

October 12, 2010

Econometrics (ECO 4421)

Class No. 84362

Department of Economics, Florida International University
Fall Semester 2009

Midterm Examination

[20 percent]

Instructions: There are two questions in all, each having several parts. Answer all parts of all questions.

You will get more credit for precise answers and penalized for vague answers. Answers that do not directly address the question being asked but rather only provide some tangential information will not get any credit.

Be as specific as you can get. As a general rule of thumb providing more details in an answer is better.

Question 1

[10 percent]

Provide brief, but complete, answers to the following questions.

- (i) What are the assumptions of the regression errors in the classical linear regression model?
- (ii) What does the Gauss-Markov theorem state about the OLS estimators in the classical linear regression model?
- (iii) As you increase the significance level of any hypothesis test, what happens to the probability of rejecting the null hypothesis?
- (iv) Prove that $\sum e_i \hat{Y}_i = 0$ that is, the sum of the product of residuals e_i and the estimated Y_i is always zero.
- (v) Prove that $\bar{Y} = \bar{\hat{Y}}$ that is, that the means of the actual Y values and the estimated Y values are the same.

Question 2**[10 percent]**

Consider the simple regression model $Y_t = \alpha + \beta X_t + u_t$ in which Y_t is total expenditure on travel and X_t is total income for the t^{th} state. Including the District of Columbia, you have data for 51 observations. Both variables are measured in billions of dollars. The following is a partial computer output for the data:

Variable	Coefficient	Standard Error
Constant	0.4981	0.5355
Income	0.0556	0.0033
Error Sum of Squares (ESS)	417.110	
Total Sum of Squares (TSS)	2841.330	

- (i) What is the economic interpretation of the estimated coefficient for income? Does the numerical value appear reasonable?
- (ii) Test individually whether the coefficients for the constant term and income are significantly different from zero at the 5 percent level. Be sure to state the null and alternate hypotheses, the test statistic and its distribution, the critical value (or range), and the criterion. What is your conclusion?
- (iii) Compute the measure of goodness-of-fit.
- (iv) Compute the 95% confidence intervals for the intercept and the slope coefficient.