FORECASTING CRUDE OIL SPOT PRICE WITH AVERAGING TIME-VARYING VAR MODELS

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Overview

The aim of this research is to present an econometric method, which joins three aspects of modelling. The underlying (initial) scheme is VAR (Vector Autoregression). This method can be extended to allow for time-varying parameters. This particular feature is in line with the real market situation, when the strength of an interaction between variables in an econometric model fluctuates with time. Secondly, the estimation of these parameters can be done in a recursive way. In other words, in each period only the market information, which was available at that time is used to estimate the model coefficients. This is in line with a real market player's perspective and situation. Third, there exists uncertainty on which variables (and their lags) should be included in the VAR model. This particular problem can be tackled with model averaging procedure. For example, according to the Bayesian approach, the weights of the several competing models can be derived on the basis of their posterior probabilities (Raftery et al., 2010). Herein, it is tried to present a modelling scheme which is an adaptation of Dynamic Model Averaging (DMA) of Raftery et al. (2010) to VAR method (Karel and Hebak, 2018).

For the oil market, VAR models can be used, for example, to model the complex relationships between crude oil spot price, oil production quotas, oil consumption quotas, economic activity, interest rates, speculative pressures on the market, exchange rates, etc. (Beckers and Beidas-Strom, 2015). Here it is tried to go beyond the basic VAR modelling, as aforementioned.

Methods

Vector Autoregression (VAR), Dynamic Model Averaging (DMA), Bayesian econometrics, model averaging, recursive estimations, time-varying parameters.

Results

First, the idea of joining VAR and DMA methodology is presented. This seems to be quite a novel approach (Karel and Hebak, 2018).

Second, the results of one-period ahead forecasting crude oil price are discussed withing the framework of modified VAR modelling.

Third, it seems that the proposed method produces more accurate forecasts than the conventional VAR model for the analysed dataset.

Conclusions

The presented model seems to produce more accurate forecasts than the conventional VAR approach.

References

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