DOUBT CLEARANCE

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + u$

$X_3 \; X_4 \ldots$

variance ↑

$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2$

$u \quad r_{12} \neq 0$

2 ~ minimum

$Y = \beta_0 + \beta_1 X_1 + v$

$v = \beta_2 X_2 + u$

$\tilde{Y} = \tilde{\beta}_0 + \tilde{\beta}_1 X_1$

$r_{12} = 0$

Ω

ψ

$var(\hat{\beta}) = E\left[(\hat{\beta} - \beta)(\hat{\beta} - \beta)'\right]$

$= E\left[(X'X)^{-1} X' \underset{\sim}{uu'} X (X'X)^{-1}\right]$

$E(uu') \neq \sigma^2 I_n$ (Heteroscedasticity).

$= \sigma^2 \psi$

$\sigma^2 \Omega$

$H_0 : \mu = \mu_0$

$H_1 : \mu \neq \mu_0$

$t = \dfrac{\bar{x} - \mu_0}{S/\sqrt{n}}$

$var(\beta) = \sigma^2 (X'X)^{-1} X' \psi X (X'X)^{-1}$

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + u$$

drop x_2

$$Y = \beta_0 + \beta_1 X + u$$

$Z \Rightarrow \operatorname{cov}(X, Z) = 0$

$$\boxed{X = \pi_0 + \pi_1 Z + v}$$

$$\ln(wage) = \beta_0 + \beta_1\, edu + \beta_2 (ability) + u$$

drop

$X = \pi_0 + \pi_1 Z + v$

2SLS

$\beta_0 + \beta_1\, edu + \beta_2\, IQ + v$

$\hookrightarrow$ ability $+ u$

$\operatorname{cov}(IQ, v) \neq 0$

IV $\quad Z \longrightarrow \operatorname{cov}(Z, u) = 0$

$\operatorname{cov}(X, Z) \neq 0$

$$X = Z\pi + u$$

$X = Z\Pi + U$

$\hat{\Pi} = [\qquad]$

$\hat{X} = Z\hat{\Pi}$

$X_1, X_2 \dots X_N \to$ unknown parameter 'θ'

$x_1, x_2 \dots x_n \to$ static (estimator) W_n

Large

$n \to \infty$

$$P[|W_n - \theta| > \varepsilon] = 0$$

$\frac{\sigma^2}{n} \to 0$

ε some negligible value

θ : population mean μ

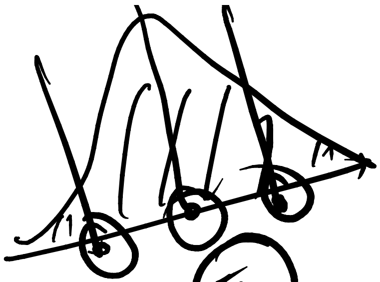
W_n : sample mean $\bar{Y}$ $\qquad Y_1, Y_2 - Y_n$

Stat

θ : β parameter

W_n : $\hat{\beta}$ estimator

$\text{plim}(\hat{\beta}) = B + \frac{Cov(x_i, u)}{\;}$



$$\text{plim}(\hat{\beta}) = \beta_j + \frac{\text{Cov}(x_j, u)}{\text{Var}(x_j)}$$

$\bar{x}$ → point estimator