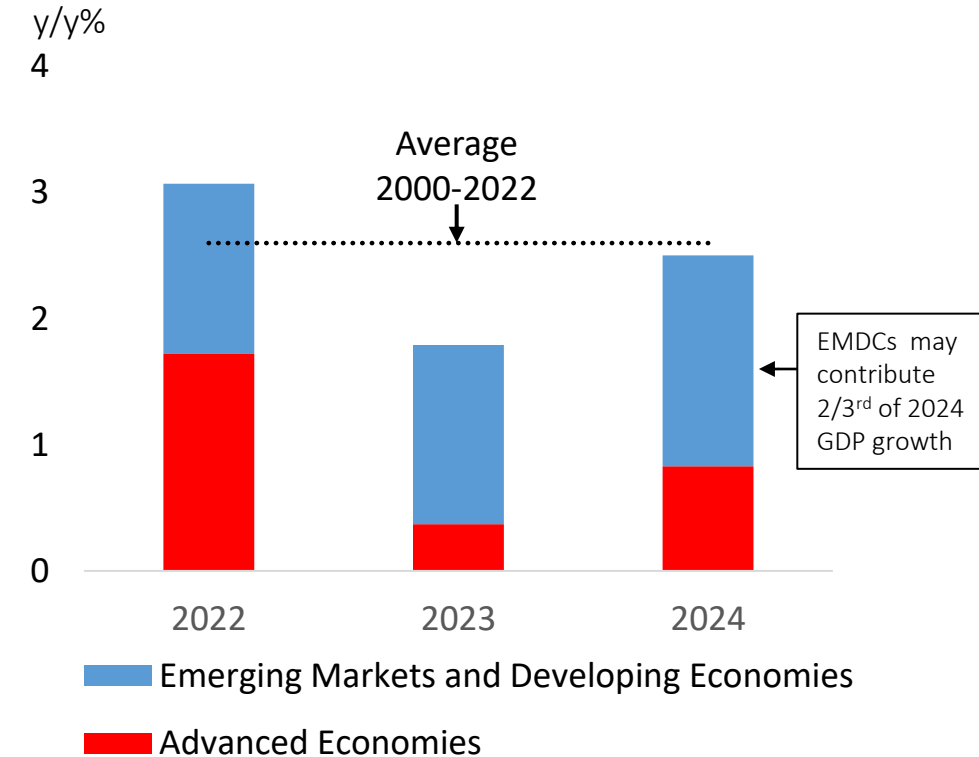


- Global and U.S. GDP growth have historically varied together, and expectations are for below-average growth of 1.8% y/y in 2023 and 2.5% y/y in 2024 despite relatively weak projected U.S. GDP growth of 1.1% y/y per IMF\*
- In 2024, energy-intensive Emerging Market and Developing Economies (EMDCs) could continue to deliver the bulk of global GDP growth

Global and U.S. real GDP growth\*

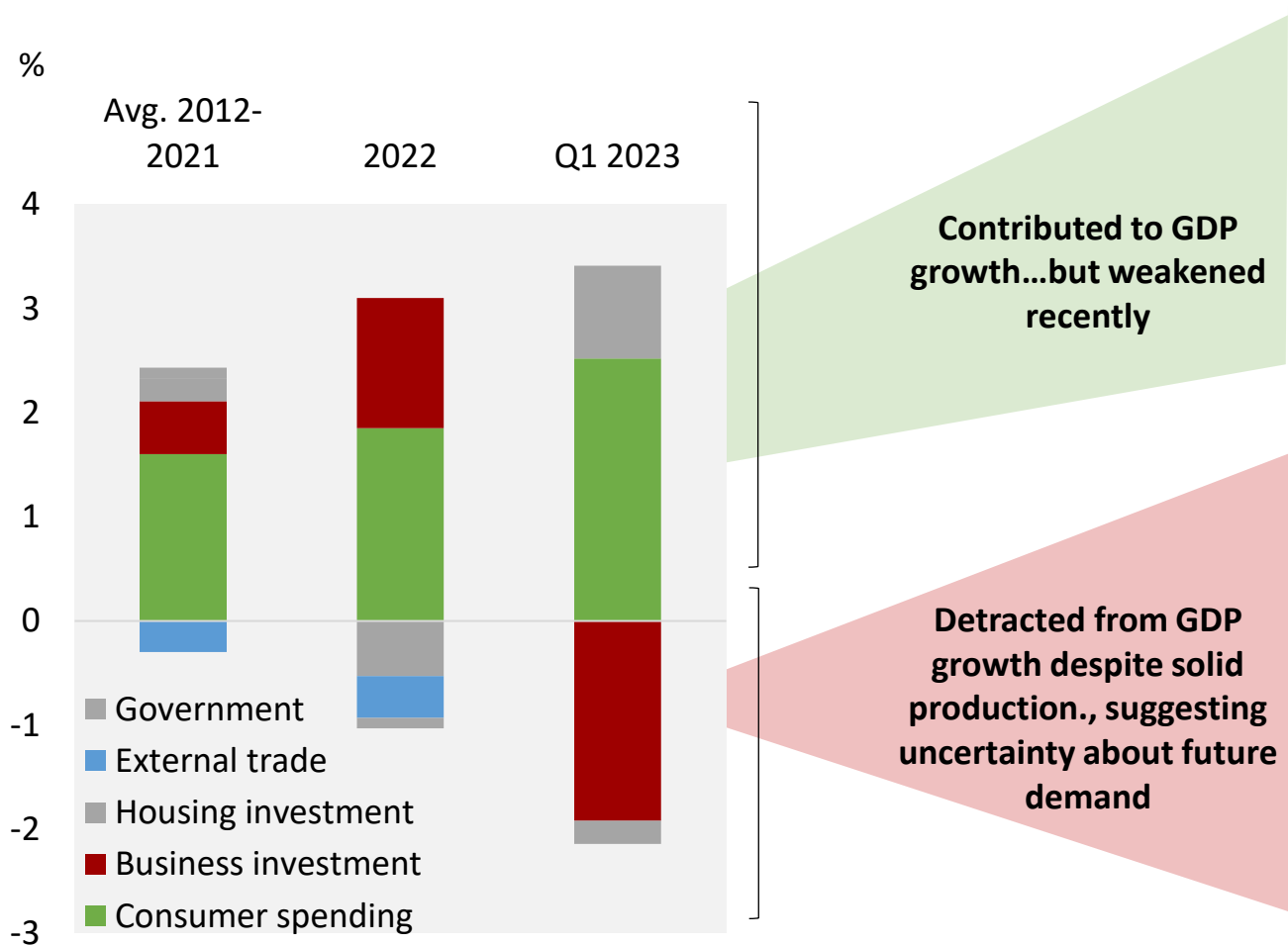


Global GDP outlook and regional contributions



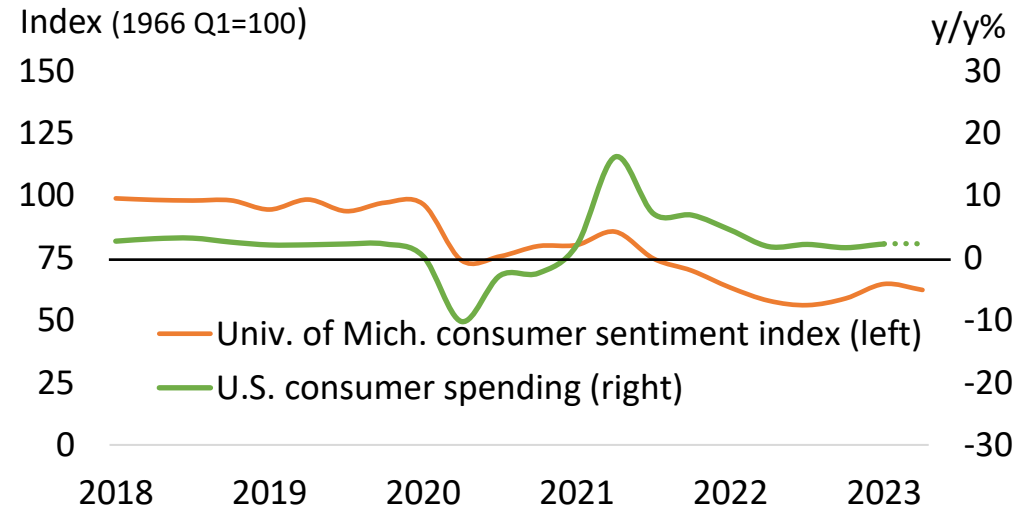
# U.S. GDP growth has largely been driven by consumer spending, and leading indicators have remained weak

