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Analyzing fixed-event forecast revisions

Chia-Lin Chang [a,b], Bert de Bruijn [c], Philip Hans Franses [c,*], Michael McAleer [c,d]

[a] Department of Applied Economics, National Chung Hsing University, Taichung, Taiwan
[b] Department of Finance, National Chung Hsing University, Taichung, Taiwan
[c] Econometric Institute, Erasmus School of Economics, Erasmus University Rotterdam, The Netherlands
[d] Tinbergen Institute, The Netherlands

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ABSTRACT

It is common practice to evaluate fixed-event forecast revisions in macroeconomics by regressing current forecast revisions on one-period lagged forecast revisions. Under weak-form (forecast) efficiency, the correlation between the current and one-period lagged revisions should be zero. The empirical findings in the literature suggest that this null hypothesis of zero correlation is rejected frequently, and the correlation can be either positive (which is widely interpreted in the literature as "smoothing") or negative (which is widely interpreted as "over-reacting"). We propose a methodology for interpreting such non-zero correlations in a straightforward and clear manner. Our approach is based on the assumption that numerical forecasts can be decomposed into both an econometric model and random expert intuition. We show that the interpretation of the sign of the correlation between the current and one-period lagged revisions depends on the process governing intuition, and the current and lagged correlations between intuition and news (or shocks to the numerical forecasts). It follows that the estimated non-zero correlation cannot be given a direct interpretation in terms of either smoothing or over-reaction.

1. Introduction

There is a substantial body of recent literature on the evaluation of macroeconomic forecasts, and on forecast revisions in particular. Such revisions involve potential changes in the forecasts for the same fixed event. For example, Consensus Forecasters quote forecasts of the value of an economic variable (such as the inflation rate, unemployment rate, or real GDP growth rate) in year T, where the forecast origin starts in January of year $T-1$. When these forecasts continue through to December in year T, there are 24 forecasts for the same fixed event, and hence there are 23 forecast revisions (or updates).

The literature on forecast revisions deals with the empirical merits of these revisions (see, for example, Cho, 2002, and Lawrence & O'Connor, 2000), but, more often, it seems to deal with the properties of the updates themselves (see, for example, the recent study by Dovern & Weisser, 2011). This seems to be inspired by the recent availability of databases with detailed information on the forecasts quoted by a range of professional forecasters.

In this paper, we contribute to this second stream of literature, that is, an evaluation of the properties of the forecast revisions themselves, where, in particular, we show how to interpret a key parameter in an auxiliary testing regression.

In the fixed-event forecast revision literature (see for example Chang, Franses, & McAleer, 2011), numerical forecasts are taken as data. It is not necessarily known how the numerical forecasts were obtained. We denote a forecast made at the origin, $t-h$, for an event at the fixed target date, t, as

$$F_{t|t-h},$$

* Corresponding author.
E-mail address: franses@ese.eur.nl (P.H. Franses).

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Table 1
Estimation results for variants of Eq. (1).

Source		Estimates of β, with averaging or pooling
Clements (1997, Table 1, p. 233)	−0.414	(Average across 5 cases, GDP)
	−0.232	(Average across 5 cases, inflation)
Isengildina et al. (2006, Table 2, p. 1097)	0.396	(Average across 5 cases, corn)
	0.212	(Average across 5 cases, soybeans)
Dovern and Weisser (2011, Table 4, p. 463)	0.089	(Average across G7, GDP)
	−0.040	(Average across G7, inflation)
	0.001	(Average across G7, industrial production)
	−0.021	(Average across G7, private consumption)
Ager et al. (2009, Tables 5 and 6, pp. 178–179)	0.309	(Average across 12 countries, GDP)
	0.163	(Average across 12 countries, inflation)
Isiklar et al. (2006, Table II, p. 710)	0.330	(Pooled estimated across 18 countries, GDP)
Ashiya (2006)	Often > 0	(IMF, OECD forecasts, GDP and inflation)
Loungani (2001)	Often > 0	(Consensus forecasts, 63 countries, GDP)
Berger and Krane (1985)	Often > 0	(DRI, Chase forecast, US, GNP)

where $h = 1, \ldots, H$. Therefore, for each event t, we have H forecasts, ranging from a one-step-ahead forecast to an H-step-ahead forecast. A (first-order) forecast revision is defined by

$$F_{t|t-h} - F_{t|t-(h+1)},$$

and it is this type of forecast revision that is the focus of this paper.

