Erasmus School of Economics

MOOC Econometrics

Training Exercise 2.2

Questions

In the wage database, education is measured in terms of a single variable 'Educ' with values 1, 2, 3, and 4. The multiple regression model (with Educ as 4-th explanatory factor) assumes a constant marginal effect:

$$\frac{\partial \log(\text{Wage})}{\partial \text{Educ}} = \beta_4.$$

This means that increasing education by one level always leads to the same relative wage increase. This effect may, however, depend on the education level, for example, if the effect is smaller for a shift from eduction level 1 to 2 as compared to a shift from 3 to 4.

(a) The wage equation presented at the start of Lecture 2.2 contains four explanatory factors (apart from the constant term). Formulate the null hypothesis that none of these four factors has effect on wage in the form $R\beta = r$, that is, determine R and r.

(b) Extend the wage equation presented at the start of Lecture 2.2 by allowing for education effects that depend on the education level.
Hint: Use dummy variables for education levels 2, 3, and 4.

(c) The model of part (b) is more general than the original wage equation. The original model can be obtained from the model in part (b) by imposing linear restrictions of the type $R\beta = r$. Derive the number of restrictions (g) and determine R and r.