- ▶ The Univ. of Mich. survey of consumers has historically corresponded with the changes in U.S. consumer spending, which represents 68% of GDP. Sentiment recovered somewhat in Q2 2023 but remains historically weak

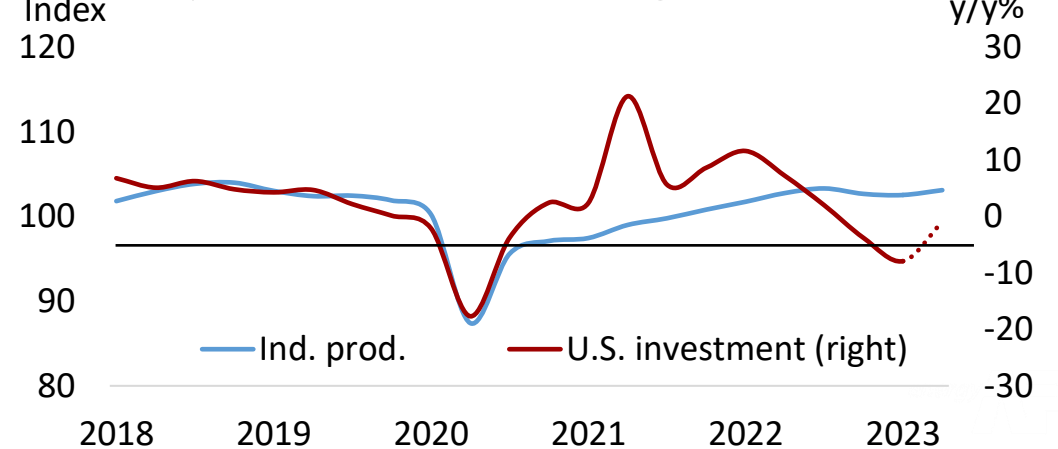


## Leading indicators of main GDP drivers

### Consumer sentiment vs. spending



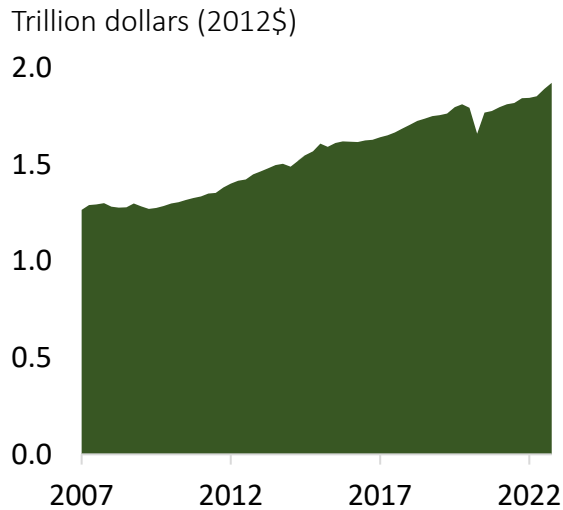
### Industrial production and investment growth



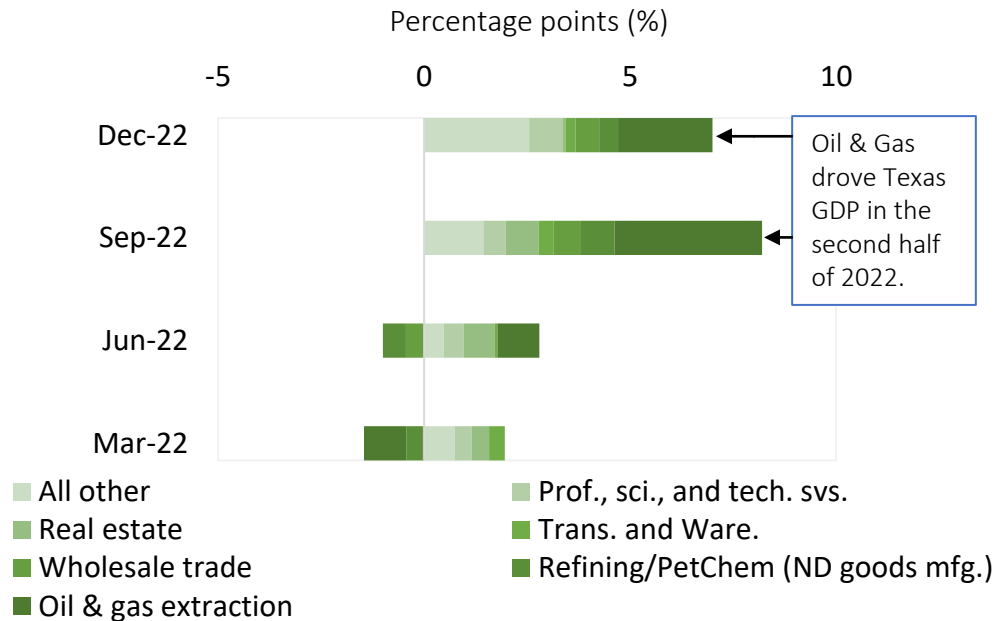
# Texas record GDP was driven by oil & gas in Q4 2022

- ▶ Texas' real GDP achieved a record-high of \$1.92 trillion in Q4 2022 and was the nation's fastest-growing state over the second half of 2022
- ▶ Over 70% of real growth in the second half of 2022 was driven by oil & gas and related industry segments per BEA
- ▶ Texas Oil & Gas industry direct employment rose by 8.3% y/y to 477,327 in Q4 2022, generating \$13.8 billion in wages per Texas Workforce Commission data

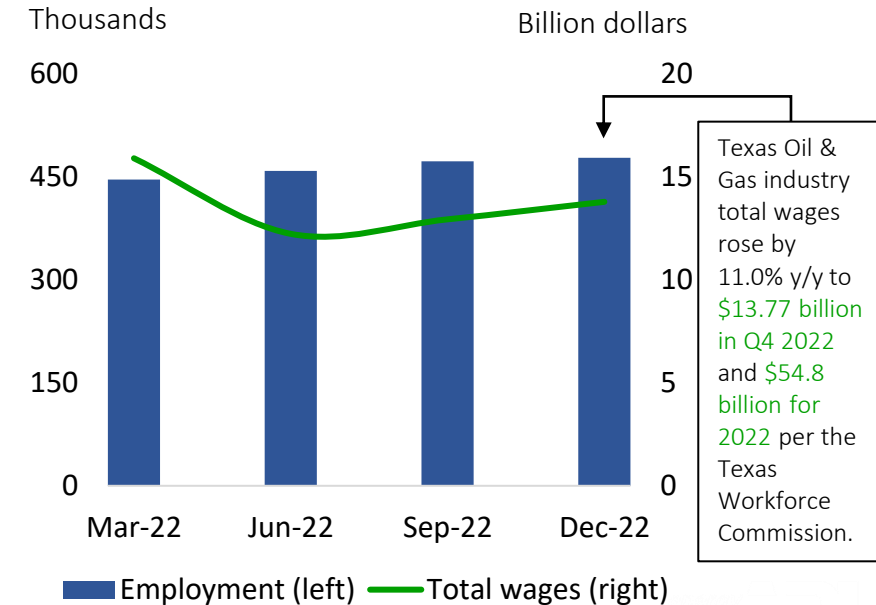
Texas real GDP in Q4 2022



Texas real GDP contributions by industry



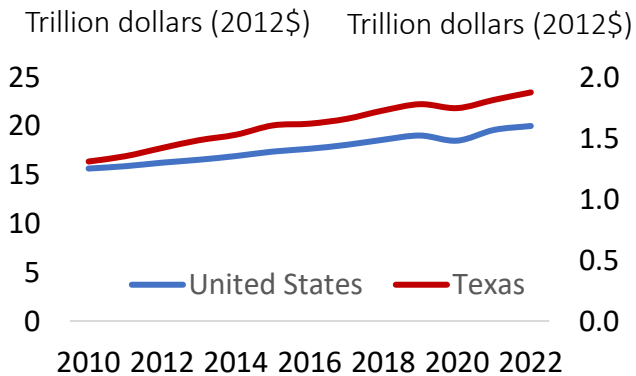
Texas Oil & Gas industry employment and wages



