Abstract:

The estimation for time series models with heavy-tailed innovations has been widely discussed in the literature, while the corresponding goodness-of-fit tests have attracted less attention. This is mainly because the commonly used autocorrelation function in constructing goodness-of-fit tests necessarily imposes certain moment conditions on the innovations. In the light of the fact that a bounded random variable has finite moments of all orders, we address this problem by first transforming the residuals with a bounded and increasing function. Specifically, this paper considers the autocorrelation function of the transformed absolute residuals from a fitted GARCH model. With the corresponding residual empirical distribution function naturally employed as the transformation, a robust goodness-of-fit test is constructed. The asymptotic null distribution of the test statistic is derived, and simulation experiments are conducted to assess its finite-sample performance. A real data example is analyzed to further illustrate its usefulness.