
Crude Recovers, but Market Awaits Proof Treatment Is Working

2016 U.S. crude market fundamental highlights.

Morningstar Commodities Research

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Sandy Fielden
Director, Oil and Products Research
+1 512 431-8044
sandy.fielden@morningstar.com

Data Sources Used in this Publication

- ▶ Baker Hughes
- ▶ CME
- ▶ ICE
- ▶ US Energy Information Administration

To discover more about the data sources used, [Click Here](#)

Crude Recovery

North American crude prices as represented by the benchmark West Texas Intermediate CME/Nymex crude contract started 2016 in a downward spiral, hitting a 13-year low in February of \$26.11/barrel, but recovered to end the year on a high of \$54/barrel in response to a perceived improvement in the supply/demand balance. Falling U.S. crude production in the first half of the year initially supported higher crude prices. Then in the fall, OPEC producers agreed to cut output in the first half of 2017, pushing prices above \$50/barrel. If the OPEC cuts materialize in 2017, they will reduce supply below demand and facilitate a drawdown in record inventories.

The following analysis highlights eight fundamental trends in the 2016 North American crude market based on Morningstar commodities and energy research during the past year.

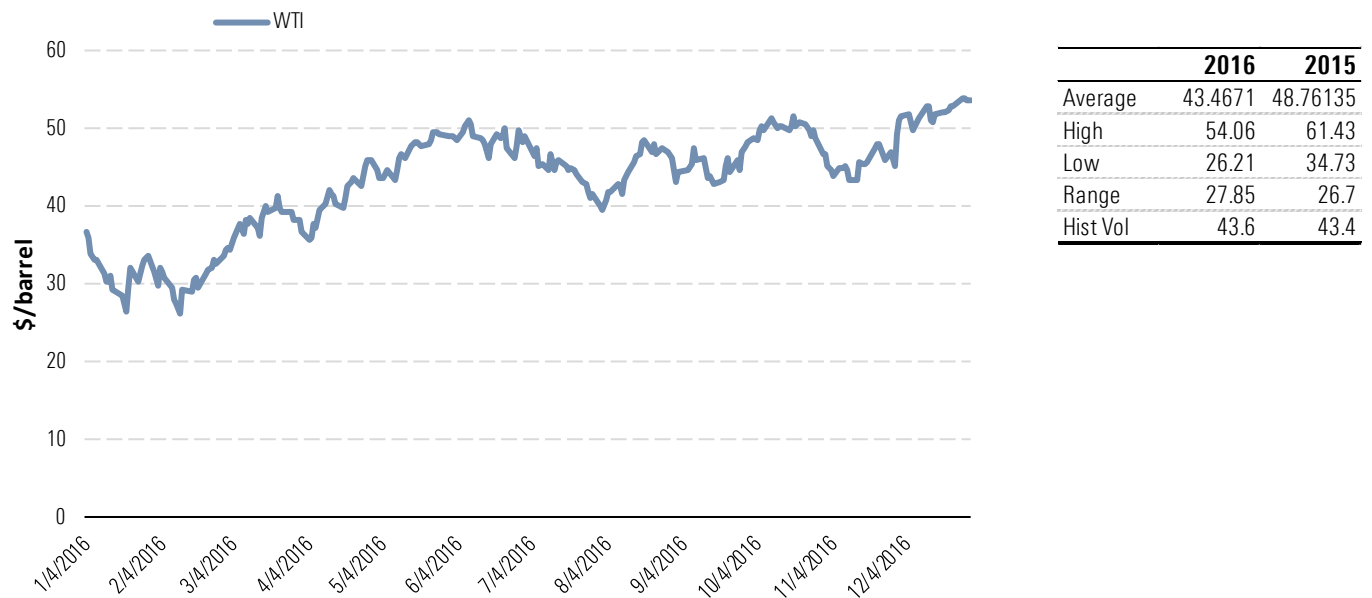
Crude Prices

Exhibit 1 shows WTI crude prices during 2016 and summary statistics with a comparison with 2015. At an average \$43.47/barrel, WTI prompt crude futures prices were \$5.29/barrel lower in 2016 than in 2015 (\$48.76/barrel). Prices started the year falling to new lows in January (\$26.55/barrel) and their lowest level for the year on Feb. 11 at \$26.11/barrel. The February 2016 low was \$8.51 lower than 2015 and the lowest crude settlement price since May 2003.

