Industrial Organization and Public Policy
Economics 640

Solutions to Final Examination

Professor D. Weisman
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I. Part I. Short Answer

1. Firm i sets $MR_i = MC_i \Rightarrow 16 - 2\left(\sum_{j \neq i}^{5} q_j\right) - 4q_i = 4$

In equilibrium, $q_j = q_i$ since all firms are identical.

This implies that $16 - 12q_i = 4 \Rightarrow q_i = 1,\ i = 1, \ldots, 5$

Hence, $Q = 5$ and $\boxed{P = 6}$

2 Submarket 1

$Q_1 = 24 - 2P_1 \Rightarrow P_1 = 12 - \frac{1}{2}Q_1,\ MR_1 = 12 - Q_1 = 2 = MC$

$\Rightarrow \boxed{Q_1 = 10 \text{ and } P_1 = 7}$

Submarket 2

$Q_2 = 14 - P_2 \Rightarrow P_2 = 14 - Q_2,\ MR_2 = 14 - 2Q_2 = 2 = MC$

$\Rightarrow \boxed{Q_2 = 6 \text{ and } P_2 = 8}$

If resale cannot be prevented, all output is sold at the lowest price offered in any submarket. Hence, $P = 7$

and $\pi = (17)(7-2) = 85$.

No increase in W with Price Discrimination Since Demand Fcts. are linear.

3. According to the statement of the problem,

(1) $\pi^c + 0 + 0 + \leq 100\left[1 + \frac{1}{0.2}\right] = 600$, where π^c = Cheating Profits

(2) $\pi^c + \frac{\pi^c}{1+0.2} \geq 600$

(2') $\pi^c(1 + 0.8333) \geq 600 \Rightarrow \pi^c \geq \frac{600}{1.8333} = 327.2727$

(1) and (2') $\Rightarrow$ $\boxed{327.2727 \leq \pi^c \leq 600}$

4. The fact that firm 1 earns positive profit implies that $X > 2$. In equilibrium, $P \geq X$. Hence,

(1) $\pi_1 = [20 - X][X - 2] = 56 \Rightarrow$

(2) $\pi_1 = 20X - 40 - X^2 + 2X = 56 \Rightarrow$

(3) $\pi_1 = X^2 - 22X + 96$

Using the quadratic formula,

$$X = \frac{22 \pm \sqrt{484 - 384}}{2} \Rightarrow X = \frac{22 \pm 10}{2}$$

$\Rightarrow$ $\boxed{X = 6 \text{ or } X = 16}$ We can rule out $X = 16$ since it exceeds the monopoly price

5. Consumers' Surplus Ranking

1. Perfect Competition $\equiv$ Bertrand Duopoly (Homogeneous Goods)
2. Cournot Oligopoly
3. Uniform Price Monopolist
4. First-Degree Price Discrimination Monopolist

6. <u>No.</u> The fact that these cartel members want to merge implies that there is an opportunity to realize merger efficiencies. Given that the profit-maximizing monopoly price is decreasing in marginal cost, this merger will increase Consumers' surplus, producer's surplus and thus total economic welfare

II. Problems and Essay

1. $P = 36 - Q$, $Q = q_1 + q_2$, $C(q_1) = 12q_1$, $C(q_2) = 12q_2$.

a) Note: The firms have identical costs, so their reaction functions will be symmetric.

Firm sets $MR_1 = MC \Rightarrow$

(1) $36 - q_2 - 2q_1 = 12 \Rightarrow$

(2) $\boxed{R_1(q_2) = 12 - \frac{1}{2} q_2}$ and, by symmetry,

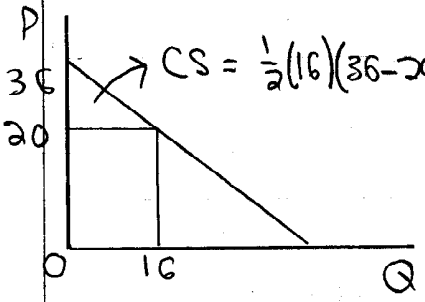
(3) $\boxed{R_2(q_1) = 12 - \frac{1}{2} q_1}$

