Bayesian Change Point Analysis of ARFIMA model for Realized Volatility *

Naonori Kurata †   Haruhisa Nishino ‡

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Abstract

This paper proposes the Bayesian estimation method for an ARFIMA model with some change points. We use a Markov chain Monte Carlo (MCMC) method, calculate a likelihood of the ARFIMA model, approximated by AR model, by the Conditional-sum-of-squares estimation (CSS), and inserted a hidden Markov model into the model.

In previous studies, several methods which estimate ARFIMA model with some change points have been proposed, although they need much calculation time such as the MA approximation method and they need to decide the order M of ARFIMA model approximated by AR or MA model before estimation. The approach proposed in this paper improves these problems.

The proposed method is applied to the simulation data with some change points of fractional difference or mean, to the yearly Nile River minima data and to the realized volatility data of Nikkei 225. We are also interested in changes of time series data of the realized volatility of Nikkei 225.

Keywords: ARFIMA model; CSS estimation; Markov chain Monte Carlo (MCMC) method; realized volatility

†Graduate School of Humanities and Social Sciences, Chiba University. aada3261@chiba-u.jp

‡Faculty of Law and Economics, Chiba University. nishino@le.chiba-u.ac.jp