

Testing for a Structural Break in the Linear Model with Non-Stationary Regressors

Simone Grose

Brett Inder

This paper extends the distributional theory for the problem of testing for structural change in the linear model when the timing of the change is unknown, and proposes a simple method of obtaining approximate critical values. The results apply for a very wide range of regressor types, including integrated and trending regressors, and regressors that exhibit their own structural break.

We begin by developing the asymptotic theory for Wald-type tests of parameter instability, while avoiding having to specify in advance the “type” of regressor being considered in any particular case. We thereby derive the limiting distributions of the mean and sup-Wald tests under assumptions encompassing most, if not all, commonly considered regressor types. The tests are shown to have non-trivial local power against a one-off change in the structural parameters.

We further devise a suitable modification of the mean Wald statistic that avoids the need to tabulate critical values. This is accomplished by deriving the asymptotic mean and variance of the mean Wald, and thus constructing a modified statistic with an approximately chi-squared limiting distribution. The “closeness” of the chi-squared distribution to the actual limiting distribution of our modified mean-Wald test is then investigated by simulation, and found to be satisfactory. The approximation thus provides a simple means of performing the mean-Wald test in a wide class of models with a variety of regressors.

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Correspondence:

Department of Econometrics and Business Statistics

Monash University

Clayton, Australia 3168

Tel: +61-3-9905-2964

Fax: +61-3-9905-5474

Simone.Grose@BusEco.monash.edu.au