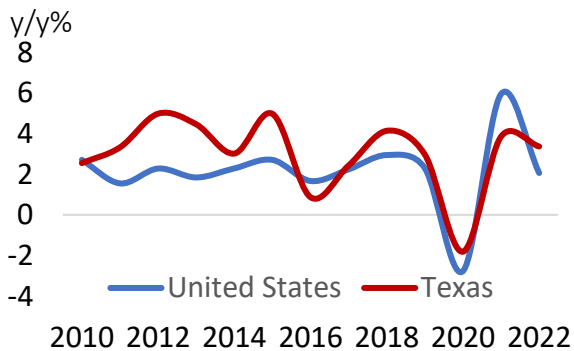
# Texas' O&G-driven economy has spurred U.S. growth, but appears to be slowing per the Dallas Fed

- ▶ Since 2010 and the U.S. energy revolution, Texas and U.S. real GDP have related consistently\* with one another
- ▶ Texas annual GDP growth has served as a significant catalyst for the U.S. economy, but not vice versa

## U.S. and Texas real GDP



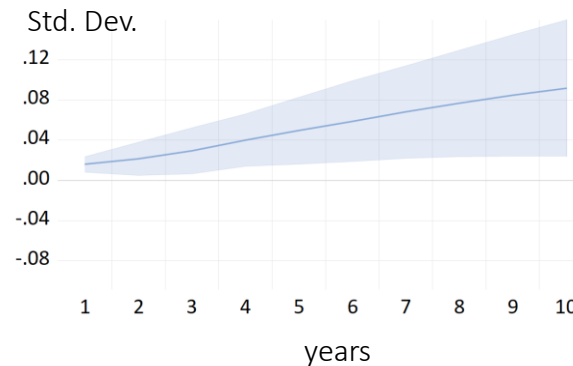
## U.S. and Texas real GDP growth



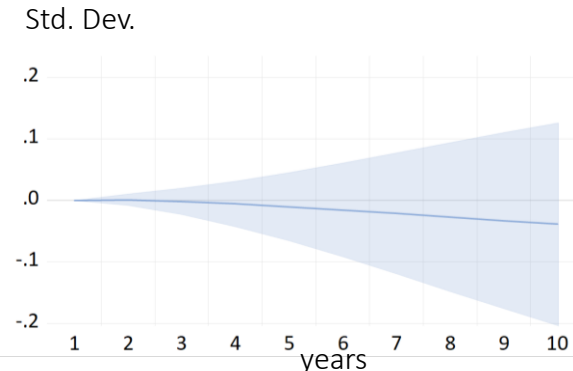
## Texas' economy has spurred national growth

Accumulated Response to Cholesky One S.D. (d.f. adjusted) Innovations  
95% CI using analytic asymptotic S.E.s

### Texas GDP cumulative impact on U.S. GDP growth



### U.S. GDP cumulative impact on Texas GDP growth



### Texas economic expansion slows; business outlooks weaken

The Texas economy's modest expansion appears to be slowing despite having some pockets of strength.

Federal Reserve Bank of Dallas, May 11, 2023



# Oil Markets

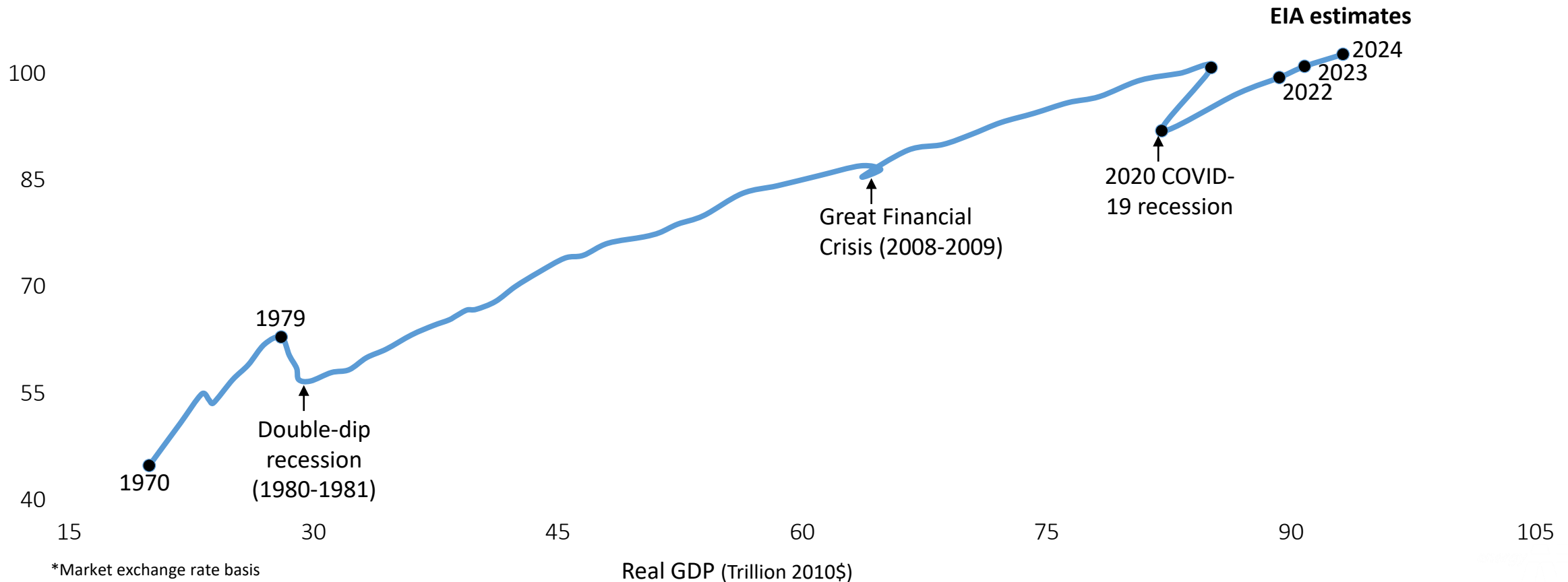


# Global oil demand has continually varied with the economy

- ▶ The largest recessions on modern record have not meaningfully changed how the global economy utilizes liquid fuels, which with high energy density and their fit with existing vehicles and infrastructure remain keys to global productivity

## Global oil demand and GDP

Million barrels per day  
115

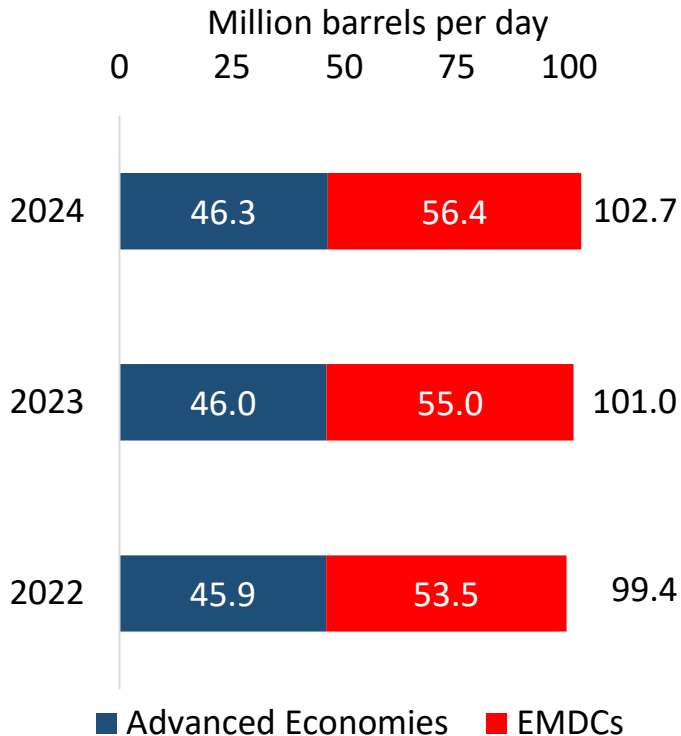


\*Market exchange rate basis  
sources: EIA; IMF; TXOGA calculations (Jun. 2023)

