

# Wild Bootstrap Tests for Autocorrelation in Vector Autoregressive Models

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## **Abstract:**

Conditional heteroskedasticity is a common feature of many macroeconomic and financial time series. Standard tests for error autocorrelation are derived under the assumption of IID errors and are unreliable in the presence of conditional heteroskedasticity. In this article we propose wild bootstrap tests for autocorrelation in vector autoregressive (VAR) models when the errors are conditionally heteroskedastic. The bootstrap method is a residual-based recursive wild bootstrap procedure. In particular, we investigate the properties of Lagrange multiplier (LM) and F-type tests. Monte Carlo simulations show that the wild bootstrap tests have satisfactory size properties in models with constant conditional correlation generalised autoregressive conditional heteroskedastic (CCC-GARCH) errors. In contrast, standard asymptotic and residual-based bootstrap tests are shown to be oversized. Some simulation evidence on the power of the tests is given. The tests are applied to credit default swap prices, Euribor interest rates and international stock prices. The results show that there are significant ARCH effects in the residuals from the estimated VAR models. The empirical examples demonstrate that wild bootstrap tests for error autocorrelation should be preferred over standard asymptotic and residual-based bootstrap tests.

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