

# Futures prices are useful predictors of the spot price of crude oil

*Reinhard Ellwanger<sup>a</sup> and Stephen Snudden<sup>b</sup>*

---

Given the importance of crude oil in policy models, for making investment decisions, and for purchasing oil-intensive goods, there is wide interest in accurately predicting its prices. An established finding in the literature is that oil futures are not particularly useful for forecasting the spot price of crude oil. We revisit this finding by proposing a different way to construct futures-based forecasts and by extending the sample period, allowing us to also evaluate the effectiveness of multi-year-ahead forecasts. Contrary to the conventional wisdom, we show that futures forecasts significantly improve upon the accuracy of monthly no-change forecasts. This occurs for two reasons.

First, we show that futures curves constructed with end-of-month futures prices rather than monthly average futures prices have always had substantive predictive power of average spot prices at short horizons. Incorporating information from end-of-month futures prices improves the mean-squared prediction error and the directional accuracy of the no-change forecast for average spot prices by 40 percent at the one-month horizon. The improvements remain statistically significant for forecasts up to 12 months ahead. The forecast gains are remarkably robust and independent of the sample period.

Second, the predictive content of crude oil futures prices at longer forecast horizons has improved since the mid-2000s. We show that, whenever the end of the forecast evaluation period is extended beyond 2014, futures-based forecasts are found to be significantly more accurate predictors than no-change forecasts. The result holds for forecasts from one year to five years ahead. It is particularly strong for forecast horizons beyond two years, which were previously difficult to evaluate due to the illiquidity of longer-dated futures contracts. The enhanced effectiveness of the futures-based forecasts coincides with an increase in trading activity in oil futures markets over the same period.

The findings hold for both Brent and WTI crude oil, and can also be applied to the U.S. refiners' acquisition cost of crude oil. Moreover, the futures-based forecasts work well for both average nominal and real prices.

The results show that a decade's worth of additional data, as well as a simple modification to the originally proposed implementation of futures-based forecasts, change the evidence on the usefulness of oil futures as predictors of spot prices. Given their transparency and ease of implementation, futures-based forecasts provide a natural point of reference to evaluate the merit of alternative forecasts of the price of crude oil.

a Corresponding author. Wilfrid Laurier University, Department of Economics, 64 University Ave W, Waterloo, ON, Canada, N2L 3C7. Email: [ssnudden@wlu.ca](mailto:ssnudden@wlu.ca).

b Bank of Canada, International Economic Analysis Department.