A Bayesian approach to Indirect-VaR TGARCH models

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A Bayesian method has been developed for estimating the parameters of the Indirect-VaR TGARCH models for time series. The method allows us to deal with multiple thresholds and the delay parameters easily.

A forecasting method has also been proposed. This forecasting method is significantly different from the existing forecasting methods in the literature, because the existing methods require a sequence of quantile models that cover the whole distributional range of the underlying process, while our method only depends on a single quantile model at a level of our choice. Furthermore, our forecasting method enable us to obtain the whole predictive density functions, hence any predictive quantities of interest can be obtained.

Extensive simulation studies show that both the estimation and the forecasting methods work well. We also applied the developed methodologies to real financial returns, further confirming that the methods can be very useful in practice.

Key Words: Bayesian method, density forecasting, quantile, threshold, Value at Risk, financial returns