Wild Bootstrap Tests for Autocorrelation in Vector Autoregressive Models

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Tests for error autocorrelation (AC) are derived under the assumption of independent and identically distributed (IID) errors. The tests are not asymptotically valid if the errors are conditionally heteroskedastic. In this paper we propose wild bootstrap (WB) Lagrange multiplier tests for error AC in vector autoregressive (VAR) models. We show that the WB tests are asymptotically valid under conditional heteroskedasticity of unknown form. WB tests based on a version of the heteroskedasticity-consistent covariance matrix estimator are found to have the smallest error in rejection probability under the null and high power under the alternative. We apply the tests to VAR models for credit default swap (CDS) prices and Euribor interest rates. An important result that we find is that the WB tests lead to parsimonious models while the asymptotic tests suggest that a long lag length is required to get white noise residuals.

Keywords: autocorrelation; conditional heteroskedasticity; Lagrange multiplier test; vector autoregressive model; wild bootstrap.