Testing GARCH models for omitted parametric time-variation in the unconditional variance

Alexander Back

Hanken School of Economics

Testing GARCH models against non-linear additive misspecification of the conditional variance often involves nuisance parameters which are not identified under the null hypothesis. A common solution is to compute a maximum or an average of a standard statistic over fixed values of the unidentified parameters, which yields so-called sup and ave tests. These procedures are potentially computationally expensive and entail non-standard asymptotic distributions. This paper proposes tests that are relatively computationally cheap and draw on theoretical results from the existing literature on sup and ave tests for models that are fitted by ordinary least squares (OLS). We use testing theory for regression models with additive non-linearity to derive test statistics. The asymptotic distributions of the test statistics can be approximated by simulation and expressed as functionals of a chi-squared process. In a Monte Carlo study we find that the proposed tests have good finite sample size and power properties. Two empirical applications demonstrate how the new tests can be used in conjunction with existing tests to better inform modeling choices.