Dependence structure analysis using Copula-Garch model: an application to the international stock market

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The relationship between different international stock markets is of crucial importance for both financial practitioners and academicians in order to manage risks. However, measuring and modelling dependence structure become even more complicated when asset returns present nonlinear, nongaussian and dynamic features. In this paper, we investigate volatility spillover effect between FTSE100, S&P500, CAC and DAX stock indices. Strong lagged volatility of stock market itself and asymmetric spillover effect between different stock markets are found out based on the multivariate MVGARCH-BEKK model. We advocate two steps copula-garch model to examine the dependence structure. Firstly, we filter log-return daily data using univariate garch model to obtain standard residuals and construct the marginal distributions. Secondly, couples of static and time-varying copulas are selected as candidates to join the estimated marginal distributions. The Akaike information criteria (AIC) method is then adopted to determine which copula provides best fitness to the market data. Finally, some interesting results of comovement between different stock markets are critically discussed.

Keywords: Copulas, dependence structure, Garch models, time-varying, volatility spillover effect, AIC