# Global oil demand growth could be led by Emerging Markets and Developing Countries (EMDCs), but declines are not expected among Advanced Economies

- ▶ EIA expects record-high global oil demand in 2023 (101.0 mb/d) in 2023 and again in 2024 (102.7 mb/d)

## Global oil demand by region



### China's Oil Demand Hits Another New High

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Energy Intelligence, May 26, 2023

### OPEC holds global oil demand view steady, cites US debt ceiling risks

By Alex Lawler

May 11, 2023 10:27 AM EDT - Updated 25 days ago



Reuters, May 11, 2023

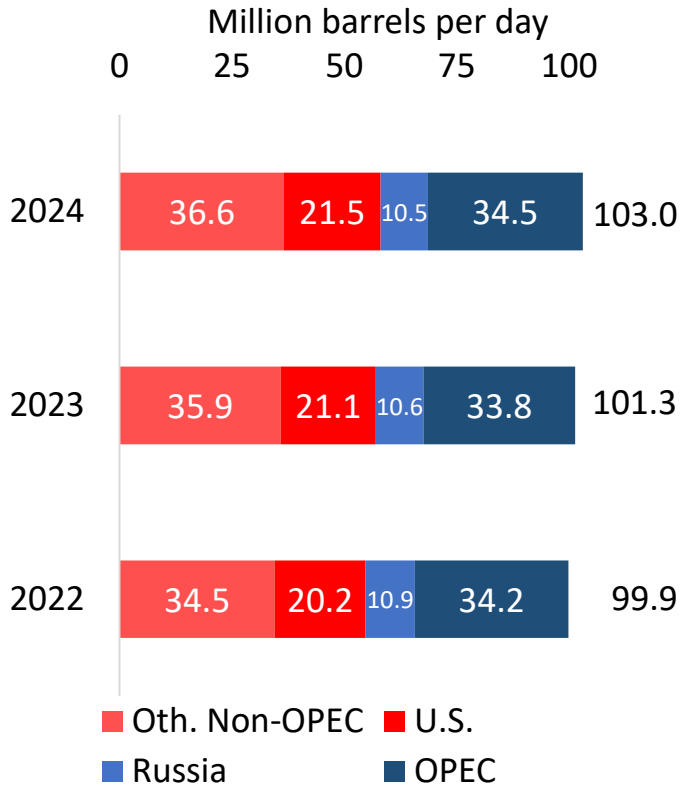
### OPEC+ extended cuts may lift oil prices, but Chinese demand uncertainty lingers: IEA's Birol

S&P Global, June 5, 2023

# Global oil supply growth could be led by the U.S. and other Non-OPEC sources per EIA

▶ EIA expects record-high global oil supply in 2023 (101.3 mb/d) in 2023 and again in 2024 (103.0 mb/d)

## Global oil supply by region



### Permian Oil Rig Count Decreases in Four of Five Straight Weeks

Zacks, June 5, 2023

### U.S. shale production set to rise to highest on record in June -EIA

Reuters, May 15, 2023

### Russian Oil Flows Stay High Three Months Into Pledged Output Cut

Seaborne exports dip but remain 270,000 barrels a day higher than February, the baseline for output reduction

Bloomberg, May 30, 2023



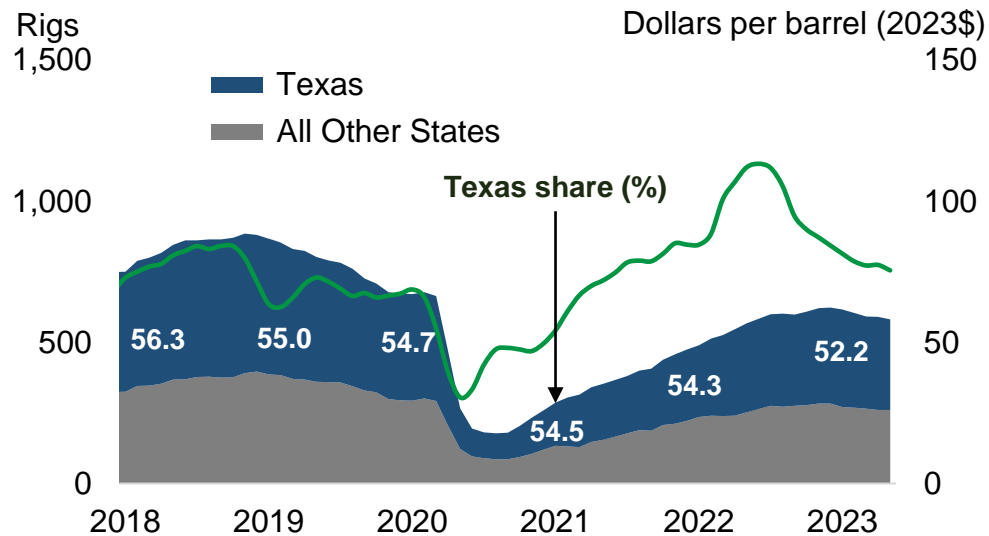
### Saudi pledges big oil cuts in July as OPEC+ extends deal into 2024

Reuters, June 4, 2023

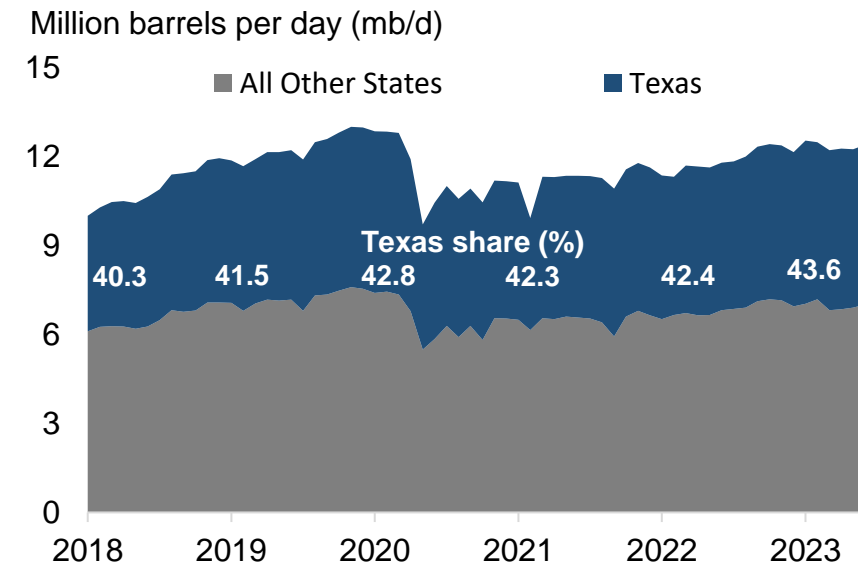
# U.S. crude oil production increasingly relies on Texas

- Oil prices have historically influenced drilling activity, which has been led by Texas
- Texas accounts for more than half of total oil drilling across the U.S. but has produced an increased share of U.S. crude oil production, which suggests that Texas' rig productivity is relatively higher

