A segmented generalized Markov regime-switching model with its application in financial time series data. (English) [Zbl 07194316]

Summary: Movements of equity indices are very important information for an investment decision. Empirical studies illustrate that the movements switch among different regimes. The Markov regime-switching model has important applications to such analysis. However, parameters estimated under normality assumption might not be stable and the corresponding change-point detection algorithm might face some challenges when either the error distribution is heavy-tailed or observed data contain outliers. In this paper, we relax the normality assumption and propose a generalized Markov regime-switching (GMRS) model. We propose a GMRS model based change-point detection algorithm, which is tested on both simulation data and Hang Seng monthly index. Simulation studies show that this algorithm can improve the accuracy of identifying change-points when either the error distribution is heavy-tailed or observed data contain outliers. It is also evident that the identified change-points on Hang Seng monthly index data match the observed market behaviours.

MSC:
60J22 Computational methods in Markov chains
62C12 Empirical decision procedures; empirical Bayes procedures
65C40 Numerical analysis or methods applied to Markov chains

Keywords:
change-point detection algorithm; log-returns; Markov process; maximum likelihood estimation; generalized Markov regime-switching model; stock market index

Full Text: DOI

References:

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