Prices recovered from that low point during the rest of the year in response to lower U.S. production and OPEC plans to cut output, conceived at its Sept. 30 Algiers meeting and finalized at the Nov. 30 Vienna meeting. Both of those meetings provided a boost to crude prices.

The \$27.85/barrel range of crude prices in 2016 was \$1.15 wider than the 2015 range. Annual average 21-day historical volatility (see our September note "[Short Speculators Chase Crude Price Volatility](#)" for more on the volatility calculation) was very similar in 2016 (43.6%) and 2015 (43.4%).

Exhibit 1 WTI Crude Prices 2016



Source: CME Group, Morningstar

Forward Curve

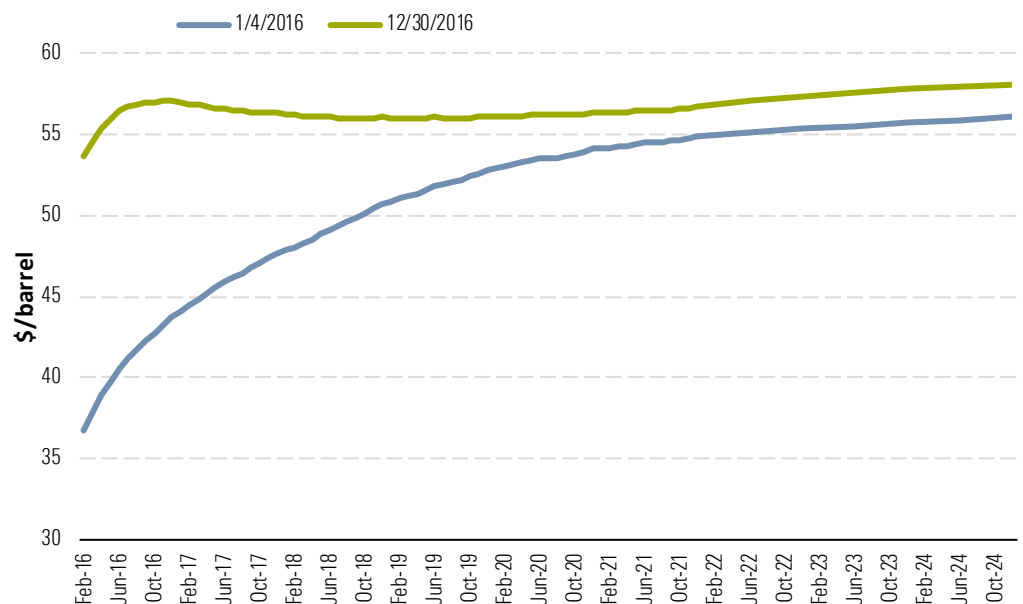
Exhibit 2 shows CME Nymex forward curves for the first and last trading days of 2016 aligned over the same delivery range.

At the start of the year, the WTI curve held a strong contango pattern (see our May 2016 note "[Lengthy Heating Oil Contango](#)" for more on the contango market structure) with prices for February 2017 \$7.74/barrel higher, February 2018 \$11.32/barrel higher, February 2019 \$14.27/barrel higher, and February 2020 \$16.26/barrel higher than the front of the curve (February 2016). This strong contango reflected record crude inventory levels and concerns that new demand would not reduce inventory during 2016.

