Key points for the week of July 31, 2023

- **U.S. economic growth reinforced.** The Bureau of Economic Analysis’ initial reading of Q2 2023 GDP growth confirmed what the leading economic indicators have shown over the past few months. Improved consumer sentiment per the Univ. of Michigan’s survey supported consumer spending growth of 2.3% y/y (vs. Q2 2022), and steady industrial production corresponded with investment growth of 3.1% y/y. Looking to Q3 2023, the Philadelphia Fed’s Aruoba-Diebold-Scotti (ADS) Business Conditions Index – remained steady in July at levels which have historically corresponded with slow economic expansion. U.S. strength led the IMF and others to upgrade their global outlooks.

- **Oil market fundamentals tightened further.** Global financial markets in which oil prices are established reflected tighter fundamentals that became apparent in our monitoring over the last two months. Key takeaways for the week ended July 21 based on the U.S. Energy Information Administration’s (EIA) data were: 1) U.S. petroleum demand near the top of its 5 yr. range at 21.3 million barrels per day (mb/d); 2) U.S. crude oil production down by -0.1 mb/d to 12.2 mb/d; 3) U.S. petroleum net exports nearly doubled from the prior week to 2.4 mb/d; and 4) U.S. ending stocks of crude oil remained at their lowest for the month of July since 1986.

- **Natural gas prices were steady.** Natural gas futures prices at Henry Hub for September delivery were $2.64 per mmBtu as of July 28, which stood in the middle of their range of variation through July as the market has digested information about high storage levels but hot seasonal weather (strong demand) and weaker drilling activity.
EIA and Texas Railroad Commission (TX RRC) oil and natural gas production estimates for Texas are two to three months in arrears (and the TX RRC’s ledgers only reflect complete reporting over longer periods), so TXOGA has developed estimates current to the month using weekly and monthly data on U.S. oil and natural gas production plus Texas’ drilling activity, production, and well inventories by shale play, as well as seasonal weather.

EIA reported new Texas production records for crude oil (5.4 mb/d in March) and natural gas (33.2 billion cubic feet per day (bcf/d) at the wellhead and 30.7 bcf/d of marketed production in April).

Although drilling activity decreased in June and July per Baker Hughes, Texas’ regional production still rose since May per EIA, based on solid rig productivity and leveraging the inventories of drilled but uncompleted wells (DUCs) in the Permian basin and Eagle Ford.

Using the most recent data, TXOGA estimates that Texas’ crude oil production reached a new high of 5.5 mb/d in July, and Texas’ natural gas production rose as high as 33.5 bcf/d (gross withdrawals) in June before slipping to 33.3 bcf/d in July.

sources: EIA; NOAA; Baker Hughes; TXOGA analysis
Consistent with improved consumer sentiment, initial Q2 GDP estimates showed 2.3% y/y growth in consumer spending. The Univ. of Michigan’s survey of consumers has historically corresponded with changes in U.S. consumer spending, which represents 68% of GDP, and the index’s preliminary reading for July rose to 72.6, its highest since Sep. 2021.

The U.S. trade deficit widened in Q2 2023. The U.S. real trade deficit ran at an annualized rate of $1.21 trillion, up from a revised $1.20 trillion in Q1. If sustained for the year, this represents the third straight year of trade deficits exceeding $1.2 trillion.

The premium for low credit quality steadied on par with its lowest since Jan. 2022. High yield (HY) rates reflect debt costs for firms with below-investment grade credit quality. HY rates remained at 13.5% on Jul. 20-27, while Fed Funds futures rate stayed near 5.3%, implying a stable premium of 8.2%.

Stable growth conditions. The ADS business conditions index, published by the Philadelphia Fed. Res. Bank, is a leading indicator of GDP growth. A quarterly average of the ADS index has risen from negative readings so far in 2023 to near zero, which historically corresponds with slow but stable growth conditions.

Nonfarm payroll employment & unemployment rate % 6

The unemployment fell, but payroll growth slowed. The employment situation is a lagging indicator of GDP growth. The U.S. unemployment rate fell to 3.6% in June per BLS, while non-farm payrolls rose by 209,000, which was the lowest monthly increase since Dec. 2019.
Mean reversion analysis can be useful in assessing short-term market actions. The historical mean reversion target exceeds prompt month futures prices as of July 28. Futures prices remain slightly backwardated, and confidence intervals based on past prices show the potential for greater upside than downside.

Mean reversion analysis can be useful in assessing short-term market actions. The historical mean reversion target exceeds prompt month futures prices as of July 28. Futures prices remain slightly backwardated, and confidence intervals based on past prices show the potential for greater upside than downside.

With economic optimism that the cycle of interest rate hikes is near an end and plus reports of tightened oil supply/demand fundamentals, and optimism that Federal Reserve rate hikes may end soon, oil prices neared $77 per barrel as of July 21.

Increased global demand for U.S. oil. Petroleum net exports were 2.4 million barrels per day (mb/d) for the week ended July 21. In 2023 so far, there has only been one week (Feb. 3) with petroleum net imports, so 2023 has remained on track to set a U.S. exports’ record.

