Econ 3385: Measuring Market Power

Problem Set 4

In this problem set, we'll analyze `hausman_data.csv`. The variables in this data set should be self explanatory. There are 5 products and a market is a city-time period. You can use `cereal_2.R` from the lecture 3 folder for hints.

Questions

1. Reshape the data so there is a variable `pricej` and a variable `qtyj` for each product j. Each row should now correspond to a city-period, with one row for each city-period.
2. Generate 5 Hausman instruments - one for each of the prices.
3. Write down a model of demand and supply.
    - Write a linear demand equation for a generic product j, which is possibly a substitute with each of the other products.
    - Write a specification for marginal cost of product j as a function of local and national cost shocks.
    - What assumptions on the correlation of the demand and supply shocks are necessary for the Hausman instruments to be valid?
4. Estimate 5 demand equations using 2SLS.
5. Compute the 5x5 matrix of own and cross elasticities *at the average* p and Q for each good.
    - Remember the elasticity of product j with respect to product k is $\frac{\partial Q_j}{\partial p_k}\frac{p_k}{Q_j}$, so you need to choose a level of p and q at which to evaluate it.
6. Which products are the closest substitutes?
7. Can you use your demand estimates to learn the distribution of marginal costs?
    - Compute the marginal costs of product 1 for each city-week and present them in a histogram.