



# Least absolute deviation estimation for AR(1) processes with roots close to unity

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## Abstract

We establish the asymptotic theory of least absolute deviation estimators for AR(1) processes with autoregressive parameter satisfying  $n(\rho_n - 1) \rightarrow \gamma$  for some fixed  $\gamma$  as  $n \rightarrow \infty$ , which is parallel to the results of ordinary least squares estimators developed by Andrews and Guggenberger (Journal of Time Series Analysis, 29, 203–212, 2008) in the case  $\gamma = 0$  or Chan and Wei (Annals of Statistics, 15, 1050–1063, 1987) and Phillips (Biometrika, 74, 535–574, 1987) in the case  $\gamma \neq 0$ . Simulation experiments are conducted to confirm the theoretical results and to demonstrate the robustness of the least absolute deviation estimation.

**Keywords** Asymptotic distribution · Autoregressive processes · Least absolute deviation estimation · Local to unity · Unit root test

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