FEEDBACK TUTORIAL LETTER
SEMEMSTER 1: (2023)

ECONOMETRICS
ECM712S

Test1& make up test

FACULTY OF MANAGEMENT SCIENCES

DEPARTMENT OF ACCOUNTING, ECONOMICS AND FINANCE

Econometrics Test One [Distance students Only]
Date: **05 May 2023**
Marks: **72**
Lecturer: **P. Nangula**

Question One   **[15 marks]**
a) Use individual example different from the one in the study guide to demonstrate your understanding of the following methodology steps in econometrics.   [15   marks]

1. *Statement of theory or hypothesis.*

Men or women increase their consumption as their income increases, but not as much as the increase in their income.

2. *Specification of the mathematical model of the theory*

$$Y = \beta_1 + \beta_2 X \qquad 0 < \beta_2 < 1$$

where Y = consumption expenditure and X = income, and where β1 and β2, known as the parameters of the model, are, respectively, the intercept and slope coefficients. This is a single equation model

Y is dependent variable and X is independent or explanatory

3. *Specification of the mathematical and statistical, or econometric, model*

$Y = \beta_1 + \beta_2 X$, The purely mathematical model of the consumption function given above is of limited interest to the econometrician, for it assumes that there is an exact or deterministic relationship between consumption and income.

$Y = \beta_1 + \beta_2 X + u$, where u, known as the disturbance, or error, term, is a random (stochastic) variable that has well-defined probabilistic properties. The disturbance term u may well represent all those factors that affect consumption but are not taken into account explicitly.

4. *Obtaining the data*

Year	Y	X
1982	3081.5	4620.3
1983	3240.6	4803.7
1984	3407.6	5140.1
1985	3566.5	5323.5
1986	3708.7	5487.7
1987	3822.3	5649.5
1988	3972.7	5865.2
1989	4064.6	6062.0
1990	4132.2	6136.3
1991	4105.8	6079.4
1992	4219.8	6244.4
1993	4343.6	6389.6
1994	4486.0	6610.7
1995	4595.3	6742.1

Question Two [15 marks]

The table below demonstrate how panel data are collected which is a combination time series and cross-sectional data.

Year	Level of income (N$)		Personal index	
	John	Selma	Selma	John
2000	25	35	2.6	1.9
2001	26	39	2.8	2.6
2002	27	42	3.1	2.9
2003	29	47	3.4	3.1
2004	31	49	3.6	3.5
2005	34	51	3.9	4.1

a) Compute time series data from the table above   [5 marks]

Year	John
2000	25
2001	26
2002	27
2003	29
2004	31
2005	34

b) Construct five possible cross-sectional data from the table above   [10 marks]

	Level of income	Personal index
John	25	2.6
Selma	35	2.8

Question Three   [20 marks]

	80	100	120	140	160
Income					
Weekly family	79	80	102	130	154
consumption	84	93	107		147
expenditure Y, $	90	95	110		
		103	116		
			118		
Conditional mean	84.33333	92.75	110.6	130	150.5

Use the information in the table above to answer the following questions:

a) Calculate conditional mean associate with each level incomes.   [10 marks]

Conditional mean	84.33333	92.75	110.6	130	150.5

b) Calculate unconditional mean.   [5 marks]
   1608/15 = 107.2

c) Draw the population regression line.   [5 marks]

Question Four   [8 marks]
Determine whether the following models are linear in the parameters, or the variables, or both. Which of these models are linear regression models?

a) $Y_i = \beta_1 + \beta_2 \frac{1}{X_i} + \mu_i$

   Linear in parameter but not linear variables but a linear model

b) $lnY_i = \beta_1 + \beta_2 lnX_i + \mu_i$

c) *Linear in parameter but not linear variables but a linear model*

d) $Y_i = ln\beta_1 + \beta_2 \frac{1}{X_i} + \mu_i$

Not linear in parameter and not linear variables but not linear model

e) $Y_i = \beta_1 + \frac{\beta_2}{\beta_1} \frac{1}{X_i} + \mu_i$

Not linear in parameter and not linear variables but not linear model

Question Five [14 marks]

Why is it important to include a disturbance term in the econometrics model?

