



**HERBERT CHITEPO SCHOOL OF LAW AND BUSINESS SCIENCES  
DEPARTMENT OF ECONOMICS AND FINANCE**

**MAIN EXAMINATION**

**BACHELOR OF COMMERCE DEGREE**

**PART 2 SEMESTER 1**

**INTRODUCTION TO FINANCIAL ECONOMETRICS**

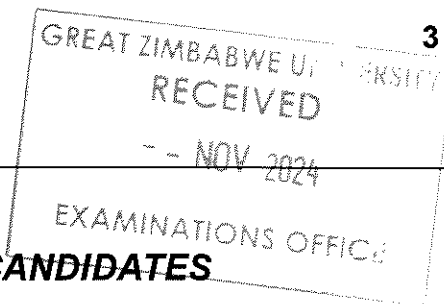
**HEF216**

**DATE**

**2024**

**DURATION**

**3 HOURS**



***INSTRUCTIONS TO CANDIDATES***

- 1. Answer any four questions*
- 2. All questions carry equal marks*
- 3. Start each answer on a fresh page*
- 4. Show all workings, where applicable*

**QUESTION 1**

- (a) Explain the following terms in relation to properties of good estimators:
- (i) Consistency [5 marks]
  - (ii) Asymptotic normality [5 marks]
- (b) Differentiate between statistical relationships from deterministic relationships. [6 marks]
- (c) Explain why the following disciplines are important to econometrics.
- (i) Economic theory; [4 marks]
  - (ii) Mathematical economics; and [3 marks]
  - (iii) Economic statistics. [2marks]

**[Total 25 marks]**

**QUESTION 2**

- (a) Given the following model  $Y = \alpha + \beta X + \mu$ , derive the ordinary least squares estimators  $\hat{\alpha}$  and  $\hat{\beta}$  in deviation form. [10 marks]
- (b) Prove that estimators  $\hat{\alpha}$  and  $\hat{\beta}$  are unbiased. [15 marks]

**[Total 25 marks]**

**QUESTION 3**

The data below shows the demand for money (M) in US\$ billions and the rate of interest (R) as a percentage, for 8 different economies:

M	36	50	46	30	20	35	37	61
R	6	4	5	7	8	5	6	3

Given that the values given below show the variables in deviation from their mean:

$$\sum m^2 = 1\,123.875 \quad \sum r^2 = 20.179 \quad \sum mr = 142.888$$

Assuming a relationship given as  $M = \alpha + \beta r + \mu$

- (a) Compute the OLS estimates for  $\alpha$  and  $\beta$ . [6 marks]
- (b) Compute the standard errors for  $\hat{\alpha}$  and  $\hat{\beta}$ . [8 marks]
- (c) Test the significance of the variables in the model. [6 marks]
- (d) Compute the coefficient of determination and comment on your findings. [3 marks]

(e) Determine if the model is correctly specifies.

[2 marks]

[Total 25 marks]

#### QUESTION 4

(a) Differentiate differential intercept from differential slope in a dummy variable model.

[4 marks]

(b) Illustrate how the following models can be transformed to linear models.

(i)  $Y = AX^\beta e^\varepsilon$

[3 marks]

(ii)  $Y = Ae^{\beta X^\varepsilon}$

[3 marks]

(iii)  $Y = \alpha + \beta\left(\frac{1}{X}\right) + \varepsilon$

[3 marks]

(c) Explain how Durbin Watson (*d*) Statistic is used to test for model misspecification.

[12 marks]

[Total 25 marks]

#### QUESTION 5

Suppose a money demand function is given as  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \mu$ , where Y is money demand,  $X_1$  is income and  $X_2$  is interest rate. Given that:

$$\sum Y = 1677,7$$

$$\sum X_1 = 27163,1$$

$$\sum X_2 = 125,75$$

$$\sum X_1^2 = 46832239$$

$$\sum X_2^2 = 1540943$$

$$\sum X_1 Y = 265708$$

$$\sum X_2 Y = 13317,49$$

$$\sum X_1 X_2 = 248214,5$$

n = 10

(a) Estimate the parameters of the model.

[9 marks]

(b) Calculate standard errors of the estimated parameters.

[6 marks]

(c) Obtain r-squared and adjusted r-squared.

[4 marks]

(d) Comment on the results taking prior expectations you have about the relationship between Y and X variables.

[6 marks]

[Total 25 marks]

END OF EXAMINATION