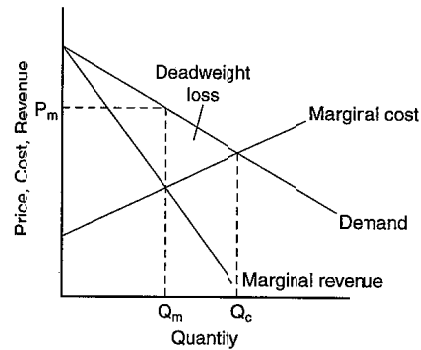


Chapter 15: Monopoly

Questions for Review: Answers

1. An example of a government-created monopoly comes from the existence of patent and copyright laws. Both allow firms or individuals to be monopolies for extended periods of time—17 years for patents, forever for copyrights. But this monopoly power is good, because without it, no one would write a book (because anyone could print copies of it, so the author would get no income) and no firm would invest in research and development to invent new products or drugs (since any other company could produce or sell them, and the firm would get no profit from its investment).
2. An industry is a natural monopoly when a single firm can supply a good or service to an entire market at a smaller cost than could two or more firms. As a market grows it may evolve from a natural monopoly to a competitive market.
3. A monopolist's marginal revenue is less than the price of its product because: (1) its demand curve is the market demand curve, so (2) to increase the amount sold, the monopolist must lower the price of its good for every unit it sells, so (3) this cut in prices reduces revenue on the units it was already selling.
4. Figure 15-1 shows the demand, marginal-revenue, and marginal-cost curves for a monopolist. The intersection of the marginal-revenue and marginal-cost curves determines the profit-maximizing level of output, Q_M . The demand curve then shows the profit-maximizing price, P_M .



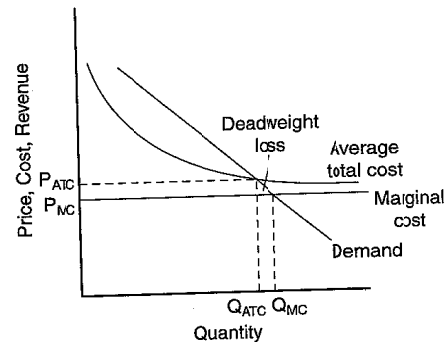
5. The level of output that maximizes total surplus in Figure 15-1 is where the demand curve intersects the marginal-cost curve, Q_C . The deadweight loss from monopoly is the triangular area between Q_C and Q_M that's above the marginal-cost curve and below the demand curve. It represents deadweight loss because society loses total surplus because of monopoly equal to the value of the good, measured by the demand curve, less the cost of production, given by the marginal-cost curve, for the quantities $Q_C - Q_M$.
6. The government has the power to regulate mergers between firms because of antitrust laws. Firms might want to merge to increase operating efficiency and reduce costs, something that's good for society, or to gain monopoly power, which is bad for society.
7. When regulators tell a natural monopoly that it must set price equal to marginal cost, two problems arise. The first is that, because a natural monopoly has a constant marginal cost that's less than average cost, setting price equal to marginal cost means that the price is less than average cost, so the firm will lose money. The firm would exit the industry unless the government subsidized it, but getting revenue for such a subsidy would cause the government to raise other taxes, increasing their deadweight loss. The second problem is that it gives the monopoly no incentive to reduce costs.
8. One example of price discrimination is in publishing books. Publishers charge a much higher price for hardback books than for paperback books—far higher than the difference in production costs. Publishers do this because die-hard fans will pay more for a hardback book when the book is first released. Those who don't value the book as highly will wait for the paperback version to come out. The publisher makes greater profit this way than if it charged just one price.

A second example is the pricing of movie tickets. Theaters give discounts to children and senior citizens because they have a lower willingness to pay for a ticket. Charging different prices helps the theater increase its profit above what it would be if it charged just one price.

Problems and Applications: Answers (Q 1-3, 5, 7-14, 16)

1. A firm's marginal revenue is the increase in revenue from producing one more unit of the good. A monopolist's marginal revenue can be negative because to get purchasers to buy an additional unit of the good, the firm must reduce its price on *all* units of the good. The fact that it sells a greater quantity increases revenue, but the decline in price decreases revenue. The overall effect depends on the elasticity of the demand curve. If the demand curve is inelastic, marginal revenue will be negative.

