$$y = e^x$$

$$\ln y = \overbrace{\ln e^x}^{x} = x$$

$$\ln y = x$$

$$Y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \cdots + \beta_k x_{ki} + \varepsilon_i$$

CONTINUS

PREDICTEURS

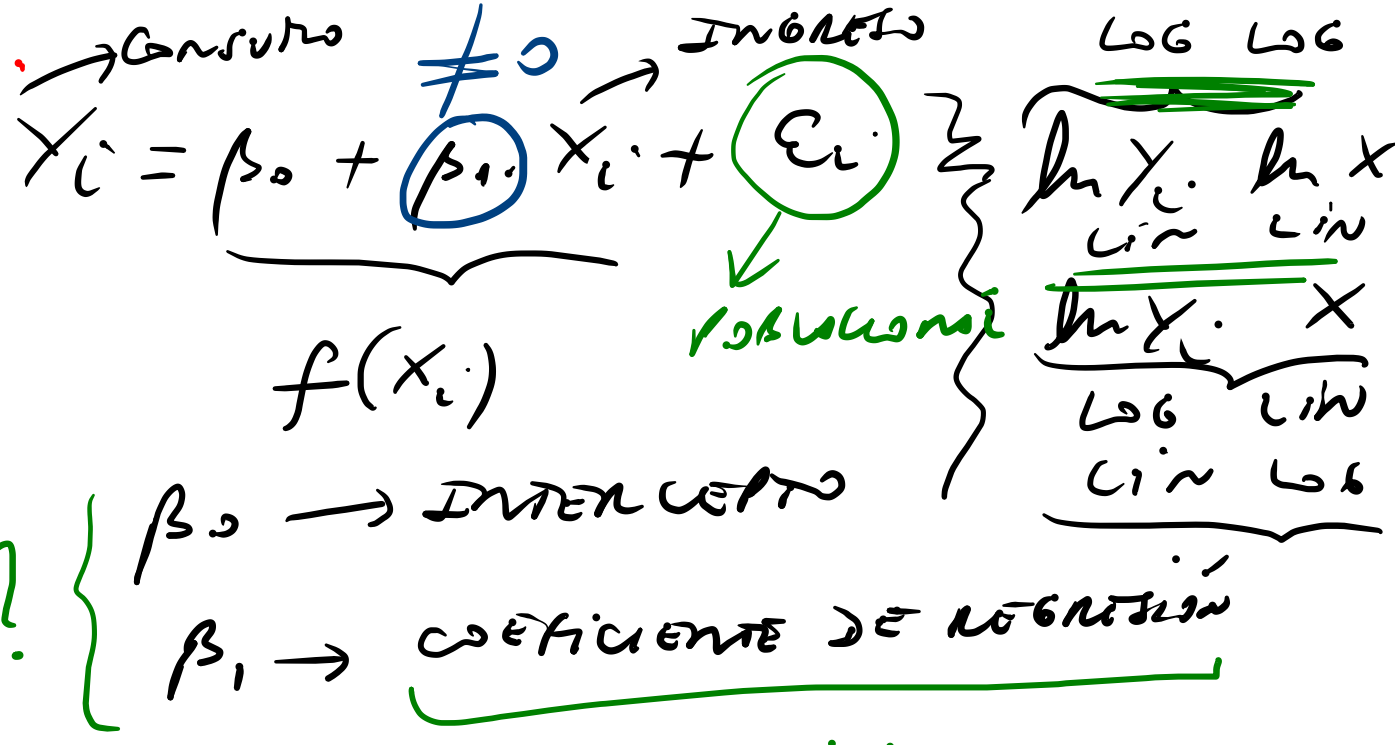
VARIABLE ALEATOIRE

BRUIT BLANC (WHITE NOISE)

$X_1 \rightarrow Y_i$

$3x_1 = X_2$

X_3


Consumo
≠ 0
Ingreso
LOG LOG
$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$
$f(X_i)$
Perturbación
$\ln Y_i$ $\ln X$
LIN LIN
$\ln Y_i$ X
LOG LIN
LIN LOG
?
$\beta_0 \rightarrow$ INTERCEPTO
$\beta_1 \rightarrow$ COEFICIENTE DE REGRESIÓN
↳ SENSIBILIDAD

