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SOME VARIABLE SELECTION METHOD WITH A GENETIC ALGORITHM AND MODEL AVERAGING: AN APPLICATION TO FORECASTING OIL PRICE

Abstract:

Forecasting oil price is an example of a problem when model and variable uncertainty occurs. In other words, basing on the literature review, there exist numerous potentially important explanatory variables. This can also result in a situation when the time-series included in the econometric model are not long enough comparing with the number of them being included in the econometric model; which becomes an obstacle to apply the conventional econometric techniques. Moreover, in different time periods different set of explanatory variables can be the “best” one. Moreover, the relationship between the given explanatory variable and oil price can be time-varying. Finally, from the investors perspective it is desirable to continuously update the econometric model with all new information from the market when it becomes available, i.e., to update the model’s coefficients. Bayesian methods and model averaging are the techniques that nicely deals with these problems. For example, Dynamic Model Averaging (DMA) is such a technique. However, still, due to the computational issues, when the number of explanatory variables is very large, this method also cannot be applied. Herein, a genetic algorithm is used to recursively select the explanatory variables and improve the DMA method. The empirical simulations show that such a modification leads to similar outcomes as the original method. The usability of the proposed technique is not narrowed to oil price forecasting, but can be applied in various economic and financial time-series forecasting, when model and variable uncertainty is present.

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Keywords:

Bayesian forecasting, Dynamic Model Averaging, forecasting, genetic algorithm, model uncertainty, oil price, time-series, variable uncertainty.

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