DALLASFED Economic Update

Energy

2018 Outlook Unchanged Despite Harvey Impacts

Third Quarter 2017

The destructive hurricane season that impacted the U.S. and Caribbean this year also threatened the oil and gas sector across the Gulf Coast. Yet only Hurricane Harvey substantially affected the sector, and many of Harvey's effects are already fading.

Prior to the hurricanes, much attention was focused on whether OPEC production cuts would successfully diminish bloated oil inventories. Pre-hurricane data from the U.S. point to some degree of success; however, increased production in several countries prevented more substantive progress. Looking ahead, 2018 forecasts suggest the market will be well-supplied next year even if production cuts are extended.

Hurricane Impacts Usually Large but Temporary

Experience has shown that hurricanes can significantly impact the energy sector. This includes disruptions to oil and gas production, refinery outages and gasoline price spikes, among others. Both the size and persistence of these effects depend upon the actual path of the hurricane. Not every area is home to a significant amount of oil and gas production, for example.

Harvey's path ensured it would have a smaller impact on oil and gas production but a relatively greater effect on refineries and petrochemical facilities. Crude oil production in the Gulf of Mexico experienced only a minor drop due to Harvey (*Chart 1*). This is quite different from 2005, when Hurricanes Katrina and Rita hit the Gulf Coast, and from 2008, when the Gulf Coast was struck by Hurricanes Gustav and Ike.

Refineries experienced a more substantial disruption from Hurricane Harvey, relative to oil and gas production. At one point, more than 10 refineries in the Gulf Coast area were either offline or operating at reduced capacity. This dramatically reduced the amount of crude oil being processed by U.S. refineries in early September by more than 15 percent from normal levels.

Retail fuel prices increased in the wake of Harvey due to refinery outages and pipeline issues. Gasoline prices increased about 30 cents per gallon, up about 11 percent in the first week of September. Additionally, there were short-lived shortages of fuel in parts of North Texas.

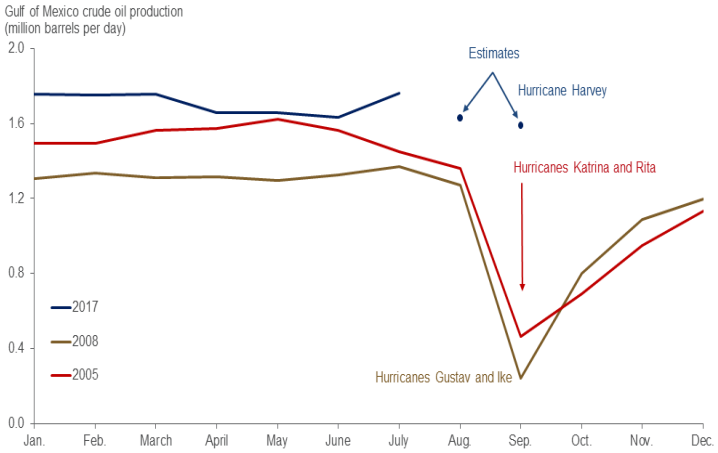
The effects of Harvey appear to be fading but were not completely gone as of the end of the third quarter. While U.S. crude production has returned to pre-hurricane levels, refineries still appear to be operating at somewhat reduced rates.

Production Cuts and Hurricanes Affect Crude Inventories

Before the hurricanes, all eyes were focused on whether OPEC and non-OPEC production cuts would reduce bloated inventory levels. U.S. data show some modest success, with inventories of crude oil declining at a somewhat accelerated pace in August and stockpiles of diesel shrinking over the entire summer.

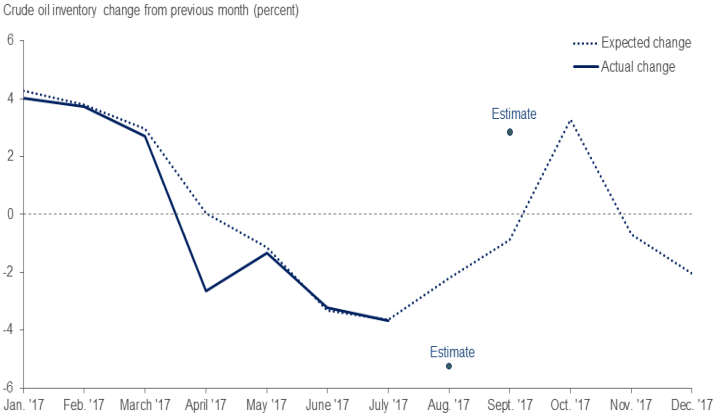
U.S. stockpiles of crude oil rise and fall at different times of the year, typically growing early in the year and declining during the summer. These patterns are driven in large part by refinery maintenance, which occurs early in the year and in late autumn (*Chart 2*). Adjusting for these seasonal movements can help provide insight into any unusual changes in inventory levels that arise due to other factors, such as OPEC production cuts. This year, inventories of crude oil only departed from seasonal norms in April and August, when they fell at an accelerated pace.

Chart 1
Hurricane Harvey Has Limited Impact on Gulf Production



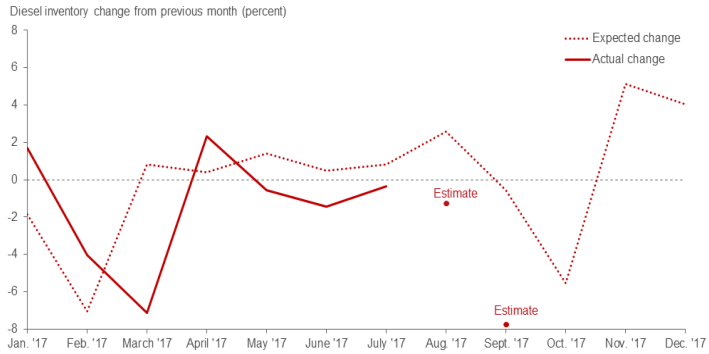
NOTE: August and September estimates are from the U.S. Energy Information Administration *Short Term Energy Outlook*, September 2017.
SOURCES: Bloomberg; U.S. Energy Information Administration; authors' calculations.

