The Evolution of Markets

Chapter 5 explored the efficiency of perfectly competitive markets. Firms maximize profit by setting output so that **marginal cost** equals **marginal revenue**. When the market sets the price, **marginal revenue** equals price. Setting output so that marginal cost equals price is economically efficient because the opportunity cost of resources used to produce the last unit of output exactly equals the value of that unit to the marginal consumer. Finally, in the long run, positive economic profit attracts firms into the market, to increase market supply, and to drive prices to their lowest sustainable level. If people want fewer buggy whips, they demand for buggy whips shifts to the left, reducing the (short-run) equilibrium price below the break-even level. Over time (as their fixed costs become variable), firms exit the industry, shifting the supply curve to the left and increasing price to the (new) break-even level. Eventually, the market may completely disappear.[1]

Monopoly

The opposite of market competition is **monopoly**, a market with one seller. Sometimes a market has one seller because there is only one producer, like most local newspaper publishers, electric power companies, cable television providers and the holder of a patent. Typically, the first firm into a small market is a monopoly. Small towns may have one gas station, one pharmacy, and one grocery store. We need to understand monopolies if we are to understand how markets evolve from a primitive form of consumer exploitation to a mature form of economic efficiency. Like competitive producers, monopoly producers also maximize profit by producing that rate of output for which marginal cost equals marginal revenue. However, since a monopoly selects its price and quantity from the market demand curve, its marginal revenue is less than its price. A numerical example can illustrate.

Table 6-1 presents the simplest example of a monopoly business – a monopoly movie theater which has a zero marginal cost.[2] Because she owns the only movie theater, the proprietor confronts a negatively sloped demand curve. The maximum price is $20; at that price (or higher) the quantity of tickets demanded is zero. In this stylized example, there is one patron who would pay $19.98 for a ticket. The second patron would purchase a ticket for $19.96. Since the theater owner cannot determine who is willing to pay each price, she must charge the same price to all patrons.[3] The **marginal revenue** – the change in revenue from the second ticket is only $19.94, since selling the second ticket requires a $0.02 reducing in the first ticket. Mathematically, if the inverse demand equation is $p = \$20 - .02Q$, marginal revenue is $MR = \$20 - .04Q$; for a linear (inverse) demand curve, marginal revenue falls at twice the rate as price does.[4]

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[1] My wife Regina has a favorite analog camera that our daughter Jennie gave her many years ago; when we traveled to a wedding, Regina could find only one roll of film at all the stores she visited. Jennie (now 23) reported that she has an idea of what Regina's next Christmas present will be – a digital camera!

[2] Once the projector is running, one more patron can be seated without increasing the owners' costs, as long as some seats are unfilled.

[3] Later we will relax this condition when we discuss *price discrimination*: charging different prices to different groups of customers. Movie theaters typically charge lower prices for children's tickets and senior citizen's tickets than they charge for working-age adults. However, since my wife and I are over 60, we receive the senior discount, despite the fact that we have three incomes between us.

[4] Marginal revenue equals the price of the last unit minus the *discount* to all (previous) buyers. In this example, $p = \$20 - .02Q$. Hence, the discount is $.02Q$, making $MR = \$20 - .02Q - .02Q = \$20 - .04Q$.

As with the perfectly competitive firm, the monopoly maximizes profit by setting output so that marginal revenue equals marginal cost. Unlike the price taker, however, a monopolist's marginal revenue is less than price. Since the marginal cost of selling movie tickets is zero (that is one more patron can be seated without increasing cost), this monopolist would set quantity at 500, which implies setting the ticket price at $10.00 each. At this price, producer surplus equals revenue, namely $5,000. Subtracting fixed costs of $2,000 yield economic profit of $3,000. The last column in Table 6-1 presents a measure of consumer responsiveness to price changes, **price elasticity,** defined as the percent change in quantity demanded divided by the percent change in price. At a price of $20, ticket sales are zero, and total revenue is zero. Dropping the price by just $0.02 would increase the quantity sold to 1 ticket – literally an infinite percent change in quantity in response to a 0.1% decrease in price. At the price intercept of a demand curve, demand is infinitely price elastic. At a price of $19, the percent change in quantity divided by the percent change in price equals -19. That is, quantity demanded is very responsive to price; the decrease in price (by 5.26%) increases quantity demanded by 100%, causing revenue to increase. As price falls, price elasticity approaches 0. When p = $10 (exactly ½ of p_{max}), price elasticity equals -1. At this price we say that demand is unit elastic, which is that price at which total revenue is maximized and marginal revenue is zero. At prices above $10, we say that demand is *price elastic*; a decrease in price increases revenue, implying that marginal revenue is positive. Finally, at prices below the midpoint of the (linear) demand curve, demand is *price inelastic*. Cutting price by, say, 1% leads to a smaller percent increase in quantity, causing total revenue to decline. Hence, the monopoly producer could not maximize profit if demand were price inelastic, because this would cause marginal revenue to be negative.

