

Asymptotic powers of stochastic unit root tests under local alternatives

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Abstract

A first order random coefficient autoregressive model is called a stochastic unit root process when the mean of the random coefficient is one. When the variance of the random coefficient is zero, the stochastic unit root process reduces to an ordinary autoregressive unit root process. Several tests have been proposed for the null hypothesis of a unit root process against the alternative hypothesis of a stochastic unit root process. In this paper, we consider four such tests, and derive their asymptotic distributions under a sequence of local alternatives. Based on the results, we calculate their local asymptotic powers and their asymptotic relative efficiencies. We find that two of them have competitive high local asymptotic powers, followed by another of the four. The remaining one, which has been most widely used in empirical applications among the four, has much smaller local asymptotic power. We also show that, the local asymptotic powers of these tests depend on the kurtosis of the disturbance term, in particular, they decrease as the kurtosis increases. Our simulation study also supports our theoretical results.

Key Words: Stochastic unit root; Local asymptotic power; Local heteroscedastic integration.

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