

Notes:

- For this exercise, you need formulas for F -test and t -test discussed in Lecture 2.4.2.

Questions

Consider the unrestricted multiple regression model $y = X_1\beta_1 + X_2\beta_2 + \varepsilon$. If we impose the null hypothesis that $\beta_2 = 0$, we get the restricted model $y = X_1\beta_1 + \varepsilon$.

- (a) Suppose that both the restricted and the unrestricted model contain a constant term. Then prove that

$$F = \frac{(R_1^2 - R_0^2)/g}{(1 - R_1^2)/(n - k)},$$

where R_0^2 and R_1^2 are the R-squared of respectively the restricted and unrestricted model.

- (b) Suppose that we test for a single restriction $H_0 : \beta_j = 0$, so that $g = 1$. Then prove that $F = t^2$.