

Micro, Module 13: "Market Power" practice problems

(The attached PDF file has better formatting.)

Exercise 13.1: Competition vs monopoly

- In 20X1, 100 identical insurers sell personal auto policies at the competitive price of \$2,000 per car-year.
- Each insurer sells 1,000 policies.
- The marginal cost curve is flat for all insurers, with no fixed costs. (All costs are variable.)

The market demand curve is linear. The maximum price at which any personal auto insurance is sold is \$2,400 per car-year.

- On January 1, 20X2, the 100 competitors merge into one monopoly, which sets monopoly prices.
 - The merger reduces underwriting and acquisition costs and allows more efficient settlement of claims.
- Variable costs decline to \$1,600 per car-year.

- A. In 20X1, before the merger, what is the market demand curve?
- B. In 20X1, before the merger, what is the market supply curve?
- C. In 20X1, before the merger, what is consumers' surplus?
- D. In 20X1, before the merger, what is producers' surplus?
- E. In 20X2, after the merger, what is the monopolist's marginal revenue curve?
- F. In 20X2, after the merger, how many policies are sold?
- G. In 20X2, after the merger, what is the monopoly price?
- H. In 20X2, after the merger, what is consumers' surplus?
- I. In 20X2, after the merger, what is producers' surplus?
- J. Has social welfare increased or decreased from monopolization?

[Note: In practice, insurers size has only a small effect on marginal costs. Some distribution costs can be reduced by large agency forces; most underwriting costs and loss costs are not affected. The large reduction in marginal costs here is heuristic.]

Part A: Two points on a linear demand curve are given:

- At a price of \$2,400, no policies are sold.
- At a price of \$2,000, $100 \times 1,000 = 100,000$ policies are sold.

The market demand curve is $P = \$2,400 - \$400 \times Q / 100,000$

- At $Q = 0$, $P = \$2,400$.
- At $Q = 100,000$, $P = \$2,000$.

Part B: The marginal cost curve is flat at $P = \$2,000$, so the market supply curve is flat at $P = \$2,000$. For firms in a competitive industry, the supply curve is the marginal cost curve.

Part C: In 20X1, $Q = 1,000 \times 100 = 100,000$ personal auto policies are sold.

- Consumers' surplus is a right triangle with a base of 100,000 and a height of $\$2,400 - \$2,000 = \$400$.
- Consumers' surplus = $\frac{1}{2} \times \$400 \times \$100,000 = \$20$ million.

Part D: With a flat marginal cost curve in a competitive market, producers' surplus = zero.

The average cost is \$2,000 per policy and the revenue is \$2,000 per policy, so economic profit = zero.

Take heed: In this exercise, fixed costs are zero, so economic profit = producers' surplus. If fixed costs are not zero, producers' surplus – fixed costs = economic profit.

Part E: The market demand curve is not affected by the merger. It is a straight line joining ($Q = 0$, $P = \$2,400$) and ($Q = 100,000$, $P = \$2,000$):

- $P = \$2,400 - Q \times \$400 / 100,000$
- $Q = (\$2,400 - P) \times 100,000 / \$400 = 600,000 - 250 P$
- Total revenue = $P \times Q = \$2,400 Q - Q^2 \times \$400 / 100,000$
- Marginal revenue = $\partial(\text{total revenue})/\partial Q = \$2,400 - \$800 / 100,000$

The marginal revenue curve is $MR = \$2,400 - Q \times \$800 / 100,000$

Part F: The monopoly quantity is at the intersection of marginal revenue to marginal cost:

$$\$2,400 - Q \times \$800 / 100,000 = \$1,600$$

$$\Rightarrow \$800 = Q \times \$800 / 100,000$$

$$\Rightarrow Q = 100,000$$

Part G: The monopoly price is taken from the market demand curve, so it remains \$2,000.

Part H: The demand curve and the price remain the same as before the merger, so consumers' surplus remains the same at \$20 million.

Part I: Producers' surplus is $100,000 \times (\$2,000 - \$1,600) = \$40$ million.

Part J: Social welfare increased from \$20 million to $\$20 \text{ million} + \$40 \text{ million} = \$60$ million.

Question: All firms join into a monopoly, yet the equilibrium price and quantity do not change and consumers' surplus does not change. Don't monopolies reduce social welfare?

Answer: In this exercise, the monopoly increases social welfare by making the production of insurance policies more efficient. Producers' surplus increased from zero to \$40 million. This exercise illustrates Landburg's statement that horizontal mergers can increase social welfare by reducing marginal costs. Insurance is not a realistic example of this, since marginal costs do not vary much by size of the insurer. But marginal costs vary greatly by size of the firm for high tech and pharmaceutical industries, which are extremely competitive but are dominated by large, global firms.

Question: What about the dead weight loss from monopoly? Doesn't monopoly increase the dead weight loss and reduce social welfare?

Answer: Monopoly pricing causes a dead weight loss even in this exercise. If the monopoly set competitive prices, 200,000 policies would be written at a price of \$1,600 per car-year.

- Consumers' surplus with competitive prices would be $\frac{1}{2} \times 200,000 \times (\$2,400 - \$1,600) = \80 million.
- Producers' surplus with competitive prices would be zero.
- The dead weight loss from monopoly is $\$80$ million $-$ $\$20$ million $-$ $\$40$ million $=$ $\$20$ million.

Question: Is this realistic? Does this happen in practice?

Answer: This happens frequently. Giant multi-national firms like Intel (computer chips) produce goods at low costs. India and China, which have less anti-trust regulation than the U.S. or Europe, have especially large conglomerates. India's Tata produces cars for a few thousand dollars. These benefits of consolidation accrue to consumers.

Question: Doesn't consolidation of firms lead to monopoly pricing, which reduces consumer welfare?

Answer: That was true many years ago; it is less true now. In the early 20th century, there were 50 U.S. auto manufacturers. Now there are just two (Ford and GM), but the market is more competitive now because of foreign auto manufacturers. Globalization has led to increased competition in most industries.