Homework I

IO-MLE-Inequality-Gaps

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Part I: IO tables

Consider the following IO table for a hypothetical economy:

	Agriculture	Manufacture	Services	Construction	Final Demand	Total Output
Agriculture	160	230	260	290	340	
Manufacture	210	190	450	170	340	
Services	410	380	200	160	350	
Construction	180	320	240	170	280	
Labor	320	240	350	400		

- Calculate total output by Industry
- Provide the Matrix of technical coefficients and labor coefficients for this Economy
- Assume that Final demand has shifted. There is a 30% increase in demand in Construction, but with a 10% decline in demand for services and Manufacturing. Estimate the changes expected in total ouput for all Sectors, as well as the changes in Labor Inputs.

Part II: MLE

Consider data from the American Time use Survey for 2019 atus_2019.dta. This data contains aggregates on various time use activities for 9K individuals. Because this is survey data, be mindful of the sampling weights. You can use either `wt06` or `wtfinal` as the sampling weight.

- At Levy, Household production activities are typically classified as
  - `Core`: Main activities taking care of the household
  - `Proc`: Procurement, shopping, and other activities related to the household production

  - `acare` and `ccare`: Activities related to the care of children and other adults in the household

  In the dataset, these variables contain information on hours spend on these activities per day.

- with this in mind, what is the average time spent on total household production activities per day? when weighted and when unweighted? why are they different?
- Estimate the average time spend on Total household production between weekends and weekdays (use variable `wkend_wkday`) Are they statistically different?
- Hours of Household production have a large share of zeros (about 11% in the data). Because of this, using a simple Linear model may not be appropriate. Instead estimate a Tobit model and Poisson model using individual and household characteristics (plus others of your choice). Discuss why you choose to control for these variables, and intepret the results.

  - For the tobit model answer, is this a problem of corner solution or censoring? How would this affect the estimation of marginal effects?

Part III: Inequality Gaps

The GINI index is commonly used to measure income or wealth inequality. However, you could also use the GINI index to measure inequality in other variables.

- Produce a table that decomposes the GINI of total hours of household production by source. That is Core, Procurement, child care and adult care.
- Which one is the component with the greatest share of household production.
- Which component shows the greatest concentration?
- What is the greatest contributor to overall inequality?

Part IV: Explaining Gaps

- Considering the methodology known as Oaxaca-Blinder decomposition. Using this methodology, analyze the gender gap on household production using a similar model specification as you did in Part II. Discuss the results.
  - Include the use of weights.
  - For better understanding of the gaps, include summary statistics and model coefficients for the relevant regressions and variables.