

Elizade University, Ilara Mokin
Ondo-State, Nigeria
Department of Economics
2nd Semester 2018/2019 Examinations Questions



Course Code: ECN 308

Course Title: Introduction to Econometrics II

Instruction: Answer any THREE questions. Each question carries 20 marks.

Time Allowed: 2 hours Credit Unit: 2

Question One

- a) How would you define multiple regression model?
- b) State the assumptions of multiple regression model
- c) State and explain the three fundamental ways that the assumption of multiple linear regressions can be violated.
- d) State three causes of multicollinearity.
- e) State four consequences of multicollinearity problem.

Question Two

Given that the table below shows the quantity demanded (Y) and the explanatory variables of price (X_1) and income (X_2) represented by the multivariable model of the form;

$$Y = b_0 + b_1 X_1 + b_2 X_2$$

Answer the questions that follow.

N	Y_i (Quantity demanded)	X_1 (Price)	X_2 (Income)
1.	100	5	1000
2.	75	7	600
3.	80	6	1200
4.	70	6	500
5.	50	8	300
6.	65	7	400
7.	90	5	1300
8.	100	4	1100
9.	110	3	1300
10.	60	9	300

- I. Solve for \hat{b}_1
- II. Solve for \hat{b}_2
- III. Solve for the variance of \hat{b}_1
- IV. Solve for the variance of \hat{b}_2
- V. Calculate the t-statistics for coefficients \hat{b}_0 , \hat{b}_1 and \hat{b}_2

Question Four

Given that you implemented a regression analysis and arrived at the results below, answer the questions that follow.

$$Y_t = 9.257 + 1.621X_1 - 1.236 - 17.772$$

$$SE = (6.741) (1.102) (0.969) (0.981)$$

$$t\text{-stat} = (1.373) (1.479) (1.275) (18.124)$$

$$\text{Prob} = (0.173) (0.143) (0.206) (0.001)$$

$$\mathbf{R\text{-squared}} = 0.984176$$

$$\mathbf{Durbin\text{-Watson Stat}} = 2.131$$

Interpret the above regression coefficient results.

- I. Present illustrations to show that the t-statistics in the result are correctly calculated.
- II. Evaluate whether the parameters are statistically significantly different from zero or not using either the probability values or t-statistics.
- III. Interpret the R-squared and Durbin-Watson statistics.
- IV. State three ways of resolving multicollinearity problem in a regression model.

Question Five:

Given a set of three equations in a simultaneous equation system as expressed in the form:

$$Y_1 = Y_3 + 3X_1 + U_1$$

$$Y_2 = 5X_2 + U_2$$

$$Y_3 = 3Y_2 - X_1 + 2X_2 + U_3$$

Where Y s are the endogenous variables

X s are the exogenous variables and

U s are the disturbance terms

Determine the identification status of the three equations in the model. Note that the necessary and sufficient conditions for identification should be taken into consideration.

Question Five

- (1) Express the following production /sales structural simultaneous equation model in its reduced form :

$$q = a_0 + a_1P + a_2C + U_1 \dots \dots \dots (1)$$

$$s = b_0 + b_1P + b_2X + U_2 \dots \dots \dots (2)$$

$$q = s \dots \dots \dots (3)$$

Where q is the quantity produced
 c is the average cost of production
 s is the quantity sold
 X is the average income.

- (ii) Given the structural equations model below that are over identified, use two stage least squares method to arrive at estimable equations. Show the steps involved using this method.

$$\text{Income function: } Y_{1t} = b_{10} + b_1Y_{2t} + a_1X_{1t} + a_2X_{2t} + U_{1t} \dots \dots \dots (1)$$

$$\text{Money Supply function: } Y_{2t} = b_{20} + b_1Y_{1t} + U_{2t} \dots \dots \dots (1)$$