Adv. Microeconometrics Computer Assignment

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1 - Size distortions

Simulate data from the following model:

$$Y = X\beta + \varepsilon$$
$$X = Z\Pi + V$$

where: * Y and X are $n \times 1$ vectors which contain the endogenous variables; * Z is a $n \times k$ matrix of instruments; * ε and V are $n \times 1$ vectors that contain disturbances. * The different rows of $\begin{pmatrix} \varepsilon & \vdots & V \end{pmatrix}$, are independently normally distributed, i.e.,

$$\begin{pmatrix} \varepsilon_i \\ V_i \end{pmatrix} \sim \mathcal{N}(0, \Sigma), \qquad \Sigma = \begin{pmatrix} 1 & \vdots & \rho \\ \rho & & 1 \end{pmatrix}$$

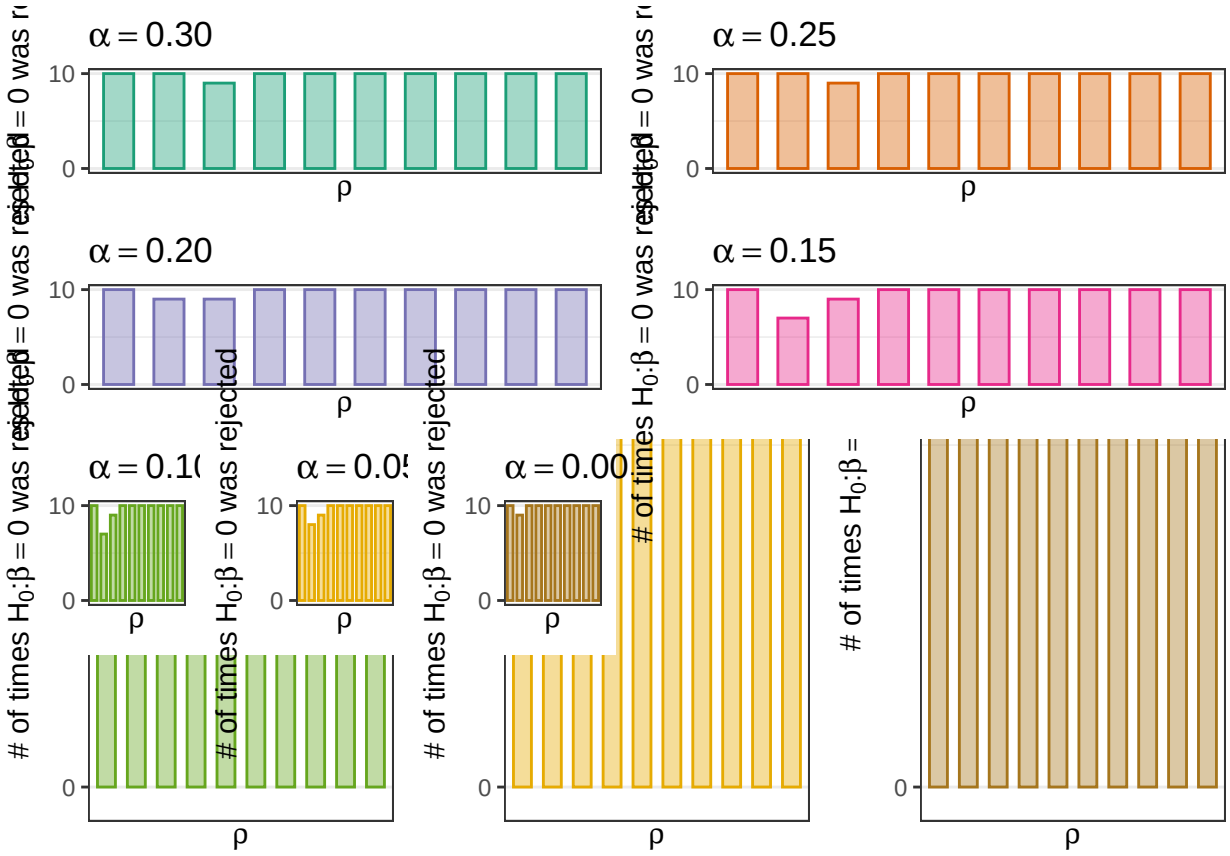
* $n = 100$, $k = 10$, $\Pi = a \times e_{10}$ with $e_{10} \in \mathbb{R}^{10}$ whose first element is 1 and the remaining are equal to zero. * All elements from Z are independently distributed and follows a standard normal distribution. * $a \in \{0.3, .0.25, 0.2, 0.15, 0.1, 0.05, 0\}$ * $\rho \in \{0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 0.95\}$

Item 1

_For each value of α make a figure of the rejection frequency as a function of ρ when testing $H_0 : \beta = 0$ with 95% significance using the $2SLS$ t-statistic (so five figures which show the rejection frequency as a function of α).

Using a package

Graph for Q1


α = 0.30
α = 0.25
α = 0.20
α = 0.15
α = 0.10
α = 0.05
α = 0.00
# of times H0:β = 0 was rejected
ρ
10
0