EX0012

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMENT OF ECONOMICS

MAR 2024

PROGRAMME: BSC ECONOMICS HONOURS DEGREE

EC420: ECONOMETRICS II EXAMINATION

DURATION: 3 HOURS

INSTRUCTIONS:

1) Answer question one and any other three questions.
2) Each question carries 25 marks.
3) Cell-phones are not allowed into the examination room.

QUESTION 1 (COMPULSORY)

A researcher came up with a model to establish the determinants of work in an agricultural setting, which he also estimated and obtained the following results:

$$wrk = 3240.7 + 0.0353lhrs + 0.5779edu + 0.320age - 0.328age^2 - 0.0024male$$
$$\quad (145.11)\ (0.006) \qquad (0.043) \qquad (0.025) \qquad (0.025) \qquad (0.0002)$$

$n = 600$, $R^2 = 0.682$, $\overline{R}^2 = 0.577$ $DW = 1.892$ F- stat (probability) = 56.456 (0.001).
The variable *wrk* is the total hours spent working in an agricultural field per month, *lhrs* is the value that an individual attaches to leisure measured using a scale ranging from 0 to 10 and increases as the value increases, *edu* and *age* is education and age of the individual measured in years respectively, and *male* is a gender dummy. Values in parentheses are p-values.

a) (i) All other factors being equal, explain if there is any evidence of gender discrimination in field work. Which gender is more committed? **(4 marks)**
(ii) Test the null hypothesis that, holding other factors fixed, *edu* has no effect on the decision to work in the field? **(2 marks)**
(iii) Give an economic interpretation of the variable age^2. **(3 marks)**

b) Assuming the model was a *log-log* model:
(i) Give an economic interpretation for the variables *age, edu* and *male*.

(6 marks)

(ii) What assumptions can you make to ensure the validity of the given model results? **(4 marks)**

c) Comment on the *DW* statistic and the $\overline{R}^2$. **(6 marks)**

QUESTION 2

a) Explain the causes and consequences of heteroscedasticity in regression analysis. **(13 marks)**

b) Detail any test to detect the presence of autocorrelation in OLS regression. **(7 marks)**

c) Suggest any two methods that you can recommend to correct for multicollinearity explaining the specific circumstances that you would use each. **(5 marks)**

QUESTION 3

a) i) Build an equation for the demand of ice-cream with at least three dummy variables and one non dummy variable. **(5 marks)**

ii) Give an economic interpretation of the coefficients for any two of the dummies you have specified. **(4 marks)**

iii) Using the specified model and with the aid of a graph(s), distinguish between a slope and an intercept dummy. **(8 marks)**

b) Using the model in (a) above, construct three interaction dummies with at least one dummy-dummy interaction term and at least one non-dummy-dummy interaction term and interpret the variables. **(8 marks)**

QUESTION 4

Consider the following simultaneous equation model:

$$z_{1t} = \lambda_1 + \lambda_2 z_{2t} + \lambda_3 v_{1t} + u_{1t} \ldots\ldots\ldots(1)$$

$$z_{2t} = \tau_1 + \tau_2 z_{1t} + \tau_3 v_{2t} + u_{2t} \ldots\ldots\ldots(2)$$

a) State the endogenous and the exogenous variables in the model. **(3 marks)**

b) Obtain the reduced form equations. **(6 marks)**

b) Using both the rank and order conditions, which of the above equations is identified? **(7 marks)**

c) If an equation is over-identified, explain the method you will use to obtain the structural coefficients? **(3 marks)**

e) Detail the assumption(s) that you would violate by estimating a simultaneous equation model and explain the likely consequences of such action. **(6 marks)**

QUESTION 5

a) i. How is the form of the functional relationship decided in regression analysis? **(4 marks)**

ii. Explain any three functional forms used in regression analysis suggesting economic relationships that are appropriate for each. **(9 marks)**

b) i. Detail the consequences of the incorrect model specification in regression analysis. **(8 marks)**

ii. Identify and explain any method that is used to test for the presence of heteroscedasticity in regression analysis. **(4 marks)**

QUESTION 6

a) Explain in detail how to use the graphical method to test for stationarity **(7 marks)**

b) What is the difference between trend stationary and difference stationary series? **(6 marks)**

c) Explain briefly the meaning of the following concepts in time-series regression:

i) Second differencing **(3 marks)**

ii) Stable model **(3 marks)**

iii) Spurious regression **(3 marks)**

iv) Co-integration **(3 marks)**

END OF PAPER