

Questions

2. Assume a monopolist faces a market demand curve $P = 100 - 2Q$, and has the short-run total cost function $C = 640 + 20Q$. What is the profit-maximizing level of output? What are profits? Graph the marginal revenue, marginal cost, and demand curves, and show the area that represents deadweight loss on the graph.
3. In question 2, what would price and output be if the firm priced at socially efficient (competitive) levels? What is the magnitude of the deadweight loss caused by monopoly pricing?
4. Show that if a firm is a natural monopoly, a government policy that forces marginal cost pricing will result in losses for the firm.
5. Suppose a change in technology available to fringe firms increases their elasticity of supply, altering the total fringe supply curve from $p = 5 + Q$, to $p = 5 + 2Q$. If market demand is $Q = 20 - p$, show the change in the residual demand curve using a graph. Is the dominant firm better off or worse off after the change?
6. If a monopolist has constant marginal cost $MC = 20$, and faces demand $p = 80 - Q$, what is the effect on consumer surplus of a \$5 per unit tax on sellers? Is the tax revenue collected less than, equal to, or greater than the consumer surplus loss plus the reduction in profits?
7. Suppose a legislator introduced a bill that would decrease patent life for new drugs from 17 years to 10 years, based on the argument that it would reduce deadweight loss through lower prices. What argument could you make against such a change?
8. Suppose a monopoly is for sale. What specifically must be purchased by the buyer in order to retain its market position? How much would it be worth?
9. Suppose a monopolist faces a market demand curve $Q = 50 - p$. If marginal cost is constant and equal to zero, what is the magnitude of the welfare loss? If marginal cost increases to $MC = 10$, does welfare loss increase or decrease? Use a graph to explain your answer.
10. The chapter notes that one possible alternative to regulation is for the government to encourage competition. Would this be an efficient mechanism to increase efficiency in an industry where the incumbent firm is a natural monopoly?
11. If a monopoly firm sells a product with price \$100, whose marginal cost is \$30. What is the price/ marginal cost ratio? What is the Lerner Index? And what is the demand elasticity the firm believes it faces?
12. Suppose a monopoly firm with a constant marginal cost 10 faces an inverse linear demand function $p = 50 - Q$. What would be the profit-maximizing price and quantity if its marginal cost doubles? How does it compare to the outcome with original cost?

Answers

2. First, derive the MR and MC functions; then set $MC = MR$ and solve. See Figure 11.1.
 Deadweight loss is equal to area abc .

$$\begin{aligned}
 P &= 100 - 2Q \\
 R &= 100Q - 2Q^2 \\
 MR &= dR/dQ = 100 - 4Q \\
 MC &= 20 \\
 100 - 4Q &= 20 \\
 Q^* &= 20 \\
 p^* &= 60 \\
 \pi &= 1200 - 1040 = 160
 \end{aligned}$$

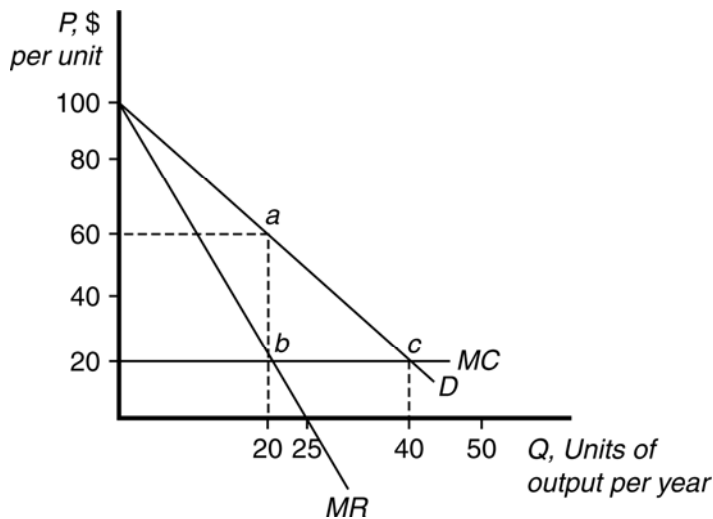


Figure 11.1

3. To solve for the competitive price and output, set $MC = p$.

$$\begin{aligned}
 20 &= 100 - 2Q \\
 Q_c^* &= 40 \\
 p_c^* &= 20
 \end{aligned}$$

The magnitude of the deadweight loss is \$400, which is the area of triangle abc in Figure 11.1.

