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# Comparing Federal Reserve, Blue Chip, and time series forecasts of US output growth

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### ABSTRACT

We evaluate the predictive content of Federal Reserve and Blue Chip forecasts of output growth by utilizing two comparable forecasts as benchmarks: a univariate autoregressive (AR) model, and a vector autoregressive (VAR) model which includes output growth, growth in residential investment, and consumers' assessments of business conditions. We first show the forecasts are all directionally accurate, free of systematic bias, and efficient. Second, the asymmetric information hypothesis cannot be supported. Third, the Federal Reserve and private forecasts are generally less informative than the VAR forecasts and thus lack past information on residential investment growth and consumers' assessments of business conditions.

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## 1. Introduction

Despite the inherent difficulty, both public and private forecasters are regularly engaged in predicting output growth. Market participants seek accurate forecasts of growth for making a variety of economic and financial decisions including investment. Such forecasts are also key inputs for both fiscal and monetary authorities in formulating economic policies (Chauvet and Potter, 2013). In evaluating the accuracy of output growth, inflation, and unemployment forecasts, studies have often tested the asymmetric information hypothesis that the Federal Reserve has useful information about the state of the economy that is not known by the private sector. Romer and Romer (2000), Gavin and Mandal (2001), and Sims (2002) convincingly support this hypothesis for inflation forecasts. However, as noted by Gavin and Mandal (2001), the findings are rather weak for output growth forecasts. In addition, Baghestani (2008) shows that the private forecasts of unemployment are more informative than the Federal Reserve forecasts.<sup>1</sup>

In this study, we evaluate the predictive information content of the Federal Reserve and private (Blue Chip) forecasts of output growth by employing two sets of comparable forecasts as benchmarks. The first set is from a univariate autoregressive

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<sup>1</sup> Baghestani (2011) investigates the predictive information content of the Federal Reserve and private forecasts of non-residential and residential investment and reports mixed evidence in support of the asymmetric information hypothesis.

(AR) model, and the second one is from a vector autoregressive (VAR) model. The AR forecasts contain past information in output growth, and the VAR forecasts contain past information on output growth, growth in residential investment, and consumers' assessments of business conditions.

There are two noteworthy aspects to this study. First, we utilize real time data to provide out-of-sample evidence on the usefulness of growth in residential investment for predicting output growth. This complements existing studies which have provided in-sample evidence. For instance, Green (1997) utilizes the Granger-causality approach to demonstrate that, unlike non-residential investment, residential investment Granger-causes GDP. As demonstrated by Coulson and Kim (2000), the reason behind such evidence is that, unlike non-residential investment, residential investment has a significant impact on consumption. Leamer (2007) shows that "It is residential investment that contributes most to weakness before recessions." Toward a more effective monetary policy, Leamer argues for a new Taylor Rule in which GDP is replaced by housing leading indicators.<sup>2</sup>

Second, the inclusion of consumers' assessments of business conditions in the VAR model is important in light of existing literature that offers mixed results. Carroll, Fuhrer, and Wilcox (1994) and Bram and Ludvigson (1998) present evidence in support of consumer sentiment as a reliable predictor of consumption growth. Croushore (2005) replicates these studies using real-time data and finds that consumer sentiment is of little value. Garner (1991) argues that consumer sentiment is rarely a useful predictor of economic performance. Batchelor and Dua (1998) show that consumer sentiment could predict only the 1991 US recession. More recent studies by Dees and Brinca (2013), Christiansen, Eriksen, and Møller (2014), and Österholma (2014), however, find that consumer sentiment has significant predictive power for economic indicators. The study by Christiansen et al. (2014), in particular, shows that sentiment indexes can significantly help improve predictions of US recessions.

We find a number of important results. First, the Federal Reserve, Blue Chip, AR, and VAR forecasts are all directionally accurate, free of systematic bias, and efficient. Second, our test results do not support the asymmetric information hypothesis that the Federal Reserve has useful information about the state of the economy that is not known by the private sector. Third, the VAR forecasts embody useful predictive information above and beyond that contained in the AR forecasts. This means that past information on growth in residential investment and consumers' assessments of business conditions is useful in predicting output growth. Fourth, the VAR forecasts generally embody useful predictive information beyond that contained in the Federal Reserve and Blue Chip forecasts. This suggests that the Federal Reserve and Blue Chip forecasts of output growth do not fully contain past information in residential investment growth and consumers' assessments of business conditions combined. We proceed by describing both the data and alternative output growth forecasts in Section 2. Section 3 presents both the methodology and forecast evaluation test results. Section 4 concludes.

## 2. Data and forecasts

Our study includes four sets of output growth forecasts. The first one is the Greenbook forecasts produced by the research staff at the Federal Reserve Board of Governors and is available on the Federal Reserve Bank of Philadelphia website. These forecasts in addition to the forecasts of other major macroeconomic variables are presented to the Federal Open Market Committee (FOMC) prior to each regular meeting. With the FOMC meetings occurring twice each quarter, there exist two sets of Federal Reserve forecasts. The first set is made close to the middle of the quarter and the second one is made in the last month of the quarter. In this study, we utilize the Federal Reserve forecasts made in the last month of the quarter. In addition, the Greenbook forecasts are released to the public with a five-year lag and are currently available up to the fourth quarter of 2010. In examining the one- through four-quarter-ahead forecasts, we focus on the first quarter of 1988 through the fourth quarter of 2010. As such, the sample periods for the one-, two-, three-, and four-quarter-ahead forecasts are, respectively, 1988.2–2011.1, 1988.3–2011.2, 1988.4–2011.3, and 1989.1–2011.4.

The second set of forecasts is from the Blue Chip monthly survey of private forecasters. Utilizing the individual responses, Blue Chip calculates and publishes the consensus (mean) forecasts in *Blue Chip Financial Forecasts* around the beginning of the month.<sup>3</sup> Given that the survey is conducted monthly, there exist three sets of forecasts for each quarter. For comparability with the Federal Reserve, we utilize the one-, two-, three-, and four-quarter-ahead Blue Chip forecasts of output growth made in the third month of the quarter.

The third set of forecasts is from a univariate AR model. In order for this benchmark to be comparable to the Federal Reserve and Blue Chip forecasts, we make use of real time data on real output available on the Federal Reserve Bank of Philadelphia website. More specifically, we utilize the data for 1967.1–1987.4 (available in the third month of 1987.4) to estimate the sample autocorrelation and partial autocorrelation function of output growth. These estimates along with the Akaike information criterion (AIC) help us select an AR(2) model with the results reported in Panel A of Table 1. As can be seen, the calculated Ljung–Box *Q*-statistic has a *p*-value well above 0.10, indicating that the residual series is white noise, and thus the model is correctly specified. We employ this model to generate the univariate AR forecasts of output growth as follows. Utilizing the 1967.1–1987.4 parameter estimates in Table 1, we generate the AR forecasts for 1988.1–1989.1. The forecast values for 1988.2, 1988.3, 1988.4, and 1989.1 correspond, respectively, to the one-, two-, three-, and four-quarter-

<sup>2</sup> Kydland, Rupert, and Šustek (2014) note that US investment–output dynamics cannot be generalized for other developed countries except Canada.

<sup>3</sup> The historical Blue Chip Financial Forecasts were purchased from Aspen Publishers, Inc.

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