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Asymptotic null distributions of stationarity and nonstationarity tests under local-to-finite variance errors

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Abstract The purpose of this paper is to investigate the asymptotic null distribution of stationarity and nonstationarity tests when the distribution of the error term belongs to the normal domain of attraction of a stable law in any finite sample but the error term is an i.i.d. process with finite variance as $T \uparrow \infty$. This local-to-finite variance setup is helpful to highlight the behavior of test statistics under the null hypothesis in the borderline or near borderline cases between finite and infinite variance and to assess the robustness of these test statistics to small departures from the standard finite variance context. From an empirical point of view, our analysis can be useful in settings where the (non)-existence of the (second) moments is not clear-cut, such as, for example, in the analysis of financial time series. A Monte Carlo simulation study is performed to improve our understanding of the practical implications of the limit theory we develop. The main purpose of the simulation experiment is to assess the size distortion of the unit root and stationarity tests under investigation.

Keywords Stable distributions · Unit root tests · Stationarity tests · Asymptotic distributions · Local-to-finite variance · Size distortion