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Joint and marginal specification tests for conditional mean and variance models. (English)

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Summary: This article proposes a class of joint and marginal spectral diagnostic tests for parametric conditional means and variances of linear and nonlinear time series models. The use of joint and marginal tests is motivated from the fact that marginal tests for the conditional variance may lead to misleading conclusions when the conditional mean is misspecified. The new tests are based on a generalized spectral approach and do not need to choose a lag order depending on the sample size or to smooth the data. Moreover, the proposed tests are robust to higher order dependence of unknown form, in particular to conditional skewness and kurtosis. It turns out that the asymptotic null distributions of the new tests depend on the data generating process. Hence, we implement the tests with the assistance of a wild bootstrap procedure. A simulation study compares the finite sample performance of the proposed and competing tests, and shows that our tests can play a valuable role in time series modeling. Finally, an application to the S&P 500 highlights the merits of our approach.

MSC:

62M10 Time series, auto-correlation, regression, etc. in statistics (GARCH)
62G10 Nonparametric hypothesis testing
62E20 Asymptotic distribution theory in statistics
62P05 Applications of statistics to actuarial sciences and financial mathematics

Keywords:

diagnostic tests; model checks; generalized spectral analysis; nonlinear time series; wild bootstrap; volatility model

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