2. A competitive firm faces a more elastic demand curve than a monopolist; in fact, a competitive firm faces a perfectly elastic demand curve since it is a price taker. The larger elasticity arises when a good has many perfect substitutes.
3. Figure 15-2 illustrates a natural monopolist setting price, P_{ATC} , equal to average total cost. The equilibrium quantity is Q_{ATC} . Marginal cost pricing would yield the price P_{MC} and quantity Q_{MC} . Since for quantities between Q_{ATC} and Q_{MC} the benefit to consumers (measured by the demand curve) exceeds the cost of production (measured by the marginal cost curve), the deadweight loss from setting price equal to average total cost is the triangular area shown in the figure.

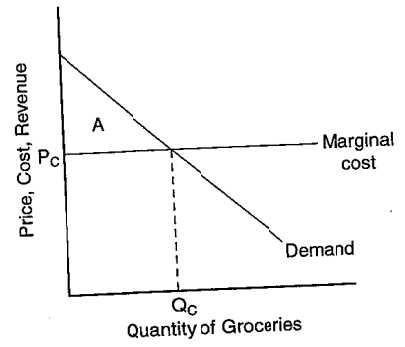


5. Mail delivery has an always-declining average-total-cost curve, since there are large fixed costs for equipment. The marginal cost of delivering a letter is very small. However, the costs are higher in isolated rural areas than they are in densely populated urban areas, since transportation costs differ. Over time, increased automation has reduced marginal cost and increased fixed costs, so the average-total-cost curve has become steeper at small quantities and flatter at high quantities.

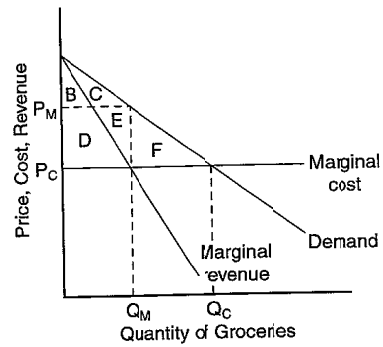
7. ~~4~~

a.

Figure 15-4 illustrates the market for groceries when there are many competing supermarkets with constant marginal cost. Output is Q_c , price is P_c , consumer surplus is area A, producer surplus is zero, and total surplus is area A.



- b. If the supermarkets merge, Figure 15-5 illustrates the new situation. Quantity declines from Q_C to Q_M and price rises to P_M . Area A in Figure 15-4 is equal to area B+C+D+E+F in Figure 15-5. Consumer surplus is now area B+C, producer surplus is area D+E, and total surplus is area B+C+D+E. Consumers transfer the amount of area D+E to producers and the deadweight loss is area F.



E. #.

- a. The following table shows total revenue and marginal revenue for each price and quantity sold:

Price	Quantity	Revenue	Total Revenue	Marginal Cost	Total Profit
24	10,000	240,000	50,000	190,000	200,000
22	20,000	440,000	100,000	340,000	160,000
20	30,000	600,000	150,000	450,000	120,000
18	40,000	720,000	200,000	520,000	80,000
16	50,000	800,000	250,000	550,000	40,000
14	60,000	840,000	300,000	540,000	

- b. Profits are maximized at a price of \$16 and quantity of 50,000. At that point, profit is \$550,000.

- c. As Johnny's agent, you should recommend that he demand \$550,000 from them, so he gets all the profit instead of the record company.

8. To the extent that people can substitute other computers for mainframes, that will constrain IBM's monopoly power. So the government might have looked at the demand curve facing IBM, or the divergence between IBM's price and marginal cost, to get some idea of how severe the monopoly problem was.

