Computational Economics Midterm 1 SFU 2024

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1 Rules of the Exam

The exam will be take-home and you have 1 week to deliver it. You can ask me questions but they must be clarification questions only, no hints.

The exam is individual. If I find two or more of you share the same the score will be divided by the number of people sharing the same answer.

You have to deliver a pdf report with your LASTNAME_Name_midterm1.pdf containing a report of your findings and document all the steps you did for obtaining the solution.

Update a single zip file with the accompanying julia files for estimation.

The handling of data, in particular to reshape it to the form you need for using the code can be done in Julia using DataFrames package and CSV package but here use the software of choice. But estimation of BLP has to be done in julia using modifications of the code I provided.

No late exams or submissions accepted.

2 BLP Estimation (60% of the grade)

I have provides a simulated dataset where you are asked to estimate BLP and report on the average elasticity of price.

In the country of Wano there are $T = 200$ markets, and there are 3 coffee makers, MD, TH and SB. Each of them produce their own differentiated product MD, TH and SB (for simplicity). The obseved characteristic is caffeine score, the only observed cost attribute is caffeine score. The firms chose prices in a monopolistic setup so there are two observable attributes for consumers price and caffeine score.

Tasks for the students:

1. Data Analysis: Transform the different datasets in the folder .../midterm1_BLP/simulated_data, into the format that is usable for the BLP estimation used in class. Document how you did it, and report in your pdf a screen shot of the first 10 markets in the shape of the data of the code we used in class. Note that instruments are not included in this dataset.

2. Use the provided instruments in the simulated dataset to estimate BLP not the ones generated by the code used in class. Report the average price elasticity , the average caffeine score elasticity for demand, and report the cost elasticity of caffeine score. The readme.file has information on the value of the elasticities, due to sample variability your estimates could differ numerically from these but should be **reasonably close. Provide a nice table with the elasticities and a good interpretation of them. Remember that in your documentation of results you have to follow best practices https://chrisconlon.github.io/site/pyblp.pdf to choose optimizers and other tuning parameters.**

3. Now use the instruments generated by the code and re-estimate BLP elasticities compare with the solution to the previous part, if your estimates differ explain why. This is an open question so no correct answer but to get full points you must provide a workable estimation using the original code. Remember that since the number of attributes is different you have to change things to make it work.

3 Merger Simulation (40% of the grade)

Simulate the new equilibrium under the following scenarios and compare to the baseline model you just estimated: with new shares and prices when MD and TH merge into a single firm.

1. Efficiency sceneario: the new caffeine score cs of $MD + TH$ coffee will be $cs_{MDTH} = min(cs_{MD}, cs_{TH})$ and the new unobserved cost shifter will be also the min of the original firms/products. So marginal cost of MD $+ TD$ is lower than the originals.

2. Average scenario: he new caffeine score cs of $MD + TH$ coffee will be $cs_{MDTH} = \frac{1}{2}(cs_{MD} + cs_{TH})$ and the new unobserved cost shifter will be also the average of the original firms/products. So marginal cost of MD $+ TD$ is in the middle of the original ones.

If you work on a regulatory institution would you approve the merger under Efficiency Sceneario? Would you approve it under the average scenario? Yes ,no and why?