

# OIL PRICE DYNAMICS REPORT

Updated: May 16, 2016

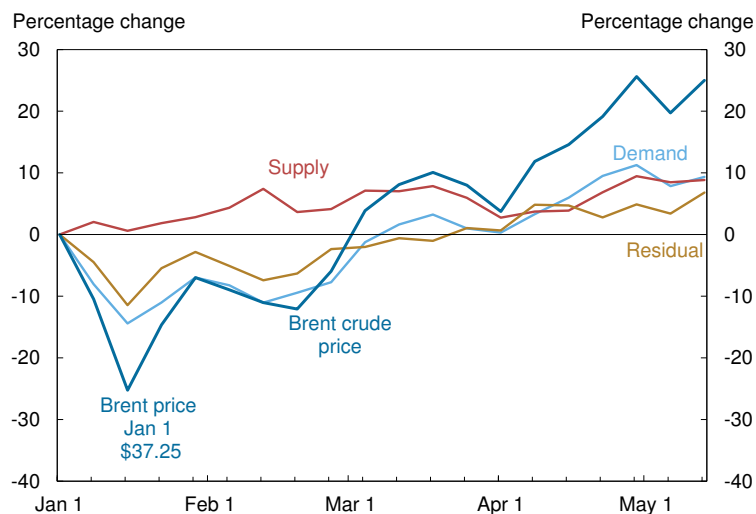
## **Oil prices rose in the past week, mostly owing to the residual, but also to somewhat improved demand**

- Oil prices recovered over the past week, largely owing to the residual and, less so, to improving demand conditions. Since early 2016:Q1, reassessment of global demand expectations has been a somewhat more prominent driver of oil price movements than perceived supply conditions.
- These developments follow the sustained oil price weakness over 2015:Q4, which was predominantly supply-driven.
- Oil price declines in Q2 and Q3 of last year were influenced more heavily by global demand expectations—a pattern at odds with the supply-driven declines seen in 2012-14.

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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, Jan 1-May 13, 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.

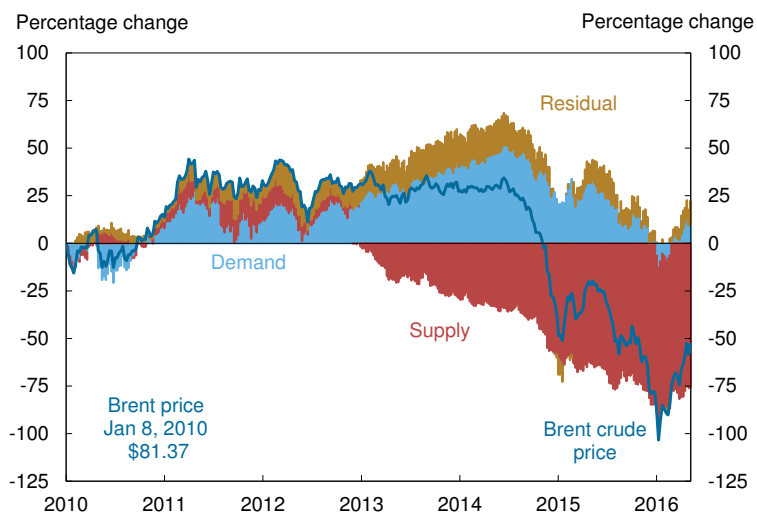
## Recent Decomposition Data

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

### Cumulative Percentage Changes since January 1, 2016

|              | Demand | Supply | Rest | Brent |
|--------------|--------|--------|------|-------|
| Apr 29, 2016 | 11.3   | 9.5    | 4.9  | 25.6  |
| May 06, 2016 | 7.9    | 8.5    | 3.4  | 19.7  |
| May 13, 2016 | 9.3    | 8.8    | 6.8  | 25.0  |

## 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 from 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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