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ORIGINAL ARTICLE

Artificial Neural Network Based Model for Forecasting of Inflation in India

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Abstract Inflation can be attributed to both microeconomic and macroeconomic factors which influence the stability of the economy of any nation. With the raising of recession at the end of the year 2008, world communities started paying much contemplation on inflation and put enormous hard work to predict it accurately. Prediction of inflation is not a simple task. Moreover, the behavior of inflation is so complex and uncertain that both economists and statisticians have been striving to model and forecast inflation in an accurate way. As a result, many researchers have proposed inflation forecasting models based on different methods; however the accuracy is always being a major constraint. In this paper, we have analyzed the historical monthly economic data of India between January 2000 and December 2012 and constructed an inflation forecasting model based on feed forward back propagation neural network. Initially some critical factors that can considerably influence the inflation of India have been identified, then an efficient artificial neural network (ANN) model has been proposed to forecast the inflation. Accuracy of the model is proved to be

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satisfactory when compared with the forecasting of some well-known agencies.

Keywords Inflation forecasting · Artificial neural network · Back propagation algorithm

1. Introduction

The term 'Inflation' is derived from the Latin word 'Inflare' which means to blow up or inflate and when used in economic world, it means an expansion of the money supply or an increase in prices. According to Crowther [1], inflation represents a state in which the value of money is falling, i.e., prices are rising. Inflation in a country is generally measured by consumer price index (CPI) of that country. CPI is a comprehensive measure used for estimation of price changes in a basket of goods and services representative of consumption expenditure in an economy. By the term 'Inflation', here, we have actually referred to the inflation measured by CPI. Forecasting of inflation is very crucial because it influences many economic decisions. As mentioned by Croushore [2] investors need accurate inflation forecasts as the returns of stocks and bonds depend on what happens to inflation. In business inflation forecast is required to decide the price of goods and plan production accordingly. Home-owners' decision about refinancing mortgage loans also depend on what they think about future inflation. Noticing this huge influence of inflation in various economic fields, researchers from different backgrounds have proposed many inflation forecasting models since last few decades. Use of soft computing techniques beside various statistical models have also become popular in forecasting inflation due to its capability of handling uncertainty and optimization. Brief explanation of few of those popular statistical models along with their comparison with ANN incorporated models in inflation forecasting are given here.

1.1. Aggregate Supply - aggregate Demand

Aggregate supply - aggregate demand (AS-AD) is a linear macroeconomic model that explains price level and output through the relationship of aggregate demand and aggregate supply. In a report, Benigno [3] discussed that in the AS-AD graphical view, optimal policy simplifies to nothing more than an additional line, inflation targeting, along which the trade-off between the objective of price stability and that of stabilizing the output gap can be optimally exploited. Though it is used by a broad array of economists, in a research Wang et al. [4] demonstrated with the help of experimental results that inflation models obtained by employing ANN techniques have higher accuracy as compared to to AS-AD model.

1.2. Auto Regressive Model

In statistics, auto regressive (AR) model is a representation of a type of random process; as such, it describes certain time-varying processes in nature, economics etc. The AR model for inflation forecasting was proposed by Atkeson et al. [5] on the