After moving sideways for over a week, oil price momentum picked up as oil futures price exceeded $80 per barrel for the first time since April.

U.S. petroleum demand, as measured by deliveries, 21.3 mb/d for the week ended July 21 – 83rd percentile towards the top of its 5-year range.

Crude oil ending stocks fell by 0.6 mb for the week ended July 21, 2023, and remained historically low.
Natural gas price mean reversion analysis
Dollars per mmBtu (2023$)

Natural gas futures prices of $2.64 per mmBtu for September 2023 delivery (rising to $3.79 per mmBtu for Jan. 2024 delivery) were in line with their mean reversion target. Historical variation has continued to show more potential upside than downside.

Natural gas prompt month futures prices
Dollars per million Btu

Natural gas futures prices at Henry Hub for September delivery were $2.64 per mmBtu as of July 28, which stood in the middle of their range of variation through July as the market has digested information about high storage levels but hot seasonal weather (strong demand) and weaker drilling activity.

U.S. natural gas net exports
Billion cubic feet per day, bcf/d

Natural gas net exports have reached a record high of 13.9 bcf/d in July per EIA.

U.S. weekly working gas storage
Trillion cubic feet (tcf)

Working gas in underground storage (3.0 tcf as of July 21) remained at the top of its five-year range.

Natural gas futures slow stochastic
Index level

Natural gas price momentum picked turned positive during the week ended July 28.

U.S. natural gas consumption
Billion cubic feet per day, bcf/d

Natural gas total consumption has exceeded its five-year historical range each month since March 2023.

sources: EIA; CME Group; BLS; TXOGA analysis
Texas’ oil and natural gas production

Texas averaged 287 oil-directed rigs (down 5.6% m/m from the end of June) and 35 gas-directed rigs (-5.4% m/m) as of July 28.

EIA reported record-high Texas oil production of 5.4 mb/d in March. Based on weekly Texas drilling activity and U.S. production, TXOGA estimates that Texas crude oil production edged up to nearly 5.5 mb/d in June and July.

EIA reported record Texas’ production in April of 33.2 bcf/d (gross withdrawals) and 30.7 bcf/d of marketed production. TXOGA estimates wellhead production rose as high as 33.5 bcf/d in June and slipped to 33.3 bcf/d in July.

Through the first seven months of the year, Texas accounted for 43.4% of U.S. crude oil production. Based on TXOGA’s projection that Texas production grew to 5.5 mb/d in July, the state may have accounted for all U.S. crude oil production growth so far in 2023.

EIA’s drilling productivity report estimates that production across Texas shale basins -- Eagle Ford and parts of the Permian, Haynesville, and Anadarko -- set a record high in Q2 2023 but have appeared to level off in July.

EIA-estimated rig productivity has steadied (decreased of 0.8% y/y in July 2023) across oil-producing basins at levels that are 18% higher above pre-pandemic productivity from Dec. 2019.

Sources: EIA; TX RRC; Baker Hughes; CME Group; TXOGA analysis
Texas' oil and natural gas industry employment and wages have risen solidly.

### Texas Oil & Gas Industry Employment Rose by +8.3% y/y

<table>
<thead>
<tr>
<th>Industry</th>
<th>Q4 2021</th>
<th>Q4 2022</th>
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<tbody>
<tr>
<td>Oil &amp; gas extraction</td>
<td>440,738</td>
<td>477,327</td>
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<tr>
<td>Oil &amp; gas drilling</td>
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<td>Support activities for o&amp;g ops.</td>
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<td>Petroleum refineries</td>
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<td>Gas stations &amp; fuel dealers</td>
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<tr>
<td>All other*</td>
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<tr>
<td>Pipeline construction</td>
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**Heatmap of employment changes by county**

* 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.

### Texas Oil & Gas Industry Wages Rose by +11.0% y/y

<table>
<thead>
<tr>
<th>Industry</th>
<th>Q4 2021</th>
<th>Q4 2022</th>
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<td>Oil &amp; gas extraction</td>
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<td>Natural gas distribution</td>
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<tr>
<td>Automotive &amp; pet. product mfg.</td>
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<tr>
<td>Pipeline transportation</td>
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<tr>
<td>All other*</td>
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**Heatmap of employment changes by county**

* 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.
Led by resurgent emerging markets, global oil demand is expected by EIA to reach a record 101.2 mb/d in 2023 and 102.8 mb/d in 2024.

EIA reduced its oil production 2023 projection by 0.2 mb/d to 1.3 mb/d but raised its 2024 estimate by the same amount to 1.5 mb/d. These are volumes needed to balance global markets in their view. The U.S. is assumed to be largest single contributor this year.

For global oil inventories, EIA’s shifted from projecting a balanced market in Q3 2023 to net stock draws of 1.0 mb/d, corresponding with Brent crude oil prices nearly $80 per barrel in Q3 rising to $85 per barrel in 2024 per their view.