Industrial Organization and Public Policy
Economics 640

Solutions to Midterm Examination

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I. Short Answer

1. Competitive Outcome : $P^C = MC = 4$

Monopoly Outcome : $MR = MC \Rightarrow 6 - 8Q = 4\theta$

$\Rightarrow 6 - 4\theta = 8Q$

$\frac{3}{4} - \frac{1}{2}\theta = Q^M$

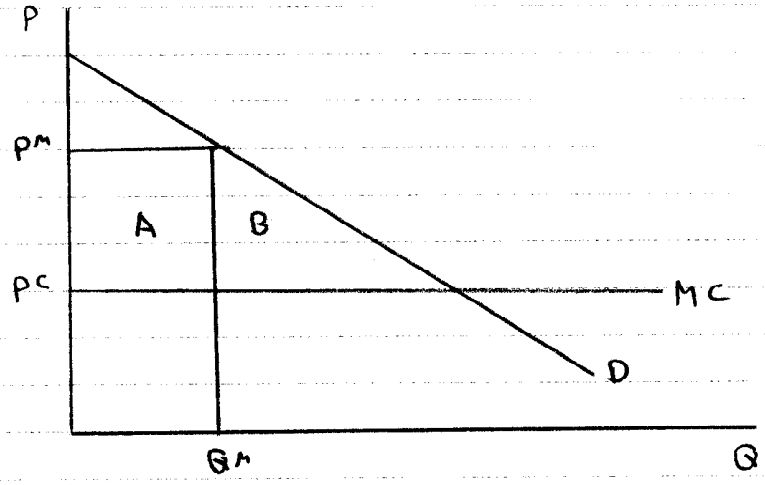
Monopoly Price : $P(Q^M) = 6 - 4(\frac{3}{4} - \frac{1}{2}\theta) = 6 - 3 + 2\theta < 4 = P^C$

$3 + 2\theta < 4$

$2\theta < 1$

$\boxed{\theta < \frac{1}{2}}$

a.



Posner suggested that the "transfer" A could be dissipated in the course of rent-seeking to become a monopolist. Hence, total social costs of monopoly could range as high as A + B (traditional DWL). A is equal to monopoly profits. With linear demand and cost, DWL = $\frac{1}{2}$ monopoly profit.

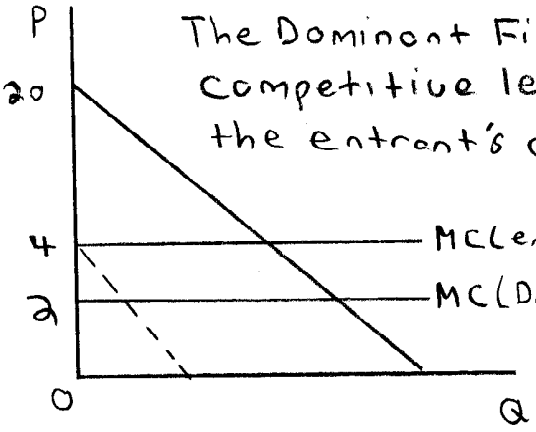
$B = 100 = \frac{1}{2}$ monopoly profit $\Rightarrow A = 200$