X_i	Y_i
X_1	Y_1
⋮	
X_n	Y_n

$\Rightarrow$ $\hat{\beta}_0 = ?$ $\hat{\beta}_1 = ?$

MÉTODO DE MÍNIMOS CUADRADOS

$\hat{Y}_i = \hat{\beta}_0 + \hat{\beta}_1 X_i$ → RECTA ESTIMADA

n.º n.º

$Y_i - \hat{Y}_i = \hat{\varepsilon}_i$ RESÍDUO (proxy al error ε_i)

$$\min \sum_{i=1}^{n} \hat{\varepsilon}_i^2 = \sum_{i=1}^{n} (y_i - \hat{y}_i)^2$$

$$= \sum_{i=1}^{n} (y_i - \hat{\beta}_0 - \hat{\beta}_1 x_i)^2$$

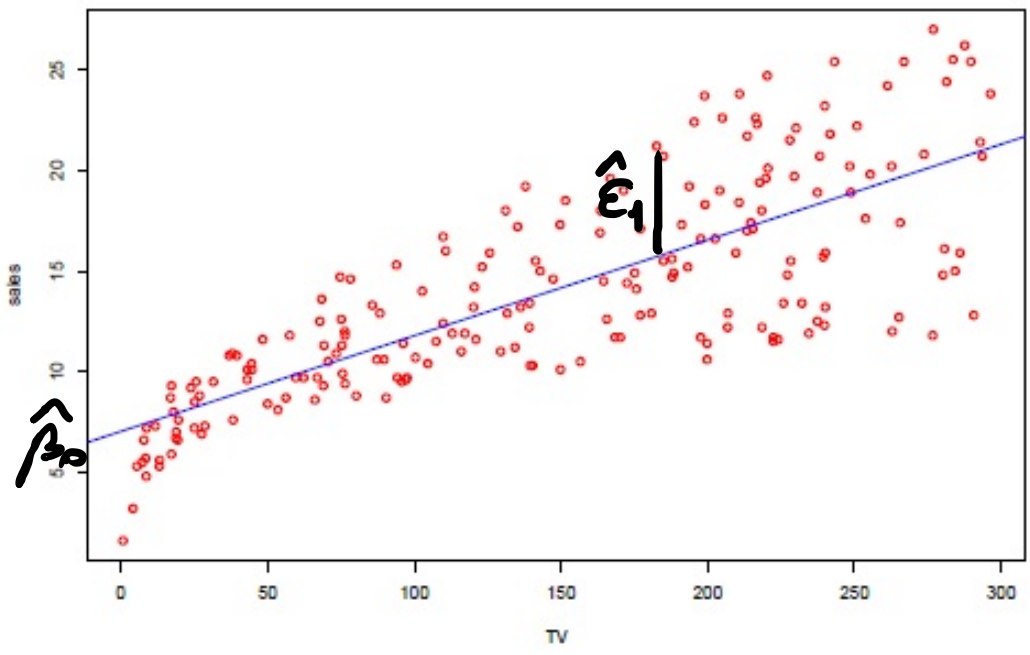
$\hat{\beta}_0 ? \quad \hat{\beta}_1 ?$

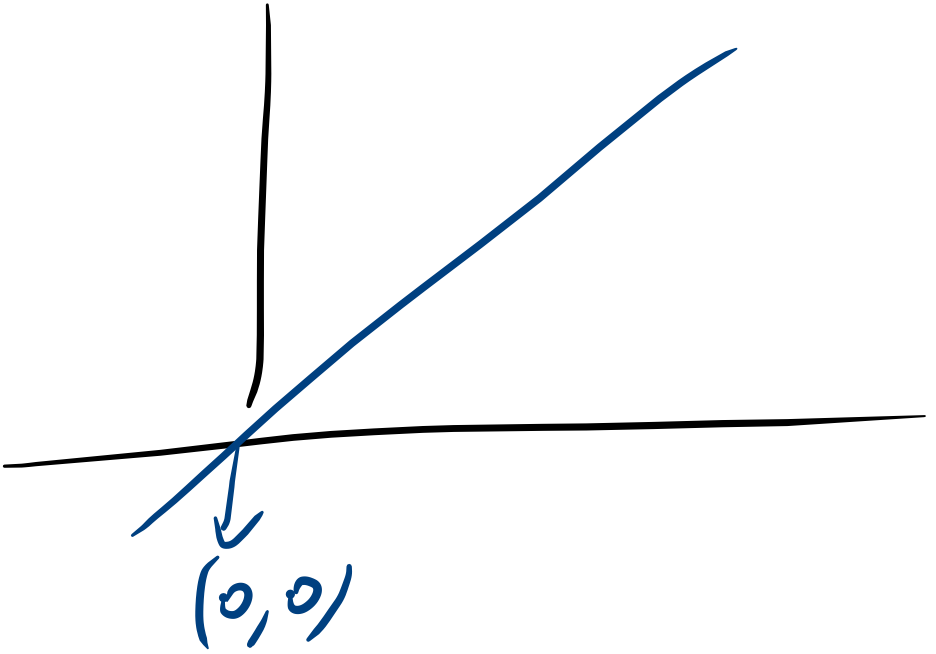
$$\hat{\varepsilon}_i = y_i - \hat{y}_i$$

$$\sum_{i=1}^{n} \hat{\varepsilon}_i = 0$$

$\hat{\varepsilon}_i > 0$

$\hat{\varepsilon}_i < 0$




(0,0)

$$\hat{\beta}_1 = \frac{\sum_{i=1}^{n} \left(X_i - \bar{X}\right)\left(Y_i - \bar{Y}\right)}{\sum_{i=1}^{n} \left(X_i - \bar{X}\right)^2}$$

$$\hat{\beta}_0 = \bar{Y} - \hat{\beta}_1 \bar{X}$$

