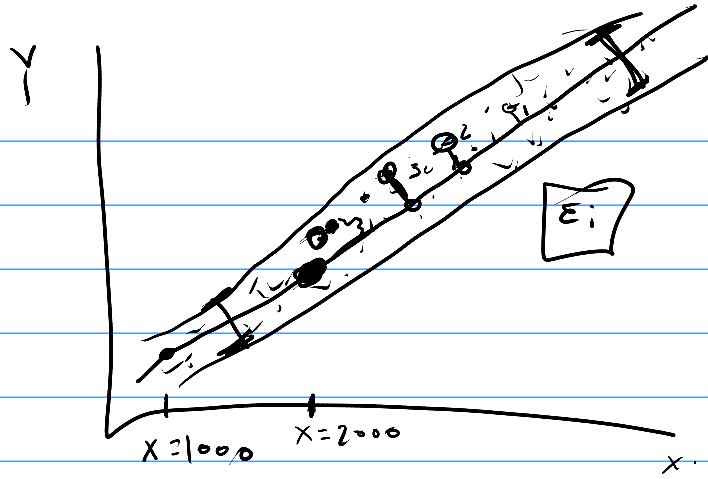
β_1



$$E[Y|x_i] = \underbrace{\beta_0}_{\text{intercepto}} + \underbrace{\beta_1}_{\to \text{pendiente}} x_i$$

Válidez del modelo

-Cumplimiento de supuesto

Modelo teórico

$$\left.Y_i = \beta_0 + \beta_1 x_i + \underbrace{\varepsilon_i}_{\text{error teórico}}\right\} \text{Teórico o poblacional}$$

$\rightarrow$
$$\left.\begin{array}{l} -\ \varepsilon_i \text{ independientes} \\ -\ \varepsilon_i \text{ identicamente distribuidos} \\ -\ \varepsilon_i \sim N \\ -E[\varepsilon_i] = 0 \quad \wedge \quad Var[\varepsilon_i] = \sigma^2 \end{array}\right\} \varepsilon_i \overset{iid}{\sim} N(0, \sigma^2)$$

línea recta muestral

$$\hat{Y}_i = \hat{\beta}_0 + \hat{\beta}_1 x_i = E[Y|x_i]$$

$$Y_i = \hat{\beta}_0 + \hat{\beta}_1 x_i + \underbrace{e_i}_{\text{residual}}$$

$$e_i^2 = [Y_i - \hat{\beta}_0 - \hat{\beta}_1 x_i]^2$$

$$\sum e_i^2 = \sum [Y_i - \hat{\beta}_0 - \hat{\beta}_1 x_i]^2$$

minimizando
$\hat{\beta}_0$
$\hat{\beta}_1$

$\hat{\beta}_i$ $\quad$ $\sqrt{var(\hat{\beta}_i)}$ $se(\hat{\beta}_i)$ $\quad$ $T = \frac{\hat{\beta}_i}{se(\hat{\beta}_i)}$ $\quad$ val-P > α

Coefficients:

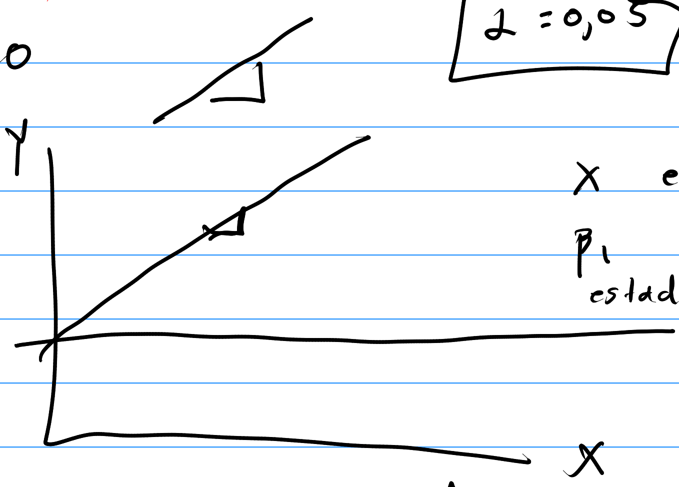
	Estimate	Std. Error	t value	Pr(>|t|)	
β_0 (Intercept)	2.030e+04	2.217e+04	0.916	0.363	
β_1 `total ratings`	6.885e-01	1.281e-02	53.744	<2e-16	***

