Problem Set 5

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1 Models

Model 1

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

Model 2

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

2 Estimation results

Model 1 with estimated parameter

$$f_m(b,t) = x_{1bm}y_{1tm} + 0.75x_{2bm}y_{1tm} - 0.07distance_{btm} + \varepsilon_{btm} \tag{3}$$

Model 2 with estimated parameter

$$f_m(b,t) = 0.96x_{1bm}y_{1tm} + 0.3x_{2bm}y_{1tm} - 0.55HHI_{tm} + 0.81distance_{btm} + \varepsilon_{btm} \tag{4}$$

Both models estimate the effect of variables on the payoff of acquiring a bank. I set the bound of each parameter estimate between -1 and 1. The main difference between models 1 and 2 is that model 2 includes transfers. In addition, model 2 includes extra variables and parameters.

The first model suggests that corporate ownership in a larger population area has a positive effect on an acquirer's payoff function, and one-mile distance increase between the buyer and seller decrease the payoff of the firm by 0.07 unit.

In the second model, the estimates of HHI and distance do not seem to be theoretically valid. The model estimate suggests that market concentration reduces the payoff, and the distance increases the payoff, but in reality, the effect tends to be the opposite, respectively. The parameter estimate of HHI suggests that a one-unit increase in HHI leads to a 0.55 reduction in the payoff. Moreover, the model suggests that the joint effect of the population in the range of the target in a market and the number of stations owned by the parent company of the buyer has a positive effect on the payoff.

Unfortunately, I do not trust my estimates. My codes produce different estimates every time I run my code. Other problem with my codes is indicated in the comment sections of my python file.