

Regression Models: Lloyd
Assignment #2: Due 2/27/07

Name: _____

Assignments are designed to help you master the important concepts presented in lecture and the text so that you don't need to stress about the exams. The subject matter in assignments will be similar to what appears on exams. *Mastery* of this material is crucial to understanding the statistical methods that scholars use in our field. Feel free to collaborate with your peers, however, if you cannot complete these questions by yourself, and in a reasonable amount of time, you need more exposure to the concepts in order to do well on the upcoming exam. When completing the following questions please be sure to present your work in the order the questions appear and type any text (don't need to type formulas). Your work will be graded on the accuracy of the information provided as well as the degree of academic professional style attained in each response. There are 23 items, based on 4 different questions; each is worth up to 5 points for a possible total of 115 points.

- 1) Bivariate Regression:
 - A. Hand calculations using the data provided. Please: 1) clearly label each problem, 2) show the formula you are using, 3) show all of your work, and 4) put a box around your final answer.
 - (1) Compute and interpret the regression coefficient (b).
 - (2) Compute and interpret the intercept (a).
 - (3) Write the regression equation using the values of **b** and **a** calculated above. Compute the predicted values of the dependent variable 1 standard deviation above and below the mean of the independent variable. Interpret your answer.
 - (4) Compute and interpret r and r^2 .
 - (5) State a 1-tailed research hypothesis about the relationship between x and y (both in words and using mathematical symbols). Test the null hypothesis using an α of .05. Be sure present your decision in the proper form and interpret your answer.
 - B. Stata calculations using YOUR dataset. Please attach the appropriate Stata output: 1) labeled by question number and 2) placed in the correct order.
 - (1) Choose 2 continuous variables. Construct a research hypothesis of the relationship between these variables. State your hypothesis using both words and mathematical symbols). Explain why you think this relationship may exist (don't need to cite any literature, just make sure the relationship is logical). (State precisely how x and y are measured & in what units)

- (2) Have Stata compute the appropriate bivariate regression. Can the null hypothesis be rejected using a 2 tailed significance level of .99? How about .90? If not, why? If so, why? (*Hint*: Be sure to use the concept of probability in your answer).
- (3) Interpret the regression coefficient.
- (4) Interpret the intercept.
- (5) Write the regression equation using the predicted values of the regression coefficient and the intercept above. Compute the predicted values of the dependent variable 2 standard deviation above and below the mean of the independent variable. Interpret your answer.
- (6) Compute and interpret r and r^2 .

2) Confidence Intervals:

- A. Hand calculations using the data provided. Please: 1) clearly label each problem, 2) show the formula you are using, 3) show all of your work, and 4) put a box around your final answer.
 - (1) Construct and interpret a 95% confidence interval around the difference in the population parameters of interest.
 - (2) Interpret your answer.
 - (3) What, precisely, has a probability of 5% of less?
- B. Stata calculations using YOUR dataset. Please attach the appropriate Stata output: 1) labeled by question number and 2) in the correct order.
 - (1) Using the same 2 variables as in question 1.B. above, have Stata construct a 99% confidence interval around the difference in the population parameter of interest.
 - (2) Interpret your answer.
 - (3) What is the point estimate of the population parameters of interest?

3) Difference in Means Tests:

- A. Hand calculations using the data provided. Please: 1) clearly label each problem, 2) show the formula you are using, 3) show all of your work, and 4) put a box around your final answer.

- (1) Test the null hypothesis that in the population the mean value of your dependent variable does not depend on whether students have dropped the course or not. Use an α of .05.
 - (2) Interpret your answer.
- B. Stata calculations using YOUR dataset. Please attach the appropriate Stata output: 1) labeled by question number and 2) in the correct order.
- (1) Keep your continuous dependent variable from question 1.B. above. Choose a dichotomous independent variable from your dataset. Construct a research hypothesis of the relationship between these variables. Explain why you think the relationship may exist.
 - (2) Test the null hypothesis that these 2 variables are not related in the population. Use an α of .01.
 - (3) Interpret your answer.
- 4) Explain why science never PROVES anything. Be sure to use specific concepts discussed in class to support your answer.