$$\hat{Y}_i = 20300 + 0{,}6885\, x_i$$

$$Y_i = \underbrace{\beta_0 + \beta_1}_{\text{poblacional}} x_i + \varepsilon_i \qquad \hat{Y}_i = \underbrace{\hat{\beta}_0 + \hat{\beta}_1}_{\text{muestral}} x_i$$

PH $\begin{cases} \beta_0 = 0 \;\times \\ \beta_0 \neq 0 \end{cases}$

significancia $\boxed{\alpha = 0{,}05}$



X explica a Y

β_1 sea significativo o estadísticamente $\neq 0$

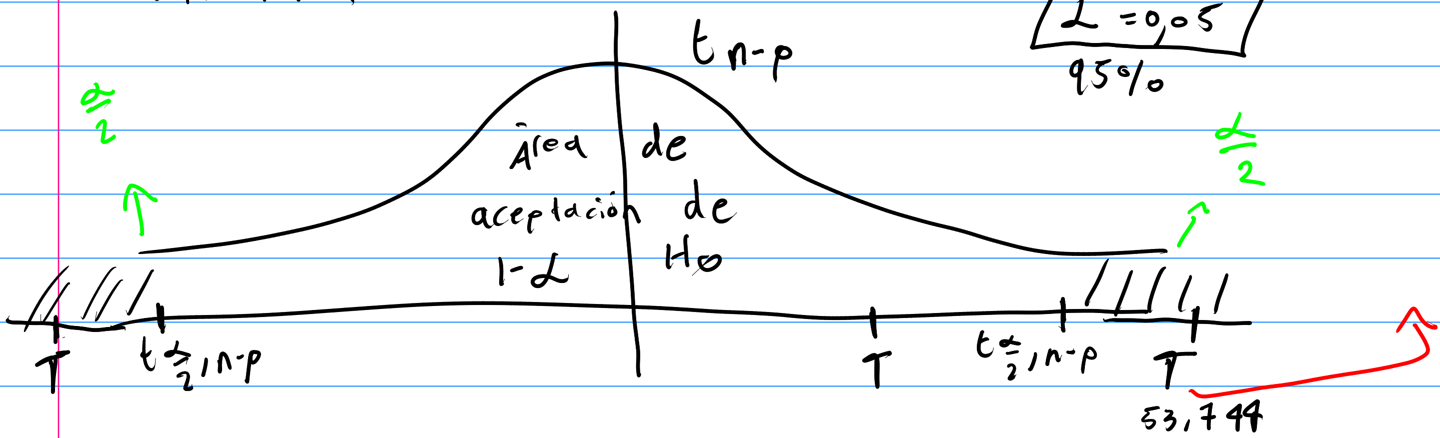
$\begin{cases} H_0 : \beta_1 = 0 \\ H_a : \beta_1 \neq 0 \end{cases}$ $\qquad T = \dfrac{\hat{\beta}_1}{se(\hat{\beta}_1)} \sim t_{n-p} \sim t_{86-2}$

n: # datos

p: # parámetros

Simetrica

$\boxed{\alpha = 0{,}05}$ 95%



$\frac{\alpha}{2} + \frac{\alpha}{2} = \alpha$

Area de Rechazo de H_0

Si $|T| > |t_{\frac{\alpha}{2}, n-2}|$ Rechazamos H_0 y β_j es significativo

Si $|T| < |t_{\frac{\alpha}{2}, n-2}|$ Aceptamos H_0 y $\beta_j = 0$ no es signif.