Tickets Price	Tickets Sold	Total Revenue	Total Cost	Economic Profit	Marginal Revenue	Marginal Cost	Price Elasticity
$20.00	0	$0	$2,000	-$2,000	$20	$0	$-\infty$
$19.00	50	$950	$2,000	-$1,050	$18	$0	-19.00
$18.00	100	$1,800	$2,000	-$200	$16	$0	-9.00
$17.00	150	$2,550	$2,000	$550	$14	$0	-5.67
$16.00	200	$3,200	$2,000	$1,200	$12	$0	-4.00
$15.00	250	$3,750	$2,000	$1,750	$10	$0	-3.00
$14.00	300	$4,200	$2,000	$2,200	$8	$0	-2.33
$13.00	350	$4,550	$2,000	$2,550	$6	$0	-1.86
$12.00	400	$4,800	$2,000	$2,800	$4	$0	-1.50
$11.00	450	$4,950	$2,000	$2,950	$2	$0	-1.22
$10.00	500	$5,000	$2,000	$3,000	$0	$0	-1.00
$9.00	550	$4,950	$2,000	$2,950	-$2	$0	-0.82
$8.00	600	$4,800	$2,000	$2,800	-$4	$0	-0.67
$7.00	650	$4,550	$2,000	$2,550	-$6	$0	-0.54
$6.00	700	$4,200	$2,000	$2,200	-$8	$0	-0.43
$5.00	750	$3,750	$2,000	$1,750	-$10	$0	-0.33
$4.00	800	$3,200	$2,000	$1,200	-$12	$0	-0.25
$3.00	850	$2,550	$2,000	$550	-$14	$0	-0.18
$2.00	900	$1,800	$2,000	-$200	-$16	$0	-0.11
$1.00	950	$950	$2,000	-$1,050	-$18	$0	-0.05
$0.00	1000	$0	$2,000	-$2,000	-$20	$0	0.00

Table 6-1

Monopoly Movie Theater

Before we generalize on monopoly producers that have positive marginal costs, consider the case of the inefficient monopolist. Suppose that a rival of this owner proposed a theater of half the capacity, where fixed costs were only $1,000. With two movie theaters, the market would constitute a **duopoly** (two sellers) instead of a monopoly (one seller). If the second theater charged more than $10 per ticket, it would sell no tickets, since movie patrons already have the option of seeing movies for $10 at the incumbent theater. If the second theater charged less than $10, it would force the first theater to match its price cut. If the would-be entrant expected the erstwhile monopolist to maintain its output of 500 tickets and match the second theater's price, the second firm would essentially claim all potential movie patrons who would only purchase movie tickets for less than $10 each. The *inverse demand curve* confronting the second firm would be $p = \$10 - .02Q_2$, implying $MR = \$10 - .04Q_2$. With a capacity for 500 movie patrons, the second theater would set its output where $MR = MC = 0$, that is, selling 250 tickets at $5.00 each. With $1025 in revenue and $1000 in (fixed) costs, the second theater would realize economic profit of $250 per day. The original monopoly's price would also drop to $5, cutting its revenue to $2,500 and its profit would decline to $2500 – $2000 = $500. As with perfect competition, entry by additional sellers decreases consumer prices and increases consumer surplus at the expense of producer surplus.

Tickets Price	Tickets Sold	Total Revenue	Total Cost	Economic Profit	Marginal Revenue	Marginal Cost	Price Elasticity
$10.00	0	$0	$1,000	-$1,000	$10.00	$0	$-\infty$
$9.00	50	$450	$1,000	-$550	$8.00	$0	-9.00
$8.00	100	$800	$1,000	-$200	$6.00	$0	-4.00
$7.00	150	$1,050	$1,000	$50	$4.00	$0	-2.33
$6.00	200	$1,200	$1,000	$200	$2.00	$0	-1.50
$5.00	250	$1,250	$1,000	$250	$0.00	$0	-1.00
$4.00	300	$1,200	$1,000	$200	-$2.00	$0	-0.67
$3.00	350	$1,050	$1,000	$50	-$4.00	$0	-0.43
$2.00	400	$800	$1,000	-$200	-$6.00	$0	-0.25
$1.00	450	$450	$1,000	-$550	-$8.00	$0	-0.11
$0.00	500	$0	$1,000	-$1,000	-$10.00	$0	0.00

