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Does disagreement among oil price forecasters reflect volatility? Evidence from the ECB surveys

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ABSTRACT

We examine quarterly oil price forecasts from the Survey of Professional Forecasters conducted by the European Central Bank. We present three empirical findings, all of which are robust to the number of respondents considered. First, the dispersion of forecasts is correlated positively with the average forecast error for all forecast horizons. Second, at the current and next quarter horizons, the oil price volatility observed through to the end of the forecast horizon statistically explains the disagreement among oil forecasters. Third, we use the disagreement among forecasters to derive a measure of the price volatility which is correlated well with the volatility observed ex post. When the forecast horizon is one quarter ahead, the disagreement-based volatility is equal to the price volatility observed subsequently, plus a small add factor. These results support the view that the disagreement among forecasters reflects the price volatility.

1. Introduction

When the disagreement between oil-price forecasters increases, does this mean that the future oil price has become more uncertain and the market more volatile? We address this issue empirically using crude oil price forecasts from the European Central Bank's quarterly *Survey of Professional Forecasters* (SPF).

The existing literature on the disagreement among forecasters relates mostly to macroeconomic forecasting. In this paper, we consider forecasts of the crude oil price. This allows us to use the price volatility as a measure of the level of uncertainty surrounding the forecasted variable. We therefore attempt to evaluate the interrelationships between oil price volatility and the disagreement among oil-price forecasters.

The disagreement between forecasters is usually measured by the dispersion of the point forecasts of the panel of respondents. By assessing the correlation between disagreement and the oil price volatility, this paper examines the view that a more volatile oil price leads to a greater disagreement among forecasters. This view does not necessarily conflict with other potential reasons why forecasters disagree. Patton and Timmermann (2010) discuss sources for disagreement among forecasters. For instance, different forecasters may have different information sets at the time when the forecast is made. This may be due to the relative importance and use of oil prices in their business and models. Forecasters may disagree about which exogenous variables are relevant or the way in which these variables translate into a specific price level. They may use different approaches: expert opinions, simple models of the market alone, or larger macroeconomic models. Disagreement can also result from strategic behaviors by certain forecasters.

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For example, they might attempt to influence the oil market or gain attention from the media. Lamont (2002) hypothesizes that forecasters who are paid according to their relative abilities might scatter, since it is hard to win when making forecasts that are similar to those of others, or if there is clustering or herding.

In addition, we explore the issue under study further by suggesting an alternative approach. Since the SPF point forecasts relate to quarterly average oil prices, the distribution of the forecasts can be viewed as the distribution of the average price over the quarter considered. This raises the question, how can we infer an oil price volatility measure that is consistent with this distribution?

Based on an assumption about the process generating prices that is standard in financial markets, namely that the logarithm of the oil price follows a random walk, we suggest a formula that derives a price volatility from the distribution of forecasts. This simple reduced-form model serves as a benchmark for translating disagreement into volatility. We apply this formula to the SPF and study the correlation between the resulting disagreement-based volatility and the oil-price volatility that is actually observed after each survey round.

The remainder of the paper is organized into five sections, beginning with a literature review. Section 3 examines the sample from the SPF. A first look at disagreement and uncertainty is taken in Section 4. Next, we assess the oil-price volatility that is observed after each forecast is made. We then study the relationships between forecasters' disagreement and oil-price volatility; and the final section concludes.

2. A review of the literature

The macroeconomic literature provides several explanations for disagreement among forecasters.[1] Special attention[2] has been paid to the relationship between disagreement and the uncertainty surrounding forecasted variables. Such studies have attempted to correlate measures of the dispersion among survey forecasts with forecast errors and proxies for macroeconomic uncertainty.

Regarding oil prices, the disparity among forecasters' models and beliefs may lead to forecasts that are more divergent when the oil price volatility is higher. Thus, a more volatile oil price will lead to a greater disagreement among forecasters. Moreover, the positions that oil market participants take with futures and options contracts are based in part on their expectations about the macroeconomy and commodity market(s). Thus, feedback on the volatility can be provided by the relative disagreements or expectations regarding financial commodity market prices and returns.

Surprisingly enough, there has been little empirical research analyzing the disagreement among oil price forecasters. Unlike macroeconomic variables, the oil price volatility, whether implied or realized, is available as a straightforward measure of the uncertainty surrounding the oil price. To the best of our knowledge, the only study relating disagreement to volatility is that by Singleton (2012), who uses monthly oil price forecasts reported by Consensus Economics. He finds that a higher dispersion of forecasts is correlated positively with increases in the futures price volatility.

Two other studies have used the European Central Bank's SPF oil price forecasts. Pierdzioch, Rulke, and Stadtmann (2010) analyze whether oil price forecasters herd or anti-herd. Reitz, Rulke, and Stadtmann (2012) investigate whether regressive and extrapolative expectations exhibit significant nonlinear dynamics. Neither of these studies was concerned with the issues discussed in this paper.

Our contribution focuses only on the behavior of the survey panel. We do not look at the dependency between respondents when measuring forecast uncertainty, as did Driver, Trapani, and Urga's (2013) cross-section panel analysis of employment data.

3. SPF oil price forecasts

The European Central Bank (ECB) has been publishing quarterly assumptions/forecasts of Brent crude oil prices in its SPF since the first quarter of 2002.[3] These oil price forecasts refer to the average nominal spot price of Brent over the quarter. The survey includes participants from the financial sector (mostly banks), non-financial research institutes, and employer or employee organizations. Our sample period is from 2002Q1 to 2012Q4, which includes 44 survey rounds. Note that the forecasters in the ECB professional survey only provide point estimates of the oil price, with no information on the underlying probability distribution.

The replies to the SPF are typically sent[4] between the 16th and 21st of January (Q1 survey), April (Q2 survey), July (Q3 survey) and October (Q4 survey). Thus, the survey participants have access to market information for the first 15 days of each quarter. Initially, the SPF surveyed forecasters for the current quarter and the next four quarters, which we will refer to as horizon 0–4 forecasts. After 2010Q1, though, the ECB stopped collecting four-quarter-ahead forecasts.

In the first year, there were about 35–40 participants, with participation fluctuating between 45 and 55 thereafter. Fig. 1 illustrates the time series of available current-quarter (horizon-0) forecasts.[5]

[1] For instance, Döpke and Fritsche (2006), Dovern, Fritsche, and Slacalek (2012), Lahiri and Liu (2005, 2006), Lahiri, Teigland, and Zaporowski (1988), and Siklos (2013) all tried to identify variables that could influence the disagreement over inflation forecasts.

[2] For instance, Bowles et al. (2007) argue that disagreement among survey responses is a proxy for uncertainty, to the extent that different forecasters have different assessments of the macroeconomic and commodity market outlooks.

[3] The SPF collects point and probability estimates for Euro area annual HICP inflation, annual GDP growth, and the unemployment rate. In addition, they also ask the participants to provide the assumptions that they use for the ECB's interest rate for refinancing operations, the crude oil price, the USD/EUR exchange rate, and the annual change in the compensation cost per employee or labor costs.

[4] According to a communication with Victor Lopez Perez at the ECB-SPF on December 3rd, 2012.

[5] Since the participants tended to provide forecasts at all possible horizons, the numbers are similar for all horizons, and are available upon request.