

A general approach for Bayesian case influence analysis in GARCH models

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Abstract

Identifying influential observations is an important step in financial time series data analysis context, since the presence of outliers may drastically affect the estimation process. It is also useful to identify the start of high instability periods. This work presents a flexible approach to detect influential and outlier data points in Bayesian GARCH models using a general divergence criteria based on the posterior joint distribution, the f-Divergence, which approximated via Markov Chain Monte Carlo methods (MCMC). We present the theoretical results and perform simulation studies with artificial data perturbation to obtain cut points for each chosen metric. Finally, the method is applied on different financial data applications in order to identify possible outliers and their associated economical explanation. The new method was able to verify accurately the date of origin of periods of high volatility, such as the start of the impact of Covid-19 on the Ibovespa stock market.

Key-words: Bayesian inference; MCMC; Time series; Case deletion; f-Divergence.

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