Available online at www.sciencedirect.com
ScienceDirect
International Journal of Forecasting 26 (2010) 248–264
international journal of forecasting
www.elsevier.com/locate/ijforecast

# Forecasting inflation in an inflation-targeting regime: A role for informative steady-state priors

Meredith Beechey[a,*], Pär Österholm[b,1]

[a] *Monetary Policy Department, Sveriges Riksbank, 103 37 Stockholm, Sweden*
[b] *National Institute of Economic Research, Box 3116, 103 62 Stockholm, Sweden*

**Abstract**

Inflation targeting as a monetary-policy regime is widely associated with an explicit numerical target for the rate of inflation. This paper investigates whether the forecasting performance of Bayesian autoregressive models can be improved by incorporating information about the target. We compare a mean-adjusted specification, which allows an informative prior on the distribution for the steady state of the process, to traditional methodology. We find that the out-of-sample forecasts of the mean-adjusted autoregressive model outperform those of the traditional specification, often by non-trivial amounts, for five early adopters of inflation targeting. It is also noted that as the sample lengthens, the posterior distribution of steady-state inflation narrows more for countries with explicit point targets.


*Keywords:* Monetary policy; Central bank preferences

## 1. Introduction

A new era for the conduct of monetary policy began in April 1988, when New Zealand's central bank became the first to explicitly target inflation. Within just a few years, the central banks of several other countries – Canada, the United Kingdom, Sweden and Australia – adopted similar frameworks. Among these early adopters, such policies have now been in place for almost two decades, with inflation targeting broadly judged to be a success in terms of engendering low and stable inflation rates.

For most central banks that have adopted inflation targeting, an explicit numerical target for the rate of inflation is a prominent feature of the policy. The target acts as a focal point both for the central bank's efforts to steer public inflation expectations and for its own policy decisions. When the central bank's commitment to achieving the target is not only strong but also

* Corresponding author. Tel.: +46 8 787 0449.
*E-mail addresses:* meredith.beechey@riksbank.se (M. Beechey), par.osterholm@konj.se (P. Österholm).
1 Tel.: +46 8 453 5972.

0169-2070/$ - see front matter 
doi:10.1016/j.ijforecast.2009.10.006

perceived as credible by the public, the inflation target is likely to be a good guide to the steady state of the inflation process. Incorporating the target as prior information in a forecasting model may thus yield improvements to inflation forecasts. We test this idea using a framework developed by Villani (2009), which allows the target to act as an informative prior for the steady state of inflation, and compare it with traditional Bayesian and classical forecasting methods in which information about the target cannot be brought to bear.

Villani's (2009) mean-adjusted specification can be applied to either univariate or multivariate autoregressive models. The forecast-accuracy gains of steady state priors should arguably increase as the dimensions of the system and the number of parameters to be estimated grow.[2] Indeed, Villani's method has been shown to be successful in large systems, with variables including output growth, inflation and interest rates; see Adolfson, Andersson, Lindé, Villani, and Vredin (2007), Österholm and Zettelmeyer (2008) and Villani (2009). Achieving gains over a simple univariate autoregressive model of inflation should be harder: with fewer parameters to estimate, forecasts from a univariate model are likely to be closer to the true steady state. With this in mind, we assess whether a univariate application of Villani's (2009) methodology improves forecast accuracy, viewing this as the higher hurdle to jump. Forecasting inflation in inflation-targeting countries is a natural application, since under credible inflation targeting, inflation can reasonably be expected to possess a steady state and the inflation target should provide useful prior information regarding its value.

The purpose of this paper is first and foremost to provide an empirical application assessing best forecasting practice among a class of univariate models for countries with inflation targets. We find that the mean-adjusted autoregressive model tends to outperform traditional specifications, often by non-trivial amounts, for the five early adopters of inflation targeting. The results also have intuitive economic interpretations. Our key empirical finding, that the inflation target is a valuable prior that improves the forecast accuracy, is consistent with the economic intuition underlying inflation targeting, namely, that a credible target acts as an expectational anchor for the inflation process.

Moreover, countries with more volatile inflation accrue greater improvements in forecast accuracy from incorporating prior information about the inflation target; and point, rather than range, targets are associated with a lesser degree of uncertainty about steady state inflation. Together, these results suggest that inflation targets help mitigate the uncertainty about future inflation outcomes, both for the forecaster and for the economic public. These results are also broadly consistent with the evidence in the monetary-policy literature. In theoretical models, inflation expectations and inflation outcomes are more stable when an inflation target is clearly defined (Orphanides & Williams, 2004, 2007), and, empirically, inflation expectations appear to be anchored more firmly in economies whose central banks have communicated a long-run objective for inflation (Gürkaynak, Levin, & Swanson, in press). Overall, our findings indicate that the mean-adjusted autoregressive model is a valuable tool for forecasting time series when reasonable priors for the steady state can be laid down.

The remainder of the paper is organised as follows: Section 2 describes the model, data and estimation, and an out-of-sample forecast exercise is conducted in Section 3. In Section 4, some economic implications of our results are discussed, and Section 5 concludes.

## 2. Modelling strategy and estimation

### 2.1. Conceptual framework

An inflation target provides a focal point for forecasting inflation by giving information about the central bank's long-run inflation objective. This in turn is likely to influence inflation expectations, and thus inflation outcomes, in the long-run. Following Svensson (1999), assume that the central bank minimises a quadratic loss function with the form:

$$\Lambda = \frac{1}{2} E_t \left( \sum_{t=\tau}^{\infty} \delta^{t-\tau} \left[ \left( \pi_t - \pi^* \right)^2 + \lambda y_t^2 \right] \right), \tag{1}$$

where $\delta$ is the discount factor, $\pi_t$ is inflation, $\pi^*$ is the inflation target, and $y_t$ is the output gap. For finite values of $\lambda$, inflation is mean-reverting, and the steady

[2] With more parameters to be estimated, the estimated steady state is likely to deviate further from the true steady state, hurting the forecasting performance, especially at longer horizons.