Corrected LM tests for AR models with time-varying variance

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Abstract

In this paper the Breusch-Godfrey Lagrange Multiplier (LM) approach for checking the goodness-of-fit of autoregressive models is extended in the case of processes with unconditionally heteroscedastic error variance. The variance structure is deterministic but changing over time and allows practitioners to consider various situations commonly faced in real applications. Based on the residual autocovariances and autocorrelations, obtained from adaptive least squares estimation of the autoregressive parameters, a modified LM test statistic is introduced and its asymptotic distribution is derived. The finite sample properties of the autocorrelation based on tests considered in this paper are investigated by Monte Carlo experiments.