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Predicting economic contractions and expansions with the aid of professional forecasts

Chew Lian Chua*, Sarantis Tsiaplias

Melbourne Institute of Applied Economic and Social Research, The University of Melbourne, Victoria, Australia

Abstract

Traditional econometric models of economic contractions typically perform poorly in forecasting exercises. This criticism is also frequently levelled at professional forecast probabilities of contractions. This paper addresses the problem of incorporating the entire distribution of professional forecasts into an econometric model for forecasting contractions and expansions. A new augmented probit approach is proposed, involving the transformation of the distribution of professional forecasts into a 'professional forecast' prior for the economic data underlying the probit model. Since the object of interest is the relationship between the distribution of professional forecasts and the probit model's economic-data dependent parameters, the solution avoids criticisms levelled at the accuracy of professional forecast based point estimates of contractions. An application to US real GDP data shows that the model yields significant forecast improvements relative to alternative approaches.

Keywords: Forecast performance; Probit model; Bayesian analysis

1. Introduction

Constructing forecasts of, and during, economic downturns is a major challenge in applied macroeconomics. From the perspective of economic and business policy makers, ex ante probabilities of an economic downturn are crucial for engaging in monetary policy and altering business strategies, as are probabilities regarding the date of a turnaround (Ramey & Ramey, 1995). The track record of traditional memory-driven econometric models in this respect, however, is ambiguous. Traditional econometric models tend to predict continuing expansion during periods where a series of expansions has been observed, whereas survey based forecasts may be more responsive to recent economic data or economic developments which are difficult to quantify (Giordani & Soderlind, 2003).

Several approaches have been used to generate better forecasts of economic downturns. Kling (1987), LeSage (1991) and Zellner, Hong, and Gulati (1990) incorporate leading economic indicators into the autoregressive framework to correct for ostensibly backward looking economic data and to steer forecasts

* Corresponding author.
E-mail addresses: mchua@unimelb.edu.au (C.L. Chua), ssts@unimelb.edu.au (S. Tsiaplias).

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in the direction of contractions and expansions. Li and Dorfman (1996) integrate over multiple forecasting models to predict economic turning points, thereby avoiding reliance on any one particular model. Alternatively, researchers have formulated approaches that aggregate professional forecasts without making reference to other sources of economic data (Graham, 1996).

There remains a considerable level of uncertainty, however, with regard to the predictive qualities of professional forecasts, especially during periods of economic uncertainty such as contractions and recessions (Ehrbeck & Waldmann, 1996; Engelberg, Manski, & Williams, 2009; Fintzen & Stekler, 1999; Graham, 1996; Lamont, 2002; Oller & Barot, 2000; Stekler, 1972). Stekler (1972) suggests that professional forecasters attach a low prior probability to the possibility of a turning point, and thus add little to the accuracy of forecasts regarding contractions and expansions. Graham (1996) arrives at a fairly similar conclusion, finding that forecasters' predictions exhibit clustering and momentum following periods of expansion, typically rendering them unable to determine a contraction until the quarter of its commencement (see also Lamont, 2002).

Although the forecasts of the probability of an economic contraction given by professional forecasters may well be inaccurate or delayed, it may still be possible to obtain information about changing economic conditions via the use of the entire distribution of professional forecasts. For example, a change in the skewness of professional forecasts may lead to useful conclusions about the prospect of an economic contraction, notwithstanding that a point estimate of the probability of a contraction obtained from the professional forecasts is markedly below 50%. Despite its intuitive appeal, however, there has been little research into explicitly incorporating the entire distribution of professional forecasts into predictive models.

This paper addresses the problem of incorporating probabilities regarding future contractions, available from professional forecasters, into a traditional econometric forecasting model of the probability of a contraction. In doing so, we devise an easily estimable approach for merging observed economic data with professional forecasts and constructing probabilities regarding economic contractions and expansions. The Bayes theorem offers a natural way of combining economic data and professional forecasts. Following the Bayesian framework, professional forecasts are incorporated into a probit-based probability model efficiently and analytically. This is done using a new approach involving the transformation of professional forecast data into a prior for the economic data underlying the forecasting model. As such, the object of interest is not the professional forecasts themselves, nor the accuracy of any point estimates of contractions based on the professional forecasts, but the implications of the distribution of professional forecasts for the economic-data dependent model parameters.

The paper is structured as follows. In Section 2, we present the augmented probit model and describe the method for embedding the distribution of the professional forecasts into the probit model's parameter space. The estimation procedure adopted in this paper is presented in Section 3. In Section 4, we employ our approach on US data, and consider whether it improves our capacity to predict economic contractions, and to undertake predictions during periods of recession. Finally, Section 5 concludes the paper.

2. A forecasting model of economic turning points augmented with professional forecasts

Consider a policy maker concerned with forecasting economic contractions who has access to both general economic data and professional forecasts. The policy maker's objective at time t requires the derivation of the probability of an economic contraction or expansion at the set of times $\{t+n|n>0\}$, for some finite n. An economic contraction is defined as a period of non-positive real GDP growth (with positive real GDP growth being interpreted as an economic expansion). To achieve his or her objective, the policy maker derives the variable y_t^* using the indicator function $1\,(y_t \leq 0)$, where y_t is real GDP growth.

According to the economic data, the probability of an economic contraction is

$$P(y_t^* = 1) = F(x_t'\beta), \tag{1}$$

where $y_t^* = 1$ ($y_t^* = 0$) indicates a period of economic contraction (expansion), and x_t is a k-dimensional vector of explanatory variables observed prior to time t. $F(\cdot)$ is the locus of $P(y_t^* = 1)$ and is assumed to