4. See Figure 11.2. If the firm is a natural monopoly, AC falls throughout the range of demand. When AC is falling, MC is below AC . By forcing the firm to price at marginal cost, revenue would be less than cost, and the firm would incur losses equal to area $abcd$.

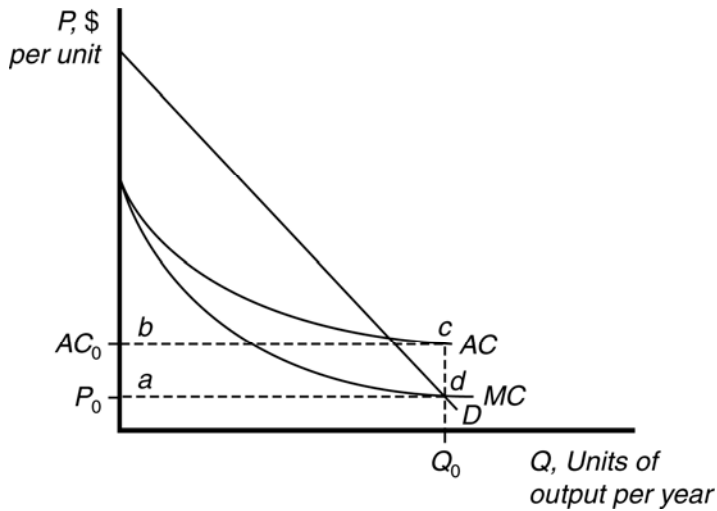


Figure 11.2

- See Figure 11.3. The change in technology reduces the slope of the fringe firm supply curve, allowing them to supply more of the total demand at all prices above \$5, making the dominant firm worse off.

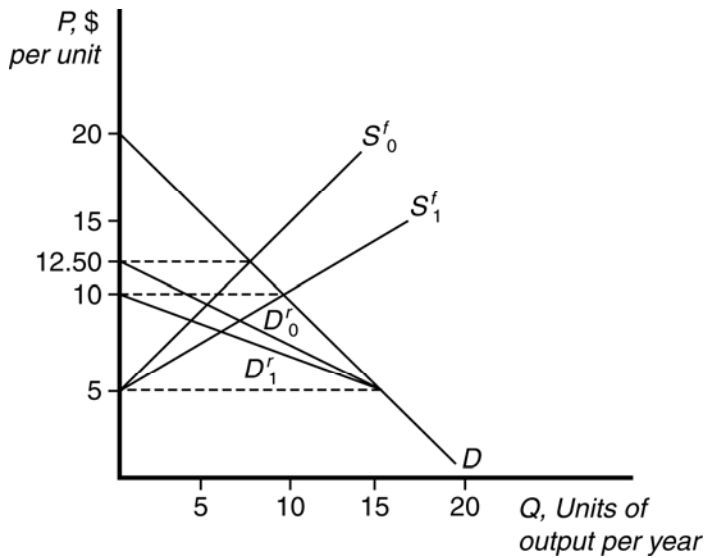


Figure 11.3

- The \$5 tax increases MC to \$25. Quantity falls from 30 to 27.5, and price increases from \$50 to \$52.50. Consumer surplus falls by \$71.875 (from \$450 to \$378.125). Profits fall by \$143.75 (from \$900 to \$756.25). Tax revenue collected is \$137.50 ($\$5 \times 27.5 = \137.50). See Figure 11.4.

