

**In-class Exercise: Regression**

**Directions:** Work in your randomly assigned groups on the following problems. This worksheet is a big one, and will count for *two quiz scores* toward your final grade. **Type up all answers to this worksheet and upload your excel sheet and typed up answers to the Blackboard Digital Drop Box for this course.** On the top of every person's answer sheet, type the names of everyone in your group. One of the submissions from all your group members will be selected at random, and everyone in the group will receive the grade earned from that representation of your group's work, so make sure everyone is contributing and everyone understands everything. This is due at the end of the day on Friday, April 17. Only typed submissions uploaded to Blackboard Digital Drop box is acceptable.

1. The first part of this exercise is using some very old data (1960) on the per-capita state and local public expenditures, by state. This data is on the excel sheet, `publicexp.xls` which is posted on the class website. The variable definitions are:
  - EX: Per capita state and local public expenditures.
  - ECAB: Economic ability index. A weird measure of the overall health of the economy.
  - MET: Percentage of people living in standard metropolitan areas.
  - GROW: Growth rate in population from 1950-1960 (percentage).
  - WEST: Dummy variable. WEST=1 indicates western state, WEST=0 indicates not a western state.
  - YOUNG: Percentage of population aged 5-19 years.
  - OLD: Percentage of population aged over 65 years.
- (a) Run a regression with public expenditures as the dependent variable, and economic ability, percentage of population living in metropolitan areas, percentage growth in population, the dummy variable for western state, the percentage of the population that is young, and the percentage of the population that is old as the explanatory variables.
- (b) What is the predicted impact on per-capita public expenditure from a one percentage point increase in the proportion of the population living in metropolitan areas?
- (c) Is the effect from part (b) statistically significantly less than zero? Conduct the appropriate hypothesis test.
- (d) Construct a 95% confidence interval for your estimate in part (b).

- (e) Can you explain what might be the explanation for your findings in parts (b) and (c).
  - (f) What percentage of the variability in public expenditure is explained by your independent variables?
2. Answer the following questions concerning the article, “Academic Performance in a College Town”.
- (a) What is the dependent variable in the regression analysis?
  - (b) List some of the “College Factors” that are included as explanatory variables.
  - (c) One of the answers to the previous question is whether or not the student lived in a dorm. What is the predicted impact on living in a dorm on the dependent variable?
  - (d) Is that impact statistically significant? Explain your conclusion in everyday English.
  - (e) Extra credit: What major (and I mean major - really, really bad) error did the author make?