A commonly-used method for examining the potential properties of forecast revisions is to use auxiliary testing regressions of the form:

$$F_{t|t-h} - F_{t|t-(h+1)} = \alpha + \beta \left(F_{t|t-(h+1)} - F_{t|t-(h+2)}\right) + \xi_{t,h}, \quad (1)$$

where the value of β is of key interest, h runs from 1 to H, and the sample size is H.

Nordhaus (1987) introduced the concept of weak-form efficiency, which states that, under such efficiency, the correlation between subsequent forecast revisions is zero. In other words, under weak-form efficiency, it should be the case that $\beta = 0$ in Eq. (1). As Nordhaus (1987) was concerned with forecasts from econometric models, it is appropriate to refer to this concept as "weak-form model forecast efficiency", whereby fixed-event forecasts taken one period apart differ only randomly. Thus, there is no discernible improvement in the forecasts as the fixed event becomes less distant.

It should be emphasized that Eq. (1) is solely a testing equation, not a model. The sole purpose of Eq. (1) is to test the null hypothesis of weak-form efficiency, that is, $\beta = 0$. It must be emphasized that a rejection of $\beta = 0$ is *not* synonymous with interpreting Eq. (1) as an appropriate specification for modelling forecast revisions. If this were the case, then Eq. (1) would be used for estimating forecast revisions, rather than for testing the weak-form efficiency of forecast revisions.

A further point to emphasize is that, as an AR(1) process for testing purposes, Eq. (1) exhibits geometric decay, regardless of the sign or magnitude of β. Therefore, the widely-used interpretations of smoothing and overreaction based on whether β is estimated to be positive or negative, respectively, in Eq. (1), must be taken as inherently flawed.

Interestingly, various recent studies that have analyzed a range of forecast revisions have found that the null hypothesis $\beta = 0$ is rejected (see Table 1). Clements (1997) analyzes the forecasts of GDP and CPI made by the National Institute of Economics and Social Research in the UK. Using five different versions of Eq. (1), documents average values of β of −0.414 for GDP forecast revisions and −0.232 for inflation forecast revisions (see Clements, 1997, Table 1). Isengildina, Irwin, and Good (2006) examine forecasts of crop production for corn and soybeans, where the forecasts are provided by the US Department of Agriculture. The authors show that eight of the ten estimates of β are significantly positive.

Using data on the Consensus Economics Forecasts, Dovern and Weisser (2011) conclude that the estimated values of β are only significantly different from 0 in a few cases, but when they are significant, they are predominantly negative. These authors interpret this finding as an indication that forecasters overreact to incoming news. For the GDP, Ager, Kappler, and Osterloh (2009) report that the null hypothesis $\beta = 0$ is rejected, with a mean estimate of 0.309 across 24 cases (namely, 12 countries and 2 methods; see their Table 5). In their Table 6, they also report a mean estimate of 0.163 across 24 cases for inflation. Isiklar, Lahiri, and Loungani (2006) examine 18 industrialized countries, and report pooled estimates of β equal to 0.330. Finally, Ashiya (2006), Loungani (2001), and an early study by Berger and Krane (1985), all report small but positive estimates of β, and interpret these as indications of forecast smoothing.

In summary, we observe from the literature that the estimates of β in Eq. (1) tend to range from −0.5 to 0.5, and the null hypothesis that $\beta = 0$ is rejected in a significant number of cases. Therefore, it is important to interpret a rejection of $\beta = 0$ correctly.

In this paper, we propose a methodology for providing an interpretation of the alternative sign outcomes of β arising from Eq. (1). The new approach is based on our conjecture that the forecasts available are typically the concerted outcome of econometric model-based forecasts, $M_{t|t-h}$, and of the intuition of an expert (such as a professional forecaster), $v_{t|t-h}$ (see, for example, Franses, Kranendonk, & Lanser, 2011, for substantial empirical evidence regarding this conjecture).