U.S. and Texas oil drilling vs. WTI Crude Prices



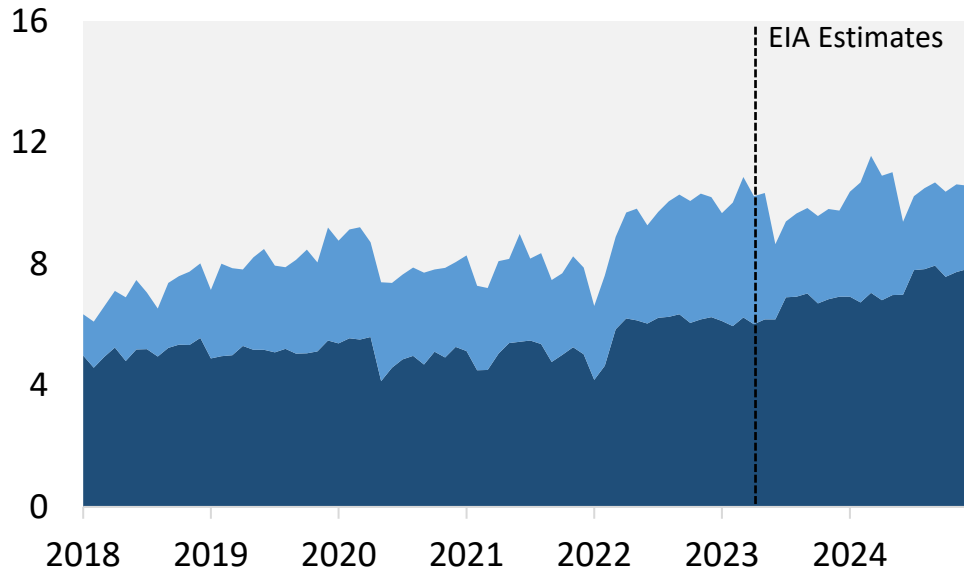
U.S. and Texas crude oil production



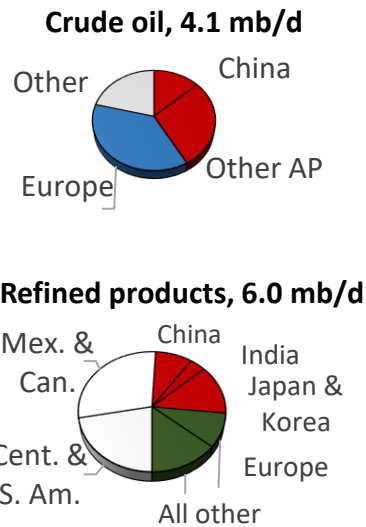
# U.S. petroleum exports achieved record highs and generated over \$73.2 billion of Texas export revenues in Jan.-Apr. 2023

- U.S. crude oil exports reached a record-high above 4.6 mb/d in March 2023 but are projected by EIA to level off through 2024
- U.S. refined product exports were 6.1 mb/d in H1 2023 and are projected to grow to a record 7.3 mb/d in 2024 per EIA
- About of U.S. refined product exports serve the Americas. but crude and product exports to China and Europe have grown the most over the past year
- Texas petroleum exports exceeded \$73.2 billion in the first four months of 2023, with nearly half coming from crude exports per the U.S. International Trade Commission

U.S. petroleum exports, monthly  
Million barrels per day (mb/d)



Destination shares  
Q1 2023



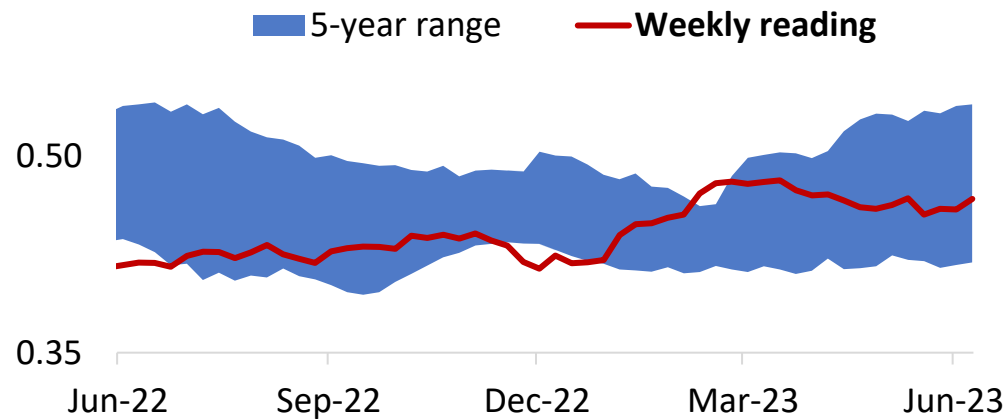
**Texas petroleum exports**  
 Crude oil: \$33,817,852,271  
 Refined prod.: \$30,123,226,989  
 HGLs: \$ 9,287,561,813  
 April 2023 year-to-date

# U.S. crude oil inventories have remained historically low

- Commercial crude inventories have recently stood around the 30% percentile within their 5-year range
- Total U.S. ending stocks of crude oil (that is, combined commercial and Strategic Petroleum Reserves) as of mid-June 2023 were at their lowest for the month since 1986