$$\hat{\beta}_0 \sim N\left(\beta_0; \sqrt{\sigma_\epsilon^2 \left(\frac{1}{n} + \frac{\bar{X}^2}{\sum_{i=1}^{n} \left(X_i - \bar{X}\right)^2}\right)}\right)$$

$$\hat{\beta}_1 \sim N\left(\beta_1; \sqrt{\frac{\sigma_\epsilon^2}{\sum_{i=1}^{n} \left(X_i - \bar{X}\right)^2}}\right)$$

$H_0: \beta_1 = 0$ NO ES SIGNIFICATIVO

$H_1: \beta_1 \neq 0$ ES SIGNIFICATIVA

SE ESTRA $RH_0 \Rightarrow \beta_1 \neq 0$

$\rho(x;y) \neq 0$

$$\hat{y}_i = \hat{\beta}_0 + \hat{\beta}_1 x_i$$

$\hat{\alpha}$ $\hat{\beta}$

$\sim N$ $\sim N$ $\sim N$

CHAO $\longrightarrow$

$$\hat{\beta}_0 = \hat{\alpha}$$

$$\hat{\beta}_1 = \hat{\beta}$$

$$\underbrace{\sum_{i=1}^{n}(Y_i-\bar{Y})^2}_{SCT}=\underbrace{\sum_{i=1}^{n}(\hat{Y}_i-\bar{Y})^2}_{SCE}+\underbrace{\sum_{i=1}^{n}(Y_i-\hat{Y}_i)^2}_{SCR}$$

MAX

MIN

$$\underbrace{R^2}_{\text{COEF. DE DETERMINACIÓN}}=\frac{SCE}{SCT}$$

$$0 \leq R^2 \leq 1$$

$y \sim x$ → virgulilla

$y = \beta_0 + \beta_1 x_i + \varepsilon_i$

$lm(y \sim x)$

$\hat{y}_i = 1 + 0{,}8125\, x_i$