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journal homepage: www.elsevier.com/locate/qrefInflation forecasts and core inflation measures: Where is the information on future inflation?[☆]Dandan Liu^a, Julie K. Smith^{b,*}^a Department of Economics, 478 Business Administration Building, Kent State University, Kent, OH 44242, United States^b Simon Center, Department of Economics, Lafayette College, Easton, PA 18042, United States

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ABSTRACT

This paper uses the forecast from a random walk model of inflation as a benchmark to test and compare the forecast performance of several alternatives of future inflation, including the Greenbook forecast by the Fed staff, the Survey of Professional Forecasters median forecast, CPI inflation minus food and energy, CPI weighted median inflation, and CPI trimmed mean inflation. The Greenbook forecast was found in previous literature to be a better forecast than other private sector forecasts. Our results indicate that both the Greenbook and the Survey of Professional Forecasters median forecasts of inflation and core inflation measures may contain better information than forecasts from a random walk model. The Greenbook's superiority appears to have declined against other forecasts and core inflation measures.

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1. Introduction

This paper examines the information content of forecasts of inflation and measures of core inflation for the consumer price index (CPI). Forecasts of inflation and core inflation measures are often used by both policy makers and the public to gauge underlying price pressures in the economy. Ang, Bekaert, and Wei (2007) find that the median forecast of the Survey of Professional Forecasters (SPF) was better than a variety of models, even some complicated ones¹; Faust and Wright (2011) find that subjective forecasts such as the Blue Chip, SPF and the Greenbook are superior to their simple benchmark.² This paper expands on those contributions, bringing together the Greenbook forecast, the SPF forecast and several core inflation measures (minus food and energy, weighted median and trimmed mean).

Studies of forecasts of inflation often use either the GNP/GDP deflator, CPI or personal consumption expenditure price index (PCEPI). The Federal Reserve's Greenbook and the SPF's survey did not contain forecasts for the PCEPI until 2000 and 2007, respectively. Therefore, previous studies examining forecasts focus either on the GNP/GDP deflator or CPI. This study uses the CPI since there is a fairly long time series available and the Cleveland Fed has calculated both the weighted median and trimmed mean CPI inflation rates for many years.

Using the forecast from a random walk model as a benchmark (in line with Atkeson and Ohanian (2001)), we compare several competing measures of future inflation over various time horizons.³ Although we expect monetary policy to have its biggest impact on inflation between one to two years, we examine both near-term and medium-term horizons for three reasons. First, we follow the previous literature. Ang et al. (2007) examine the one-year ahead forecast and Romer and Romer (2000) examine quarterly inflation rates from zero to eight quarters ahead. Second, the SPF does not forecast more than four quarters ahead so comparisons are limited if we consistently choose a longer time horizon. Third, there are data limitations given the construction of the Greenbook forecasts, which we discuss further in Section 4.

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¹ They did not consider the Greenbook forecasts.

² Faust and Wright's benchmark model is an autoregressive (AR) model. They use an AR(1) model, for the first difference of the consumer price index with a fixed slope coefficient.

³ In total we have five possible candidate measures: Greenbook forecast, SPF forecast, inflation minus food and energy, weighted median inflation, and trimmed mean inflation. The data are discussed further in Section 4.

The previous literature on core inflation often suggests that core inflation should track trend inflation (defined in various ways) and forecast future inflation (over various time horizons).⁴ To evaluate the candidate measures we examine the mean squared forecast error (MSFE) of each candidate and determine if the candidate performs better than two possible benchmarks (random walk forecast or Greenbook forecast).

While we do compare the performance of the point forecasts of the Greenbook and SPF with the performance of the core inflation measures for the individual 0- to 8- quarter ahead time horizons, this comparison is somewhat unfair. These core inflation measures are meant to provide the tendency of inflation in the medium term not for a specific quarter in the future. The more meaningful comparisons for these core inflation measures are those that compare a sufficiently long average future time period not those at specific time leads.

When using the forecasts from a random walk model as the benchmark, the results consistently demonstrate that the random walk forecast is not a better forecast. The core inflation measure that performs the worst against the random walk forecast is the CPI minus food and energy. When using the Greenbook forecast as the benchmark, the forecast in the Greenbook is usually indistinguishable from those generated from the weighted median and trimmed mean. [Faust and Wright \(2009\)](#) indicate that using the Greenbook forecast as a benchmark is “interesting” since its previous performance forecasting inflation is strong.

Section 2 discusses the previous literature on forecasts and core inflation. Section 3 describes the data and Section 4 examines the empirical results. Finally, Section 5 concludes.

