Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SET A

SCHOOL OF COMMERCE
END TERM EXAMINATION - JAN 2024

Semester : Semester III - 2022
Course Code : BSE1009
Course Name : Basic Econometrics
Program : B.Sc. Economics

Date : 03-JAN-2024
Time : 1:00 PM - 4:00 PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **5 X 2M = 10M**

1. Define econometrics and highlight its key objectives.
(CO1) [Knowledge]
2. Define nominal data and ordinal data. Provide examples of variables that are measured on a nominal scale and ordinal scale.
(CO1) [Knowledge]
3. Define Maximum Likelihood Estimation (MLE) and its role in econometrics.
(CO2) [Knowledge]
4. Define "goodness of fit" and "adjusted R-square" and explain its role in regression analysis.
(CO2) [Knowledge]
5. Define the Linear Probability Model and explain its key assumptions.
(CO6,CO3) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **5 X 10M = 50M**

6. Define hetroscedasticity. When hetroscedasticity is present, are the coefficients biased? is the variance for the coefficients correct? are the tests and F-tests valid?
(CO3) [Comprehension]

7. Explain the causes of heteroscedasticity. Elaborate on the rationale behind using $1/\sqrt{h}$ as the equivalent in Weighted Least Squares (WLS), even though the weight is represented as 1/h. Provide an answer to the question.

(CO3) [Comprehension]

8. Compare and contrast the Probit Model and the Logit Model in the context of binary choice models. Highlight the similarities and differences between these two models. Discuss the situations where one model might be preferred over the other.

(CO4) [Comprehension]

9. Consider an equation to explain salaries of CEOs in terms of annual firm sales, return on equity (roe, in percentage form), and return on the firm's stock (ros, in percentage form):
log(salary) = β0 + β 1log(sales) + β 2roe + β 3ros 1 u.
(i) In terms of the model parameters, state the null hypothesis that, after controlling for sales and roe, ros has no effect on CEO salary. State the alternative that better stock market performance increases a CEO's salary.
(ii) Using the data in CEOSAL1.RAW, the following equation was obtained by OLS:
log(salary) = 4.32 1 .280 log(sales) + .0174 roe + .00024 ros
(.32) (.035) (.0041) (.00054)
n = 209, R2 = .283.
By what percentage is salary predicted to increase if ros increases by 50 points?
Does ros have a practically large effect on salary?
(iii) Test the null hypothesis that ros has no effect on salary against the alternative that ros has a positive effect. Carry out the test at the 10% significance level.
(iv) Would you include ros in a final model explaining CEO compensation in terms of firm performance? Explain.

(CO4) [Comprehension]

10. Describe autocorrelation. Mention common methods for detecting autocorrelation in a time series dataset.

(CO5) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **2 X 20M = 40M**

11. Using the data in GPA2.RAW on 4,137 college students, the following equation was estimated by OLS:
colgpa = 1.392 - .0135 hsperc +.00148 sat
n = 4,137, R2 = .273,
where colgpa is measured on a four-point scale, hsperc is the percentile in the high school graduating class (defined so that, for example, hsperc = 5 means the top 5% of the class), and sat is the combined math and verbal scores on the student achievement test.
(i) Why does it make sense for the c ficient on hsperc to be negative?
(ii) What is the predicted colleg A when hsperc = 20 and sat = 1,050?
(iii) Suppose that two high school gradua A and B, graduated in the same percentile from high school, but Student A's SAT score was 140 points higher (about one standard deviation in the sample). What is the predicted difference in college GPA for these two students? Is the difference large?
(iv) Holding hsperc fixed, what ference in SAT scores leads to a predicted colgpa difference of .50, or one-half of a grade point? Comment on your answer.

(CO6) [Application]

12. Examine the possible impacts of positive autocorrelation on regression analysis outcomes. Investigate the difficulties and distortions introduced by negative autocorrelation within statistical models.

(CO6) [Application]