$A = 200$

$B = 100$

Total Social Costs = 300

3. $P(Q) = 20 - Q$. $C(Q) = 2Q$, $C(q) = 4Q$



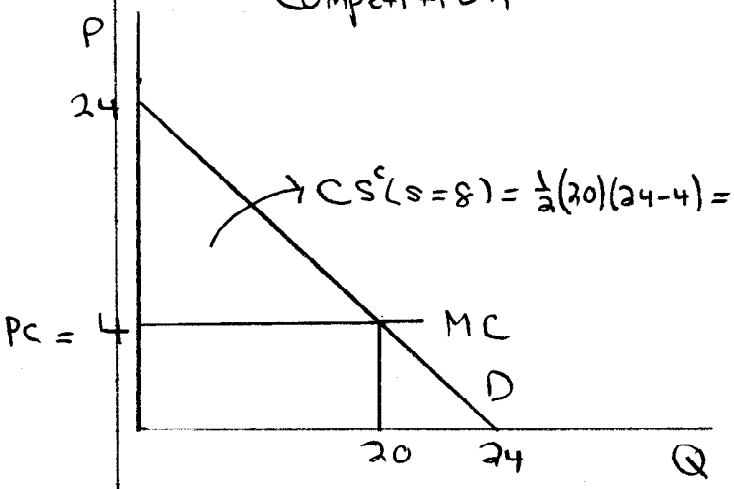
The Dominant Firm puts on the market the competitive level of output corresponding to the entrant's cost function: $4 = 20 - Q \Rightarrow$

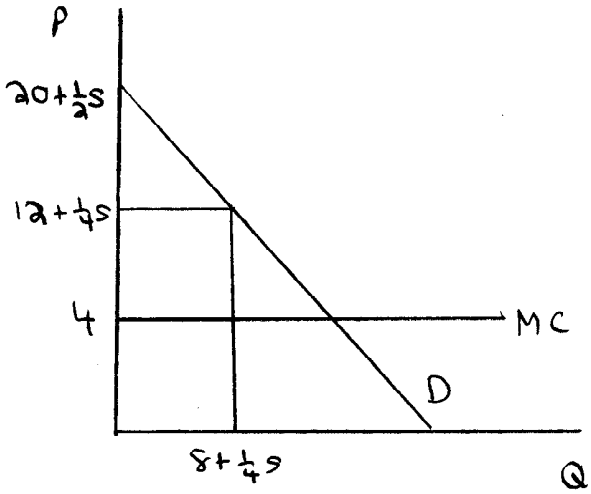
$\boxed{Q_L = 16 \quad P_L = 4}$

4. $P = 20 - 1Q + \frac{1}{2}s \qquad C(Q) = 4Q$

With $S = 8$, $P = 24 - 1Q = 4 = MC \Rightarrow Q^c = 20, P^c = 20$

Competition





Under monopoly, $MR = MC \Rightarrow 20 + \frac{1}{2}s - 2Q = 4 \Rightarrow Q^M = 8 + \frac{1}{4}s$

The corresponding monopoly price is given by $\mathcal{E}$

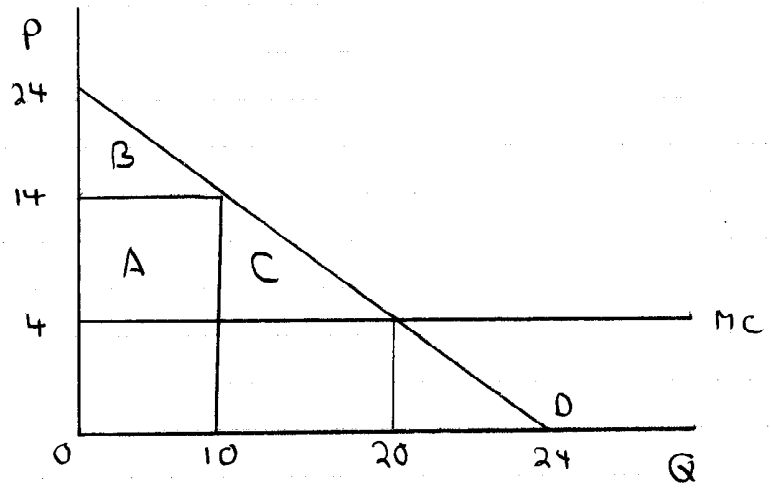
$$P^M = 20 - (8 + \tfrac{1}{4}s) + \tfrac{1}{2}s = 12 + \tfrac{1}{4}s$$

$$CS^M(s) = \tfrac{1}{2}(8 + \tfrac{1}{4}s)(20 + \tfrac{1}{2}s - 12 - \tfrac{1}{4}s) = \tfrac{1}{2}(8 + \tfrac{1}{4}s)^2 \geq 200$$

$$\Rightarrow 8 + \tfrac{1}{4}s \geq 20 \Rightarrow \tfrac{1}{4}s \geq 12 \Rightarrow \boxed{s \geq 48}$$

Note that at $s = 48$, $Q^M = 20 = Q^c$ when $s = 8$.

