

Assignment 5 (Bootstrap)

Consider the following panel fixed effects regression

$$y_{it} = a_i + \beta x_{it} + u_{it}$$

DGP 1:

$$\begin{aligned} x_{it} &\sim iidN(1, 1) \\ u_{it} &= \rho u_{it-1} + \varepsilon_{it}, \quad \varepsilon_{it} \sim iidN(0, 1) \end{aligned}$$

DGP 2:

$$\begin{aligned} x_{it} &= \rho x_{it-1} + u_{it}, \quad u_{it} \sim iidN(0, 1) \\ u_{it} &= \rho u_{it-1} + \varepsilon_{it}, \quad \varepsilon_{it} \sim iidN(0, 1) \end{aligned}$$

DGP 3:

$$\begin{aligned} x_{it} &= \lambda_i F_t + u_{it}, \quad u_{it} \sim iidN(0, 1), \quad \lambda_i \sim iidN(1, 1), \quad F_t \sim iidN(0, 1) \\ u_{it} &= \phi_i \theta_t + \varepsilon_{it}, \quad \varepsilon_{it} \sim iidN(0, 1), \quad \phi_i \sim iidN(1, 1), \quad \theta_t \sim iidN(0, 1) \end{aligned}$$

Set $\rho = 0.9$, $N = T = 50$.

Q1: Show the size distortions of the ordinary \hat{t}_β and t-ratio based on panel robust covariance matrix for all DGPs. (by means of Monte Carlo simulation)

Q2: Do sieve and nonparametric bootstraps to obtain the critical values for all DGPs, and show that the bootstrap reduces the size distortion.