ResEcon732 Problem Set 4

Merger Analysis

Rules

Please submit your problem set writeup, code, and output on Moodle. You may work in groups of up to three and submit one writeup for the group, and I strongly encourage you to do so. You can use any software and command you want for this problem set.

Directions

On Moodle you will find a dataset data_agg_rc_sales.csv. The data contains (fictitious) market-level data for beer. Each market is a store, and every store sells 6 brands of beer (with names 1,2,3 ..). The columns are:

1. STOREID

2. PRODUCTID

3. QUANTITY SOLD

4. MKTSIZE

5. PRICE

6. LEVEL OF ADVERTISING (measured as the number of billboards placed near the store)

7. LIGHT BEER DUMMY

8. FOREIGN BEER DUMMY

9. MARGINAL COST SHIFTER

Advertising will be taken as exogenous.

A second dataset data_agg_rc_demo.csv, lists the proportion of the population in the market around each store that are ethnic minorities and have a college degree. It is believed that ethnicity and college education may affect preferences for light and foreign beers. It is organized as follows:

1. STOREID

2. PROPORTION non-minority and non-college

3. PROPORTION non-minority and college

4. PROPORTION minority and non-college

5. PROPORTION minority and college

Questions

1. Calculate market shares for each product in the data. Plot the distribution of the share of the outside good across markets using a histogram.

2. Estimate some regressions to understand the likely effect of demographics on preferences for light and foreign beers. Explain your reasoning.

Consumer's demand is a logit model where

$$u_{ijm} = \beta_j + \alpha p_{jm} + \beta_1 ad_{jm} + \beta_{2i} LIGHT_j + \beta_{3i} FOREIGN_j + \xi_{jm} + \varepsilon_{ijm}$$

where $\beta_{2i} = \beta_2 + \beta_2^{MIN} MINORITY_i + \beta_2^{COL} COLLEGE_i$ and $\beta_{3i} = \beta_3 + \beta_3^{MIN} MINORITY_i + \beta_3^{COL} COLLEGE_i$. Note that there are no random coefficients (or nesting parameters) here. In practice you'd want them, but I want to keep this straightforward.

For the rest of the problem, we are only going to consider the **first** market and you should assume that for light beer,

- $\beta_2^{MIN} * MINORITY_i = 3.5$

- $\beta_2^{COL} * COLLEGE_i = -3$

and for foreign beer

- $\beta_3^{MIN} * MINORITY_i = -3$

- $\beta_3^{COL} * COLLEGE_i = 3$

3. Using the observed prices, back out the implied marginal costs of each brand assuming that each brand has a separate owner and the firms are using Bertrand Nash pricing.

4. Consider a merger of the two brands with the largest market shares. Consumer tastes are not affected by the merger.

(a) if the merger produces no synergies, what would be the predicted post-merger equilibrium prices of all brands? What happens to consumer surplus? and total welfare?

(b) what synergy (marginal cost reduction) would be required to prevent prices from rising?

(c) what synergy would be required to prevent total welfare from falling?