Table 6-2
Demand and Profit Conditions Confronting Potential Duopolist

If two firms could fit profitably into this market, what about a third? Under perfect competition, entry would continue until all prospects for economic profit were eliminated. At a $5 price, a total of 750 tickets would be sold (500 by theater #1 and 250 by theater #2). If a third theater opened with only 125 seats, thereby experiencing only $250 in fixed costs, it could expect to face a residual demand curve, $p_3 = \$5 - .02Q_3$, so that $MR_3 = \$5 - .04Q_3$. $MR_3 = MC_3 = 0$ implies that the profit-maximizing number of tickets would be $2.50 per ticket. The third theater would sell 875 – 500 (firm1) - 250(firm2) = 125. Firm 3's revenue would be $2.50(125) = $312.50; subtracting fixed costs of $250 yields economic profit of $62.50. Eventually the limited size of the market would deter further entry even while (relatively small) economic profits remained for incumbent firms. As the city grows, there will be increased demand for movie tickets. The larger theaters can accommodate more patrons, but new theaters will enter

when profit potential develops. Theaters will compete by advertising, which they can co-ordinate as movie distributors develop their own chains of movie theaters. Today, most cities' movie theater markets are characterized by *oligopoly* – a few theater chains that compete by location, advertising, and indeed, price.[5]

Persistent Monopoly: Economies of Scale

The previous monopoly was merely a transitory phase as additional sellers responded to the economic profit of incumbent firms. Without **barriers to entry,** competition would gradually decrease price and squeeze out inefficient firms. A **natural monopoly** occurs when the monopoly price is sufficiently low, relative to would-be entrants' average costs and market demand, to deter competition. In Table 6-3 we consider the prospect of a daily newspaper in a medium sized city like Las Vegas. The demand curve is negatively sloped, in this case the equation is $p = \$1 - 1/1{,}000{,}000Q$, where p is the circulation price of a daily paper and Q is daily circulation. We further assume that marginal cost – the cost of paper, ink and deliver – is $0.25 per paper, while daily fixed cost is $300,000. Since marginal cost is positive, a monopoly paper would not wish to maximize revenue, since maximizing revenue would require marginal revenue equal zero. Reducing output to where $MR = MC = \$0.25$ means setting output in the elastic region of its demand curve. As shown in Table 5-3, the profit-maximizing circulation occurs where circulation = 375,000 papers per day, at a price of $0.63. With fixed costs of $100,000 per day[6], economic profit is $40,625 per day.

Price per Paper	Daily Circulation	Marginal Revenue	Marginal Cost	Price Elasticity	Total Revenue	Total Cost	Economic Profit
$1.00	0	$1.00	$0.25	$-\infty$	$0	$100,000	-$100,000
$0.95	50,000	$0.90	$0.25	-19.00	$47,500	$112,500	-$65,000
$0.90	100,000	$0.80	$0.25	-9.00	$90,000	$125,000	-$35,000
$0.85	150,000	$0.70	$0.25	-5.67	$127,500	$137,500	-$10,000
$0.80	200,000	$0.60	$0.25	-4.00	$160,000	$150,000	$10,000
$0.75	250,000	$0.50	$0.25	-3.00	$187,500	$162,500	$25,000
$0.70	300,000	$0.40	$0.25	-2.33	$210,000	$175,000	$35,000
$0.65	350,000	$0.30	$0.25	-1.86	$227,500	$187,500	$40,000
$0.63	375,000	$0.25	$0.25	-1.67	$234,375	$193,750	$40,625
$0.60	400,000	$0.20	$0.25	-1.50	$240,000	$200,000	$40,000
$0.55	450,000	$0.10	$0.25	-1.22	$247,500	$212,500	$35,000
$0.50	500,000	$0.00	$0.25	-1.00	$250,000	$225,000	$25,000
$0.45	550,000	-$0.10	$0.25	-0.82	$247,500	$237,500	$10,000
$0.40	600,000	-$0.20	$0.25	-0.67	$240,000	$250,000	-$10,000
$0.35	650,000	-$0.30	$0.25	-0.54	$227,500	$262,500	-$35,000
$0.30	700,000	-$0.40	$0.25	-0.43	$210,000	$275,000	-$65,000
$0.25	750,000	-$0.50	$0.25	-0.33	$187,500	$287,500	-$100,000
$0.20	800,000	-$0.60	$0.25	-0.25	$160,000	$300,000	-$140,000
$0.15	850,000	-$0.70	$0.25	-0.18	$127,500	$312,500	-$185,000
$0.10	900,000	-$0.80	$0.25	-0.11	$90,000	$325,000	-$235,000
$0.05	950,000	-$0.90	$0.25	-0.05	$47,500	$337,500	-$290,000
$0.00	1,000,000	-$1.00	$0.25	0.00	$0	$350,000	-$350,000