$n = 90$

$\boxed{\hat{\beta}_j =}$

$\boxed{Se(\hat{\beta}_j) =}$

$\alpha = 0,08$

$t_{0,08,98} = 1,83$

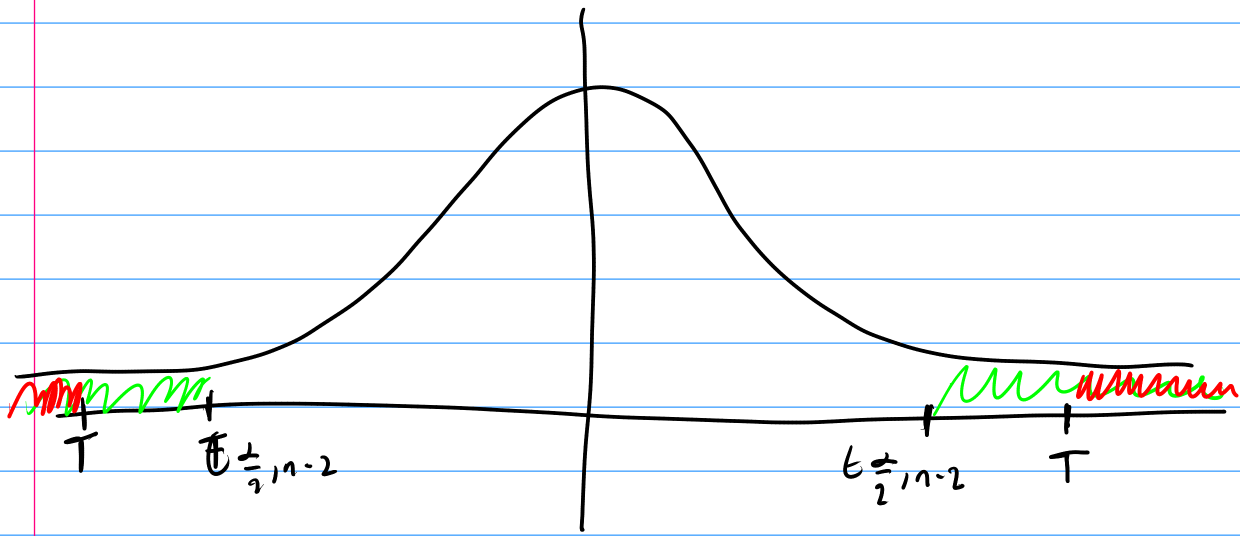
$t_{0,08,90} = 1,73$

$\boxed{t_{0,04,88}} = 1,65 \rightarrow t_{\frac{0,08}{2}, 90-2}$

$$\frac{\hat{\beta}_j}{se(\hat{\beta}_j)} = 55 = T$$

$$T > t_{\frac{\alpha}{2}, n-2}$$

$\hat{\beta}_j$ es significativo



$+ = \alpha$

$+ = \text{Val-P}$

Si Val-P $< \alpha$ Rechazo H_0

Si Val-P $> \alpha$ No Rechazo H_0

Val-P $\rightarrow$ Probabilidad de equivocarse rechazando H_0

Interpretabilidad

Si $\beta_1, \beta_2, \beta_3$

- Es interpretable siempre que significativo

Si es β_0

- Significativo
- $X=0$ esté en el intervalo de ajuste

significativo

- Estadístico T, comparar con $t_{\frac{\alpha}{2}, n-p}$
- val-p, comparar con α
- Intervalo de confianza al $(1-\alpha)\cdot 100\%$ y si 0 está en el intervalo, no es significativo

$\beta_0 \quad (- \ , \ +)$

$\beta_1 \quad (- \ , \ -)$ ó $(+ \ , \ +)$

IC al $(1-\alpha)\cdot 100\%$ para β_j

$$\hat{\beta}_j \pm t_{\frac{\alpha}{2}, n-p} \cdot se(\hat{\beta}_j)$$

$$\hat{\beta}_j \pm t_{\frac{\alpha}{2}, n-p} \cdot \sqrt{Var(\hat{\beta}_j)}$$