5. $P(Q) = 24 - Q$ $\quad C(Q) = 4Q$



Monopoly Price: $24 - 2Q = 4 \Rightarrow Q^M = 10$

$P(Q^M) = 14$

Monopoly Profits: $\pi^M = Q^M(P^M - MC) = 10(14-4) = 100$

Consumers would have to bribe the monopolist with its monopoly level of profits = A.

Consumers enjoy net CS of B + C

Hence PS = A

CS = B + C

$W = A + B + C = \frac{1}{2}(20)(24-4) = 200$

6 $Q = 20 - 2P \Rightarrow P = 10 - \frac{1}{2}Q$

This is a linear demand function. The revenue-maximizing price occurs at the midpoint of the linear demand function. This corresponds to $P = 5$ and $Q = 10$

$$\varepsilon = \frac{dQ}{dP} \cdot \frac{P}{Q} = (-2)\frac{5}{10} = -1$$

II Problems

1. $W = \alpha CS + (1-\alpha) PS \quad \alpha \in [0,1]$

$Q = 32 - 2P \Rightarrow P = 16 - \frac{1}{2}Q$

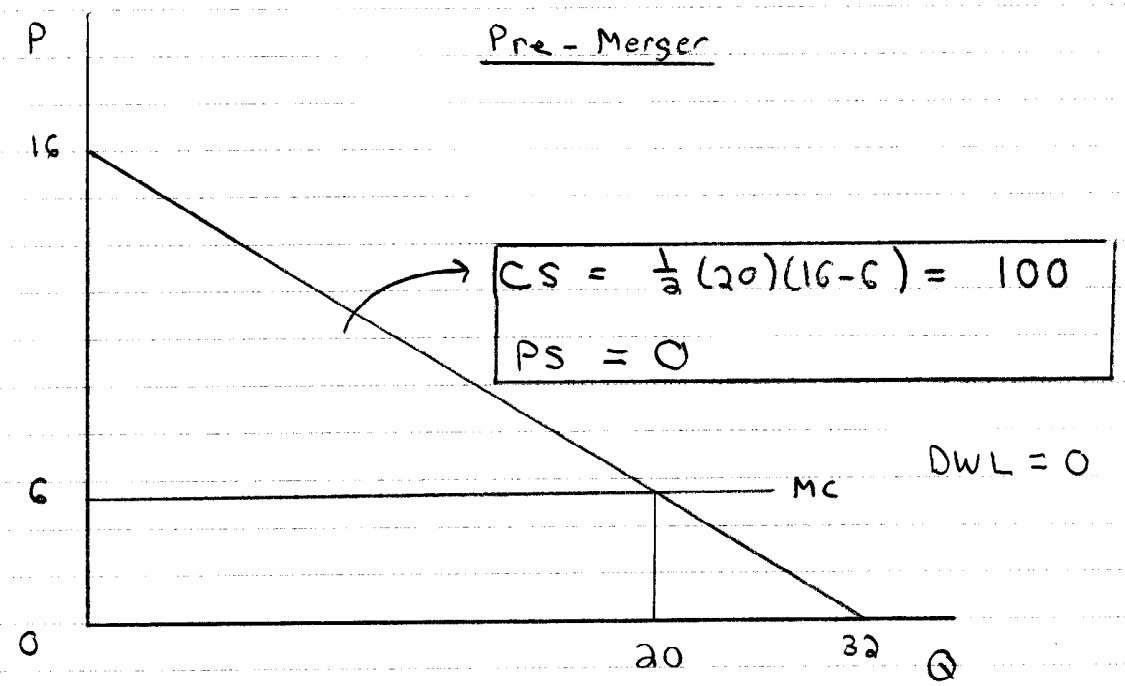
$C(Q) = 6Q$ Pre-Merger ; $C(Q) = 4Q$ Post-Merger

