

$\min E'E \equiv \min E'E$ TDA Econométrie

$$E = Y - X\beta$$

$$Q \doteq E'E = (Y - X\beta)'(Y - X\beta) = YY' - \beta'X'Y - Y'X\beta + \beta'X'X\beta$$

$$\left[(Y')_{n \times n} | (X)_{n \times 2} | (\beta)_{2 \times 1} \right]_{n \times 1} \Rightarrow Y'X\beta = (Y'X\beta)' = \beta'X'Y$$

$$\Rightarrow E Q = YY' - \beta'X'Y - \beta'X'Y + \beta'X'X\beta = YY' - 2\beta'X'Y + \beta'X'X\beta$$

$$\frac{\partial Q}{\partial \beta} = -2X'Y + 2X'X\beta \quad \text{Equation normale}$$

$$\min Q \Rightarrow \frac{\partial Q}{\partial \beta} = 0 = -2X'Y + 2X'X\beta = X'X\beta = X'Y \Rightarrow \beta = (X'X)^{-1}X'Y$$

• Exercice 2

Question additionnelle

$$d = 51 \quad H_0: \alpha_i = 0 \quad H_1: \alpha_i \neq 0 \quad \hat{\sigma}_{\alpha_i}^2 = \hat{\sigma}_e^2 \left(\frac{1}{n} + \frac{\bar{\epsilon}\epsilon^2}{\sum_{i=1}^n (\Delta \alpha_i - \bar{\Delta \alpha})^2} \right) \quad t_7^{0.025} = 2,36$$

$$\hat{\alpha}_1 = 0,902 \quad \hat{\sigma}_{\alpha_1} = 0,206 \quad t^* = \frac{\hat{\alpha}_1}{\hat{\sigma}_{\alpha_1}} = 4,378 \Rightarrow |t^*| > t_7^{0.025} \Rightarrow \text{rejet de } H_0$$

i=2

$$\hat{\alpha}_2 = -0,256 \quad \hat{\sigma}_{\alpha_2} = 0,104 \quad t^* = \frac{\hat{\alpha}_2}{\hat{\sigma}_{\alpha_2}} = -2,460 \Rightarrow |t^*| > t_7^{0.025} \Rightarrow \text{rejet de } H_0$$