

AREC 345: Global Poverty and Economic Development

Problem Set 6

Department of Agricultural and Resource Economics
University of Maryland
Fall 2016

Problem Set 6 is due at the start of section on October 28. Problem sets turned in more than 5 minutes after the start of section will be marked as late. All problem sets must be turned in as hard copies; points will be deducted if multiple pages are not stapled together.

To complete this problem set, you will need to download the data set `arec345ps6data.xlsx` from the course website. The data set contains information on the academic test scores of 200 children in fifth grade. The data set includes the following variables:

- **id**: a unique identifier for each child in the data set
 - **score**: test score (out of 100 points)
 - **textbook**: an indicator for whether or not a child owns a textbook
 - **wealth**: an indicator for whether or not a child comes from a wealthy household
 - **treatment**: an indicator for random assignment to a textbook distribution program
1. Estimate the naive cross-sectional estimate (i.e. the participant vs. non-participant estimate) of the impact of textbooks on academic test scores by (a) calculating the average test score for students with a textbook, (b) calculating the average test score for students without a textbook, and (c) calculating the difference in average test scores between those with a textbook and those without textbook.
 2. Now calculate the naive cross-sectional estimate of the impact of textbooks on academic test scores by using the `LINEST` command to regress test score on the indicator for owning a textbook. Paste your Excel output into your answers and discuss your results. Make sure that the estimates reported in Questions 1 and 2 are equal.
 3. Are children from wealthy households and poor households equally likely to own textbooks? Report the fraction of children in wealthy households who own textbooks, and compare this to the proportion of children in poor households who own textbooks.
 4. By now, you should be concerned about selection bias. Assess whether selection bias is likely to be driving your results in Questions 1 and 2 by estimating a multivariate regression of test scores on both textbook ownership and the indicator for being part of a wealthy household. Paste your Excel (`LINEST`) output into your answers. How does this estimate of the impact of textbooks compare to those reported in Questions 1 and 2?

5. You learn that a textbook distribution program randomly assigned students to either a treatment group ($\text{treatment} = 1$) or a control group ($\text{treatment} = 0$). Estimate the impact of the program on textbook ownership by regressing the indicator for owning a textbook on the indicator for random assignment to the treatment group. How much did the program impact the probability of owning a textbook?
6. Now regress the test score outcome on the indicator for random assignment to the treatment group. What is the estimated impact of the program on student test scores? Explain why your answer is different than your answer to question (4).