THE NEW BENCHMARK FOR FORECASTS OF THE REAL PRICE OF CRUDE OIL

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Overview

Standard forecast comparisons with a simple no-change benchmark can introduce spurious predictability when the series is temporally aggregated. We show that a benchmark based on end-of-period observations re-establishes meaningful forecast comparisons and reduces the mean squared prediction errors by up to 45 percent under the null. Moreover, estimating econometric models with end-of period observations produces similarly large short-horizons forecast gains. We illustrate these effects by estimating popular real-time forecasts of the real price of crude oil with a new series of monthly real closing prices. Despite unprecedented forecast improvements, crude oil price forecasts cannot outperform the new benchmark. Both the large forecast gains and the higher bar to claim forecastability call for a re-evaluation of proposed methods in studies that forecast temporally aggregated series.

Methods

We show that the theoretically optimal forecast of aggregated series under the null hypothesis of "no predictability" is the end-of-period no-change, not the conventional no-change of the aggregated series. We replicate real-time model-based forecasts of the real price of crude oil that have been proposed in the literature. Furthermore, we improve and update the real-time data set of Baumeister and Kilian (2012) using historical releases from the U.S. Energy Information Administration. The conventional no-change forecast is compared to the optimal end-of-period no-change forecast. Model-based forecasts are compared when models are estimated with monthly average prices and with monthly closing prices. New tests are proposed to evaluate the accuracy of the model-based forecasts.

Results

For temporally aggregated macroeconomic series, the theoretical gains in forecast accuracy from using the new benchmark are as large as 45 percent. These gains are realized when applied to real-time forecasts of the real price of crude oil and are significant up to one year ahead. The end-of-period no-change outperforms all model-based forecasts. A simple change of the benchmark can thus have large effects on the assessment of different forecasts.

Estimating forecasting models with closing prices rather than average prices also substantially improves forecast accuracy by up to 45 percent. These gains are two to three times larger than previously proposed improvements in the literature such as new models or forecast combination approaches. Nonetheless, only forecasts derived from oil futures prices significantly outperform the new end-of-period no-change benchmark, and only for forecast horizons larger than nine months. The introduction of a more suitable benchmark for forecast comparisons shows that oil prices are more difficult to predict than previously thought.

Conclusions

Using the end-of-period observations as the no-change forecast benchmark raises the bar for model-based forecasts to claim improvements over a no-change benchmark. Despite unprecedented forecast improvements from estimating models with end-of period observations, such forecasts cannot outperform the new benchmark. Both the large forecast gains and the higher bar to claim forecastability call for a re-evaluation of proposed methods in studies that forecast temporally aggregated series.