

Learning and heterogeneity in GDP and inflation forecasts

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Abstract

Using a Bayesian learning model with heterogeneity across agents, our study aims to identify the relative importance of alternative pathways through which professional forecasters disagree and reach consensus on the term structure of inflation and real GDP forecasts, resulting in different patterns of forecast accuracy. There are two primary sources of forecast disagreement in our model: differences in prior beliefs, and differences in the interpretation of new public information. Estimated model parameters, together with two separate case studies on (i) the dynamics of forecast disagreement in the aftermath of the 9/11 terrorist attack in the US, and (ii) the successful inflation targeting experience of Italy after 1997, firmly establish the importance of these two pathways to expert disagreement, and help to explain the relative forecasting accuracy of these two macroeconomic variables.

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1. Introduction

An analysis of forecast revisions and their cross-sectional dispersion can reveal important information on how efficiently and uniformly forecasters react to new information. Using monthly fixed-target survey forecasts for real GDP, Lahiri and Sheng (2008) estimated a Bayesian learning model aimed at

explaining the role of priors in forecast disagreement and its evolution over various horizons. In this paper we extend our analysis to both real GDP and inflation forecasts using more recent data, and explain certain important differences in the ways professional forecasters treat these two variables for producing multi-period forecasts. We find that when predicting inflation, professional forecasters (i) make smaller forecast errors; (ii) disagree to a lesser extent; and (iii) start revising their forecasts much earlier, compared to predicting real GDP. Even though the first of these results has been implicit in most studies of forecast

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evaluation,¹ none of these empirical results are well articulated in the forecasting literature.

At least part of the explanation for the superior forecasting record of some variables has to lie in the nature of their data generating processes. In reality, however, the predictability can be improved by incorporating additional information from diverse sources and using more complicated models. In real time, the forecasters face both additional uncertainty due to data revisions and the possibility of breaks due to unstable data generating processes. Also, one could reasonably ask why the data generating processes differ between variables. To understand these issues more comprehensively, we also need to explore the underlying expectation formation processes and the role of individual heterogeneity in incorporating new information. Using a Bayesian information processing framework, our study aims to identify the relative importance of the alternative pathways through which professional forecasters adapt to new information and determine the term structure of forecasts, resulting in different patterns of forecast accuracy.

We find that experts start off with widely divergent prior beliefs at very long horizons. Their initial beliefs propagate forward to the whole series of forecasts, generating a significant amount of inertia in expectations formation. This “anchoring”-type effect, which has been much emphasized in the psychological literature, is a result of optimal Bayesian information processing that efficiently combines priors with new information (see Zellner, 2002). However, our analysis shows that there is more pervasive stickiness in the recorded real GDP forecasts than in the inflation forecasts, due to the inefficient use of new information.

The rest of the paper is organized as follows. In the next section, we present some stylized facts based on the cross-country forecast data. In Section 3, we explore the data generating processes of the target variables. In Section 4, we estimate the Bayesian learning model and present empirical evidence on the alternative pathways for generating disagreement. Section 4 also presents two case studies on (i) the dynamics of forecast disagreement after the 9/11 terrorist attack in the US, and (ii) the inflation targeting experience of

Italy after 1997. We investigate forecast efficiency in utilizing public information for both real GDP and inflation in Section 5, and Section 6 concludes.

2. Some stylized facts

This section starts with a brief introduction to the data used in our analysis. We then highlight a few stylized facts concerning the evolution of consensus forecasts, forecast accuracy, forecast disagreement and forecast revisions in real GDP and inflation. We find some important differences in the ways professional forecasters treat these two macroeconomic variables.

2.1. Data

The data used in this study are taken from “*Consensus Forecasts: A Digest of International Economic Forecasts*”, published by Consensus Economics Inc. We study a panel of forecasts of annual real GDP growth and inflation. The survey respondents start forecasting in January of the previous year, and their last forecast is reported at the beginning of December of the target year. Thus, for each country and target year, we have 24 forecasts at various horizons. Our data start with the January 1990 forecasts and end with the December 2007 forecasts, giving predictions for 17 target years 1991–2007 and seven major industrialized (G7) countries — Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.² Inflation is measured by the annual percentage change in the consumer price index for all G7 countries except the United Kingdom.³ The forecasting institutions, numbering between 20 and 40, are typically banks, securities firms, econometric modelers, industrial corporations and independent forecasters. Thus, they are all professional private market forecasters. Since most of the institutions are located in the countries for which they are forecasting, country-specific expertise is guaranteed. Altogether, we have more than

¹ See, for example, Banerjee and Marcellino (2006), Öller and Barot (2000), Stock and Watson (2003), and Zarnowitz and Braun (1993) over various sample periods and countries.

² Note that the targets for GDP and inflation in Germany change over our data sample due to unification. We use forecasts for West Germany made for the target years 1991–1995, and for unified Germany for the target years 1996–2007.

³ For the UK, the inflation rate is based on the Retail Price Index (RPI). However, from April 1997 onward, forecasts are solicited for the RPI excluding mortgage interest costs.

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