2. Previous literature on forecasts and core inflation

[Romer and Romer's \(2000\)](#) paper examines if there is additional information in the Greenbook inflation (GNP deflator) forecasts over commercial forecasts. They compare the Greenbook inflation forecast to the Blue Chip forecast, DRI (Global Insight) forecast, and the SPF forecast. They find that the Greenbook does contain additional information over that contained in commercial forecasts and that the weight that should be placed on the Greenbook forecast is generally close to one.⁵

[Gavin and Mandal \(2001\)](#) examine the relationship between the Greenbook and Blue Chip forecasts and the inflation forecast of the GDP deflator given by the Fed's chairman's twice yearly Congressional testimony. They find that the Greenbook is a better forecast than the Blue Chip but that both are similar to the forecast given in the Congressional testimony, which is the central tendency of the forecasts given by the Federal Open Market Committee (FOMC) members.

[Atkeson and Ohanian \(2001\)](#) study Greenbook forecasts as well. They evaluate the usefulness of Phillips Curves for forecasting inflation (GNP/GDP deflator). They find that Phillips Curve models are not more accurate than a naïve model (random walk). In addition, they compare the naïve model to the Greenbook forecasts and find that the errors from each are about the same over 1984–1996.

[Smith \(2004\)](#) shows that the weighted median CPI inflation rate is a better forecast of future inflation than lagged inflation and the traditional core inflation measure, inflation minus food and energy.

[Smith \(2004\)](#) uses both in-sample prediction and simulated out-of-sample forecasting.

[Carroll \(2003\)](#) models inflation expectations of households and professionals. In a preliminary exercise, he shows that the SPF forecast does have additional information above what is contained in lagged inflation. He expands the set of lagged inflation measures to include the CPI minus food and energy and the CPI weighted median but he does not examine the Greenbook forecasts.

More recently, [Ang et al. \(2007\)](#), [Croushore \(2010\)](#) and [Faust and Wright \(2011\)](#) examine the forecasting ability of surveys (Blue Chip, SPF, Livingston) and the Greenbook and find that they are difficult to beat when compared to a variety of forecasting models. The focus of these papers is mainly on how data releases and revisions affect forecasting ability. This is not a concern in this paper since the CPI is unrevised or as [Faust and Wright \(2011, p. 8\)](#) state, “data revisions are trivial” to the CPI.

3. Data

The data are publicly available and we have quarterly inflation rates as monthly observations as in [Romer and Romer \(2000\)](#). The forecasts are made in a particular month but the forecast is for the annualized quarterly inflation rates h -quarters ahead. For consistency, we treat all inflation measures with this method.

We obtain price indices of the CPI and CPI minus food and energy (CPIX) from the Bureau of Labor Statistics website. The weighted median CPI inflation rate (CPIMED) and trimmed mean CPI inflation rate (CPITRIM) are from the website of the Federal Reserve Bank of Cleveland. For both we take the monthly inflation rates and compute a price index.⁶ From this price index, we then obtain the quarterly inflation rates.⁷ The inflation forecasts are the median forecasts of the CPI inflation rate from the SPF and the CPI forecasts from the Greenbook; both are available from the Federal Reserve Bank of Philadelphia. We use the Greenbook data through 2005.⁸ In addition, earlier work by [Smith \(2005\)](#) indicates that the best core inflation measure varies across monetary policy regimes; therefore, the sample starts in 1984.⁹

We use matched data so the number of observations varies by horizon. In our sample, there are 88 observations for the SPF forecasts (four per year), 176 observations for the Greenbook forecasts (eight per year) and 264 observations for the three core inflation measures (12 per year). For the forecast comparison tests when including both the SPF and Greenbook there are only 58 matched observations at the 0- to 4-quarter ahead horizons so those are the observations used for all those comparisons. Similarly, at the 5-quarter ahead horizon there are 128 matched observations. Since the SPF does not forecast past 4 quarters ahead, the matching is based on the availability of the Greenbook forecasts. The number of observations for the remaining time horizons depends on the availability of the Greenbook forecasts and at 6-, 7- and 8-quarter ahead forecast horizons there are 114, 82 and 50 observations,

⁶ The Federal Reserve Bank of Cleveland reports the monthly inflation rate for the trimmed mean and median not price indices whereas the Bureau of Labor Statistics reports the price index for the CPI and CPIX. We need the price indices to calculate the quarter-over-quarter inflation rates for CPIMED and CPITRIM.

⁷ A procedure similar to the one in Romer and Romer is followed to calculate the inflation rates for the inflation measures. The annualized quarterly inflation rates are calculated from the quarterly averages of the price indices. The data are at a monthly frequency. Each month in a given quarter has the same inflation rate. See Romer and Romer (page 434) for more details.

⁸ The Greenbook is released with a five-year lag.

⁹ The sample start in 1984 coincides with the start of the Great Moderation and the end of the Volcker disinflation.

⁴ See [Detmeister \(2011\)](#) for an extensive review of both of these properties.

⁵ [Romer and Romer \(2000\)](#) discuss in a footnote that they also examine the information in the CPI forecasts and find that there is additional information in the Greenbook forecast over what is contained in commercial forecasts but they do not examine the forecasting ability of core inflation measures.

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