By the end of 2016, the market contango had subsided considerably. The Dec. 30, 2016, curve held a one-year \$3.19/barrel contango between February 2018 and the front of the curve in February 2017, but that contango weakened to \$2.31/barrel in February 2020 because the forward curve was in slight backwardation between January 2018 and August 2019.

The forward curve flattened out in response to expectations that OPEC cuts will reduce inventory levels by the end of 2017, leading to a more "normal" backwarddated futures curve in 2018. However, the level of backwardation is very slight, reflecting a cautious market waiting to see how OPEC cuts pan out and whether U.S. production will take off again in response to higher prices.

Exhibit 2 WTI Forward Curves

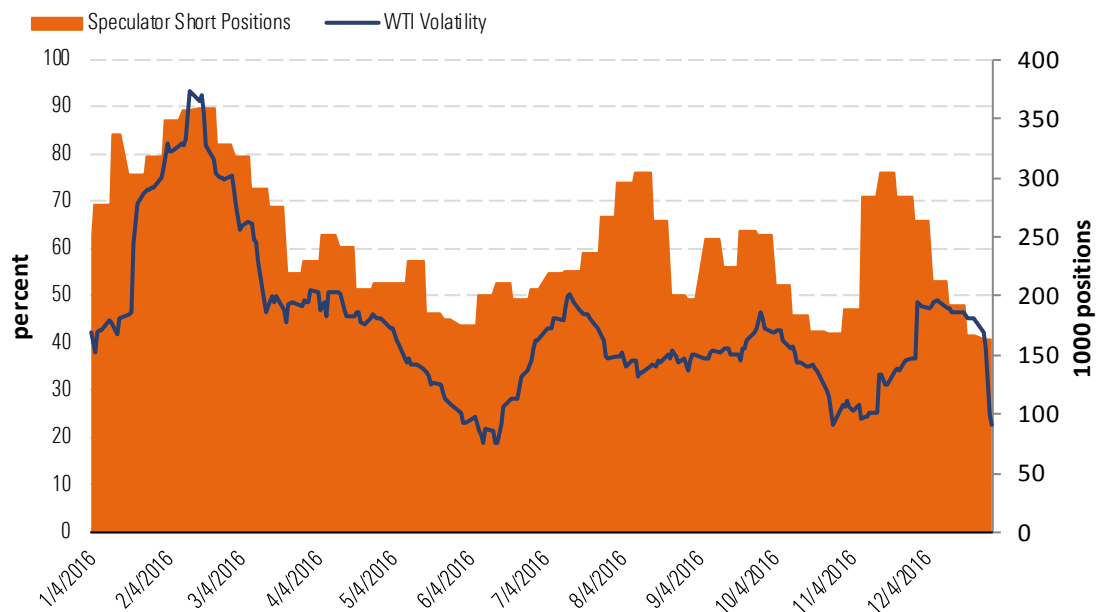


Source: CME Group, Morningstar

Commitments of Traders: Speculation

In a September 2016 note ("[Short Speculators Chase Crude Price Volatility](#)"), we discussed the activity of managed money or hedge funds in the crude oil futures market. Our analysis identified correlation between prompt futures price volatility and the accumulation of short positions by hedge funds. Data from the Commodity Futures Trading Commission's weekly Commitments of Traders reports indicate the volume of open positions held by each category of trader. Exhibit 3 shows the picture for the whole of 2016. There are several caveats about the CFTC data, including that we don't know which delivery months the positions are held in and that there is some ambiguity about the categories that larger trading firms are included in. Nevertheless, the data show strong visual correlation between price volatility and speculation, with traders building up short positions in anticipation of prices falling and closing out those positions as the market recovers from low points. The last short cycle ended in December after OPEC announced production cuts, reducing uncertainty around prices for 2017. We expect lower volatility in 2017 until the OPEC agreement is tested in action during the first six months. Current speculator positions are mostly long positions, held in the expectation that prices will increase in 2017 with OPEC compliance.