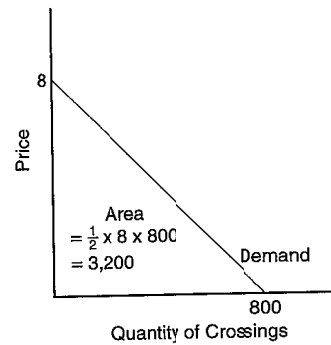
9. a. The following table shows revenue and marginal revenue for the bridge:

Price	Quantity	Revenue	Marginal Revenue
8	0	0	700
7	100	700	500
6	200	1,200	300
5	300	1,500	100
4	400	1,600	-100
3	500	1,500	-300
2	600	1,200	-500
1	700	700	-700
0	800	0	

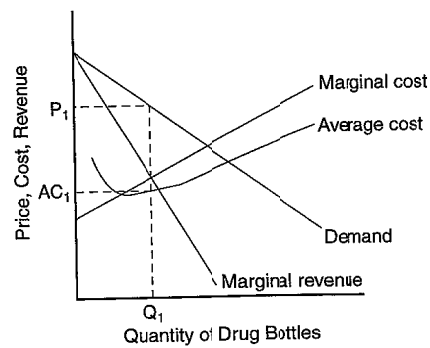
The profit-maximizing price would be where revenue is maximized, which will occur where marginal revenue equals zero, since marginal cost equals zero. This occurs at a price of \$4 and quantity of 400. The efficient level of output is 800, since that's where price equals marginal cost equals zero. The profit-maximizing quantity is lower than the efficient quantity because the firm is a monopolist.

- b. The company shouldn't build the bridge because its profits are negative. The most revenue it can earn is \$1,600,000 and the cost is \$2,000,000, so it would lose \$400,000.

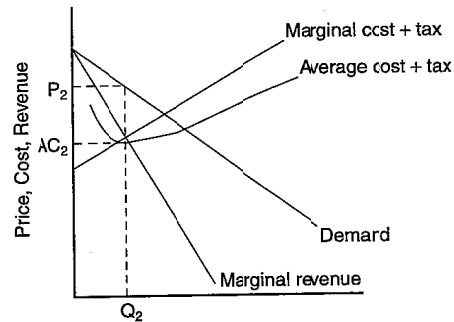
- c. If the government were to build the bridge, it should set price equal to marginal cost to be efficient. But marginal cost is zero, so the government shouldn't charge people to use the bridge.
- d. Yes, the government should build the bridge, because it would increase society's total surplus. As shown in Figure 15-6, total surplus has area $\frac{1}{2} \times 8 \times 800,000 = \$3,200,000$, which exceeds the cost of building the bridge.



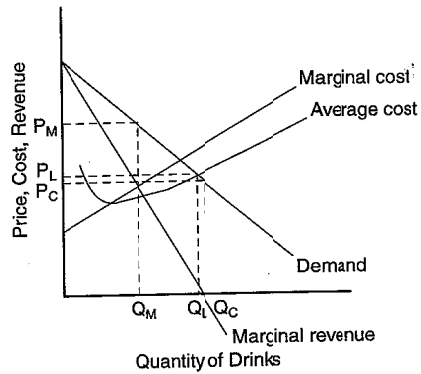
10. a. Figure 15-7 illustrates the drug company's situation. They'll produce quantity Q_1 at price P_1 . Profits are equal to $(P_1 - AC_1) \times Q_1$.



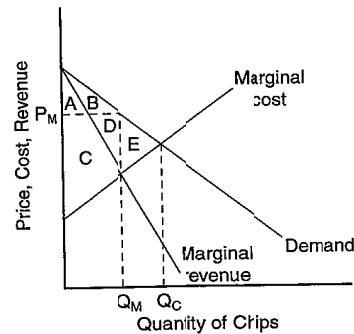
- b. The tax on the drug increases both marginal cost and average cost by the amount of the tax. As a result, as shown in Figure 15-8, quantity is reduced to Q_2 , price rises to P_2 , and average cost plus tax rises to AC_2 .



- c. The tax definitely reduces profits. After all, the firm could have produced quantity Q_2 at price P_2 before the tax was imposed, but it didn't maximize profits. So the firm's revenue less costs are lower after the tax is imposed; in addition, the firm must pay the tax.
- d. A tax of \$10,000 regardless of how many bottles of the drug are produced would result in the quantity produced at Q_1 and the price at P_1 in Figure 15-7 because such a tax doesn't affect marginal cost or marginal revenue. It does, however, raise average cost; in fact, profits decline by exactly \$10,000.
11. Larry wants to sell as many drinks as possible without losing money, so he wants to set quantity where price (demand) equals average cost, which occurs at quantity Q_L and price P_L in Figure 15-9. Curly wants to bring in as much revenue as possible, which occurs where marginal revenue equals zero, at quantity Q_C and price P_C . Moe wants to maximize profits, which occurs where marginal cost equals marginal revenue, at quantity Q_M and price P_M .



