

Econ 120B
Spring 2003

Ramu Ramanathan
First Midterm (20%)

Your name (please print it) _____

Your Student Id. (NOT Soc. Sec. no.) _____

DO NOT TURN THIS PAGE UNTIL EVERYONE HAS RECEIVED THE EXAM AND YOU ARE GIVEN THE SIGNAL TO START. ALSO, YOU MUST STOP WRITING WHEN YOU ARE ASKED TO DO SO (YOU WILL BE GIVEN A 2 MINUTE WARNING). TEN POINTS WILL BE DEDUCTED FOR EACH MINUTE OF EXTRA TIME IT TAKES YOU TO STOP WRITING.

If you use a pencil, you forfeit the right to complain about grading UNLESS YOU PICK UP THE EXAM FROM THE TA FROM HIS/HER OFFICE AND LOOK AT THE GRADING BEFORE LEAVING THE OFFICE.

Make sure that all pages (1 through 4) are there. Read the questions carefully and make sure that you do not misunderstand them. If you get stuck somewhere, don't waste time but move on.

I CONSIDER CHEATING AS A VERY SERIOUS MATTER AND WILL GIVE AN F IN THE COURSE TO ANY ONE CHEATING AND ALSO REFER HIM/HER TO THE DEAN FOR DISCIPLINARY ACTION.

MAXIMUM NUMBER OF POINTS = 50

THE NUMBER OF POINTS FOR EACH PART IS AN INDICATION OF THE MAXIMUM NUMBER OF MINUTES THAT PART WOULD REQUIRE TO ANSWER.

SHOW ALL YOUR WORK IN COMPLETE

I. Carefully explain whether the following statements are correct or not.

I.1 (5 points) A high p-value means that the corresponding regression coefficient is significantly different from zero.

I.2 (5 points) If the errors are serially correlated or heteroscedastic, then Coefficients cannot be unbiased or consistent.

I.3 (5 points) The p-value is the probability that the null hypothesis is true.

II.

An investigator gathered the following data on the salaries and employment characteristics of 49 employees in a certain company.

WAGE = Wage rate per month (actual dollars) – dependent variable

EDUC = Years of education beyond 8th grade when hired

EXPER = Number of years at the company

AGE = Age of employee in years

Three models were estimated (the values in parentheses are standard errors).

$$(A) \quad \widehat{WAGE} = 1120.25 + 112.452 EDUC \quad R^2 = 0.1696$$

$(241.489) \quad (36.297)$

(B) $\widehat{WAGE} = 1580.29 + 27.15 \text{ EXPER}$ $R^2 = 0.0687$
(157.393) (14.59)

(C) $\widehat{WAGE} = 1645.77 + 4.117 \text{ AGE}$ $R^2 = 0.0043$
(397.387) (9.117)

II.1 (5 points) What do the low values for R^2 indicate? Which is the “best” model and why?

II.2 Test your best model for overall goodness of fit (that is, that the correlation between WAGE and your independent variable is zero) at the 1% level.

(4 points) Compute the test statistic:

(3 points) State its distribution and degrees of freedom under the null. _____

(3 points) The critical value lies in the range _____

(4 points) Do you reject the null hypothesis or not? What do you conclude in terms of the goodness of fit?

I.3 In your best model, test (at the 1 percent level) the null hypothesis that the regression coefficient for the slope term is significantly different from zero by carrying out the following steps.

(2 points) State the null hypothesis and the alternative: H_0 : _____ H_1 : _____

(3 points) Compute the test statistic:

(2 points) State its distribution and degrees of freedom under the null. _____

(3 points) The critical value lies in the range _____

(3 points) Do you reject the null hypothesis or not? What do you conclude in terms of the significance of the coefficient?

(3 points) Explain why the two-variable model is inadequate. Write down a possible multiple regression model.