Exhibit 3 Speculator Short Positons and Volatility

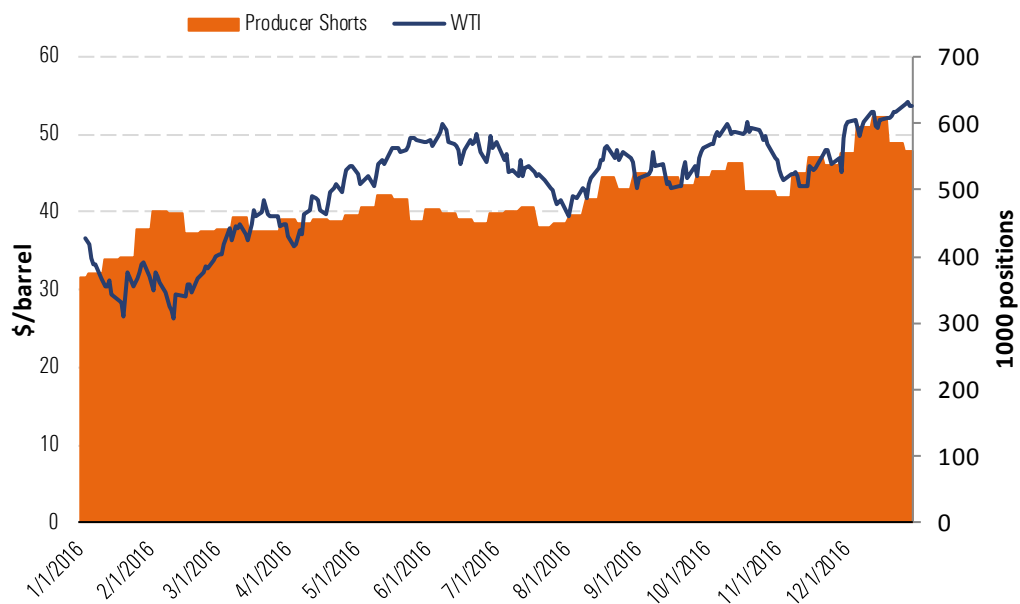


Source: CME Group, CFTC, Morningstar

Commitments of Traders: Hedging

In an October 2016 note ("[Signs of a Return to the Drilling Fields](#)"), we looked at signs of recovery in shale drilling in response to higher crude prices after the September OPEC meeting. One of the indicators covered in that analysis was CFTC data showing the number of short contract positions held by the producer/merchant/processor/user category—otherwise known as physical hedgers. Exhibit 4 shows the number of shorts held by PMPU traders during 2016 as well as prompt WTI crude.

