

Testing and modelling the unconditional variance component in multiplicative time-varying GARCH models

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Abstract

The topic of this paper is testing the hypothesis of constant unconditional variance in GARCH models against the alternative that the unconditional variance changes deterministically over time. The change is parameterised using ideas from neural network models. Tests of this hypothesis have previously been performed as misspecification tests after fitting a GARCH model to the original series. It is found by simulation that the non-negligible positive size distortion present in these tests is a function of the kurtosis of the GARCH process. Adjusting the size by simulation is considered. Next, the possibility of testing the constancy of the unconditional variance before fitting a GARCH model to the data is discussed. The power of the ensuing test is vastly superior to that of the misspecification test and the size distortion minimal. The test has reasonable power already in very short time series. It would thus serve as a test of constant variance in conditional mean models. An application to exchange rate returns is included.