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One-sided testing for ARCH effects using wavelets. (English) Zbl 1017.62078

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Summary: There has recently been increasing interest in hypothesis testing with inequality restrictions. An important example in time series econometrics is hypotheses on autoregressive conditional heteroskedasticity (ARCH). We propose a one-sided test for ARCH effects using a wavelet spectral density estimator at frequency zero of a squared regression residual series. The square of an ARCH process is positively correlated at all lags, resulting in a spectral mode at frequency zero.

In particular, it has a spectral peak at frequency zero when ARCH effects are persistent or when ARCH effects are small at each individual lag but carry over a long distributional lag. As a joint time-frequency decomposition method, wavelets can effectively capture spectral peaks. We expect that wavelets are more powerful than kernels in small samples when ARCH effects are persistent or when ARCH effects have a long distributional lag. This is confirmed in a simulation study.

MSC:

62M10	Time series, auto-correlation, regression, etc. in statistics (GARCH)	Cited in **6** Documents
62G08	Nonparametric regression and quantile regression	
62G10	Nonparametric hypothesis testing	
62P20	Applications of statistics to economics	
62M15	Inference from stochastic processes and spectral analysis	