



MAASAI MARA UNIVERSITY
REGULAR UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR
SCHOOL OF BUSINESS AND ECONOMICS
BACHELOR OF SCIENCE IN ECONOMICS,
BACHELOR OF SCIENCE IN FINANCIAL
ECONOMICS, BACHELOR OF SCIENCE IN
ECONOMICS AND STATISTICS, BACHELOR OF
SCIENCE IN PROJECT PLANNING AND
MANAGEMENT

FOURTH YEAR SECOND SEMESTER/THIRD YEAR
SECOND SEMESTER

COURSE CODE: ECO 4203-1/ECS 3203-1

COURSE TITLE: ECONOMETRICS II

DATE:

TIME:

INSTRUCTIONS:

Answer **Question One** and any other Three Questions

QUESTION ONE

- a. Differentiate between the following terms.
 - i. Dummy independent variable and dummy dependent variable. **(2 marks)**
 - ii. Ordinary Least Square Estimator and Maximum Likelihood Estimator. **(2marks)**
 - iii. Structural equations and reduced form equations. **(2 marks)**
 - iv. Time series data and Panel data. **(2 marks)**

- b. Consider the following data which shows the amount of time in hours people spend watching the television as a function of their age and gender:

Hours watching TV	Gender	Age of individual
0	Male	41
180	Male	19
360	Female	54
900	Male	22
0	Male	48
360	Female	52
3600	Female	24
630	Male	60
1440	Female	28
0	Male	58
360	Female	35
4680	Female	67
630	Female	30
1440	Female	21

Let Gender be defined as: D = 1 if Female
 0 if Male

Required:

- (a) Regress hours against gender and age of individual using matrix algebra and interpret the results of the estimated model. **(8 marks)**
- (b) Compute R-squared and interpret. **(5 marks)**
- (c) Derive the variance-covariance matrix $\sigma^2(\mathbf{X}'\mathbf{X})^{-1}$ **(4 marks)**

QUESTION TWO

a. Consider the following Linear Probability Model (LPM) regression results of the labor force participation of women;

$$\widehat{D}_i = \text{pr}(D_i=1) = -0.28 - 0.38M_i + 0.09S_i$$

$$N = 30, \widehat{R}^2 = 0.32, \widehat{R}_p^2 = 0.81$$

Where: $D_i=1$ if the i th woman is in the labor force, and 0 otherwise,

M_i = marital status defined as $M_i=1$ if married, 0 otherwise,

S_i = number of years of schooling of the i th woman.

- i. interpret the regression results of this model (4 marks)
 - ii. Do you think LPM is the best estimation method for the above model? Why? (4 marks)
- b. The estimates obtained by OLS and MLE are identical for a linear equation that meets the classical assumptions. Which estimator is mostly preferred? and why (3 marks)
- c. Discuss steps involved in the Indirect Least Squares method (4 marks)

QUESTION THREE

- a) Differentiate between direct effect and Total effect in simultaneous equations (2 marks)
- b) Consider the following simultaneous equation model:

$$\begin{aligned} Y_t &= C_t + I_t + G_t \\ C_t &= \beta_0 + \beta_1 Y_t - \beta_2 T_t + e_{1t} \\ I_t &= \alpha_0 + \alpha_1 Y_{t-1} - \alpha_2 R_t + e_{2t} \end{aligned}$$

- i. Obtain the reduced form equations for this model (5 marks)
 - ii. What is the Total effect and direct effect of Taxes on consumption (3 marks)
- c) Using rank condition, identify and give the appropriate method for estimation for each equation (5 marks)

QUESTION FOUR

- a) Differentiate between the following terms as used in time series analysis
 - i. A Purely Random Walk and Random Walk processes (2 marks)
 - ii. Difference stationary and Trend stationary (2 marks)
 - iii. The Dickey-Fuller tests and Augmented Dickey-Fuller test (2 marks)
- b) Explain in details the properties of a weakly stationary time series stochastic process. (6 marks)
- c) Define and explain the meaning of the term cointegration as used in time series analysis. (3 marks)

QUESTION FIVE

- a) Highlight and explain the key advantages of Panel data over other types of data **(5 marks)**
- b) Describe the steps of undertaking a seemingly unrelated regression process. **(4 marks)**
- c) Differentiate between a fixed effect model and random effect model. **(4 marks)**
- d) Explain how an econometrician chooses between a fixed effect and random effect model. **(2 marks)**

ECO 4203-1/ECS 3203-1
ECONOMETRICS II
Course Instructor: GASTONE OTIENO
GLADYS KEMBOI
Contact Hours: 3 Hours

Purpose: To build on basic statistics, inference and regression as covered in Econometrics I.

