Reflection Paper – Mathematical Economics

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1 Motivation and Background

1.1 Motivation

The motivation behind this paper is to understand how ownership structure, geography, and prices are all linked together. It was very important to understand this relationship as market power, structure, and mergers are all important towards creating competitive environments. The research question of this paper is how do mergers in differentiated industries differ in their effect on prices.

2 Overview

2.1 What does the paper accomplish?

2.2 Methodology

2.3 Results

3 Model

3.1 Demand

$$V_{i,j} = X'\beta - D_{i,j}\delta - P_j\gamma + \eta_{i,j} \tag{1}$$

$$V_{i,0} = \beta_0 + M_i\pi + \eta_{i,0} \tag{2}$$

$$S_{i,b}(P, X, M \mid \beta, \delta, \gamma, \pi) = \int_{A_j} f(\eta_i)\, d\eta_i \tag{3}$$

$$A_j = \{\eta_i \mid (V_{i,j} > V_{i,t}\ \forall t \neq j) \cap (V_{i,j} > V_{i,0})\} \tag{4}$$

$$S_{j,b}(P, X, M \mid \beta, \delta, \gamma, \pi) = \frac{e^{X_j'\beta - D_{b,j}\delta - P_j\gamma}}{e^{\pi M} + \sum_{t=1}^{J} e^{X_t'\beta - D_{b,t}\delta - P_t\gamma}}. \tag{5}$$

$$Q_j(P, X \mid \beta, \delta, \gamma, \pi) = \sum_b \sum_M h(b, M) S_{i,b}(P, X, M \mid \beta, \delta, \gamma, \pi) \tag{6}$$

$$\frac{\partial Q_j(P, X \mid \beta, \delta, \gamma, \pi)}{\partial P_k} = \frac{\partial \sum_b \sum_M h(b, M) S_{i,b}(P, X, M \mid \beta, \delta, \gamma, \pi)}{\partial P_k} \tag{7}$$

3.2 Supply

$$\Pi_f = \sum_{j \in F_f} (r_k P_j Q_j(P) - c_j Q_j(P) - FC_j) \tag{8}$$

$$\Pi_f = \sum_{j \in F_f} (P_j Q_j(P) - (\frac{c_j}{r_k}) Q_j(P) - \frac{FC_j}{r_k}) \tag{9}$$

$$C_j = (C_k + \varepsilon_j) \tag{10}$$

$$Q_j(P) = \sum_{r \in F_f} (P_r - C_k - \varepsilon_r) \frac{\partial Q_r(P)}{\partial P_j} = 0 \tag{11}$$

$$\Omega_{j,r} = \begin{cases} \frac{\partial Q_r}{\partial P_j}, & \text{if } r \text{ and } j \text{ have the same owner,} \\ 0, & \text{otherwise.} \end{cases} \tag{12}$$

$$Q(P) + \Omega(P - C - \varepsilon) = 0 \tag{13}$$

$$Q(P, X \mid \theta) + \Omega(P, X \mid \theta)(P - C - \varepsilon) = 0 \tag{14}$$

$$\varepsilon = P - C + \Omega(P, X \mid \theta)^{-1} Q(P, X \mid \theta) \tag{15}$$

$$E[\varepsilon_j(\theta^*) \mid Z_j] = 0 \tag{16}$$

$$G_J(\theta) = \frac{1}{J} \sum_{j=1}^{J} Z_j \, \varepsilon_j(\theta) \tag{17a}$$

$$G_J(\theta) = \frac{1}{J} \sum_{j=1}^{J} \left[R_{\text{18-29}} \frac{Q_j(M_{\text{Age}}, \theta)}{\text{Pop}(M_{\text{Age}})} - R_{\text{Age}} \frac{Q_j(M_{\text{18-29}}, \theta)}{\text{Pop}(M_{\text{18-29}})} \right] \tag{17b}$$

$$G_J(\theta) = \frac{1}{J} \sum_{j=1}^{J} \left[R_{\text{Male}} \frac{Q_j(M_{\text{Female}}, \theta)}{\text{Pop}(M_{\text{Female}})} - R_{\text{Female}} \frac{Q_j(M_{\text{Male}}, \theta)}{\text{Pop}(M_{\text{Male}})} \right] \tag{17c}$$

$$G_J(\theta) = \frac{1}{J} \sum_{j=1}^{J} \left[R_{\text{Black}} \frac{Q_j(M_{\text{White}}, \theta)}{\text{Pop}(M_{\text{White}})} - R_{\text{White}} \frac{Q_j(M_{\text{Black}}, \theta)}{\text{Pop}(M_{\text{Black}})} \right] \tag{17d}$$