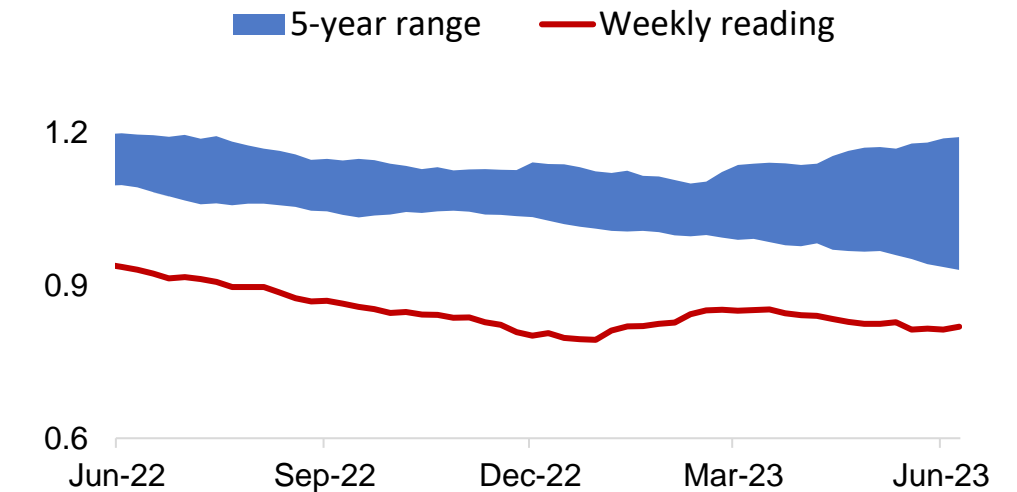
## U.S. commercial crude inventories

Million barrels (mb)  
0.65



## U.S. ending stocks of crude oil (commercial & SPR)

Million barrels (mb)  
1.5

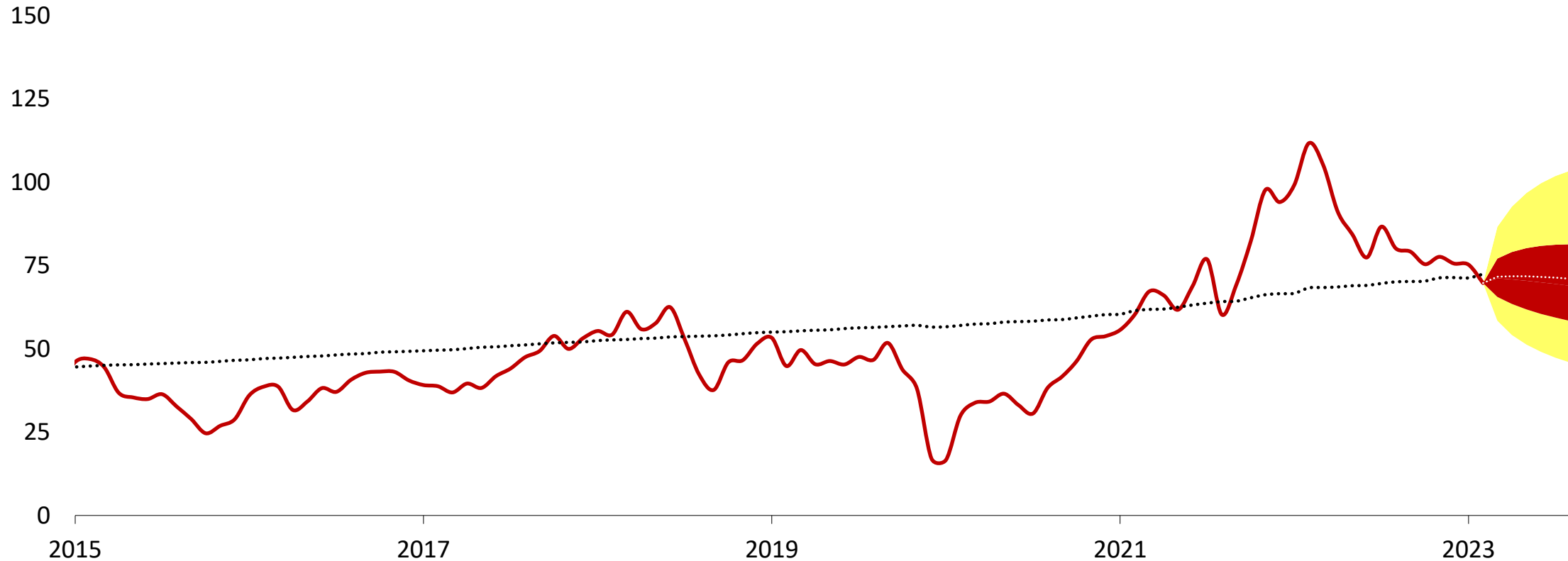


# WTI crude oil prices historical mean reversion analysis

- Mean reversion analysis measures variation and convergence speed versus a best-fit curve based on history, which informs a confidence interval around futures prices, as shown by data from CME Group through 2025
- Futures prices currently are aligned with the mean reversion best-fit curve, which suggests an equilibrium, with balanced upside/downside variation

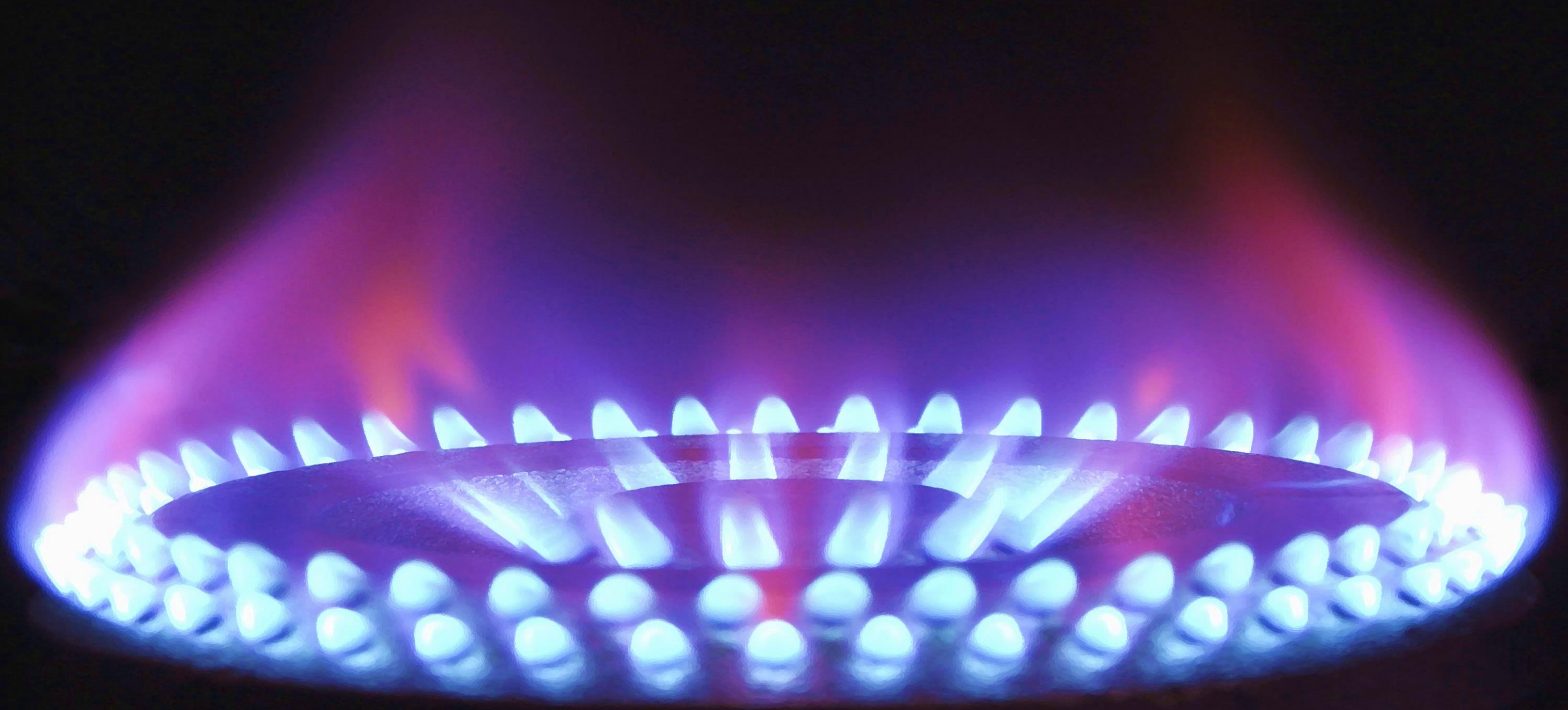
WTI crude oil price mean reversion analysis

Dollars per barrel (2023\$)





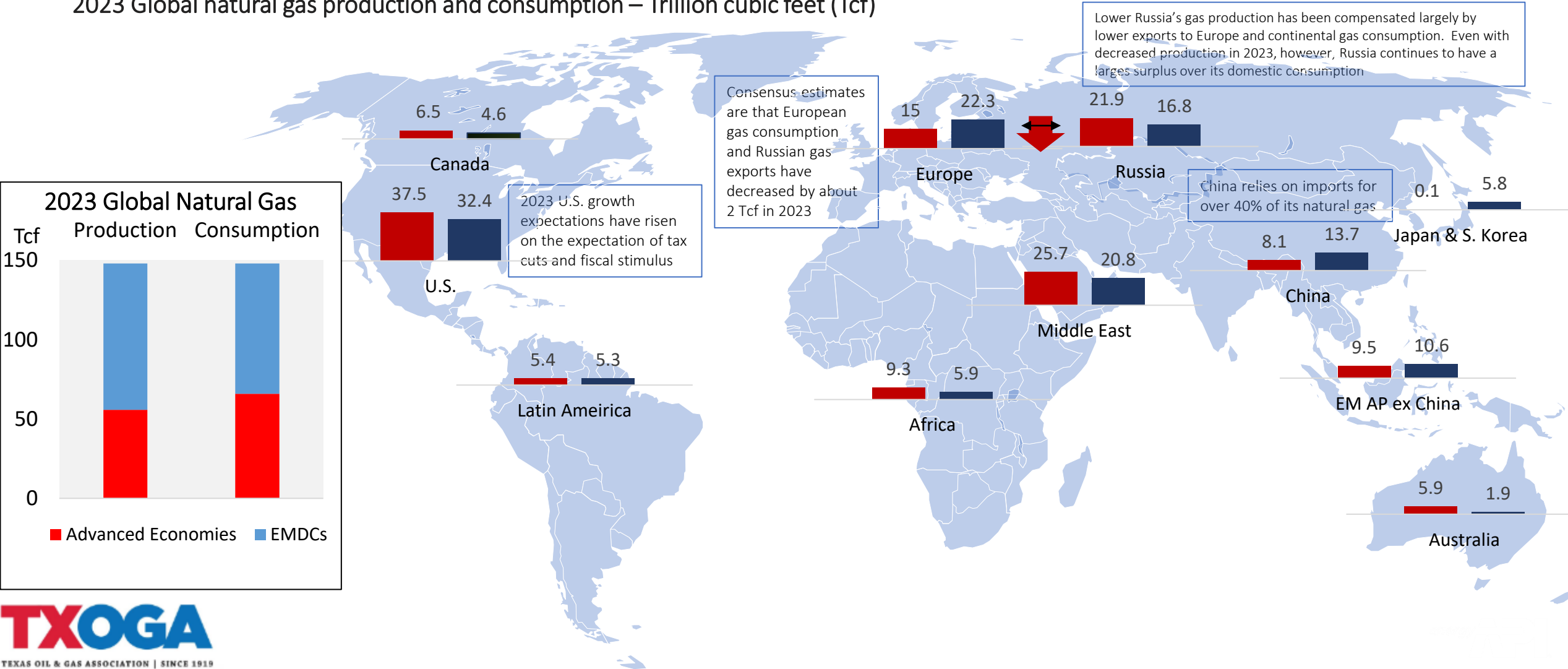
# Natural Gas Markets



# U.S. natural gas production and exports lead the world

Europe requires imports to cover about one-third of its consumption, compared with over 40% for China

