L11QUE: Quantitative Economics
L11QUM: Quantitative Methods
L11MES: Mathematical and Economic Statistics

Tutorial 5

1. X is weekly household income (in hundreds of £) and Y is weekly household spending (in hundreds of £). A researcher conducts a survey of 75 households and records the following information:

$$\overline{x} = 41 \qquad \overline{y} = 19 \qquad Var[X] = 34 \qquad Var[Y] = 28 \qquad Cov[X, Y] = 11$$

The researcher wants to estimate the following linear regression

$$y = \beta_0 + \beta_1 x + \epsilon$$

(a) Estimate the regression coefficients $\widehat{\beta}_0$ and $\widehat{\beta}_1$.

(b) Interpret your estimates of both $\widehat{\beta}_0$ and $\widehat{\beta}_1$.

(c) The researcher now conducts another sample, this time from 150 households. She obtains the following OLS estimation:

$$y = 5.0 + 0.25x + \widehat{\epsilon}$$

where the estimate $\widehat{\beta}_0$ has a standard error of 1.0 and the estimate $\widehat{\beta}_1$ has a standard error of 0.05.

(i) Test the claim that there is no relationship between weekly household spending and weekly household income at a 5% level of significance (you may assume the relevant critical value is 1.96).

(ii) Test the claim that "households increase their expenditure by £20 for every £100 increase of their income" at a 5% level of significance (again assume the relevant critical value is 1.96).

2. Outline the role of R^2. How can it be calculated? (L11QUE/MES students only)