

Quantile residuals for multivariate models*

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We generalize so-called quantile residuals for multivariate time series models. These residuals are under mild regularity conditions approximately independent with standard normal distribution. We develop misspecification tests based on them. The tests are applicable e.g. to nonlinear time series models for which conventional residuals are not well suited. We formulate a general framework and use it to obtain the tests aimed at detecting non-normality, serial correlation, and conditional heteroscedasticity in quantile residuals. These tests can be thought of as pure significance type tests and they take uncertainty caused by parameter estimation properly into account. Under regularity conditions, the test statistic is shown to be asymptotically chi-square distributed.

JEL classification: C32, C52.

Keywords: Generalized autoregressive conditional heteroscedasticity, Multivariate Generalized Orthogonal Factor GARCH model, Nonlinear time series model, Quantile residuals, Misspecification test, Pure significance test.

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