Exhibit 4 Producer Hedges and WTI Price



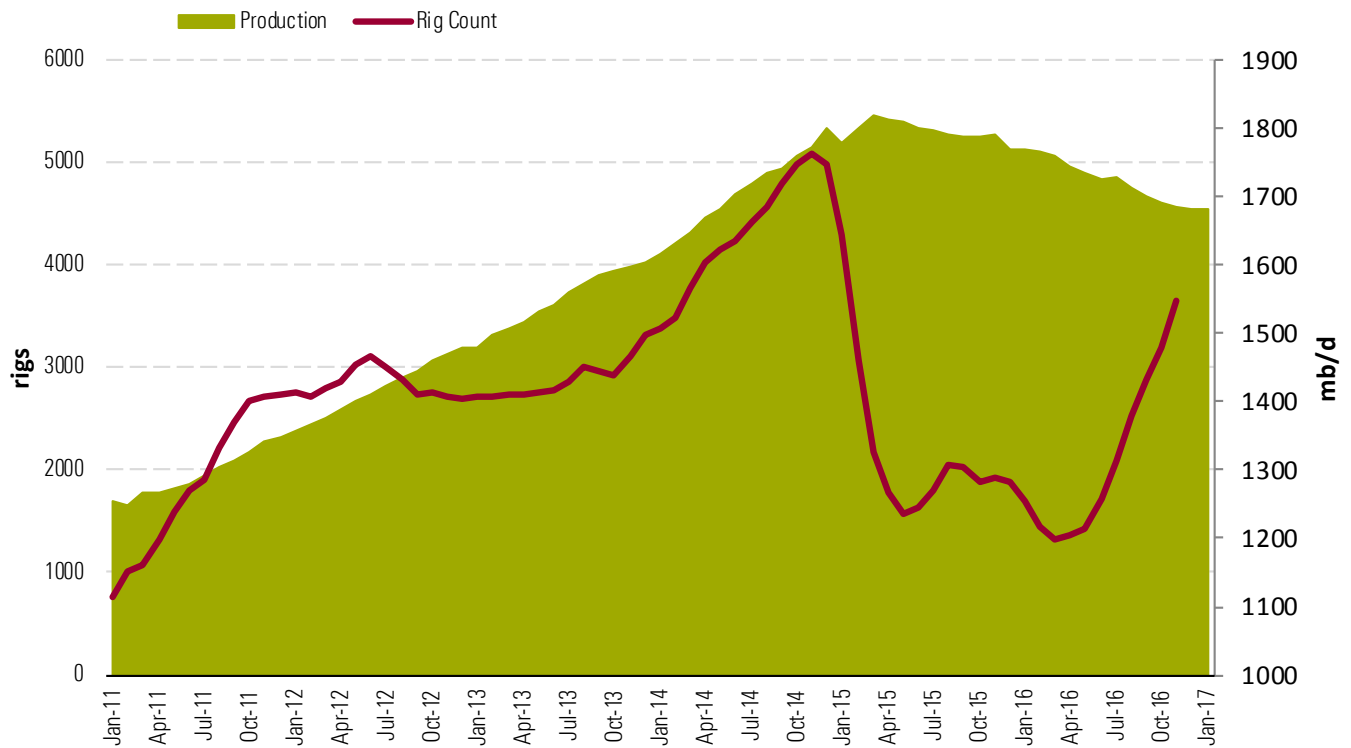
Source: CME Group, CFTC, Morningstar

Producer short hedges increased throughout the year to a record high of 608 thousand contracts in mid-December 2016 before dropping by 50 thousand contracts during the last two weeks of the year. The yearlong accumulation of short positions by PMPU traders shows growing confidence in increased production during 2017 and 2018.

Shale Production

Growing producer confidence in 2016 was underlined by a leveling off in shale production declines and the first signs of an increase in output as well as a recovery in the number of rigs drilling for oil. Data from the monthly Energy Information Administration Drilling Productivity Report summarize activity in the seven most prolific shale regions (Permian, Bakken, Eagle Ford, Niobrara, Haynesville, Marcellus, and Utica). Exhibit 5 shows the dramatic recovery in drilling rig counts during 2016. The rig count for these seven regions bottomed out at 1,200 in March before recovering by 29% to 1,549 in November. Weekly data from Baker Hughes suggest the rig count continued to increase through year-end with the Permian Basin seeing the greatest recovery.