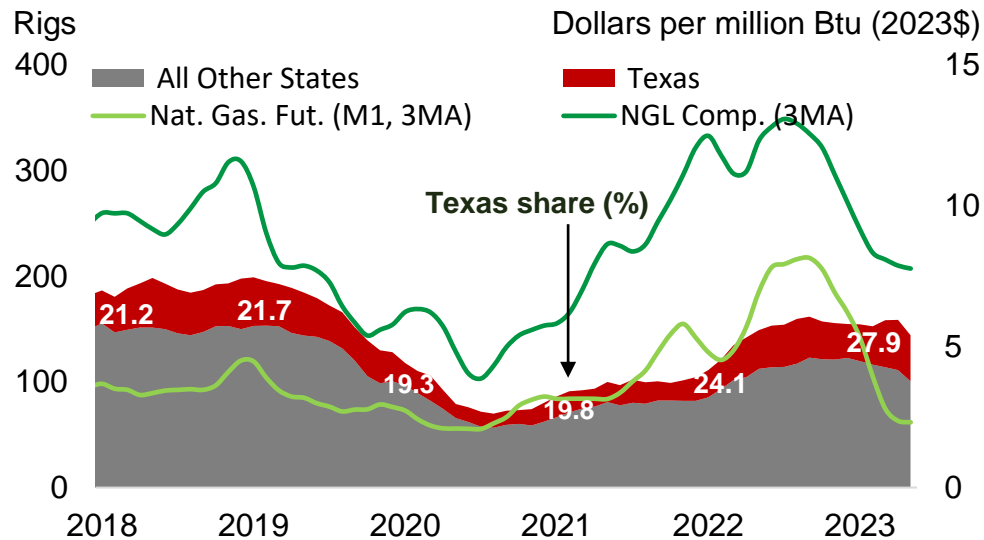
2023 Global natural gas production and consumption – Trillion cubic feet (Tcf)



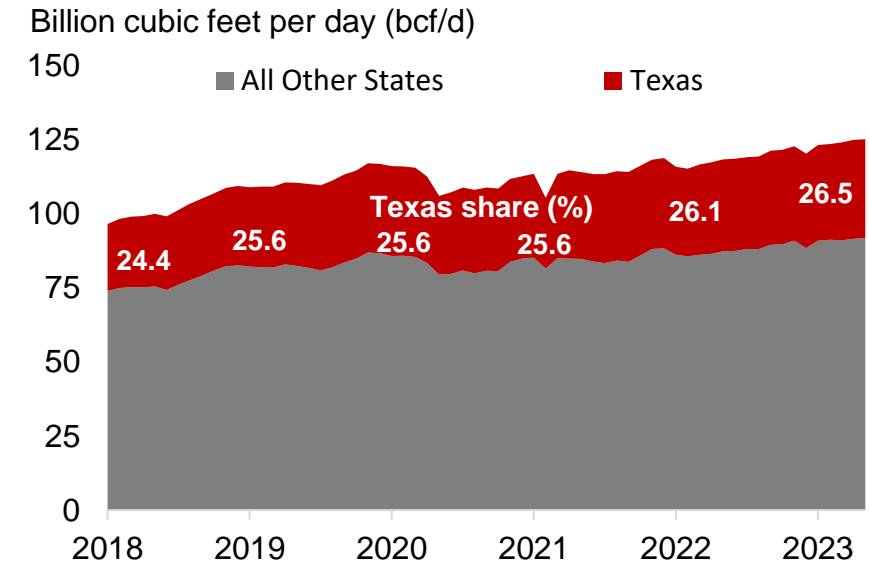
# Texas has driven a greater share of U.S. natural gas drilling & production

- Natural gas drilling and production in Texas has historically responded to the prices of natural gas and natural gas liquids (NGL), but the activity levels have not followed prices as closely since 2020, due to
- Texas' natural gas production reached a record-high 33 bcf/d in March 2023 per EIA and is projected to have remained above that level through May. Texas's share of total U.S. natural gas production was steady between 2019 and 2021, but rose to over 26% since 2022.

## U.S. and Texas gas drilling vs. nat. gas/NGL prices



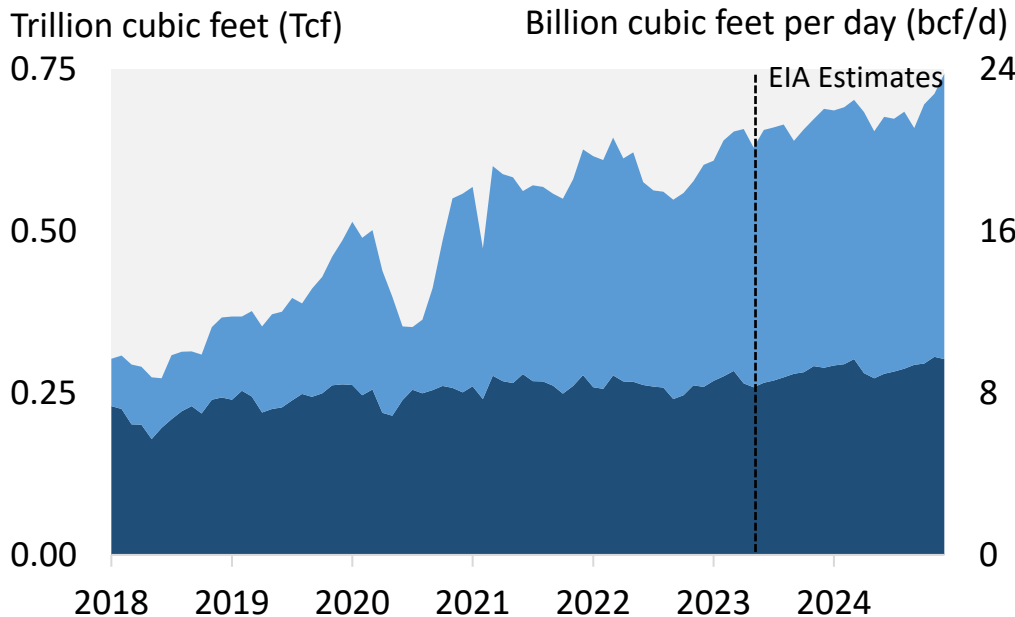
## U.S. and Texas natural gas production



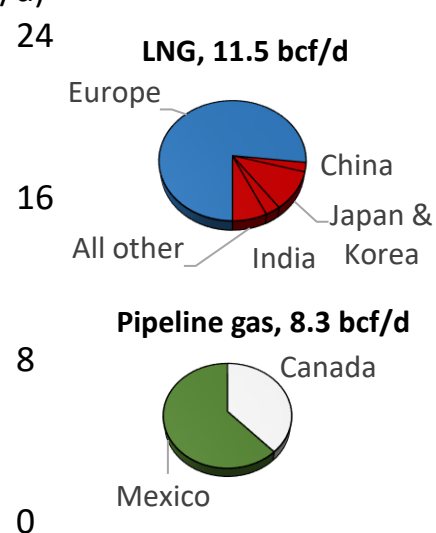
# U.S. natural gas exports achieved record highs and generated \$7.8 billion of Texas export revenues in Jan.-Apr. 2023

