Econ 120C   Ramu Ramanathan
Spring 1998   Final exam (35%)

Your name _____

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

Read the questions carefully and answer all points. For each part, confine your answers to the specific question. Marks will be taken off for irrelevant or redundant answers. Also, if you write the answers to one part in another part, you wouldn't get credit. Answers must be specific to the model in the problem. Simply copying down formulas from the index card without applying them to the problem will get you zero points. Don't use general terms such as "estimate basic model", "compute nRsquare statistic", "use weighted least squares", "compute p-value", etc. Clearly state exactly what they are FOR THE SPECIFIC QUESTION. Think of your answers as explaining to a Research Assistant exactly how to proceed.

CHECK AND MAKE SURE THAT ALL 5 PAGES ARE LEGIBLE. IF ANY OF THEM IS MISSING, GET A NEW COPY.

ANYONE CHEATING IN THIS EXAM WILL GET AN F IN THE COURSE AND BE REFERRED TO THE PROVOST FOR DISCIPLINARY ACTION.

MAXIMUM NUMBER OF POINTS 30 + 30 + 20 = 80

I.   Using cross-section data for 59 single family homes sold in the La Jolla and University City areas of San Diego, data on the following variables were obtained.

      price   =   sale price in thousands of dollars
      sqft   =   living area in square feet
      yard   =   yard size in square feet
      pool   =   1 if the house has a swimming pool, 0 otherwise
      view   =   1 if the house has a view, 0 otherwise
      lajolla   =   1 if the house is located in La Jolla, 0 otherwise

The attached table has the coefficients and ESS for two different models. Model B is the basic model and Model A is the most general model that incorporates structural change between the two areas.

Variable	MODEL A Coeff	MODEL B Coeff
β_1) constant	33.134	-3.604
β_2) sqft	0.056	0.085
β_3) yard	0.001	0.001
β_4) view	15.888	43.212
β_5) pool	12.169	23.126
β_6) lajolla	65.553	
β_7) lajolla × sqft	0.021	
β_8) lajolla × yard	0.001	
β_9) lajolla × pool	57.207	
β_{10}) lajolla × view	-4.326	
ESS	2,003,718	3,916,605

I.1 (2 points) To carry out a Wald test for structural difference in the model between La Jolla and University city, using Model B as the restricted model and Model A as the unrestricted model, write down the null hypothesis.

I.2 (3+2+2 points) Compute the test statistic and write down its distribution and d.f.

I.3 (4+3 points) Actually carry out the test at the 1 percent level and write down your conclusion as to whether there is a significant difference in the structure or not.

I.4 (8 points) <u>In Model A</u> , compute the marginal effect on sale price with respect to the independent variables, separately for University City and La Jolla and enter in the following table.

	University City	La Jolla
sqft		
yard		
view		
pool		

I.5 (6 points) What do the above numbers indicate about differences in sales patterns between University City and La Jolla ? Explain as you would to a senator or congressman.

II. Consider the following double-log model of the demand for a commodity estimated with quarterly data for 15 years (60 observations).

$$LQ_t \; = \; \beta_1 + \beta_2 LP_t + \beta_3 LY_t + u_t$$

where LQ = ln(per capita quantity demanded), LP = ln(price per unit), and LY = ln(per capital real income).

II.1 (6 points) Write down the most general auxiliary equation for AR(4) error specification and formally state the null hypothesis of no serial correlation.

II.2 (12 points) Describe step by step, for the above model, how you would use the Breusch-Godfrey test for fourth-order serial correlation of the errors. Be sure to describe the regressions to run, how you will compute the test statistic, and what its distribution and d.f. are. It is not enough to copy things from the index card. You must apply it to the above model and provide numerical values wherever available.

II.3 (12 points) Suppose you find significant AR(4) in the residuals. Describe the steps for using the Generalized Cochrane-Orcutt estimation procedure for the above model.

III. Instead of serial correlation, suppose the model in II exhibits a fourth-order ARCH effect.

III.1 (10 points) Carefully describe the procedure for using Engle's ARCH test.

III.2 (10 points) If there is significant ARCH effect, describe how you would use the weighted least squares procedure (assume that there is no negative variance problem) to obtain estimates better than OLS.