Exhibit 5 Shale Production and Rig Count

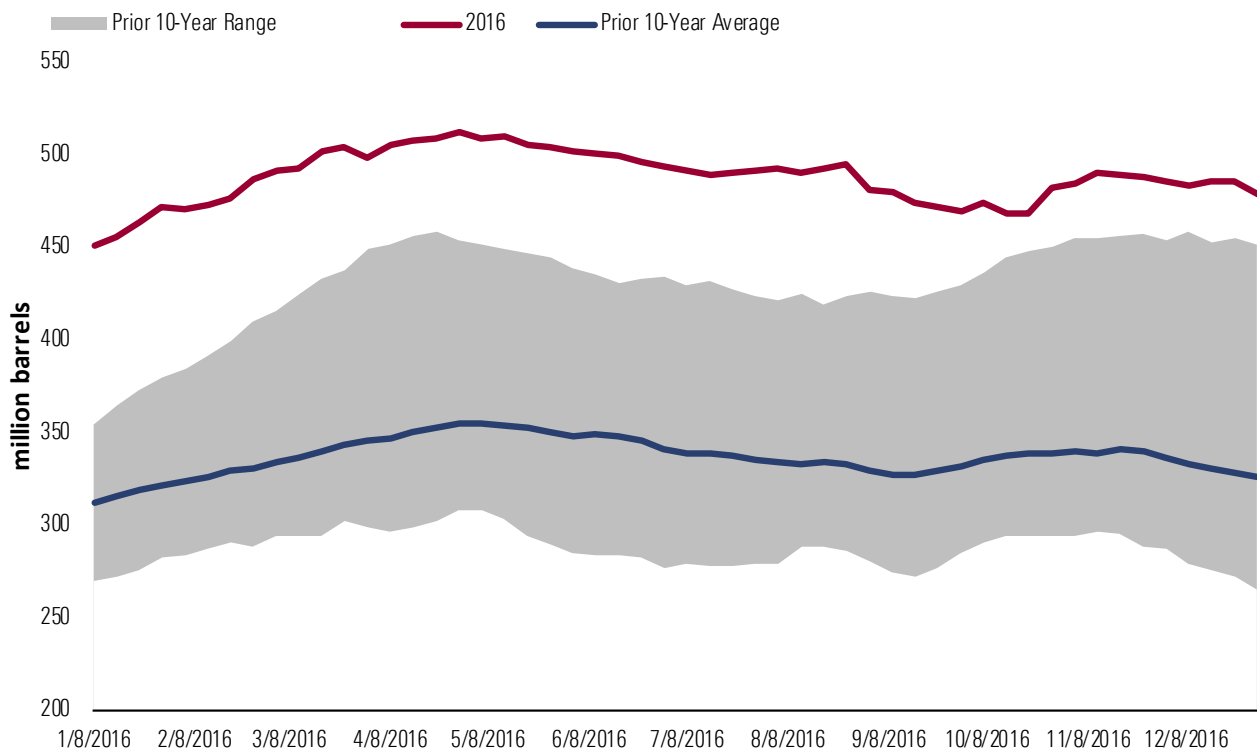


Source: EIA

Crude Inventory

Crude price recovery and new shale production cannot together be sustained by the market until demand exceeds supply for long enough to soak up record crude inventories worldwide. The first goal of the OPEC production cut is therefore to rebalance supply with demand and bring down crude stockpiles. Although U.S. crude inventories fell somewhat in 2016, they remain at record levels as of Dec. 30, 2016 (Exhibit 6). Total U.S. commercial crude inventories began 2016 at record levels and remained higher than normal throughout the year — on average 58 million barrels above the high for the previous 10-year period. Crude stockpiles peaked at a record 512 million barrels at the end of April and then fell to a low of 468 million barrels in October before recovering to end the year at 479 million barrels.

