

Small Project 2 (Due 5/7 Midnight)

Description: The goal of Small Projects is “learning by doing” rather than evaluating your knowledge. So, this project will be graded based on your efforts than its correctness. In other words, you will receive a full score as long as you answer all questions enough.

Instructions: Use R to estimate the model and answer the questions. Please work on the problem set and submit it in a PDF format along with your R script file (in separate files) via Blackboard Assignments by the end of May 7th (Friday). Please do not zip the file!

1. Use the data in ATTEND for this exercise.

(i) Obtain the minimum, maximum, and average values for the variables *atndrte*, *priGPA*, and *ACT*.

(ii) Estimate the model

$$atndrte = \beta_0 + \beta_1 priGPA + \beta_2 ACT + u$$

and write the results in equation form. Interpret the intercept. Does it have a useful meaning?

(iii) Discuss the estimated slope coefficients. Are there any surprises?

(iv) What is the predicted *atndrte* if *priGPA* = 3.65 and *ACT* = 20? What do you make of this result? Are there any students in the sample with these values of the explanatory variables?

(v) If Student A has *priGPA* = 3.1 and *ACT* = 21 and Student B has *priGPA* = 2.1 and *ACT* = 26, what is the predicted difference in their attendance rates?

2. Use the data in MEAP93 to answer this question.

(i) Estimate the model

$$math10 = \beta_0 + \beta_1 \log(expend) + \beta_2 lchprg + u$$

and report the results in the usual form, including the sample size and *R*-squared. Are the signs of the slope coefficients what you expected? Explain.

(ii) What do you make of the intercept you estimated in part (i)? In particular, does it make sense to set the two explanatory variables to zero? [Hint: Recall that $\log(1) = 0$.]

(iii) Now run the simple regression of *math10* on $\log(expend)$, and compare the slope coefficient with the estimate obtained in part (i). Is the estimated spending effect now larger or smaller than in part (i)?

(iv) Find the correlation between $l\log(expend) = \log(expend)$ and *lchprg*. Does its sign make sense to you?

(v) Use part (iv) to explain your findings in part (iii).