# Persistence and power performance of unit root tests in misspecified structural breaks and three-regime TAR models

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## Abstract

Economic variables have frequent regime shifts as is characteristic of nonlinear models including those with structural breaks (SB) and three-regime threshold autoregressive (TAR) models. These nonlinear models have a significant influence on unit root tests. It is possible that the persistence of a variable becomes higher and the power of the unit root tests has distortions if the form of the regime shifts is misspecified. This paper investigates the persistence and power performance of unit root tests in misspecified SB and three-regime TAR models. We show that the misspecified SB model has high persistence similar to an AR model when the true process is a three-regime TAR process. On the other hand, the misspecified three-regime TAR model does not have persistence unlike the AR model when the true process is one with SB. The results of Monte Carlo simulations demonstrate that a unit root test in the misspecified three-regime TAR model has a better power even under processes with SB, whereas a unit root test in the misspecified SB model does not perform well under three-regime TAR processes. Accordingly, it appears that the use of the three-regime TAR model is a robust method to detect stationarity with regime shifts.

Keywords: Structural breaks; three-regime TAR; persistence; unit root test; power
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