Optimal prediction-based estimating function for COGARCH(1,1) models

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Abstract

The COGARCH (COntinuous Generalized Auto-Regressive Conditional Heteroschedastic) models were introduced by Kluppelberg *et al.* (2004) as a continuous version of the GARCH models. They are driven by general Lévy processes and the resulting volatility process satisfies a stochastic differential equation. The main difference between COGARCH models and other stochastic volatility models is that there is only one source of randomness (the Lévy process) and all the stylized feature are captured by the dependance structure of the model as in the GARCH models.

The prediction-based estimating functions (PBEF's) were introduced by Sorensen (2000 and 2011) as a generalization of martingale estimation functions. They are based on linear predictors, have some of the most attractive properties of the martingale estimating functions, moreover an optimal prediction-based estimating function can be found.

Kluppelberg *et al.* (2007) suggest moment estimators for the parameters of the COGARCH(1,1) based on equally spaced observations, and they derive the asymptotic properties of the proposed estimator.

In this work (on progress) the prediction-based estimating functions method is applied to draw statistical inference about the COGARCH(1,1) model from discrete observed data. To find the optimal PBEF, a general method to calculate the moment of higher order of the COGARCH(1,1,) model is also presented. Some simulation studies are presented to investigate the empirical quality of the proposed estimator (based on optimal PBEF) compared with the one obtained with the method of moment by Kluppelberg *et al.* (2007).