Exhibit 6 Total U.S. Crude Inventory



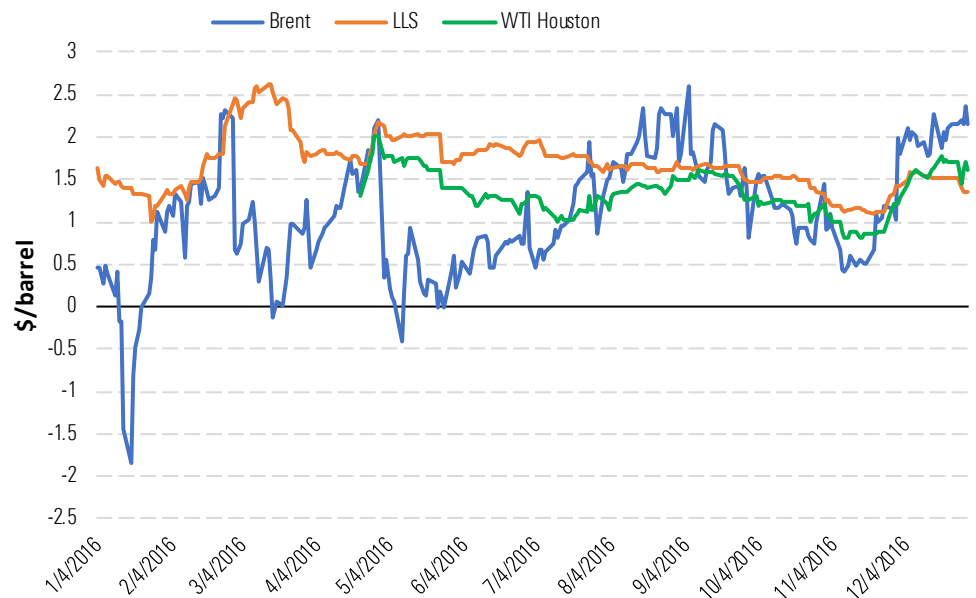
Source: EIA, Morningstar

As the OPEC cuts take effect (or not) during the coming year, we'll look to crude stockpiles for evidence that the U.S. market is rebalancing, in which case inventories should fall to more normal levels. If crude inventories remain at or near record levels, prices will remain under pressure.

Crude Exports

Arguably the most significant change to crude market dynamics in 2016 was the lifting of the export ban in December 2015. We covered prospects for crude exports in a December note ("[OPEC and NOPEC Cuts to Benefit Crude Exports](#)"). During 2016, despite high expectations, crude exports did not increase significantly from 2015 levels. With the final numbers not yet released by EIA, the average of the preliminary weekly data through Dec. 30, 2016, was 485 mb/d, just 20 mb/d higher than 2015. Exports remain constrained because prices for U.S. crude are close enough to those of international rivals to reduce the incentive to ship domestic barrels overseas except in specific circumstances when the arbitrage opens. Exhibit 7 shows premiums over U.S. domestic benchmark WTI for three relevant benchmark crudes that determine export opportunities. We discussed the way that these premiums are changing at the Gulf Coast in an August note ("[Tight Range in a Sweet Crude Glut](#)"). The first is Brent crude—a North Sea benchmark equivalent to WTI that sets the price of light sweet crude internationally. During 2016, the Brent/WTI price relationship was volatile, with Brent usually but not always at a premium to WTI that averaged \$1.09/barrel over the year¹. To compete internationally, WTI prices should be at least \$3/barrel lower than Brent. That difference in part reflects the transport cost of getting WTI to the Gulf Coast from its Cushing, Oklahoma, delivery point and the need to cover freight costs to international markets.

