DEPARTMENT OF POLITICAL SCIENCE
AND
INTERNATIONAL RELATIONS

Posc/Uapp 816

Assignment 10

TOPICS IN MULTIPLE REGRESSION

Name_____
(Printed)
Student Number_____
(Social Security Number)
E-mail_____

Let's apply a couple of the techniques we discussed in class.

The course web site contains data presented in Agresti and Finlay, ***Statistical Methods for the Social Sciences***, 3rd edition, Table 9.16, page 349. (Florida crime data) They pertain to 67 Florida counties, the names of which have been deleted from the data file. You can either download this information using the usual procedures or enter them directly into your data sheet from the book. The variables are: Number of crimes per 1,000 residents, median income (in thousands of dollars), percentage of residents with at least a high school diploma, and percent of the people in the county who live in urban areas.

1. What is the relationship between crime and income. Attach a neatly labeled plot that shows this relationship.

2. What is the correlation coefficient? _____

3. What is the least squares estimator of the regression coefficient of crime on income? _____

4. What are 95 percent confidence intervals? (To find the appropriate t use Agresti and Finlay's table or one that is equivalent. Treat the degrees of freedom as infinity and pick a two-side value. That is use $\alpha/2$.)
   A. What t value did you use? _____

   B. Lower limit: _____ Upper limit: _____

   C. Do the limits include 0? _____ What statistical hypothesis does that finding pertain to and what is your conclusion?
   _____

_____

D. What is R^2: _____ S (s): _____

5. Now add percent living in urban areas to the model.

A. What is the R^2? _____

B. What is the observed F for the overall model? _____

C. Is it statistically significant? Explain briefly.

_____

_____

_____

_____

D. Obtain 95 percent **simultaneous** intervals for the **two** partial regression coefficients, but not the slope.

i. What t value did you use? Why? _____

ii. Lower limit for $\hat{\beta}_{Crime,income|urban}$:_____ Upper limit: _____

iii. Lower limit for $\hat{\beta}_{Crime,urban|income}$:_____ Upper limit: _____

E. What is the partial regression coefficient relating crime to income controlling for urbanization? _____ (Pay attention to this number.)

F. Now let's obtain a partial residual plot. Keep track of what you are doing. First, regress crime on just urbanization. Store the residuals. Next, regress income on percent urban and store the residuals. Okay, you have two sets of residuals. Plot the crime residuals against the income residuals. Attach a clearly labeled plot. The title should make it clear that this is a partial regression plot. How does it compare to the plot obtained in the first problem?

_____

_____

_____

_____

_____

_____

G. Now regress the crime residuals on the income residuals. What is the regression coefficient? _____

i. How does it compare to the one obtained when you regressed crime on both income and urbanization? _____

ii. Is it significant? Explain briefly

_____

_____

_____

_____

_____

H. What is the regression constant? _____

Go to Assignments page

Go to Statistics page