

DETERMINING OIL PRICE DRIVERS WITH DYNAMIC MODEL AVERAGING

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Overview

Modelling spot oil price is a hard but important task. Various researches has previously shown that oil price drivers can vary in time. In other words, it is hard to find one oil price model which would perform well in every period. On the other hand, usually the best performing model changes in time.

From the econometric point of view such a situation requires building a model with two features. First, there is an uncertainty about the “true” model. Therefore, supposing there is initially given some set of models, the “true” model should be allowed to change with time. Secondly, suppose that the methodology is narrowed just to regression models arising from some set of initially given explanatory variables (drivers). Then, also the regression coefficients of these models should be allowed to vary in time.

Such a construction is already known. It is Dynamic Model Averaging (DMA). This methodology arised as a certain extension and improvement of Bayesian Model Averaging (BMA). Indeed, this method comes from the Bayesian econometrics.

As the initial set of oil price drivers the following factors have been chosen: stock market index, interest rates, economic activity index, exchange rates, supply and demand, import quotas, inventories level, and stress market index.

The paper is organised as follows: First a brief overview about the oil price drivers is given. Next, a brief description of Dynamic Model Averaging is provided. Finally, the results are presented and conclusions are formulated.

Methods

Dynamic Model Averaging and Dynamic Model Selection

Results

First, the quality of forecast for different internal models' parameters is presented.

Second, the certain probabialities (weights arising from the recursive updating scheme of Dynamic Model Avearging) are used to describe the time-varying importance of the considered oil price drivers.

Third, Dynamic Model Averaging forecast quality is compared with that of Dynamic Model Selection. It is argued that model averaging, indeed, improves the quality of forecast.

Conclusions

In different periods, different drivers play the most important role in influencing spot oil price behaviour. However, generally, the most important drivers are those coming from stock markets – not the fundamental indicators like supply and demand forces.

Secondly, Dynamic Model Averaging is robust to various initial model parameters' specification.