

- 1 Suppose the demand curve is $Q(p) = p^\epsilon$, what is the elasticity of demand? If marginal cost is \$1 and $\epsilon = -2$, what is the profit-maximizing price?

$$\epsilon_Q, P = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

$$Q = P^{-2}$$

$$\frac{\Delta Q}{\Delta P} = -2P^{-3}$$

$$\epsilon_Q, P = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} = -2P^{-3} \times \frac{P}{P^{-2}} = -2P^{-3} \times P^{1+2} = -2$$

$$P = -Q + 10$$

$$\text{Max. Pro. : } MR = MC$$

$$\frac{1}{2} Q^{-\frac{1}{2}} = 1$$

$$Q^{-\frac{1}{2}} = 2$$

$$Q = \frac{1}{4}$$

$$TR = P \cdot Q$$

$$TR = Q^{-\frac{1}{2}} \cdot Q = Q^{\frac{1}{2}}$$

$$MR = \frac{1}{2} Q^{-\frac{1}{2}}$$

$$\text{Substitute } Q = \frac{1}{4} \text{ in } Q = P^{-2}$$

$$P^{-2} = \frac{1}{4}$$

$$P = 2$$

- 2 Suppose the demand curve for corn is $Q(p) = 10 - p$. Suppose that one firm owns all five units of corn in the world and has zero marginal cost. Does a monopoly sell less output than would be sold in a competitive market in which 100 firms each own 0.05 units?

$$TR = Q(-Q + 10)$$

$$TR = -Q^2 + 10Q$$

$$MR = -2Q + 10$$

$$MR = MC$$

$$-2Q + 10 = 0$$

$$Q = 5$$

Monopolist should sell at $Q = 5$

Total outputs in the competitive market is $100(0.05) = 5$

Both market have outputs sold at the same level which is 5 units.

8. Output is homogenous and the demand curve is

$$P = 448 - Q.$$

There are two firms with identical costs given by $C = q_i^2$ where q_i is the production of firm i .
The marginal cost of firm i is $MC_i(q_i) = 2q_i$.

- Find the Cournot equilibrium firm outputs.
- Find the Stackelberg equilibrium firm outputs.

Cournot equilibrium

Firm 1 ; $\Pi_1 = P \cdot q_1 - q_1^2$

$$\Pi_1 = (448 - q_1 - q_2) \cdot q_1 - q_1^2$$

$$\Pi_1 = 448q_1 - q_1^2 - q_2q_1 - q_1^2$$

$$\frac{\partial \Pi_1}{\partial q_1} = 448 - 2q_1 - q_2 = 0$$

$$-4q_1 + 448 = q_2$$

$$q_1 = \frac{1}{4}(-4q_2 + 448) + 448$$

$$q_1 = 16q_1 - 1292 + 448$$

$$q_1 = 16q_1 - 1344$$

$$-15q_1 = -1344$$

$$q_1 = 89.6$$

Firm 2 ; $\Pi = P \cdot q_2 - q_2^2$

$$\Pi = (448 - q_1 - q_2) \cdot q_2 - q_2^2$$

$$\Pi = 448q_2 - q_2^2 - q_1q_2 - q_2^2$$

$$\frac{\partial \Pi}{\partial q_2} = 448 - 2q_2 - q_1 = 0$$

$$-4q_2 = q_1 - 448$$

$$q_1 = -4q_2 + 448$$

Stackelberg

We assume that firm 1 is a leader

Firm 2 ; $\Pi = P \cdot q_2 - q_2^2$

$$\Pi = (448 - q_1 - q_2) \cdot q_2 - q_2^2$$

$$\Pi = 448q_2 - q_2^2 - q_1q_2 - q_2^2$$

$$\frac{\partial \Pi}{\partial q_2} = 448 - 2q_2 - q_1 = 0$$

$$-4q_2 = q_1 - 448$$

$$q_1 = -4q_2 + 448$$

$$q_2 = \frac{-q_1 + 448}{4}$$

$$\Pi_1 = P \cdot q_1 - q_1^2$$

$$\Pi_1 = (448 - q_1 - q_2) \cdot q_1 - q_1^2$$

$$\Pi_1 = 448q_1 - q_1^2 - q_2q_1 - q_1^2$$

$$\Pi_1 = 448q_1 - q_1^2 - \left(\frac{-q_1 + 448}{4} \right) q_1 - q_1^2$$

$$\Pi_1 = 448q_1 - q_1^2 + \frac{q_1^2 + 448q_1}{4} - q_1^2$$

$$\frac{\partial \Pi_1}{\partial q_1} = 336 - \frac{1}{2}q_1 = 0$$

$$q_1 = 672$$

$$q_2 = 112 - \frac{1}{4}(672) = 88$$

$$q_2 = 88$$

🔍 (write about 0.5 page) Find 1 example of an industry that has a dominant firm. Describe what this industry is, which firm is the dominant firm, which firms are fringe firms (name the ones that you

The industry that I am going to illustrate is supermarket industry which is a self-service shop offering a wide variety of food, beverages and household products, organized into sections. This kind of store is larger and has a wider selection than earlier grocery stores, but is smaller and more limited in the range of merchandise than a hypermarket or big-box market. For an easy understanding, I am going to illustrate the supermarket circles in Thailand. The dominant firm of the supermarket circle in Thailand is 7-eleven, owned by CPALL which has over 12,000 branches all over the country.

Its revenue is 334,061 million baht and 20,130 million baht is its profits showing that it is the most-favored supermarket in Thailand. For the fringe firm, Cj supermarket is owned by Khun Laksir 19549108 who is the biggest shareholder of Cj. Cj supermarket has over 600 branches all over the country whose revenue is 13,296 million baht and 557 million baht is its profits.

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