"On the impact of a pretest of the random effects specification in a panel data model"

Consider a two-stage test in a panel data model when in the first stage a
Hausman specification test is used as a pretest of the random effects specification. In the
second stage, a simple hypothesis about a component of the parameter vector is tested, using
a t-statistic that is based on either the random effects or the fixed effects estimator depending
on the outcome of the pretest. As the first contribution, the paper determines the asymptotic
size of the two-stage test. It depends crucially on the degree of time variation of the
regressors and the test is severely size distorted if there is little time variation. We
then investigate the possibility of size-correction of the two-stage test. We show that size-
correction is possible by increasing the critical value of the two-stage test
appropriately. Data-dependent critical values, based on estimators of the degree of time
variation are discussed, that are shown to improve the power properties of the size corrected
test. Size-corrected subsampling critical values are investigated as another alternative. Power
comparisons between the various two-stage inference procedures with correct asymptotic size
are provided, both theoretically and by Monte Carlo simulations, and compared to the power
properties of the one-stage procedure given by a t test based on the fixed effects estimator.