Advanced Econometrics – Lab 02 – Mock test

Exercise 1

The exercise comes from the book *Principles of Econometrics*. The data file *cocaine.csv* describes variables related to sales of cocaine powder in northeastern California over the period 1984–1991. The data is a subset of those used in the study Caulkins,J.P. i R.Padman (1993), "Quantity Discounts and Quality Premia for Illicit Drugs", *Journal of the American Statistical Association*, 88, 748-757. Explanatory variables:

- PRICE - price per gram in dollars for a cocaine sale,
- QUANT - number of grams of cocaine in a given sale,
- QUAL - quality of the cocaine expressed as percentage purity,
- TREND - a time variable with 1984 = 1 up to 1991 = 8.

Let's consider the regression model of the form

$$PRICE = \beta_1 + \beta_2 QUANT + \beta_3 QUAL + \beta_4 TREND + \varepsilon. \tag{1}$$

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Call:
lm(formula = price ~ quant + qual + trend, data = dane)

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 90.84669    8.58025   ?????   ?????? ???
quant       -0.05997    0.01018  -5.892 2.85e-07 ***
qual         0.11621    0.20326   ?????   ?????? ???
trend       -2.35458    1.38612  -1.699   0.0954 .
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 20.06 on 52 degrees of freedom
Multiple R-squared:  0.5097,Adjusted R-squared:  ?????
F-statistic: 18.02 on 3 and 52 DF,  p-value: 3.806e-08
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a) (10%) What signs of β_2, β_3 and β_4 should we expect? Explain.

b) (5%) How many observations were used to estimate the model? Explain.

c) (10%) Interpret the value of the coefficient of determination.

d) (5%) What is the value of the adjusted R^2 statistic?

e) (5%) Which variables are statistically significant at the level of $\alpha = 5\%$? Explain.

f) (5%) Are all variables jointly statistically significant at $\alpha = 5\%$?

g) (10%) Interpret the estimates of the parameters.