Subjective Probability Forecasts for Recessions

EVALUATION AND GUIDELINES FOR USE

By Kajal Lahiri and J. George Wang

Probabilistic forecasts are often more useful in business than point forecasts. In this paper, the joint subjective probabilities for negative GDP growth during the next two quarters obtained from the Survey of Professional Forecasters (SPF) are evaluated using various decompositions of the Quadratic Probability Score (QPS). Using the odds ratio and other forecasting accuracy scores appropriate for rare event forecasting, we find that the forecasts have statistically significant accuracy. However, compared to their discriminatory power, these forecasts have excess variability that is caused by relatively low assigned probabilities to forthcoming recessions. We suggest simple guidelines for the use of probability forecasts in practice.

Forecasting relatively rare business events like recessions or major stock market corrections is inherently risky, resulting in frequent misses and false signals. However, when uncertainty about future events is expressed in terms of probabilities (e.g., the probability of a recession next year is 30 percent), these forecasts are more informative and useful than purely categorical forecasts (e.g., recession or no recession) in that the probabilities can be used in the calculation of various measures of interest such as expected payoffs and downside risks. Also, because more information is imbedded in probability forecasts, there may be more scope to improve prediction.

The failure of point forecasts from large scale structural macro and VAR models or from professional surveys (e.g., Blue Chip, OECD, Survey of Professional Forecasters, National Association for Business Economics, etc..) in predicting—or even timely recognition of—postwar recessions is well documented.1 Admittedly, recessions that are caused by external shocks cannot, by definition, be predicted. However, the trans-

1See, for instance, Filardo (1999, 2004), Fintzen and Stekler (1999), and Juhn and Loungani (2002).
mission of the exogenous shocks through the economy can take some time to generate a full-fledged recession. Moreover, anti-inflationary monetary policies, that have often caused recessions in the U.S. economy, take quarters to take effect. Thus, the basic challenge is whether one can identify, at least probabilistically, an impending recession by understanding the structure of the transmission mechanism. Not surprisingly, in recent years, economists have developed advanced macroeconomic models to generate probability forecasts for business cycle turning points.2

However, one such model—the dynamic single index model developed by Stock and Watson (1993)—could not identify its first two out-of-sample recessions, viz., those of 1990 and 2001. Since the Stock-Watson model is built on one of the strongest scientific foundations found in the literature and on extensive use of time series data, the failures of their recession indexes represent a significant challenge for today’s business cycle researchers. In explaining forecast failures, Stock and Watson (2003) painfully fall back on Leo Tolstoy in Anna Karenina, “Happy families are all alike; every unhappy family is unhappy in its own way.” That is, econometric models typically fail to predict recessions because each recession is special in its own novel way. For example, while the decline of the stock market gave some advance warning of the 2001 recession, it was not otherwise reliable during the 1980s and the 1990s. In short, the structure of the economy changes—sometimes abruptly—and no single model specification or a set of variables can do justice to all forthcoming recessions.

Yet, recessions inflict enormous costs to society, the exact extent of which we have just begun to explore. For instance, Bangia, et al. (2002) showed that the economic capital required to capitalize a bank during a recession year is about 25-30 percent higher than that during an expansion year. Carey (2002) found that losses of a typical bank portfolio during a recession are about the same as losses in the 0.5 percent tail during an expansion. Human costs due to lay-offs and stock market declines are well known, and need no elaboration.

In this paper, we will study the usefulness of subjective probability forecasts obtained from the Survey of Professional Forecasters (SPF) as predictors of cyclical downturns. Since these probability forecasts are generated from no specific models or variables but are based on subjective probability heuristics of professional economists, there may be certain advantages in using them over models based macro forecasts (Kahnemann and Tversky, 1973). Even though the probability forecasts are available since 1968, and have drawn some media attention,3 very little systematic analysis has been conducted to look into their usefulness as possible business cycle indicators. Fortunately, there is a rich history of probability forecasts of rare events in meteorology, psychology, and geophysics, see for example, Murphy (1991), Doswell, et al. (1990), and Ogata, et al. (1994). We will utilize verification methodologies developed in these disciplines to see if the SPF probability forecasts have any value and then explore ways of reading these forecasts for monitoring cyclical downturns.

The plan of this paper is as follows: In the next sections, we will introduce the data, explain the set up, and evaluate the probability forecasts using procedures developed in other disciplines. We will also suggest simple ways to monitor and interpret time series movements in the data in terms of odds ratios and other accuracy score measures appropriate for rare-event forecasting. Finally, concluding remarks will be summarized.

The SPF Forecasts and the Joint Probability Predictor

Thanks to the ingenuity of Victor Zarnowitz, one of the world’s leading scholars on business cycles, indicators, and forecast evaluation, the Survey of Professional Forecasters (SPF)5 has been collecting subjective probability forecasts of real GDP/GNP declines during the current and four subsequent quarters since its inception in 1968.6 At the end of the first month of each quarter, the individual forecasters in SPF form their forecasts. The survey collects probability assessments for a decline in real GDP in the current quarter, in the next quarter conditional on the growth in the current period, and so on. The number of respondents has varied between 15 and 60 over the quarters. In this study, we use probabilities averaged over individuals. The joint probability of GDP


3The New York Times columnist David Leonhardt (September 1, 2002) calls the one-quarter-ahead GDP decline probability the “Anxious Index”.

4Notable exceptions include Braun and Yaniv (1992), Wang (1993), Graham (1996), and Stock and Watson (2003). However, these studies emphasized different aspects of the probability forecasts. Baghestani (2003) suggests a way of improving interest rate forecasts available in SPF.

5Formerly the surveys were done under the auspices of American Statistical Association and National Bureau of Economic Research (ASA-NBER). Since 1990, the Federal Reserve Bank of Philadelphia has conducted the survey. See Croushore (1993) for an introduction to SPF.

6The definition of real output in the survey has changed from real GNP to real GDP since 1992:1.