Panel Unit Root Tests with Structural Breaks

Yuthana Sethapramote

Department of Economics
University of Warwick

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Abstract

This paper investigates the effect of structural breaks in panel data unit root testing. Monte Carlo experiments are used to evaluate the size and power properties of panel unit root tests. When the break dates are known, the exogenous break panel LM unit root test of Im, Lee and Tieslau (2002) is applied to control the effect of structural shifts. The invariance property of the panel LM unit root test, where the asymptotic properties are unaffected by the presence of breaks in any location, is practically useful in constructing the panel statistic. The simulation results show that when the break points are correctly specified, the size and power performance of the exogenous break panel LM test is similar to that of the test without shifts. However, incorrectly specifying the number and/or location of breaks results in size distortions. In view of this, several endogenous break selection procedures are applied to estimate the break dates from the data. Even though, the endogenous break panel LM test performs considerably well in terms of the size, power and accuracy with which the true break points are selected, the finite sample properties of the endogenous break LM test vary according to the methods used to estimate the break points. In addition, the magnitude of breaks under the DGP also affects the properties of the tests. These differences in the finite sample properties of the endogenous break tests depend on the accuracy with which the break points are estimated.