

Unit root testing with covariates under structural breaks and asymmetric nonlinearity

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Abstract

We extend the covariate unit root test developed by Tsong (2012) by accommodating possible structural breaks of unknown number, unknown dates, and unknown form. Instead of estimating the number of the breaks and their locations, we employ the Fourier component to deal with such structural change. The limiting distribution of the test is derived, and the asymptotic critical values are tabulated. Simulation experiments show that the test can deliver robust size for various breaks commonly seen in economic analysis and enjoy high power property, even in small sample sizes encountered in empirical studies. We apply the proposed test to the issue of fiscal sustainability, and find that public debts in most OECD countries not only follow sustainable paths in the long run, but also experience structural breaks and exhibit asymmetric dynamics.

Keywords: fourier form, structural change, covariate unit roots, asymmetry, debt-GDP ratio