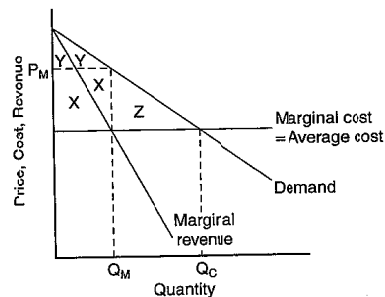
12. a. Long-distance phone service was originally a natural monopoly because installation of phone lines across the country meant that one firm's costs were much lower than if two or more firms did the same thing.
- b. With communications satellites, the cost is no different if one firm supplies them or if many firms do so. So the industry evolved from a natural monopoly to a competitive market.
- c. It is efficient to have competition in long-distance phone service and regulated monopolies in local phone service because local phone service remains a natural monopoly (being based on land lines) while long-distance service is a competitive market (being based on satellites).
13. a. The patent gives the company a monopoly, as shown in Figure 15-10. At a quantity of Q_M and price of P_M , consumer surplus is area A-B, producer surplus is area C+D, and total surplus is area A+B+C+D.



- b. If the firm can perfectly price discriminate, it will produce quantity Q_C and extract all the consumer surplus. Consumer surplus is zero and producer surplus is $A+B+C+D+E$, as is total surplus. Deadweight loss is reduced from area E to zero. There's a transfer of surplus from consumers to producers of area $A+B$.
14. A monopolist always produces a quantity at which the demand curve is elastic. If the firm produced a quantity for which the demand curve were inelastic, then if the firm raised its price, quantity would fall by a smaller percentage than the rise in price, so revenue would increase. Since costs would decrease at a lower quantity, the firm would have higher revenue and lower costs, so profit would be higher. Thus the firm should keep raising its price until profits are maximized, which must happen on an elastic portion of the demand curve.

Another way to see this is to note that on an inelastic portion of the demand curve, marginal revenue is negative. Increasing quantity requires a greater percentage reduction in price, so revenue declines. Since a firm maximizes profit where marginal cost equals marginal revenue, and marginal cost is never negative, the profit-maximizing quantity can never occur where marginal revenue is negative, so can never be on an inelastic portion of the demand curve.

15. The government could create monopoly power for the Big Three U.S. automakers by restricting imported cars. Then the Big Three would face much less competition and could drive their prices up substantially.
16. Though Rod Stewart has a monopoly on his own singing, there are many other singers in the market. If Stewart were to raise his price too much, people would substitute to other singers. So there's no need for the government to regulate the price of his concerts.
17. a. Figure 15-11 shows the cost, demand, and marginal-revenue curves for the monopolist. Without price discrimination, the monopolist would charge price P_M and produce quantity Q_M .



- b. The monopolist's profit consists of the two areas labeled X, consumer surplus is the two areas labeled Y, and the deadweight loss is the area labeled Z.
- c. If the monopolist can perfectly price discriminate, it produces quantity Q_c , and has profit equal to $X+Y+Z$.
- d. The monopolist's profit increases from X to $X+Y+Z$, an increase in the amount $Y+Z$. The change in total surplus is area Z. The rise in monopolist's profit is greater than the change in total surplus, since monopolist's profit increases both by the amount of deadweight loss (Z) and by the transfer for consumers to the monopolist (Y).
- e. A monopolist would pay the fixed cost that allows it to discriminate as long as $Y+Z$ (the increase in profits) exceeds C (the fixed cost).
- f. A benevolent social planner who cared about maximizing total surplus would want the monopolist to price discriminate only if Z (the deadweight loss from monopoly) exceeded C (the fixed cost) since total surplus rises by $Z - C$.
- g. The monopolist has a greater incentive to price discriminate (it will do so if $Y+Z > C$) than the social planner would allow (she would allow it only if $Z > C$). Thus if $Z < C$ but $Y+Z > C$, the monopolist will price discriminate even though it's not in society's interest.