Testing with many restrictions and heteroskedasticity

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Abstract

We propose a hypothesis test that allows for many tested restrictions in a heteroskedastic linear regression model. The test statistic is a centered and studentized F-statistic, where the centering utilizes leave-one-out estimation while we rely on leave-*three*-out estimators when studentizing the statistic. To construct the variance estimate, we employ an idea of leave-*three*-out estimation of its components. Large sample properties of the test are established in an asymptotic framework where the number of tested restrictions may grow in proportion to the number of observations. We show that the test is asymptotically valid and has non-trivial asymptotic power against the same local alternatives as the exact F test when the latter is valid. Simulations corroborate the relevance of these theoretical findings and suggest excellent size control in moderately small samples also under strong heteroskedasticity.

Keywords

Linear regression, Heteroskedasticity, Many regressors, Many restrictions, Ordinary least squares, Leave-out estimation.

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