Economics 172: Problem Set #1

Due on September 29, 2025 at 11:00pm

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Problem 1: Short questions

1. What is the poverty gap? What is the drawback of poverty head count ratio. What is the advantage of Poverty gap 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? What is the poverty severity?

3. Show an example that P_1 (poverty gap) and P2 (poverty severity) can change while P_0 (headcount ratio) is fixed. (You may not need to calculate each value)

4. How P_0 (headcount ratio), P_1 (poverty gap), P_2 (poverty severity) change in graph (a), (b), (c) between situation 1 (black line) and situation 2 (blue line)? '

Problem 2: Regression

A group of researchers wishes to test whether cash transfers to low-income households have any spillovers on local small business owners. Their sample consists of 160 villages across 20 districts in India. The researchers randomly assign 80 villages to control and 80 villages to treatment, stratifying by district. In control villages, no households receive cash transfers. In treatment villages, approximately one fourth of households receive a cash transfer.

The researchers conduct surveys with a sample of 10–15 small business owners in each village 3 months after the cash transfers are disbursed. Note that none of the small business owners are also cash transfer recipients. In these surveys, the researchers collect information such as the nature of the business as well as monthly revenues, labor costs, input costs, and profits. The researchers run the following regression:

$$Y_{ivd} = \alpha_0 + \alpha_1 \text{Treatment}_v + \varepsilon_{ivd},$$

where Y_{ivd} represents outcomes of interest (revenues, profits) for business owner i in village v in district d, and Treatment_v denotes treatment status at the village level.

Here is the regression table and results (standard errors in parentheses). The "Village wealth index" (VWI) combines several indicators of village wealth, constructed so the index has mean zero and standard deviation one. Positive values indicate a wealthier village, and the index is measured in standard deviation units. "Above median business assets" is a dummy variable equal to 1 if the business has above median assets and 0 otherwise.

(a) Write out the regression equation for results presented in column (3). What's the variable of interest and coefficient?

(b) Columns (1) and (2) above show the results of this analysis. Interpret these results, commenting on the magnitude and significance of the parameters of interest.

(c) What is the 95% confidence interval around the estimated treatment effect in column (1) and (2)? What does this confidence interval tell you?

(d) In columns (3) and (4), the researchers test whether the cash transfers had differential impacts on business revenues based on individual business owner's characteristics and village characteristics. Write down the regressions depicted in columns (3) and (4). Interpret each of the parameters in detail.

(e) How would you summarize these results?