The Effect of Speculation in Futures Market on Oil Price

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Overview

During 2004-2016, the market for crude oil had shown a dramatic price fluctuation which cannot be sufficiently explained by only supply and demand analysis. For instance, speculation in the futures market became the other plausible factor which contributes to the volatility of oil price changes. In this paper, we propose the non-commercial traders' net long position of light sweet crude oil in NYMEX as the proxy to capture the speculative behavior in the futures market and employ a Sign Restricted SFAVAR model to evaluate the effect of speculation on oil price changes. The conclusion implies that taking speculation into account in the analysis of oil price changes is pertinent and will benefit the forecast of oil price.

Method

In this paper, we employ a Sign Restricted SFAVAR (Structural Factor Augmented Vector Autoregression) model to study the effect of speculation on crude oil price. This model is modified from Juvenal & Petrella (2014) with a technique employed by Belviso & Milani (2006). The model's setting is:

$$X_t = b_0 + \varphi_0 D_t + \varphi_1 X_{t-1} + \varphi_2 X_{t-2} + \dots + \varphi_p X_{t-p} + S Q_G^T w_t$$

where X_t are variables and structural common factors interested, S is the Cholesky decomposition of reduced-form error's variance-covariance matrix, Q_G is generalized Givens rotation matrix, and $w_t = Q_G z_t$ represents a new set of standardized structural shocks that are also orthogonal. This model is also featured with:

1. Instead of using oil inventory as speculative demand (Kilian & Murphy, 2014; Kilian & Lee, 2014), we employ the net non-commercial long position of light sweet crude oil in NYMEX as the proxy to capture the speculative behavior in the futures market, which may be more consistent with ordinary people's recognition.

2. With the help of the dynamic factor analysis, three information-rich demand-side factors are extracted from 128 pre-categorized global and G7 economic variables: (1) real economic activity factor, (2) inflation factor, and (3) monetary & financial factor. Besides, we use crude oil production and oil inventory to represent supply-side driving forces.

3. The "Sign Restriction" approach is also applied to identify economically meaningful sign restrictions on the impulse response function of SFAVAR model.

Results

The results have shown that (1) speculation had instantaneously and accumulatively positive impact on the crude oil price changes; (2) the change of inventory has an immediately negative impact on oil price change, while a negative accumulative impact of oil production change appears in the latter periods; (3) the shocks from demand-side factors have positive cumulative impacts on oil price in general and last for 6-12 months. We also found that the evolution of oil price in the past decade was determined by the changes of different factors in different time and speculation in the futures market had a significant contribution to oil price during 2004-2007, 2011-2013, and 2015-2016.

Conclusion

The objective of this paper is to examine the effect of speculative behavior in the oil futures market as well as other factors on the price of crude oil from January 2004 to June 2016. From above

empirical findings, we conclude that speculative behavior of non-commercial traders in the futures market played an important role in the oil price changes from during 2004-2016. Hence, incorporating the speculation factor into the analysis of oil price changes is pertinent and will benefit the oil price forecast in the future.

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