

TITLE:

Outliers and misleading leverage effects in asymmetric GARCH-type models

AUTHORS:

M. Angeles Carnero (Dpto. Fundamentos del Análisis Económico, Universidad de Alicante. E-mail: acarnero@ua.es)

Ana Pérez (Dpto. Economía Aplicada. Universidad de Valladolid. E-mail: perezesp@eae.uva.es)

ABSTRACT:

It is known that outliers could mislead the estimation of both parameters and volatilities in symmetric GARCH models. In this paper we face the problem of how outliers affect the parameter estimation and test of significance in asymmetric GARCH models where the volatility response is different depending on the sign of past returns. We analyze the impact of positive and negative outliers on the leverage effect estimates in the context of the Threshold GARCH model. Different estimation methods are compared: Gaussian quasi-maximum likelihood (QML), quasi-maximum likelihood based on maximizing the Student likelihood and Least Absolute Deviations Estimation. We also look at the impact of outliers on testing the significance of the leverage effect parameter, when the usual t-test and the Likelihood Ratio test are used. As expected, inference based on Gaussian QML can be severely distorted by even a single outlier. Moreover, the presence of two consecutive outliers could lead to estimating either spurious asymmetries or asymmetries of the wrong sign and could make the tests fail to reject the null of no leverage effect even for moderately large samples. However, inferences based on robust estimators are more reliable. We illustrate these results with a series of daily DJIA returns.