UNIVERSITY
—OF—
JOHANNESBURG

DEPARTMENT OF ECONOMICS AND ECONOMETRICS

DEPARTEMENT EKONOMIE EN EKONOMETRIE

FINAL ASSESSMENT NOVEMBER 2014

Course:	Econometrics 3B
Assessor:	Mr JJ Kouadio
Internal Moderator:	Mrs M Pretorius
External Moderator:	Ms NS Cattaneo
Time:	**180** minutes
Marks:	**120**

<u>This paper consists of 16 pages</u>

Answer all the questions. An Excel file is provided, with different sheets. Use the Excel file provided for some of the questions. The Excel sheets are labeled after each question. Round your answers to four decimal places

Surname & Initials _____

Student number _____

Cellphone number _____

Question	Mark	Total
1		26
2		26
3		26
4		20
5		22
Total		**120**

Question 1:   **26 Marks**

Part 1   **[10]**

Decide whether the following statements are true, false or uncertain. Briefly justify your answer.

1. The Koyck model will not make sense if the distributed lag coefficients are positive.

(2)

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2. Statistical inference in a nonlinear least-squares (NLLS) regression cannot be made on the basis of the usual t, F, and X^2 tests even if the error term is assumed to be normally distributed.   (2)

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3. If a time series is I (0) you have to difference it once to make it stationary.   (2)

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4. The ECM is a means of reconciling the short-run behaviour of an economic variable with its erratic behaviour.   (2)

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5. One of the advantages of the Almon method is that it provides a flexible method of incorporating a variety of lag structures. (2)

Part B: [16]

Answer the following theory by providing a clear answer.

a. Explain the connection between cointegration and spurious regression. (4)

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b. Discuss the fundamental problem with the Linear Probability Model (LPM) and explain how its alternatives help solve this problem. (4)

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c. Discuss the two major estimation problems encountered in the Koyck model and the Adaptive Expectation Model. (4)

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d. What is meant by intrinsically linear and intrinsically nonlinear regression models? (4)

Question 2:   [26 Marks]

2.1. Briefly explain the simultaneous-equation bias problem.   (4)

2.2. You are given the following simple Keynesian model of income determination.

$$C_t = a_0 + a_1 Y_t + u_{1t}$$
$$I_t = b_0 + b_1 Y_t + b_2 Y_{t-1} + u_{2t}$$
$$Y_t = C_t + I_t + G_t$$

i. From the simultaneous – equation model above, distinguish the endogenous variables from the predetermined variables.   (4)

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ii. Write down the reduced form of the behavioural equations.   (6)

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iii. Establish the identification state of each of the structural equations, using both the rank and the order conditions. (10)

iv. What is the identification state of the entire model? (2)

Question 3
[26 Marks]

Use the data provided in the excel worksheet Question 3.xls to provide answers to the following questions where necessary.

Consider the following representation of house ownership:

$$P_i = \frac{1}{1 + e^{-(Z)}}$$

Where $Z = \beta_1 + \beta_2 X_i + u_i$ and X represents income level and P the probability of owning a house

3.1. Which cumulative distribution does the above equation represent? (2)

3.2. Transform the above equation into an intrinsically linear model (show all the steps) and name the model obtained. (4)

3.3. Provide the expression of the variance of the error term of the model obtained in question 3.2 (2)

3.4. What estimation method is more appropriate to estimate the coefficients (β_1 and β_2) of the model obtained in question 3.2? OLS or Weighted Least Squares (WLS)? Why? (3)

3.5. Estimate β_1 and β_2 using the **OLS method** and report your regression results.

(3)

3.6. Estimate β_1 and β_2 using the **WLS method** and report your regression results

(5)

3.7. Compare and comment on the OLS and WLS regressions in 3.5 and 3.6 (3)

3.8. Using the results of the WLS method, calculate the probability of owning a house when the income level is 10000. (2)

3.9. Using the results of the WLS method, calculate the rate of change of probability of owning a house when the income is equal 20000. (2)

Question 4 [20 Marks]

Consider the dividends and profits time series provided in the excel worksheet Question 4.xls. Since dividends depend on profits, consider the following simple model:

$$lnDividends_t = \beta_1 + \beta_2 lnCP_t + u_t$$

a. Run the model and report your results (2)

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b. Using the Granger and Newbold's rule of thumb would you suspect the regression to suffer from the spurious regression phenomenon? (2)

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c. Determine the order of integration of the logged dividends and logged profits. Report all your results. (4)

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d. Are the logged dividends and logged profits cointegrated? Show how you would test for this. (6)

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e. Assuming that there is cointegration, employ the error correction mechanism (ECM) to study the short-run and long run behavior of the logged dividends in relation to the logged profits. (6)

Question 5 [22 Marks]

Consider the following model:

$$Y_i = \beta_1 e^{\beta_2 X_i} + u_i$$

a. Name this type of model (2)

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b. Using the data provided in the Excel file named Question 5.xls, run and report the regression model. (4)

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c. All inference procedures in nonlinear regression model (NLRM) should be based on a specific condition. State that condition. (2)

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d. Are the coefficients statistically significant? Why? (4)

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e. Determine the rate of change of Y(=fee) with respect to X(asset size). Show all your calculations. (4)

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f. What is the expected rate of change in Y when X is equal to 20? (3)

g. Do you suspect the presence of autocorrelation in this model? Why? (3)

Good Luck