Impacts of supply and demand factors during oil price falls

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Overview

Recently, we have observed extraordinary oil price falls twice; from 2008 to 2009 and from 2014 to 2016. During these relatively short periods, the oil prices became a half. We investigate what cause these extreme events in term of the supply and demand based price decision mechanism. Demand factors in the oil markets are categorized into the real demand and strategic demand. If there is economic recession, the oil demand will decrease, and then the oil price is expected to fall. In contrast, if the economy is booming, companies may increase their investment, which will increase the oil demand and oil price. On the other hand, if the Mideast political environment is unstable, people may expect the oil price increase soon. Based on this rational expectation, some people may buy the oil more than their real demand in a strategic aspect, which leads to oil price risings. Meanwhile, the OPEC production and Shale oil development have been interesting supply factors in the recent oil markets. To find out which factors are more significantly influence the oil price falls, lag-differenced time-series regression models with various input variables (supply and demand factor) were evaluated in the aspect of out-of-sample forecasting performances. In particular, monthly spot prices of WTI, Brent, Dubai were implemented due to the availability of input variables. Impacts of supply and demand factors between two oil price falling periods were evaluated and compared.

Method

Lag-differenced time-series regression; co-integration test; out-of-sample forecasting; rmse and mape

Results

- In the first falling period, the real demand, strategic demand, and OPEC production play important roles. OECD industry index and S&P 500 reflect the real demand. US strategic petroleum reserve is utilized to measure the strategic demand.
- In the second falling, the strategic demand did not influence the oil price falling, but the real demand and OPEC production still play important roles. Here, the China economic condition is also influential to the oil price.
- Shale oil production also meaningful to the oil price falls. However, during both falling period, OPEC production is more significant than Shale oil production.

Conclusion

Since the economic recession in the middle of 2008, China has become the world-first oil consuming country. This might be a reason why the Chinese economic condition is important in the second oil price fall. This pattern may continue as China remain the world-first oil consuming country. US Shale oil development has been known to be a main reason why the oil price is falling in the second oil price falling period. However, the impact of OPEC production seems to be still more dominant. Oil demand in a strategic aspect seems to disappear in the second oil fall.

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