Expected Learning Outcomes of the Course

By the end of the course unit the student should be able to: -

1. Show understanding of the methods involved in using statistical software to provide results
2. Interpret and comment on results
3. Identify the problems in modeling.

Course Content

Week	Main Topic	Sub Topic
1	INTRODUCTION	<ul style="list-style-type: none"> • Review of concepts of Econometrics • Regression in matrix algebra • Variance-covariance Matrix
2	DUMMY INDEPENDENT VARIABLES	<ul style="list-style-type: none"> • Introduction to dummy independent variables • Incorporating dummy variables in a regression model • Interaction effects of dummy variables (intercept and slope effects) • ANOVA and ANCOVA models
3	DUMMY DEPENDENT VARIABLE MODELS	<ul style="list-style-type: none"> • introduction to dummy dependent variables • the Linear Probability Model • the logit and probit model (Binary cases)
4	DUMMY DEPENDENT VARIABLE MODELS	<ul style="list-style-type: none"> • Marginal effects for Dummy dependent Variable models • Goodness of fit for dummy dependent variable models

5	CAT 1	
6	SIMULTANEOUS EQUATION MODELS	<ul style="list-style-type: none"> • Introduction to simultaneous equations • Endogenous versus Exogenous variables • Structural equations and reduced form equations
7	SIMULTANEOUS EQUATION MODELS	<ul style="list-style-type: none"> • The Simultaneity bias in OLS estimation • Identification of Simultaneous equations – Order and Rank conditions • Methods of estimating simultaneous equations
8	TIME SERIES	<ul style="list-style-type: none"> • Introduction to Time series Econometrics • Characteristics of time series • Data generating processes • Stationary and non-stationary series: Unit roots
9	TIME SERIES	<ul style="list-style-type: none"> • Testing for stationarity of time series and remedial measures for non-stationary series • Integrated time series • Cointegration and Error-correction Model
10	CAT 2	
11	PANEL DATA ANALYSIS	<ul style="list-style-type: none"> • Introduction to Panel Data • Merits and demerits of Panel Data • Types of panel data
12	PANEL DATA ANALYSIS	<ul style="list-style-type: none"> • Models for estimation of Panel Data • Fixed Effects and Random effects: The Hausman Test

Prerequisites: ECO 4103-1 Econometrics I

Mode of Delivery

The course materials will be delivered through lectures, guided readings and homework and assignments. There will be 3 contact hours per week. A minimum 3 hours of independent study for each contact hour of a lecture is recommended.

Teaching/learning strategies

1. Lectures
2. Tutorials
3. Discussion
4. Guided library reading and guided reading

5. Presentations
6. Individual consultations
7. E-Learning

Instructional materials

8. LCD projectors
9. Text books, magazines, journals
10. Chalkboards/whiteboards
11. Computers and research tools
12. Reference materials

Course monitoring/evaluation

13. Student's class attendance lists
14. Orientation
15. Supervision
16. Student's evaluation of the course/lecturer at the end of the course
17. Student's progress reports
18. Peer evaluation
19. External examiners reports
20. External and internal auditor's reports at the end of every semester of an academic year.

Course Assessment Methods

21. The following assessment methods will be used:
22. Assignments & Continuous Assessment Tests (CATs) 30%
23. Final examination 70%
24. TOTAL 100%
25. The assignments will consist of theoretical and applied problems to be solved by the students. The CATs will be based on the lectures, readings, and homework assignments. The final examinations will test the knowledge gained throughout the course.

Core Reading texts

1. Damodar N. Gujarati, Dawn C. Porter and Sangeetha Gunasekar (2013). *Basic Econometrics*. New York/New Delhi: MacGraw Hill Education (India).
2. G. S Maddalla & Kajal L. (2009). *Introduction to Econometrics*. 4th ed. John Wiley and Sons Ltd.
3. Koutsoyiannis, A. (1993). *Theory of Econometrics: An Introductory Exposition of Econometric Methods*. Houndsmills: The Macmillan Press Ltd.

Recommended Reference Materials

1. Peter, K. (2008). *Guide to Econometrics*, USA: Black Well Publishing
1. Salvatore, Dominick & Reagle, D. (2002). *Statistics and Econometrics*, 2nded. The McGraw Hill Book Company
3. Carter H., William E.G., and Guay L.C., *Principles of Econometrics* 4th Ed, Willey.

4. Adkins and Hill. *Using STATA for Principles of Econometrics*, 4th Ed.