Exhibit 7 Crude Premiums to WTI



Source: CME Group, Morningstar

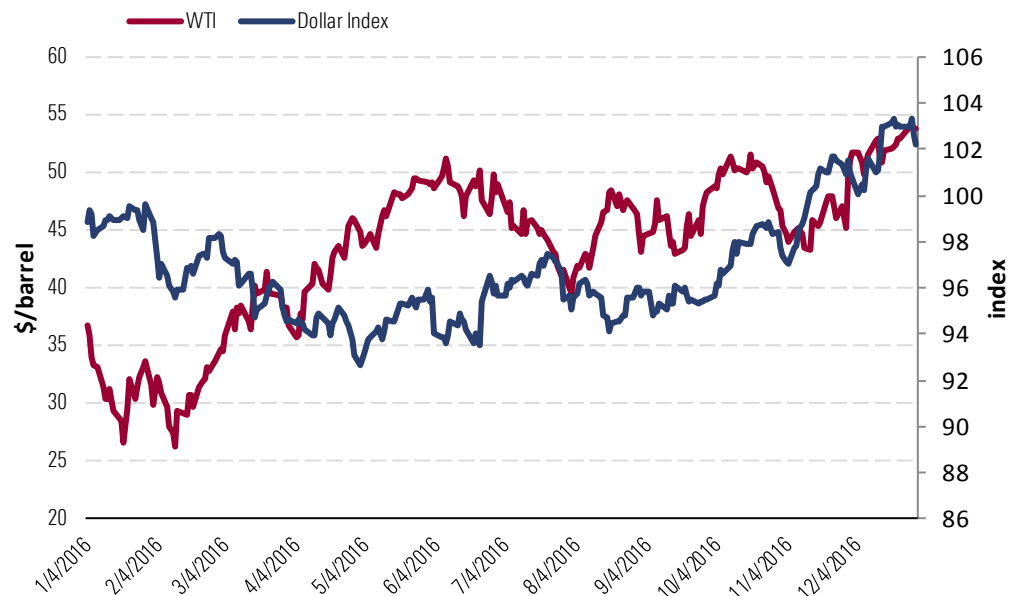
¹ The Brent/WTI premium calculation is complicated by the very different trading patterns of these crudes (which changed significantly in February 2016). Our analysis compares prompt month Brent contract settlements on the ICE futures exchange with equivalent relative month WTI contracts on the CME Nymex using a custom roll feature to align the data. With the adjustment (comparing apples to apples), the Brent premium in 2016 averaged \$1.09/barrel; without the adjustment, the premium calculates to \$1.71/barrel.

Light Louisiana Sweet crude premiums over WTI provide a clearer indication of Gulf Coast export potential because LLS is delivered at St. James, Louisiana, and can be exported directly from there. We used a CME Group prompt LLS futures quote in our analysis that averaged \$1.68/barrel above WTI, meaning that LLS was \$1.68-\$1.09 or \$0.59/barrel higher than Brent, discouraging exports. A third indicator that gained importance on the Gulf Coast in 2016 is the price for WTI delivered to Magellan's East Houston terminal from the Permian Basin. Increasing volumes of Permian WTI delivered to Houston have created a liquid market with the CME Nymex starting an OTC futures contract in 2016. The average premium of that WTI Houston futures contract over WTI (Cushing) from its inception in April 2016 to the end of the year was \$1.35/barrel—again higher than the Brent premium over WTI. These narrow premiums kept the lid on new crude export volumes in 2016 in part because international crude inventories were swimming with crude and also because U.S. crude production eased during 2016, leaving less surplus to export and a shortage of light crude in some instances (see our July note, "[Gulf Coast Refiners Penalized for Running the Lights](#)").

Dollar Index and Crude

The final fundamental indicator on our radar is the inverse relationship between the strength of the U.S. dollar—as defined by an index of currencies against the dollar—and crude prices (Exhibit 8).

Exhibit 8 Dollar Index and WTI Crude



Source: CME Group, Morningstar

Crude is bought and sold in dollars per barrel, and the strength or weakness of the currency is an important factor in purchases by countries that don't use the dollar. If the U.S. dollar is strong, that makes crude more expensive for importers outside the United States and reduces demand, putting downward pressure on prices. Conversely, if the dollar is weak, then oil is cheaper and demand

increases, pushing crude prices higher. Hence the inverse relationship where a rising dollar means lower crude and a falling dollar supports crude prices. That's the theory, and it works most of the time, usually when there are no other larger distractions in the oil market (such as an OPEC meeting). However, although the dollar/crude inverse relationship was held to through most of 2016, it broke down in the final quarter. That was because the OPEC commitment to production cuts combined with the Federal Reserve decision to increase interest rates led to both strong crude prices and a strong dollar. ■■

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+1 800 546-9646 North America

+44 20 3194 1455 Europe

commoditydata-sales@morningstar.com



22 West Washington Street
Chicago, IL 60602 USA

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