

## **ECONOMETRICS (ECN3311)**

### **ASSIGNMENT BRIEF**

#### **Assignment Outline**

In 2020, the University of Oxford Human Resources Department conducted a survey to understand the earnings distribution at the university. The survey collected different variables described below:

BLACKR=Black respondent; AGE=Age as at last birthday; SCHLING=Years spent in school; HEIGHT=Respondent's height; SIBLINGS=Number of Siblings; GENDER=0 for male respondent and 1 for female respondent; EARNINGS=Respondents current earnings/pay and, HOURS=Respondent's working hours per week. This dataset is obtained/available in dta (Stata) format.

**Note:** ID is the questionnaire identity numbers.

As a student of Econometrics (ECN3311) at UNZA, you are asked to help with the analysis through answering the questions below:

**Question 1. [27 Marks]**

Upload the dataset into Stata and run a regression of EARNINGS on SCHLING. Answer parts a)-d).

a) Derive the normal equations corresponding to this estimation and explain your understanding of them. [10]

b) Obtain the expression for the sample mean of EARNINGS in terms of the estimated model parameters. Comment on this. [7]

c) Construct and implement a two-tailed t-test to determine whether the estimated coefficient on SCHLING is significant at the 5% level. Comment on your finding. [5]

d) Generate a dummy variable for all male respondents in the survey and run a new regression of EARNINGS as dependent variable, and, SCHLING and Male dummy as two independent variables.

- Explain the meaning of a dummy variable [2]

- Comment on the significance of the two variables. [3]

**Question 2. [38 Marks]**

Generate a new variable, AGE2 by squaring the variable AGE. Run a regression of EARNINGS on SCHLING, Male dummy and include all available variables in the dataset. Answer parts a)-e).

a) Describe a suitable measure of the model's fit to the data. Comment on the fit indicated by your measure. [5]

b) What is the nature of the relationship between an individual's age and EARNINGS? Construct a test for the joint significance of AGE and AGE2 on EARNINGS. Implement the test and comment on your finding. [10]

c) Dr. Matakala, a Zambian born male teaches at Oxford. He is a 40-year-old black male with average HEIGHT. Use the estimation output to predict Dr. Matakala's EARNINGS. [5]

d) There was a mistake in Dr. Matakala's height that was recorded in the survey. When the height was corrected by the Head Researcher, his height increased by one standard deviation.

What is the expected increase in his EARNINGS arising from the height correction? Construct the 90% confidence interval for this increase. [8]

e) Explain how you could test whether SCHLING's effect on EARNINGS differs for men and women. Conduct the test and comment on your findings. [10]

**Question 3. [35 Marks]**

In no more than 750 words critically evaluate estimations when a regression of EARNINGS on SCHLING is conducted (Question 1) and when all the available variables in the dataset are included (Question 2).

## **INTRUCTIONS**

**Word count:** Maximum 2500 (excluding references, appendix and cover page). The maximum word length for the answer to question 3 is 750 words.

**Due date:** 6<sup>th</sup> June, 2021

**Format:** PDF

**Font:** Times New Roman

**Size:** 12

**Spacing:** 1.5

**END**