

Practice Question No. 1

Question 1

1. Suppose that we have a cross sectional data on markets, with equilibrium prices and quantities and observable demand and supply shifters as data
Consider the following system:

- Demand: $Q_m = \alpha_1 p_m + \alpha_2 x_m + \epsilon_m$
- Supply: $p_m = \beta_1 Q_m + \beta_2 w_m + v_m$

Suppose you estimated the following linear reduced form model of price and quantity.

- $p_m = a_1 x_m + a_2 w_m + \eta_{1,m}$
- $Q_m = b_1 x_m + b_2 w_m + \eta_{2,m}$

Based on the estimation results of the above linear reduced form a_1, a_2, b_1, b_2 , recover the structural parameters $\alpha_1, \alpha_2, \beta_1, \beta_2$. Include any assumptions that is necessary to recover the structural parameters from the reduced form regression.

2. Can you also recover $Var(\epsilon)$, $Var(v)$ and $Cov(\epsilon, v)$ from the estimation of the linear reduced form equations?

Question 2

Consider a static oligopoly model with n firms producing homogenous product. Firm i has the following profit function.

$$\pi_i = h(Q)q_i - C_i(q_i)$$

where $p = h(Q)$ is the inverse demand curve and $Q = \sum_{j=1}^n q_j$ is the total market output.

1. Write down the first order condition of the profit maximization.
2. Let $\theta = \frac{1}{n} \sum_{i=1}^n \frac{\theta_i q_i}{Q}$ where $\theta_i = 1 + \sum_{j \neq i} \frac{\partial q_j}{\partial q_i}$. Explain how you would specify and estimate the parameters of the inverse demand function, marginal cost function and θ . In particular, discuss what you need to assume to be able to separately estimate θ .