- U.S. natural gas exports are estimated by EIA to have reached a record-high 21 bcf/d in April 2023, 60% of which was via LNG
- The majority of the 12.6 bcf/d of LNG exports in April supplied allies across Europe
- The average LNG exports price in Q1 was \$9.50 per million Btu, multiples over U.S. prices, and generated over \$6.3 billion of export revenues for Texas in the first four months of the year. Pipeline gas exports added nearly another \$1.5 billion in export revenues

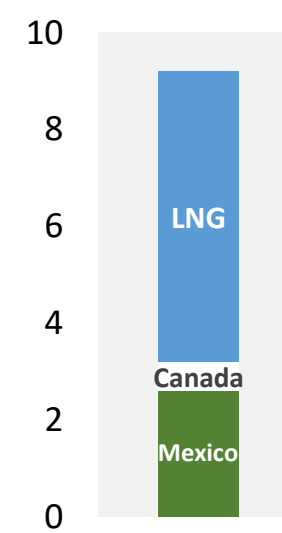
U.S. natural gas exports, monthly



Destination shares Q1 2023



Avg. export price Q1 2023



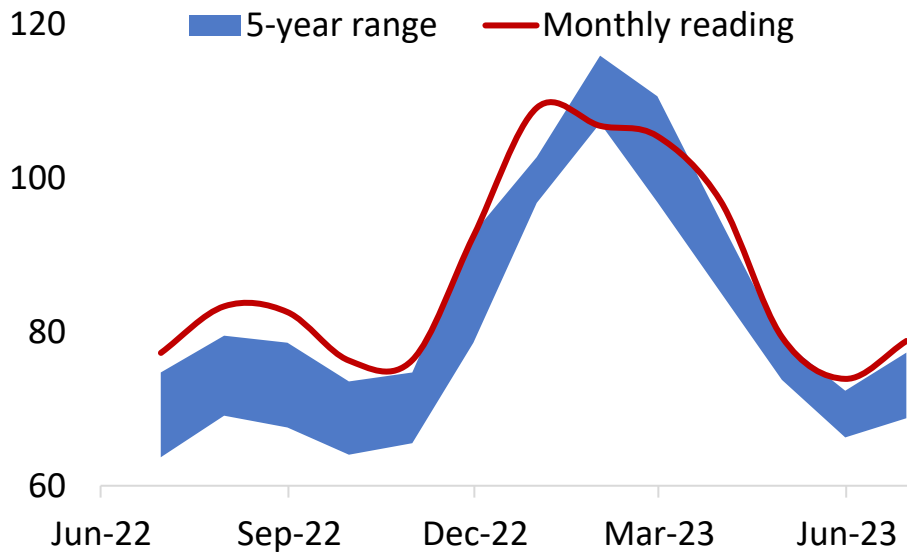
**Texas LNG exports**  
 LNG: \$6,301,922,922  
 Pipeline: \$1,488,647,723  
 April 2023 year-to-date

# U.S. natural gas inventories have remained ample

- Natural gas consumption so far in 2023 has slightly exceeded its historical 5-year range
- Working gas in underground storage has remained near the top of its 5-year range, thanks to record-high production that has been ample to supply domestic consumption and international exports despite historically low prices

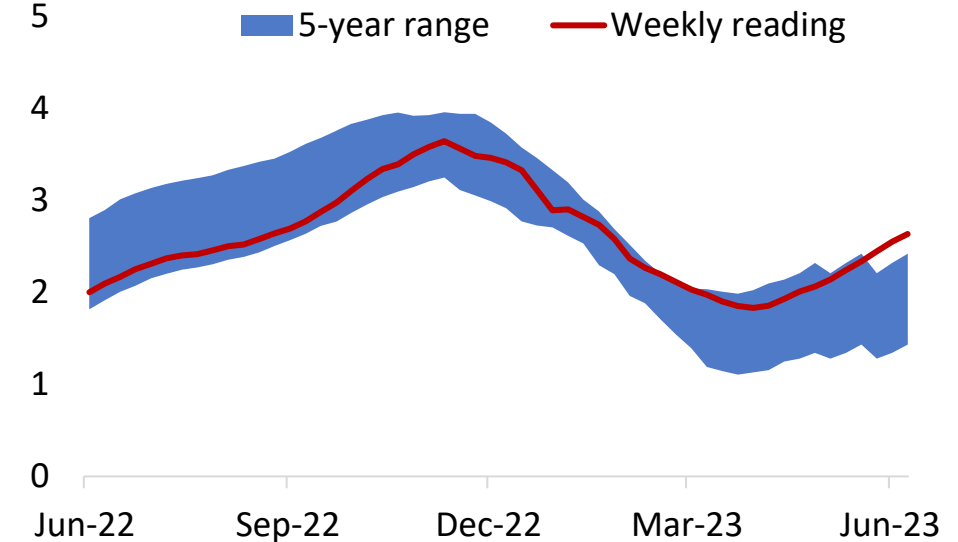
## U.S. natural gas consumption

Billion cubic feet per day, bcf/d



## U.S. working gas in underground storage

Trillion cubic feet (tcf)

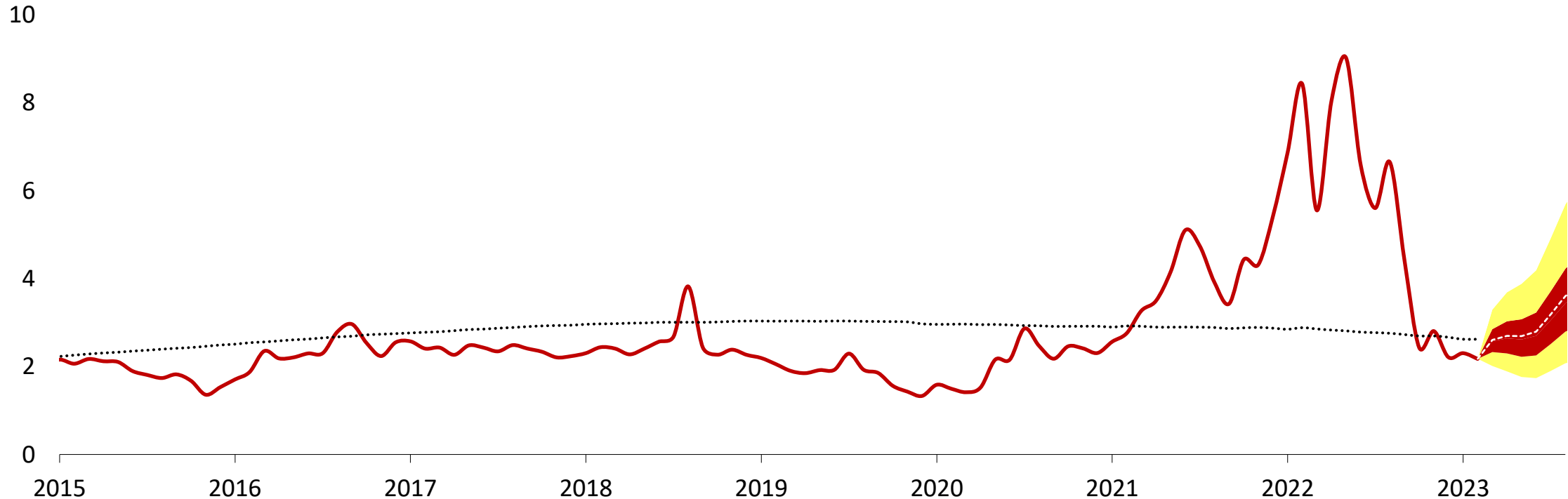


# Natural gas price historical mean reversion analysis

- Mean reversion analysis measures variation and convergence speed versus a best-fit curve based on history, which informs a confidence interval around futures prices, as shown by data from CME Group through 2025
- Futures prices currently are aligned with the mean reversion best-fit curve, but with greater upside than downside based on historical values

Natural gas price mean reversion analysis

Dollars per million Btu (2023\$)



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