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14.771 Development Economics: Microeconomic Issues and Policy Models
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14.771, Development Economics

Problem Set #5 - Duflo and Udry (2003)

Question 1

Consider a permutation of the static model in Duflo and Udry. We will generalize individual preferences to be of the form $u_i(c_i, L_i)$ where L_i is labor (hence $\frac{\partial u_i}{\partial L_i} < 0$).

1. Write the maximization problem of the household.
2. Take the first order conditions with respect to the four choice variables. What form does the consumption function take now? (Recall that in the paper it is $c_i = c_i(\lambda, p, x)$). Give some intuition for the difference.
3. What restriction gets us back to the consumption function specified in the paper? Do you think this restriction seems reasonable? Why or why not?

Question 2

If we had just one measure of rainfall, would we be able to perform the tests presented in this paper? Explain why, referencing the testable restrictions derived in the paper (see equation 12).

Question 3

You and your colleague are discussing this paper, and your colleague finds the authors' tests indirect. Instead, he proposes that you estimate the following equation:

$$\ln(c_{it}) - \ln(c_{it-1}) = \alpha_1 (\ln(x_{it}) - \ln(x_{it-1})) + (X_{it} - X_{it-1})\delta + (R_{it} - R_{it-1})\gamma + \varepsilon_{it} - \varepsilon_{it-1}$$

and simply test $\hat{\gamma} = 0$, since the null is that rainfall should not matter for individual consumption conditional on expenditure. He argues that $\hat{\gamma}$ will be consistently estimated since rainfall is random, and thus will not be correlated with the error term.

1. What do you think about your colleague's idea? Explain why it will work if you think it will work, and why it will not if you think it won't.

Your colleague then decides that this would be a great dataset to estimate consumption elasticities with respect to expenditure. He argues that you can run the following 2SLS regression

$$\ln(c_{it}) - \ln(c_{it-1}) = \alpha_1 (\ln(x_{it}) - \ln(x_{it-1})) + (X_{it} - X_{it-1})\delta + \varepsilon_{it} - \varepsilon_{it-1}$$

instrumenting $\ln(x_{it}) - \ln(x_{it-1})$ with $R_{it} - R_{it-1}$.

2. Given what you know about the paper, do you think that you will get similar estimates of $\hat{\alpha}_1$ for different rainfall measures? Give your reasoning.
3. The authors run regressions given by equations (16) and (17) in the paper. Inspect them closely. Do you see any relationship to the 2SLS procedure suggested above? How are they related? Can you relate the test they perform using the two equations to a test you could perform using IV?

Question 4

The authors make several important assumptions over the course of this paper. My list includes:

- Separability of consumption and labor supply in utility
- Rainfall does not directly impact preferences
- Regional markets are integrated (that is, there is a common region-wide price for goods at any time)
- Demand is multiplicatively separable between the Pareto weight (λ) and household expenditure (x)
- Commodity demand is log linear in expenditure
- Rainfall impacts the log of profits

For each assumption, state why it matters, and how its violation could cause problems for the empirical test. If the authors test the assumption or provide evidence on the assumption, summarize what they present. In light of this, state whether or not you think each assumption seems reasonable.

Question 5

The results in this paper suggest that households could increase aggregate welfare by switching to a regime of income pooling - instead of keeping separate accounts, they should simply pool all their income and decide how to allocate expenditure based on what is available. Thinking about "real world" frictions, why might this be difficult to enforce? Can you think of some reasons why separate accounts (i.e. male/female/yam income) might be a (relatively) efficient response to frictions faced by the household?