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Explanations of the inconsistencies in survey respondents' forecasts ☆

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ABSTRACT

A comparison of the point forecasts and the probability distributions of inflation and output growth made by individual respondents to the US Survey of Professional Forecasters indicates that the two sets of forecasts are sometimes inconsistent. We evaluate a number of possible explanations, and find that not all forecasters update their histogram forecasts as new information arrives. This is supported by the finding that the point forecasts are more accurate than the histograms in terms of first-moment prediction.

1. Introduction

There is a large literature addressing various aspects of the rationality of point forecasts of key macro aggregates, such as output and inflation (see Stekler, 2002 for a recent review), and smaller but expanding literatures on the evaluation of other *types* of forecasts, such as probability distributions (e.g., Diebold et al., 1998, 1999a), interval and quantile forecasts (e.g., Granger et al., 1989; Christoffersen, 1998; Giacomini and Komunjer, 2005), volatility forecasts (e.g., Andersen and Bollerslev, 1998; Andersen et al., 2003), and probability forecasts (e.g., Clements and Harvey, 2009). The recent focus on more informative types of forecasts, such as probability distributions, has been welcomed by many, and in policy circles density forecasts are now routinely produced.[1]

Recently, a number of authors have taken a different tack: rather than assessing whether a particular set of forecasts are unbiased, or make an efficient use of the available information, they have sought to assess forecaster rationality in terms of whether the different types of forecasts simultaneously made by individual forecasters are mutually consistent. An advantage of assessing rationality in terms of whether the different types of forecasts made by the respondent are consistent is that the survey respondent has access to the same information when they fill in both their histogram and point forecasts. A problem with the traditional approach to assessing rationality is that it is not always clear what the

☆ Computations were performed using code written in the Gauss Programming Language, and STATA. Helpful comments were received when the paper was presented at the European Central Bank, Frankfurt; the International Symposium of Forecasting, Nice; and Statistics Norway, Oslo.

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[1] The Bank of England has for a number of years produced inflation 'fan charts' (see, e.g., Clements, 2004; Wallis, 2003) and a number of other central banks have followed suit.

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forecast is conditioned upon.[2] The key papers are Engelberg et al. (2009), who compare the point forecasts and histograms of the respondents to the US Survey of Professional Forecasters (SPF), and Clements (2009a, b), who in addition assesses the evidence for consistency of the SPF respondents' histograms and forecast probabilities of declines in real output growth. Inconsistencies are found, and are generally in the direction of the point and probability forecasts indicating a rosier outlook than the histograms: the point forecasts of output growth and inflation are higher and lower, respectively, than implied by the histogram forecasts,[3] and the histogram probabilities of declines in output tend to overstate the directly-reported probabilities that respondents assign to such an event.

The aim of this paper is to explore a number of potential explanations of the tendency of some forecasters to produce forecasts which are more optimistic than measures of central tendency derived from their histograms. Two of the explanations we consider are consistent with the forecasters being rational and producing mutually consistent point forecasts and histograms. The first of these is that the apparent inconsistencies may result from the difficulties inherent in deriving measures of central tendency from the reported histograms, as well as from lack of knowledge of what it is that the point forecasts are. That is, the two sets of forecasts do not match because they are not forecasting the same object. The second is that the two sets of forecasts are consistent once we allow the forecasters to have more general loss functions. Neither of these explanations account for the inconsistencies.

We then consider an explanation that allows forecasters to differ in terms of their ability or propensity to produce mutually consistent sets of forecasts, motivated by the heterogeneous agent model literature.[4,5] We provide evidence of delayed updating of the histograms relative to the point forecasts, and conjecture that this would occur if the point forecasts have a higher profile than the histogram forecasts or if the histograms are more costly to produce. Hence forecasters may react differently to the arrival of new information when they come to update their point and histogram forecasts, inkeeping with the literature on bounded rationality (see, e.g., Mankiw and Reis, 2002; Carroll, 2003): not all the forecasters continually update their forecasts as new information arrives, and the inconsistencies that arise are likely due to the use of simple forecasting rules rather than the use of a fully-integrated forecasting system that produces forecast distributions and point forecasts in a mutually consistent fashion. The more timely updating of the point forecasts relative to the histograms is supported by the greater accuracy of the point forecasts in terms of first-moment prediction.

One explanation of the inconsistencies considered in the literature is to do with 'rounding'. Engelberg et al. (2009) consider whether the tendency of survey respondents to round the probabilities of their histogram forecasts might be the cause of the inconsistencies, but find that their results are qualitatively unchanged if an allowance is made for rounding. A set of possible issues that we do not address is that forecasters may face economic incentives to act strategically in the sense of balancing accuracy against conflicting aims, such as convincing the market that they are well-informed, or of attracting media attention (see, e.g., Ehrbeck and Waldmann, 1996; Laster et al., 1999; Ottaviani and Sorensen, 2006). It is possible that these factors may impinge differently on the point forecasts and histograms. Whilst the anonymity of the SPF respondents might be expected to rule out some of these strategic motives, one might also argue that the respondents are likely to report the same forecasts to the SPF as they make public, so that these issues remain pertinent.

The plan of the paper is as follows. Section 2 briefly describes the SPF survey, and Section 3 records the evidence for inconsistencies between the point forecasts and measures of central tendency of the histograms for inflation and output growth. Section 4 investigates whether the apparent 'inconsistencies' between the histograms and point forecasts could have been produced by fully rational forecasters with asymmetric loss functions, or instead suggest boundedly rational forecasters. Section 5 studies the relative accuracy of the two types of forecasts and uses these findings in conjunction with those of the previous section to argue in favour of boundedly rational forecasters. Section 6 considers possible explanations of the observed correlation between the discrepancies and forecast uncertainty in the context of boundedly rational forecasters. Section 7 concludes.

2. The Survey of Professional Forecasters (SPF)

The Survey of Professional Forecasters (SPF) is a quarterly survey of professional macroeconomic forecasters that elicits information on the outlook for the US economy. The respondents provide point forecasts for a number of macro variables, as well as reporting histograms for output growth and inflation. The SPF began in 1968 as the ASA–NBER Survey of Forecasts by Economic Statisticians, administered by the American Statistical Association (ASA) and the National Bureau of Economic Research (NBER). Since June 1990 it has been run by the Philadelphia Fed, renamed as the SPF: see Zarnowitz (1969), Zarnowitz and Braun (1993) and Croushore (1993). This is a unique resource in that it provides histogram and

[2] As Keane and Runkle (1990, p. 715) remark, 'Tests of forecast rationality depend upon correct assumptions about what the forecasters tried to predict and what they know when they made their predictions'. The 'tried to predict' is a criticism of the practice of evaluating forecasts against actual values that incorporate benchmark revisions, which were unforeseeable at the time the forecast was made. When we use actual values in our analysis they are taken from an early-vintage data release.

[3] García and Manzanares (2007) report a similar tendency for the GDP growth and inflation forecasts of the ECB's Survey of Professional Forecasters, for the period 1999Q1 to 2006Q4.

[4] Hommes (2006) provides an excellent review of heterogeneous agent models in economics and finance.

[5] Note that disagreement among forecasters' point forecasts has been widely studied. Zarnowitz and Lambros (1987) was an early contribution, considering the use of disagreement among forecasters as a proxy for (intra-personal) forecast uncertainty. See also Bomberger (1996), Mankiw et al. (2003), D'Amico and Orphanides (2006), Lahiri and Sheng (2008) and Clements (2008).