ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27
MA ECONOMICS – III SEMESTER
SEMESTER EXAMINATION: OCTOBER 2019
EC9418: BASIC ECONOMETRICS

Time- 2 ½ hrs   **Max Marks-70**

This paper contains TWO printed pages and THREE parts

PART A   **Answer any FIVE of the following**   **2 X5=10**

1. What is the difference between an estimator and an estimate? Explain in the context of simple regression model given underlying population regression line $\beta_0 + \beta_1 X_i$

2. What is need for adjusted R square?

3. "A variable can be statistically significant but not economically significant." Explain.

4. Re-formulated the following equation to be linear in parameters: $y = Ax^{\beta} e^u$.

5. In a regression model with 2 explanatory variables, X and Z how is the interpretation of the coefficient on X different from a model with only X as the explanatory variable?

6. What is Variance Inflation Factor (VIF)?

7. Define auto-correlation.

PART B   **Answer any THREE of the following**   **10x 3=10**

8. What is a joint or compound test? What is the basic idea (in term of fit or residual) behind using F-test to conduct a joint test? Consider a simple regression model with 3 explanatory variables to explain.

9. A researcher with a sample of 50 individuals with similar education, but differing amounts of training, considers that hourly earnings (Wages), may be related to hours of training, (Training), according to the relationship:
$$Wages = \beta_0 + \beta_1 Training + u$$

He wants to test the null hypothesis $H_0: \beta_1 = 0$ against the alternative hypothesis $H_a: \beta_1 \neq 0$ at *both* 5 percent and 1 percent levels.

What would be the decision if $\beta_1 = 0:30$, $se(\beta_1) = 0.12$?

The critical values of t-stat for 48 degrees of freedom at the 5 percent, 1 percent levels are 2.01 and 2.68.

10. If a variable should be included in the model but is not, there is omitted variable bias. Consider the true model which includes $X_1 \ and \ X_2$ but the estimated model excludes one of these variables. Derive the Omitted Variable Bias and give the intuition for the bias.

11. Explain the types of error in hypothesis testing with an example.

12. What does it mean if an estimator is unbiased? In a simple linear equation with one explanatory variable: $Y = \beta_0 + \beta_1 X + u$ show that the OLS estimator $\beta_1 = \frac{\sum_i^n (Y_i - \bar{Y})(X_i - \bar{X})}{\sum_i^n (X_i - \bar{X})^2}$ is unbiased?

PART C   Answer any TWO of the following   15 X2=30

13. A researcher is interested in understanding how wage is affected by being part of union. In addition, she is interested in finding if being a union member affects wage differently for male and female.
    a. Write a model which includes a dummy variable to capture the impact of being a union member.
    b. Can an interaction model be used to capture how union membership impacts male and female differently.

14. What are the consequences of autocorrelation? Suggest a potential remedy to solve AR(1) autocorrelation problem.

15. Given 2 samples, show the Chow test to examine if you should combine them. Recall that it is a variant of F test with the general form of

$$F = \frac{Improvement \ in \ fit/extra \ degrees \ of \ freedom}{residual \ sum \ of \ squares/degrees \ of \ freedom \ remaning}$$