

AREC 345: Global Poverty and Economic Development

Problem Set 1

Department of Agricultural and Resource Economics
University of Maryland
Fall 2016

Problem Set 1 is due at the start of section on September 16. 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.

1. What is the poverty gap? What is the advantage of this measure over the headcount ratio?
2. Consider a country in which 20 percent of the population live on 20 cents per day, 15 percent live on 30 cents per day, 15 percent live on 50 cents per day, 10 percent live on 70 cents per day, 20 percent live on 90 cents per day, and 20 percent live on 1.50 dollars per day. If the poverty line is set at one dollar per day, what is the poverty headcount ratio? What is the poverty gap?
3. You are interested in evaluating a program that provides fertilizer and hybrid seeds to maize farmers in Malawi. The non-governmental organization (NGO) implementing the program plans to offer the fertilizer+seed package to farmers in ten different villages; for each village, they've compiled a list of farmers who are interested in participating in the program.

To assess the impact of the program, they suggest comparing the crop yields of farmers who receive the fertilizer+seed package to the yields of those who were not interested in the program. You learn that the villages where the fertilizer+seed program is being implemented contain different types of households: wealthy households and poor households, and households that do and do not grow any maize. Specifically, 20 percent of all households are wealthy; half of the wealthy households grow maize, and all of the poor households grow maize.

Regardless of what crop they grow, wealthy households use modern irrigation techniques and have higher crop output per hectare than poor households. Let Y_w denote crop output per hectare in every wealthy household (irrespective of what crop they grow — think of this as dollars per hectare once the crops are sold) in the absence of the program, and let Y_p denote output per hectare in every poor household in the absence of the program. All the households that grow maize are interested in participating in the fertilizer+seed program. Suppose that the program increases maize farmers' output per hectare by $\delta > 0$. The program would have no impact on the output of farmers who don't grow maize, and these farmers wouldn't want to participate anyway.

- (a) What proportion of poor households participate in the program?
- (b) What proportion of wealthy households participate in the program?

- (c) What proportion of *all* households participate in the program?
 - (d) What proportion of households that choose to participate in the program are wealthy?
 - (e) What proportion of households that choose not to participate are wealthy?
 - (f) Express the difference in mean output per hectare between those who choose to participate and those who don't in terms of Y_w , Y_p , and δ .
4. To complete the remainder of this problem set, you will need to download the data set `arec345ps1data.xlsx` from the course website. The data set contains 7 variables: `Country code`, `Country`, `Log GDP per capita in 2010`, `Absolute latitude`, `Under 5 mortality`, and dummies for being located in South Asia and Sub-Saharan Africa.
- Make a table that reports the means, standard deviations, and minimum and maximum values of all the variables. Include this table in your answers.
5. Make a scatter plot showing the relationship between GDP per capita and infant mortality.
- (a) Paste the image (of the scatter plot) into your problem set.
 - (b) Is the association between income per capita and under-5 mortality positive or negative? (In other words, does under-5 mortality increase or decrease as income per capita increases?)
 - (c) What else do you notice about the relationship between these two variables?
6. Use Excel to calculate the correlation between log GDP per capita and absolute latitude. Report the correlation. Is the correlation positive or negative? Discuss.