

Robust Quantile Time Series in Financial Time Series Models

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Abstract

This paper invokes the quantile regression and the M -regression methods which are widely used for time-independent data. We propose a robust quantile estimator for short and long memory time series, as frequently found in financial data. Asymptotic results of the estimator are established for Gaussian time series. The proposed methodology's performance is illustrated by Monte Carlo simulations under different scenarios of time series with additive outliers and asymmetric errors. As an application, the method is used to model the S&P 500 index. As an additional contribution of this paper, the methodology is introduced in mixed models with time series covariates. In this context, a real data set collected in the Greater Vitória area, Brazil, is analyzed to quantify the impact of the particular matter (PM_{2.5}) levels on the health of children with asthma problems.

Keywords: M -regression, quantile regression, time series, long memory, mixed model.