AN APPLICATION OF THE CHOLESKIZED MULTIVARIATE DISTRIBUTIONS FOR CONSTRUCTING INFLATION 'FAN CHARTS'

W.W. CHAREMZA, S. MAKAROVA, P. JELONEK
e-mail: wch@leicester.ac.uk

Abstract

The paper postulates applying the multivariate non-normal and skewed distributions with dependent components to construct probabilistic forecasts of inflation, usually presented in a form of 'fan charts'. The rationale of this came from the empirical analysis of naïve and econometric forecasts annual inflation (measured monthly) for 28 OECD countries from January 1957 (or later, for some countries) to September 2009. Naïve forecasts are obtained by simple extrapolation of rates of growth, while econometric forecasts are given by the stationary bilinear ARMA (BARMA) models. The forecasts horizons are from one to 8 months. It has been found that, for the naïve forecasts, the empirical distributions of forecasts errors (which are the empirical base for constructing the fan charts) are in most cases stably distributed. For the econometric forecasts the picture is less clear, but in most cases the tempered stable distribution exhibits the best fit. It has also been found that distributions of multi-step forecasts errors are mutually dependent. Hence, a logical step forward seems to be constructing 'fan-charts' by simulation of forecasts outcomes from distributions obtained by Choleskization of the tempered or tempered-stable distributions, which parameters have been evaluated using past forecast errors. This approach seems to be particularly attractive for evaluation of probabilities of the appearance of turning points and probabilities of runs of inflation of certain length which might appear in future. Expected lengths of continuation of inflation tendencies (to rise or to fall) have been computed for all 28 OECD countries. Empirical illustration containing the 'fan-chart' and detailed evaluation of probabilities of turning points occurrences is given for Japan. The paper includes two appendices; one on random number generation from the Choleskized tempered stable distributions and another on the 'grid-search' comparison of fitted stable and tempered stable distributions.