(b) Substituting (3) into (2) yields

(4) $q_1 = 12 - \frac{1}{2}(12 - \frac{1}{2} q_1) = 6 + \frac{1}{4} q_1 \Rightarrow$

(5) $\frac{3}{4} q_1 = 6 \Rightarrow$ $\boxed{q_1^* = 8 \text{ and } q_2^* = 8}$

$\boxed{P = 20 \text{ and } CS = 128}$

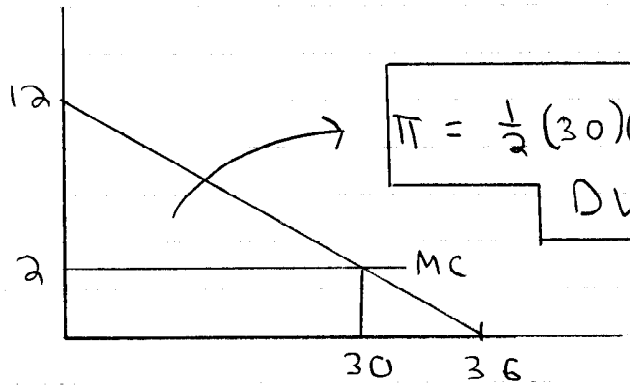


c) A monopoly prevails post-merger $\Rightarrow MR = MC$

(6) $36 - 2Q = X \Rightarrow Q = \frac{36 - X}{2} = 18 - \frac{1}{2} X$

Set $18 - \frac{1}{2} X \geq 16 \Rightarrow \boxed{X \leq 4}$

2 $Q = 36 - 3P$ and $C(Q) = 2Q$



$\Pi = \frac{1}{2}(30)(12-2) = 150$ (No Resale)

DWL = 0 (efficient)

a) $Q = 36 - 3P \Leftrightarrow P = 12 - \frac{1}{3}Q$

b) Submarket 1 : $Q_1 = 20 - 2P_1 \Leftrightarrow P_1 = 10 - \frac{1}{2}Q_1$

Set $MR_1 = MC_1 \Rightarrow 10 - Q_1 = 2 \Rightarrow$ $Q_1 = 8$, $P_1 = 6$

$\Pi_1 = 8(6-2) = 32$

Submarket 2 :

$Q_2 = 16 - P_2 \Leftrightarrow P_2 = 16 - Q_2$

Set $MR_2 = MC_2 \Rightarrow 16 - 2Q_2 = 2 \Rightarrow$ $Q_2 = 7$, $P_2 = 9$

$\Pi_2 = 7(9-2) = 49$

Resale can be prevented

$\Pi = 32 + 49 = 81$

Resale cannot be prevented

$\hat{\Pi} = (18)(6-2) = 72$

No. Price discrimination does not lead to higher economic welfare. Demands are linear, so there is no increase in output as a result of price discrimination, but there is a consumption inefficiency

c) Under uniform monopoly pricing, $MR = MC \Rightarrow$

$12 - \frac{2}{3}Q = 2 \Rightarrow Q^M = 15$, $P^M = 7$

and $\pi^M = 15(7-2) = 75$

$$\boxed{75 < S \leq 81}$$

3. Essay Question – Key Points

1. Merger is welfare-enhancing if quality is non-decreasing.

2. If firm wants to merge under policy, we can infer that PS > 0.

3. If quality is non-decreasing, CS > 0.

4. Policy requires some mechanism to adjust prices over time to account for inflation and other input price variations. The firm may not be viable in the long-run otherwise.

5. Policy requires DOJ to be in the enforcement business—something it is not staffed to do.

6. Recall that Sherman Act precludes arrangements which tend to advance the cost to the consumer.

7. What mergers would not take place? Mergers for which the primary motivation was to eliminate a rival and leverage market power would not take place under this policy.

8. There is a possibility of strategic behavior with this policy. If there is some market power prior to the merger, firms could raise price in advance of the merger.

9. What are implications for innovation? Limit price cap to existing products, but do not cover new products.

10. When can price cap be relaxed? It can be relaxed when the market share of the newly merged falls below "critical" levels or new substitutes appear on the market that would serve to provide the requisite level of discipline.

11. Point deductions were made for incorrect economic analysis, incoherent and sloppy writing.

12. Credit was given for use of examples, creativity and clear writing.