

Reexamination of the Spread between WTI and Brent

:the application of Time Varying Parameter Model

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(1) Overview

Since crude oil is the most important trade commodity in the world, to understand the trend of international oil prices is an inevitable subject in the energy area. Although many papers had devoted lots of important concepts and addressed many methods to discover the issues of world oil prices, its dynamic evolution always provides us some research topics. The reversal of the spread between WTI and Brent is one of the hot topics in recent years. By tracing this issue for years, these authors found several interesting methods to capture the evolution of crude oil prices.

(2) Methods

Two main concepts are implemented in our paper. First of all, we try to find some structural breaks of the spread between WTI and Brent. In addition to explore the reversal factors of Brent and WTI prices in recent years, this paper identifies the significant structure change points of the spread between WTI and Brent by implementing the Bai & Perron model (1998, 2003) and the Chow test proposed by Hansen (1992). We also approve the same structure changes by using these two different approaches.

Secondly, we use Time Varying Parameter Method (TVP) to predict the spread between WTI and Brent. Two TVP models are established here. In the first simple TVP model, we build the weekly time series transfer forecasting model by considering the independent variables (i.e. the Cushing stock and WTI long contracts proportion of all contracts in CFTC). Then the second model is built by combining this simple TVP model with the structural break impacts, which is found from the outcomes of the above Bai & Perron model.

(3) Results

Except using some new statistical skills to reveal the evolution of the spread of WTI and Brent (see Figure 1 below), some interesting econometric results are found. From the Bai & Perron model, we found the coefficients changed significantly after 2011. A dummy variable is then built to consider this structure change point (January 21, 2011) in the TVP model. TVP model shows that the prediction error (RMSE) can be reduced by about US\$3/BBL.

(4)Conclusions

World oil prices change all the time. Current hot issues are more related to the wider spread between WTI and Brent. This paper uses some new statistical and econometric skills to date the breaks of the spread of WTI and Brent, and then predict this spread. We found the consideration of structural breaks enhance the reliability for predicting the spread of WTI and Brent.

Major References

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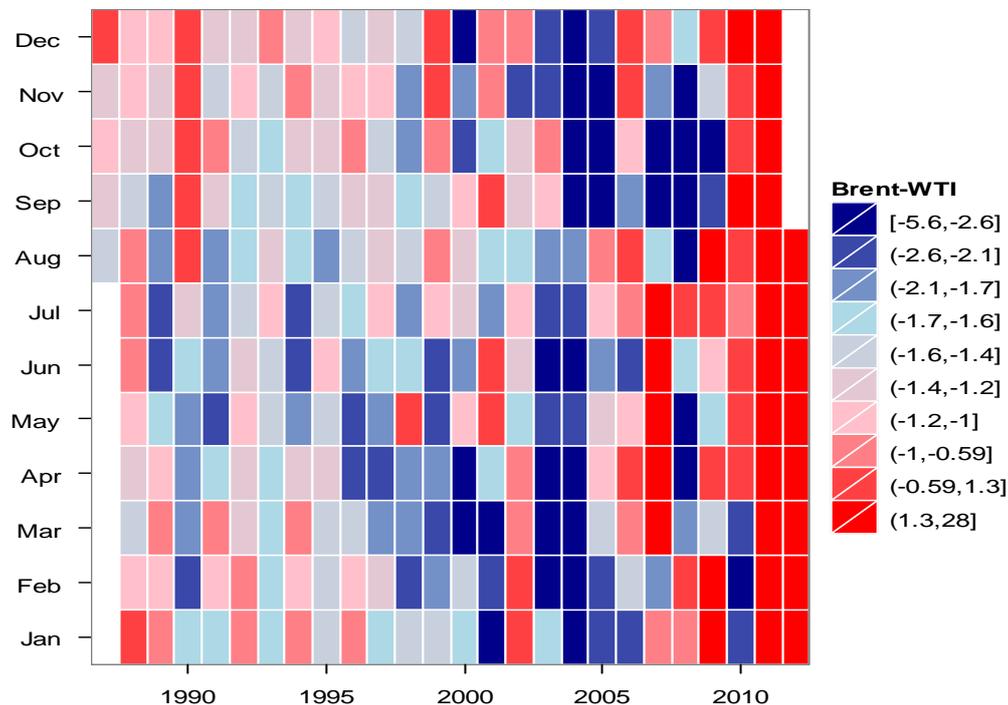


Figure 1: The spread of Brent and WTI(1987.8~2012.8)