

Bayesian Unit Root Test in Double Threshold Heteroskedastic Models

Cathy W. S. Chen¹, Shu-Yu Chen¹, and Sangyeol Lee²

¹Department of Statistics, Feng Chia University, Taiwan
chenws@mail.fcu.edu.tw

²Department of Statistics, Seoul National University, Korea

This talk aims to detect the presence of local non-stationarity of nonlinear autoregressive processes with heteroskedastic errors. A Bayesian test is developed to test for the unit root in multi-regime threshold autoregression with heteroskedasticity. To implement a test, a posterior odds analysis is proposed. Particularly, a mixture prior for the autoregressive coefficient is used to alleviate the identifiability problem that occurs when time series has unit roots. The proposed method achieves a reliable inference despite of the non-integrability problem in the likelihood function. A simulation study and two real data analysis are conducted for illustration. This paper successfully proves the proposed model can accommodate different threshold values to cope with local non-stationarity and in addition, captures discrete time-varying properties.

Keywords: Bayesian hypothesis testing; SETAR; GARCH; Unit-root test; Markov chain Monte Carlo; Posterior odds ratio