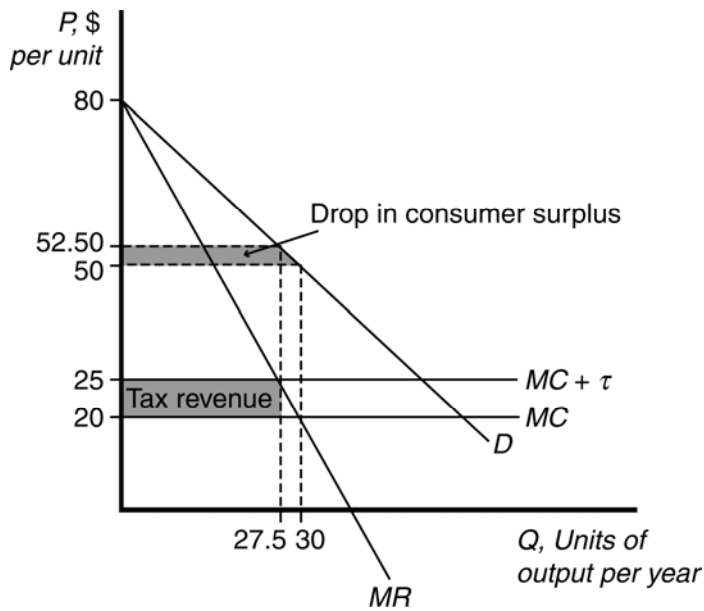


Figure 11.4

7. In order for the legislation to have a net positive effect, any social cost must be more than offset by the lower prices when the patent expires. Firms would engage in less research and development.
If a firm believed that a project could only become profitable in the 11th through 17th year of the patent, it would not be funded, or may be funded at a less than efficient level. The reduction in health that occurs as a result represents the social cost of the policy.
8. The buyer would have to purchase whatever the source is of the monopolist's barrier to entry, for example, a patent, or the control of a resource needed for production. The value of a barrier to entry is the discounted stream of profits that a monopolist could expect to earn from that monopoly. In the case of a patent it would be the discounted stream of profits that could be earned in the remaining years before the patent expires.
9. See Figure 11.5. When marginal cost is zero, the firm sells 25 units of output for \$25 per unit. The welfare loss is equal to the area of triangle *abc*, or \$312.50. When marginal cost increases to \$10, the firm reduces output to 20, and the new welfare loss is *def*, or \$250.00.

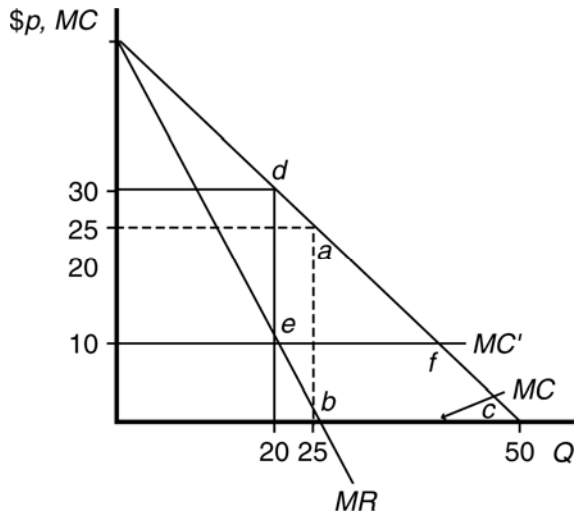


Figure 11.5

10. No. If the incumbent firm is a natural monopoly, to encourage entry through any form of assistance or subsidy will reduce overall efficiency and lead to increased prices, because cost increases as per-firm output decreases.
11. The price/marginal cost ratio will be $100/30 = 3.33$. Its Lerner Index is $70/100 = 0.7$ and the firm believes it faces a demand elasticity of -1.43 .
12. Under $MC = 10$, we have $10 = 50 - 2Q$, hence $Q = 20$ and $p = 30$. With the new marginal cost, we have $20 = 50 - 2Q$. Hence $Q = 15$ and $p = 35$.