Chart 2
U.S. Crude Oil Inventories Experience Counter-Seasonal Decline in August



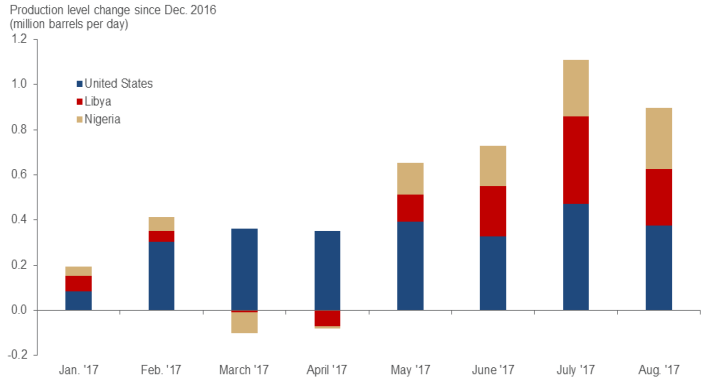
NOTES: The expected change represents the percent change in inventories due to seasonal factors. Expected changes for September to December are calculated with forecasted seasonal factors using the census' X-12 model. The August estimate is calculated using U.S. Energy Information Administration data for the week of Aug. 25, whereas the September estimate is calculated using the data for the week of Sept. 22.
SOURCES: U.S. Energy Information Administration; authors' calculations.

Chart 3
U.S. Diesel Inventories Deviate from Normal Seasonal Pattern



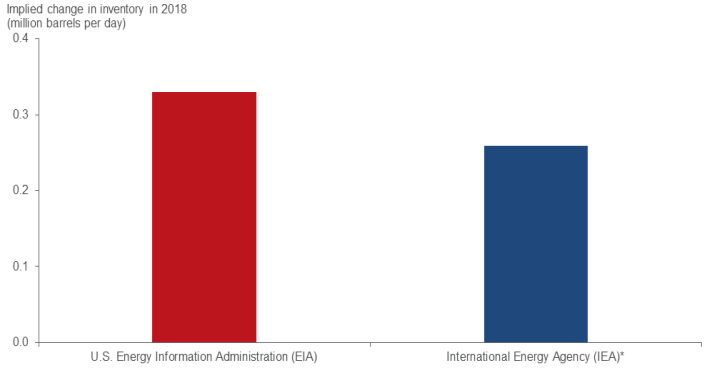
NOTES: The expected change represents the percent change in inventories due to seasonal factors. Expected changes for September to December are calculated with forecasted seasonal factors using the census' X-12 model. The August estimate is calculated using U.S. Energy Information Administration data for the week of Aug. 25, whereas the September estimate is calculated using the data for the week of Sept. 22.
SOURCES: U.S. Energy Information Administration; authors' calculations.

Chart 4
Production Growth Partially Offsets OPEC Cuts



SOURCES: U.S. Energy Information Administration; International Energy Agency *Oil Market Report*, September 2017; authors' calculations.

Chart 5
Energy Agency Forecasts Suggest Modest Global Inventory Growth in 2018



*Assumes OPEC crude oil production remains constant at 32.7 million barrels per day, August 2017's level.
NOTE: The implied change in inventory is calculated by taking an arithmetic difference between production and consumption estimates.
SOURCES: EIA *Short Term Energy Outlook*, September 2017; IEA *Oil Market Report*, September 2017; authors' calculations.

Inventory levels of gasoline and diesel also exhibit their own seasonal patterns. For example, stockpiles of diesel, which is used as heating oil in certain parts of the U.S., typically grow in the summer when demand is relatively low, as the dotted line in Chart 3 shows. This summer, inventory levels outright declined over the course of the summer.

Since late August, hurricanes have dramatically affected the inventory data. Refinery outages have led to sharp increases in U.S. crude oil inventories and contributed to rather dramatic declines in both diesel and gasoline inventories. This has made it difficult to parse out the potential effects of the production cuts and other factors toward end of the quarter.

OPEC Cuts Partially Offset by Increased U.S. Production

The production-cut agreement by OPEC members and a number of non-OPEC members, such as Russia, has removed a significant amount of oil from the market. But the success of the cuts at lowering inventories and boosting prices has been partially mitigated by rising production elsewhere.

Two countries substantially increasing their production levels since the end of 2016 are Libya and Nigeria, both OPEC members exempt from cutting their production levels. The United States is another country that has boosted oil production, driven by a resurgence of drilling activity in shale areas.

Production growth in all three countries was enough to offset a substantial portion of the cuts in July (*Chart 4*). This offset was less notable in August, but much of it was due to hurricane-related outages in the U.S. Looking ahead, the level of offset is likely to continue growing in the fourth quarter. U.S. production has already returned to pre-hurricane levels and is expected to continue growing.

Crude Market Looks Well-Supplied in 2018

Forecasts from two major energy agencies suggest the market should be well-supplied in 2018, even if OPEC production cuts are extended. Forecasts from the U.S. Energy Information Administration, which already incorporate an extension, imply production will slightly exceed consumption next year (*Chart 5*). One ends up with a similar conclusion using forecasts from the International Energy Agency for global demand and non-OPEC supply. Global production would exceed consumption, even if OPEC crude output remains constant at the levels seen in August 2017. Production levels higher than this would further increase the expected oversupply.

—Justin J. Lee and Michael D. Plante

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About the Authors

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