

`ccgarch`: An R package for modelling multivariate GARCH models with conditional correlations

Tomoaki Nakatani

*Department of Economic Statistics, Stockholm School of Economics,
P.O. Box 6501, SE-113 83 Stockholm, Sweden
E-mail: sttn@hhs.se*

Abstract

The multivariate GARCH models with explicit modelling of conditional correlations (the CC-GARCH models) have been widely used in modelling high-frequency financial time series. Examples include the Constant Conditional Correlation GARCH, the Dynamic Conditional Correlation GARCH, and the Smooth Transition GARCH models and their extensions to allow for volatility spillovers.

The package `ccgarch` provides functionality for estimating the major variants of the CC-GARCH models in arbitrary dimensions. Both normal and robust standard errors for the parameter estimates are calculated through analytical derivatives. Numerical optimisations are carried out in such a way that negative volatility spillovers are allowed. The package is capable of simulating data from the major family of the CC-GARCH models with multivariate normal or student's t innovations. Procedures for misspecification diagnostics such as a test for volatility interactions are also included in `ccgarch`.

In presentation, we will discuss usefulness, limitation and directions for modification of the package.