

# OIL PRICE DYNAMICS REPORT

Updated: October 3, 2016

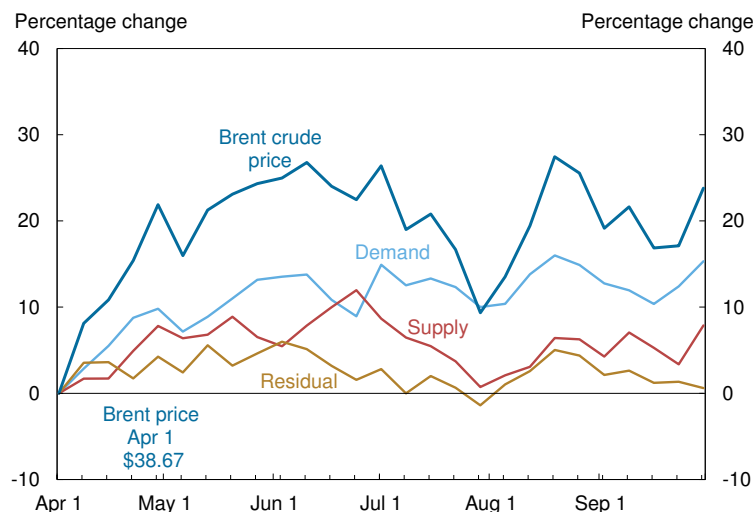
## **Oil prices moved up over the past week, owing to stronger demand and tighter supply.**

- Oil prices increased over the past week, driven by continuing improvement in global demand expectations as well as tightening in perceived supply following OPEC's production cut deal. In 2016:Q2, reassessment of global demand expectations and tighter supply conditions both exerted upward pressure on oil prices.
- These developments follow the temporary demand-driven oil price weakness of early Q1. Tighter supply conditions, however, exerted upward pressure during this period, leaving oil prices up modestly.
- Overall, since the end of 2014:Q2, both lower global demand expectations and looser supply have held oil prices down—a trend that has been reversing since the end of 2016:Q1.

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Our analysis of oil price movements does not necessarily represent the views of the Federal Reserve Bank of New York, the Federal Reserve System, or the Federal Open Market Committee.

## Cumulative Weekly Decomposition, Apr 01-Sep 30, 2016



Sources: Authors' calculations; Haver Analytics; Thomson Reuters; Bloomberg.

Notes: Residual reflects price movements unexplained by supply and demand factors. Supply, demand, and residual sum to Brent crude price.

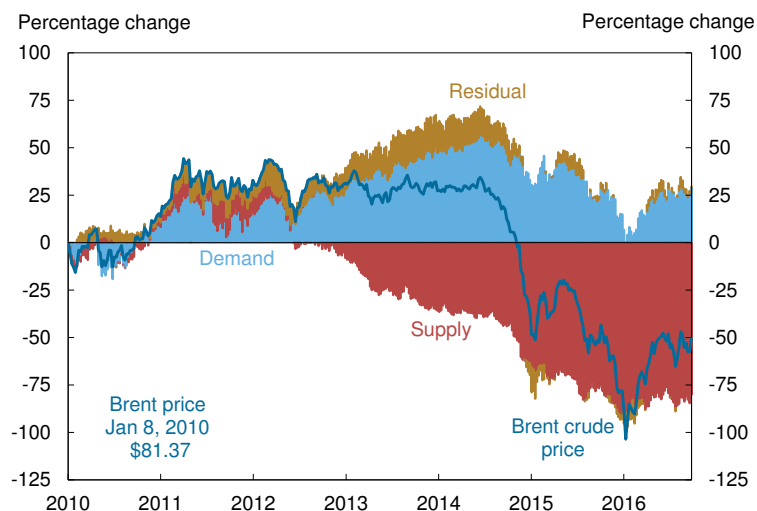
## Recent Decomposition Data

- The chart at left depicts the cumulative oil price decomposition from April 1, 2016.
- The table below presents the most recent cumulative values.

### Cumulative Percentage Changes since April 1, 2016

	Demand	Supply	Rest	Brent
Sep 16, 2016	10.4	5.3	1.2	16.9
Sep 23, 2016	12.4	3.4	1.3	17.1
Sep 30, 2016	15.3	7.9	0.6	23.8

## Cumulative Weekly Decomposition, 2010-16



Sources: Authors' calculations; Haver Analytics; Thomson Reuters; Bloomberg.

Notes: Residual reflects price movements unexplained by supply and demand factors. Supply, demand, and residual sum to Brent crude price.

## Longer-Term View of Oil Price Movements

- This final chart provides a somewhat longer-term perspective by means of a cumulative decomposition from 2010 onward.
- The analysis shows that excess supply became a significant driver of oil prices in mid-2012 and generally dominated price dynamics after mid-2014.

# **Oil Price Decomposition Q&A**

## **1) What is the goal of the oil price decomposition?**

Our aim is to determine how much of the observed oil price change has been driven by demand and supply factors.

## **2) What is the modeling strategy?**

Using a statistical model and a large number of financial variables, we decompose weekly oil price changes into demand effects, supply effects, and an unexplained residual.

Sparse partial least squares regression allows us to construct linear combinations from the variables in our financial market data set—called factors—which have maximum explanatory content for oil price changes. We first use this procedure to generate factors that best capture the patterns in the data, and then examine the estimated factors to determine how they reflect demand or supply dynamics.

The model is re-estimated every week using weekly data from January 1986 through the close of business on Friday of the most recent week. Over this sample, the model can explain about two-thirds of the weekly oil price dynamics.

## **3) How to interpret the results?**

The output of the model is used to decompose weekly changes in an accounting sense. More specifically, the weekly Brent crude price change always equals the change explained by demand factors plus the change explained by supply factors plus a residual (the weekly change unexplained by the sum of the estimated demand and supply factors).

Given the noise in weekly price changes, we choose to show the results as a cumulation from a certain starting point (usually the start of the previous quarter).

## **References**

- *Groen, J., and P. Russo.* 2015. “Is Cheaper Oil Good News or Bad News for the U.S. Economy?” *Liberty Street Economics*, June 8.
- *Groen, J., K. McNeil, and M. Middeldorp.* 2013. “A New Approach for Identifying Demand and Supply Shocks in the Oil Market.” *Liberty Street Economics*, March 25.

## **Authors**

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