Minimizing post-shock forecasting error through aggregation of outside information

Jilei Lin[a,*], Daniel J Eck[a]

[a]*Department of Statistics, University of Illinois at Urbana-Champaign*
725 S. Wright St., Champaign, IL, 61820, U.S.

Abstract

We develop a forecasting methodology for providing credible forecasts for time series that have recently undergone a shock. We achieve this by borrowing knowledge from other time series that have undergone similar shocks for which post-shock outcomes are observed. Three shock effect estimators are motivated with the aim of minimizing average forecast risk. We propose risk-reduction propositions that provide conditions that establish when our methodology works. Bootstrap and leave-one-out cross validation procedures are provided to prospectively assess the performance of our methodology. Several simulated data examples, and a real data example of forecasting Conoco Phillips stock price are provided for verification and illustration.

Keywords: Data Integration, Prospective forecasting, Risk reduction, Residual bootstrap, Cross validation

*Corresponding author
Email addresses: jileil2@illinois.edu (Jilei Lin), dje13@illinois.edu (Daniel J Eck)