a) Pre-Merger Competitive Outcome

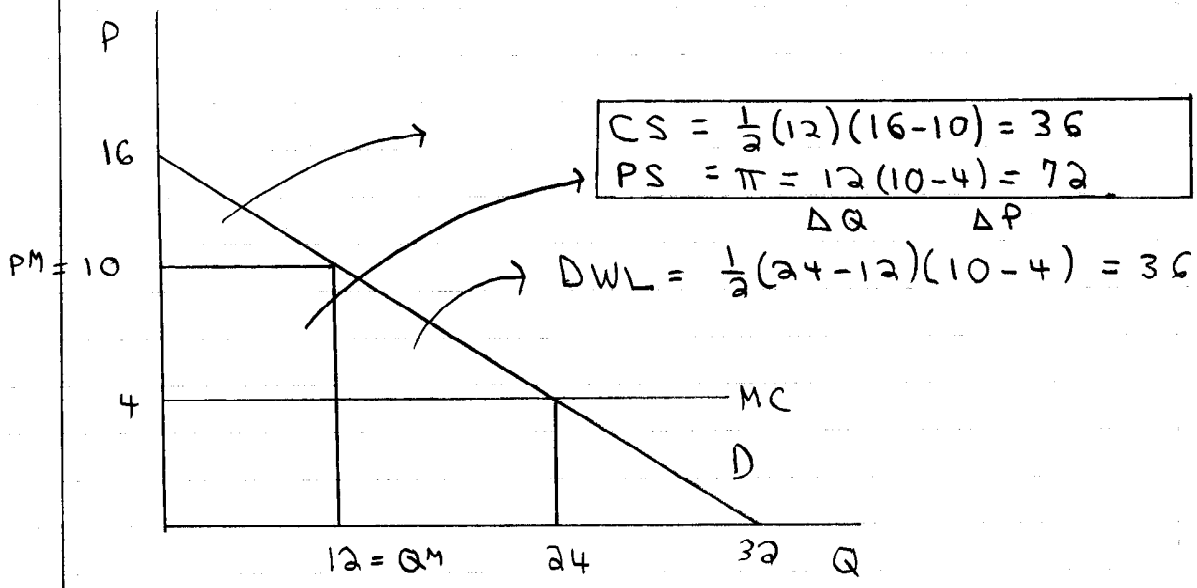
(1) $P^c = MC = 6$; $Q(6) = 20$

Post-Merger Monopoly Outcome

(2) $\overbrace{16 - Q}^{MR} = \overbrace{4}^{MC} \Rightarrow Q^M = 12, \; P^M = 10$



Post-Merger



Alternatively, $DWL = W^C - W^M = 100\alpha + 0 - 36\alpha - 72(1-\alpha)$

$= 136\alpha - 72$

b) Pre-Merger DWL = 0 ; Post-Merger DWL = 36

c) $W = \alpha CS + (1-\alpha) PS$

$\Delta W = [\alpha(36) + (1-\alpha)72] - [\alpha(100) + (1-\alpha)0] < 0$

(W^M and W^C)

$36\alpha + 72 - 72\alpha - 100\alpha < 0$

$72 - 136\alpha < 0$

$\Rightarrow \quad \alpha > \frac{72}{136}$

$\Rightarrow \quad \boxed{\alpha > 0.5294}$

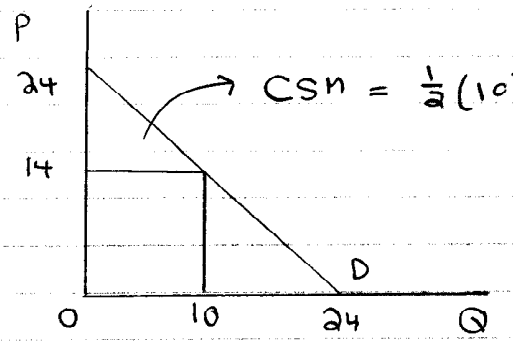
d) No. Democratic administrations tend to place more weight on CS than on PS and this implies that $\alpha > 0.5$. The analysis reveals that the merger is welfare diminishing for all values of $\alpha > 0.5294$. Hence, it is unlikely that the Obama administration would look favorably upon this merger.

