“More Efficient Estimation of Volatility Models via Quantile Regression”

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Abstract: In this paper, we propose a novel method to robustly estimate conditional volatility using quantile regressions. The proposed method extracts and combines distributional information across different quantiles, and is much more effcient than the traditional QMLE estimators in the presence of non-Gaussian innovations. The proposed approach is easy to implement and very useful in financial applications since financial time series are well-known to be skewed and heavy-tailed. We take the ARCH and GARCH models as leading examples to illustrate the proposed estimation procedure and to develop the asymptotic theory. The proposed method can aslo be extended to estimate other types of models. Monte Carlo and empirical application results indicate that the proposed estimation method outperforms some present estimation techniques in providing accurate and robust conditional volatility and quantile estimates and forecasts.