

Hoja de Ejercicios 7

Contrastes individuales sobre coeficientes

Estadística-II. INTRODUCCIÓN a la ECONOMETRÍA. UC3M

1. (Ejercicio 4.1, Wooldridge (2002)). Which of the following can cause the usual OLS t statistics to be invalid (that is, not to have t distributions under H_0)?
 - (i) Heteroskedasticity.
 - (ii) A sample correlation coefficient of 0.95 between two independent variables that are in the model.
 - (iii) Omitting an important explanatory variable.
2. (Ejercicio 4.2, Wooldridge) Consider an equation to explain salaries of CEOs in terms of annual firm sales, return on equity (*roe*, in percent form), and return on the firm's stock (*ros*, in percent form):

$$\log(\text{salary}) = \beta_0 + \beta_1 \log(\text{sales}) + \beta_2 \text{roe} + \beta_3 \text{ros} + u$$

- (i) In terms of the model parameters, state the null hypothesis that, after controlling for *sales* and *roe*, *ros* has no effect on CEO salary. State the alternative that better stock market performance increases a CEO's salary.
- (ii) Using the data in CEOSAL1.RAW, the following equation was obtained by OLS:

$$\begin{aligned} \log(\text{salary}) &= 4.32 + 0.280 \log(\text{sales}) + 0.0174 \text{roe} + 0.00024 \text{ros} \\ &\quad (0.32) \quad (0.035) \quad (0.0041) \quad (0.00054) \\ n &= 209, R^2 = 0.283 \end{aligned}$$

By what percent is salary predicted to increase, if *ros* increases by 50 points? Does *ros* have a practically large effect on *salary*?

- (iii) Test the null hypothesis that *ros* has no effect on *salary*, against the alternative that *ros* has a positive effect. Carry out the test at the 10% significance level.
- (iv) Would you include *ros* in a final model explaining CEO compensation in terms of firm performance? Explain.

3. (Ejercicio 4.3, Wooldridge)) The variable *rdintens* is expenditures on research and development (R&D) as a percentage of sales. Sales are measured in millions of dollars. The variable *profmarg* is profits as a percentage of sales.

Using the data in RDCHEM.RAW for 32 firms in the chemical industry, the following equation is estimated:

$$\begin{aligned} rdintens &= 0.472 + 0.321 \log(sales) + 0.050 \textit{profmarg} \\ &\quad (1.369)(0.216) \qquad (0.046) \\ n &= 32, R^2 = 0.099 \end{aligned}$$

- (i) Interpret the coefficient on $\log(sales)$. In particular, if sales increases by 10%, what is the estimated percentage point change in *rdintens*? Is this an economically large effect?
- (ii) Test the hypothesis that R&D intensity does not change with sales, against the alternative that it does increase with sales. Do the test at the 5% and 10% levels.
- (iii) Does *profmarg* have a statistically significant effect on *rdintens*?