A four-step procedure for forecasting headline inflation in India

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Extended Abstract

The primary objective of monetary policy in India is to maintain price stability while keeping in mind the objective of growth. The Reserve Bank of India targets headline inflation of 4 percent while allowing it to vary between the tolerance limit of (+/-) 2 percent. Thus, forecasting inflation is of great policy relevance as the future inflation trajectory guides the central bank's current policy actions.

In this paper, we build on the existing literature on inflation forecasting methods and develop a model with a novel approach to improve forecasting efficacy (as measured by the RMSE of out-of-sample forecasts).

One of the simplest approaches for forecasting headline inflation is to fit an ARIMAX model where the ARIMA structure can be determined by the standard information criterion (like the AIC). The choice of additional co-variates is based on economic theory combined with econometric evidence. Two main challenges while selecting the covariates include: (i) the timely availability of data on covariates as data on one of the most important indicators of demand-pull pressure (real GDP) is published with a two-month lag; (ii) some covariates only impact selected components of headline inflation (for instance, irregular rainfall patterns are unlikely to impact core inflation contemporaneously). This implies that the impact of the covariates on headline inflation might be statistically insignificant in the ARIMAX structure due to high noise. The first issue can be addressed by constructing a demand index using high-frequency indicators which are published with a shorter lag and the second issue can be solved by forecasting the components of headline inflation.

We adopt a **four-step procedure** to forecast headline inflation in India.

In the first step, we select and **construct covariates** to be used in inflation forecasting. We use a state-space model to predict economic activity at monthly frequency using high-frequency indicators and estimate this model using the EM algorithm and Bayesian approach (Monte-Carlo-Markov-Chain simulation) as in Sharma and Padhi, 2020 (Reserve Bank of India Occasional Papers). In addition, we also select climate variables and global commodity prices to be used as covariates for food and fuel inflation.

In the second step, we **fit a VARMAX model** to capture both the individual and inter-dependent dynamics of three key components of headline inflation—core, food, and fuel.

The third step is a **correction procedure** to improve the forecast accuracy of the target inflation measure. Since the forecasting model uses month-on-month changes in the seasonally adjusted

price index, the forecasts will correspond to sequential momentum (m-o-m, seasonally adjusted growth rate) while the target inflation measure is the year-on-year growth rate of the price index. Thus, we use the forecast of sequential momentum to predict the price index value and then, compute the year-on-year growth rate of the predicted index to forecast core, food and fuel inflation.

The fourth step **aggregates the predicted price index** value (of core, food, and fuel) by using the weights as published by the Ministry of Statistics and Program Implementation (MOSPI) to arrive at the headline price index and finally, the inflation rate (year-on-year growth rate) can be computed.