



UNIVERSITY OF JOHANNESBURG

Department of Economics and Econometrics

November 2016 Examination

Course : Econometrics 2B
Examiner : Mr JJ Kouadio
Internal moderators : Prof Mwamba
Time : 180 minutes **Marks: 90**

This paper consists of 9 pages. Answer ALL the questions.

Please round off all answers to four (4) decimal places.

Surname:																						
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Initials:				
-----------	--	--	--	--

Student number:									
-----------------	--	--	--	--	--	--	--	--	--

	Mark allocated	Mark Scored
Question 1	14	
Question 2	10	
Question 3	52	
Question 4	14	
Total	90	

Question 1

[14 marks]

State with reason whether the following statements are true, false or uncertain.

- a) The t test of significance requires that the sampling distributions of estimators $\widehat{\beta}_1$ and $\widehat{\beta}_2$ follow the normal distribution. (2)

- b) The p value and the size of a test statistic mean the same thing. (2)

- c) If a null hypothesis is not rejected, it is true. (2)

- d) Even though the disturbance term in the CLRM is not normally distributed, the OLS estimators are still biased (2)

- e) The conditional variance, $\text{var}(Y_i|X_i) = \sigma^2$, and the unconditional variance of Y, $\text{var}(Y) = \sigma_y^2$, will be the same if X had no influence on Y. (2)

- f) If there is no intercept in the regression model, the estimated u_i will not sum to zero. (2)

- g) The higher the value of σ^2 , the larger is the variance of $\widetilde{\beta}_2$ (2)

Question 2

[10 marks]

Provide the slope for each of the models in the table below. (2 marks each)

Model	Equation	Slope (dY/dX)
Linear	$Y = \beta_1 + \beta_2 X$	
Log-linear	$\ln Y = \beta_1 + \beta_2 \ln X$	
Lin-log	$Y = \beta_1 + \beta_2 \ln X$	
Reciprocal	$Y = \beta_1 + \beta_2 \left(\frac{1}{X}\right)$	
Log-lin	$\ln Y = \beta_1 + \beta_2 X$	

Question 3**[52 marks]**

According to Keynesian theory, demand for money depends on the level of income, the level of interest rate and the price level.

You are provided with real South African data for a measure of quantity of money that is, $M1_{current}$; a measure of level of income that is, Gross Domestic Product (GDP); interest rate (%) measured by long-term government bond yield (GBY) and price level measured by CPI.

Use the data provided in Excel worksheet to answer some of the following questions:

Now, estimate the following double-log function (not that interest rate is not logged).

$$\ln M1_t = \alpha + \beta_1 \ln GDP_t + \beta_2 GBY_t + \mu_t$$

- a) Provide a summary of the regression results and write down the equation of the regression line and t statistics. (4)

- b) Interpret the partial slope estimates of β_1 and β_2 . Explain why they are elasticities.

(6)

- c) Do the regression results make economic sense?

(4)

- d) Are β_1 and β_2 coefficients statistically significant? Explain. *Remember to include your hypothesis.* Construct a 95 per cent confidence interval for estimates of β_2 .

(6)

- e) Is the overall regression statistically significant? Explain. Given $\alpha = 0.05$.

Remember to include your hypothesis.

(5)

- f) Now add price level (lnCPI) into the regression equation. In the light of your results, should price level be added to the regression? Explain your answer. (4)

- g) Using the dummy variable, test if a structural break occurred in the second quarter of 1994. Test for both a change in intercept and a change in the slope. Show all your steps. *Remember to include your hypothesis.* $\alpha = 0.05$ (6)

- h) Provide a regression equation for the period before and after the second quarter of 1994. (4)

- i) Does your regression suffer from multicollinearity? How do you know? *Hint: Create a correlation matrix.* (5)

- j) Explain how you can sort out multicollinearity problem in the regression, if present. (3)

- k) Are the residuals from the regression normally distributed? Perform an appropriate test given that $\alpha=0.05$. *Remember to include your hypothesis.* (5)

Question 4**Clearly answer the following questions****[14 marks]**

- a) What is meant by Ordinary Least Squares method (OLS)? How can the regression coefficients be obtained using this method? (4)

- b) Discuss three properties of the OLS estimators (6)

- c) Name the eight (8) steps of the traditional econometric methodology (4)

END OF PAPER