2. $P = 24 - (q + Q)$ $C(Q) = 4Q$ - Dominant Firm's Cost Function. $C(q) = e + 4q$ - Entrant's Cost Function

a) Monopoly Outcome For Dominant Firm, set $q = 0$

(1) $P = 24 - Q$. Set $MR = MC$

(2) $\underbrace{24 - 2Q}_{MR} = \underbrace{4}_{MC} \Rightarrow Q^M = 10 \Rightarrow P^M = 14$



$CS^M = \frac{1}{2}(10)(24-14) = 50.$

b) $P(Q) = 24 - q - Q$ or $P(Q) = (24 - Q) - q$.

The fringe acts as a monopolist on that portion of the market demand curve remaining after the dominant firm has placed Q amount of output on the market.

(3) $MR(q) = 24 - Q - 2q = 4 = MC$ Solve for q,

(4) $24 - 4 - Q = 2q \Rightarrow q = 10 - \frac{1}{2}Q$

c) The fringe profit function is given by,

(5) $\pi^f = (P - MC)q - e$. Substitute for P and MC

(6) $\pi^f = (24 - q - Q - 4)q - e$

(7) $\pi^f = (20 - q - Q)q - e$

Substitute in for q,

(8) $\pi^f = [20 - (10 - \frac{1}{2}Q) - Q][10 - \frac{1}{2}Q] - e$

(9) $\pi^f = [10 - \frac{1}{2}Q]^2 - e$

Set $\pi^f = 0$ and Solve for Q

(10) $[10 - \frac{1}{2}Q]^2 = e$

(11) $10 - \frac{1}{2}Q = \sqrt{e}$

(12) $10 - \sqrt{e} = \frac{1}{2}Q$

(13) $Q^L = 20 - 2\sqrt{e}$

When $e = 0$, $Q^L = 20$ and $P^L = 4 = MC$

Hence, when there are no sunk costs of entry ($e = 0$), the dominant firm must put the "competitive" level of output on the market and charge the "competitive" price in order to keep the fringe firm out.

d) For $Q^L = Q^M$, it follows that

(14) $10 = 20 - 2\sqrt{e} \Rightarrow 2\sqrt{e} = 10$

$\Rightarrow e = 25$

Note that $\pi^f = [10 - \frac{1}{2}(10)]^2 - 25 = 0$.

Economic Intuition: When the sunk costs of entry are sufficiently high (i.e., $e \geq 25$), the dominant firm can act like a monopolist. In this case, the fringe firm exerts no discipline on the behavior of the dominant firm.

3. Essay

There is no single "correct" answer to this essay. Grading was based on:

(1) Use of references / literature to support the fundamental premises of your discussion.

(2) The Economic logic employed in your discussion

(3) Whether your arguments were well-reasoned and flow logically from your basic premises.

(4) The objectivity and coherence of your writing

(5) Discussion of costs / benefits of antitrust pursuits and principles that derive therefrom

(6) Distinction between Consumers' Surplus and Economic Welfare.

Essential Points

1) Differentiate Between CS and W
2) Williamson Analysis & "Rectangles Dominate Triangles" Theorem
3) $\hat{W} = \alpha CS + (1-\alpha) PS$, $\alpha \in [0,1]$
4) Chicago / Harvard - SCP low/high α, respectively
5) Senator Sherman's Focus on CS - increase in price was concern? What about innovation and "creative destruction"
6) Cost Savings Realized By Firm - Higher Prices Borne by Consumers. Related Back to 2) and 3)
7) Readings: Carlton, Schumpeter, Antitrust Modernization Commission Report, Baker, Crandall and Winston
8) Should antitrust be concerned solely with efficiencies, regardless of distribution issues - why, why not? arguments