Problem Set 5

Bhavna Phogaat
ECON833: Computational Methods for Economists

Fall 2021

Data Description

1. The data are in the CSV file radio_merger_data.csv.
2. There are 2 independent markets representing mergers in 2007 and 2008.
3. There are 45 mergers in 2007 and 54 in 2008.
4. A unique id is assigned to each buyer and target.
5. The variable names should be mostly obvious.
6. Prices are in constant dollars, population in number of people

Objective

Model 1

Consider a model of a one-to-one matching market representing radio station mergers. Each year there is a national market where radio station owners target new stations. In particular, the payoff to the merger between radio station buyer b and target t in market m is given by:

$$f_m(b,t) = x_{1bm}y_{1tm} + \alpha x_{2bm}y_{1tm} + \beta distance_{btm} + \epsilon_{btm} \quad (1)$$

where

1. x_{1bm} is the number of stations owned by the parent company of the buyer

2. y_{1tm} is the population in range of the target in market m

3. x_{2bm} is an indicator for corporate ownership

4. $distance_{btm}$ is the distance (in miles) between the buyer and target

5. The match-specific error term, is independent across matches

The maximum score objective function is:

$$Q(\alpha, \beta) = \sum_{m \in M} \sum_{i \in U_m} \sum_{j \in U_m \setminus i} 1[(f_{\alpha,\beta}(i,i) + f_{\alpha,\beta}(j,j) > f_{\alpha,\beta}(i,j) + f_{\alpha,\beta}(j,i))] \quad (2)$$

Figures

```
Model1 Without Transfer:
Optimal value of alpha : 0.43499999999999894
Optimal value of beta : -0.650000000000001
Maximum socre: 2286
```

Figure 1: Model 1

Model 2

Estimate the version of model1 with transfers (the prices pay to acquire the target station). Here, use the data of the merger and a different inequality in the score function. In this case, let the payoff function also include target characteristics:

$$f_m(b,t) = \delta x_{1bm} y_{1tm} + \alpha x_{2bm} y_{1tm} + \gamma HHI_{tm} + \beta distance_{btm} + \epsilon_{btm} \quad (3)$$

where HHI_{tm} is the Hindahl-Hirschman Index measuring market concentration (a higher index means a more concentrated market) in the location of the target in market m.

The maximum score objective function is:

$$Q(\delta, \alpha, \gamma, \beta) = \sum_{m \in M} \sum_{i \in U_m} \sum_{j \in U_m \setminus i} 1[(f_{\delta,\alpha,\gamma,\beta}(i,i) + f_{\delta,\alpha,\gamma,\beta}(j,j) > f_{\delta,\alpha,\gamma,\beta}(i,j) + f_{\delta,\alpha,\gamma,\beta}(j,i))] \quad (4)$$

Figures

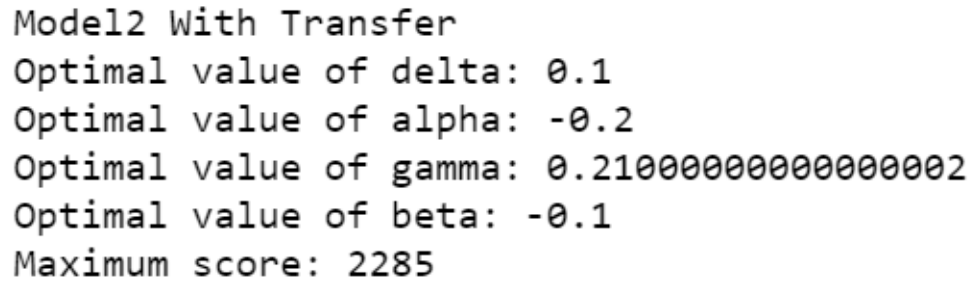

Figure 2: Model 2