

Location Basis Differentials in Crude Oil Prices

Phat Luong, Bruce Mizrach and Yoichi Otsubo

College of Business Management, SUNY Polytechnic Institute
Department of Economics, Rutgers University
Alliance Manchester Business School, University of Manchester

Executive summary

Crude oil is delivered in a variety of locations, but two of the most important are the U.S. market in Cushing, Oklahoma, which determines the West Texas Intermediate price, and the Brent price for delivery in the North Sea, offshore from the U.K. The difference in the two prices, which is called the basis, was very stable historically, with Brent trading at a small discount to WTI.

New production technologies contributed to a massive increase in U.S. crude oil production which reached a record high of more than 10 million barrels per day in 2017. The infra-structure in the U.S. was temporarily overwhelmed, and the Brent and WTI prices disconnected for a period of six years, from January 2010 to December 2015. This breakdown coincided with the decision of Saudi Arabia to stop using WTI for its pricing in the U.S. and ended with the lifting of the crude oil export ban. Brent at one point in 2011 traded at \$27 premium to the WTI price in September 2017.

We measure this basis change statistically through cointegration and causality analysis of the two benchmark prices. Cointegration tests for a long-run equilibrium between two prices, and our tests confirm that Brent and WTI were not cointegrated between January 2010 and December 2015. Granger causality analysis also shows that inventory levels were no longer a causal factor in the spread during the period in which prices detached. U.S. retail gasoline prices also lost their connection to WTI prices.

New pipelines were built and transport capacity increased so that by the end of 2015, more than 90% of crude oil heading into the Gulf Coast was by pipeline, resolving the inventory build-up in Cushing. With the ending of the 40 year ban on crude oil exports in December 2015, crude exports from the Gulf surged to 50 million barrels per month. With the route to international markets fully restored, the WTI price resumed its long run pricing relationship with Brent.

Keywords: Brent; West Texas Intermediate,; basis differential.

JEL Codes: G12; G14; G18.