The significance of stochastic disturbance term
  1. *Vagueness of theory*
  2. *Unavailability of data*
  3. *Core variable versus peripheral variables*
  4. *Intrinsic randomness in human behavior*
  5. *Poor proxy variables*
  6. *Principle of parsimony*
  7. *Wrong functional form*

All the best

NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OFCOMMERCE, HUMAN SCIENCE AND EDUCATION

DEPARTMENT OF ECONOMICS, ACCOUNTING AND FINANCE

Econometrics make test [Full, Part and Distance Students]
Date: **17 May 2023**
Marks: **50**
Lecturer: **P. Nangula**

Question One   [20 marks]
Question One

a) Summary output table of $\hat{Y}_i = \hat{\beta}_1 + \hat{\beta}_2 X_i$ where y hat is the estimated consumption and x is consumer level of income

Multiple R	0.998906
R Square	**i)**
Adjusted R Square	**ii)**
Standard Error	21.14699
Observations	13

ANOVA

	df	SS	MS	F	Significance F
Regression	1	2244134	2244134	5018.24	5.51E-16
Residual	11	**iv)**	447.1954		
Total	12	2254134			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	-158.409	56.99757	**v)**	0.017929	-283.86
X(Income)	**iii)**	0.009905	70.83953	5.51E-16	0.679847

Use the information above to answer the following questions:
   i) Calculate R^2 of this model   [3 marks]
       R square = 2244134/2254134 = 0.995564

   ii) Calculate adjusted R^2 of this model   [3 marks]
       Adj R square = 1 –[(1- R square)(n-1)/n-k-1)
   iii) Calculate slope coefficient or income parameter   [3 marks]
       Income parameter = standard error x t stat = 0.009905*70.83953 = 0.7

iv) Calculate residual sum of square (RSS)   [3 marks]
   RSS = 2254134 – 2244134 =10000
v) Calculate the t statistics of the intercept   [3 marks]
   T stat for intercept = intercept coefficient / standard error= -158.409/56.99757 = - 2.779
vi) Is this model supposed to be an intercept present model or intercept absent model if adjusted R^2 =0.916624 of the absent intercept model?   [5 marks]
The model supposed to include intercept because the intercept coefficient is statistically significant.

Question Two   [22 marks]

Income	80	100	120	140	160
Weekly family	79	80	102	130	154
consumption	84	93	107	137	147
expenditure Y, $	90	95	110	131	150
		103	116	140	155
			118		

Use the information in the table above to answer the following questions:
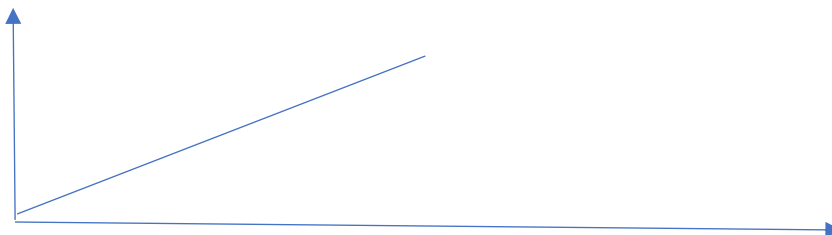a) Calculate conditional mean associate with each level incomes.   [10 marks]

Income	80	100	120	140	160
Weekly family	79	80	102	130	154
consumption	84	93	107	137	147
expenditure Y, $	90	95	110	131	150
		103	116	140	155
			118		
Conditinal mean	**84.33333**	**92.75**	**110.6**	**134.5**	**151.5**

b) Calculate unconditional mean.   [6 marks]
   2321/20 =116.05
c) Draw the population regression line.   [6 marks]

Question Four [8 marks]

Explain four differences between model with intercept and model without intercept.

Model without intercept uses raw sum of squares whereas model with intercept uses mean-adjusted sum of squares

•The d.f in computing σ^2 is n-1 in the model without intercept rather n-2 as in the case of an intercept-present model

•In the intercept-absent model R^2 may turn out to be negative and give nonsensical results

•The Σe_is always zero in the intercept-present model unlike in the intercept-absent model

<u>All the best</u>