Table 6-3

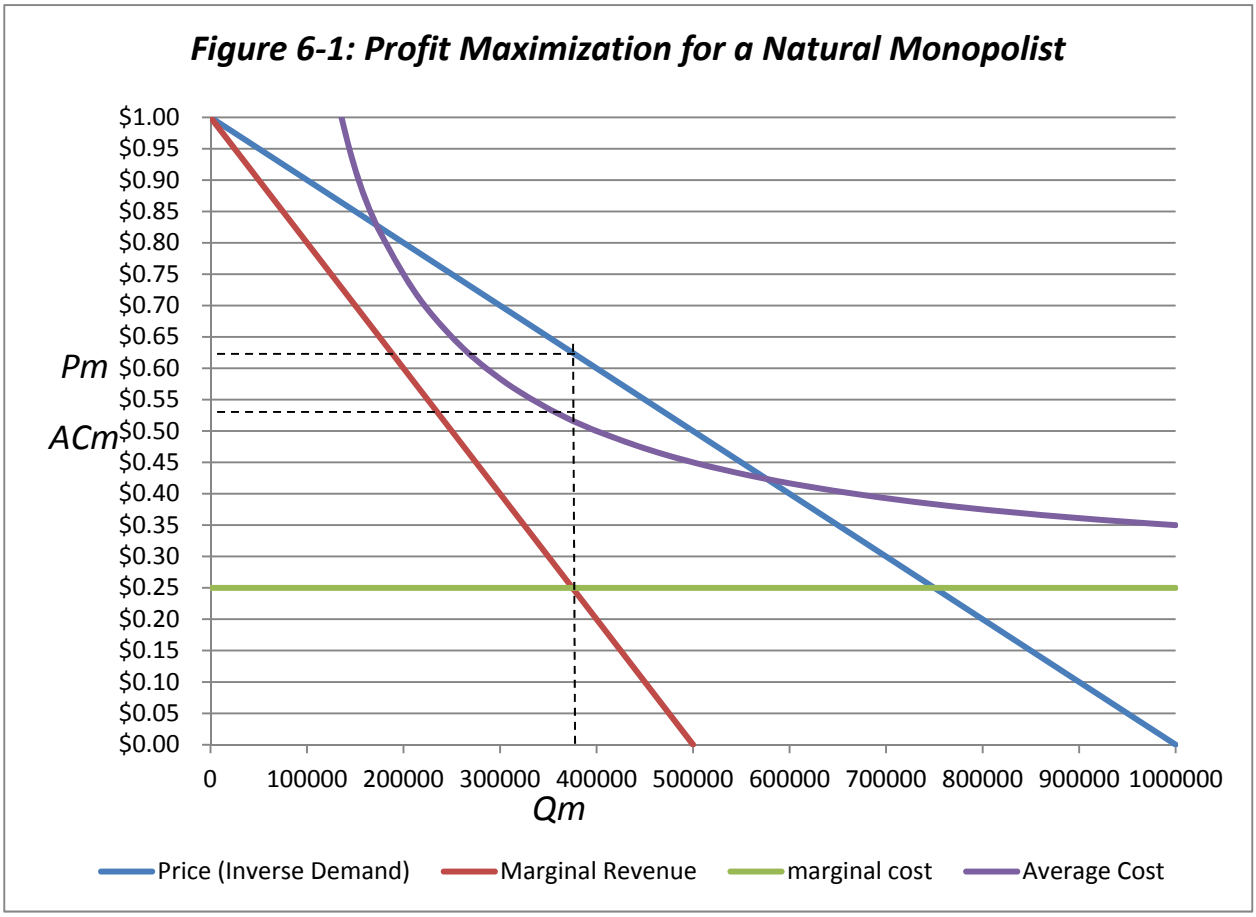
Monopoly Local Daily Newspaper

[5] Most movie theaters practice *price discrimination* – charging different prices to different customers based on their price elasticity of demand. Typically, the demand for tickets by senior citizens and children is more price elastic than the demand for working-age adult tickets, since the opportunity cost of time is lower for those whose wage rate is zero. Price discrimination allows the monopolist to reduce the price where demand is price elastic (children and seniors) while raising the price where demand is price inelastic (working-age adults).

[6] We can identify fixed costs as total costs when output (daily circulation) is zero.

Figure 5-1 presents a graphical depiction of the numbers in Table 6-3. The publisher's (inverse) demand curve[7] is given by the equation $p = \$1.00 - 0.000001Q$, which generates the marginal revenue function $MR = \$1.00 - 0.000002Q$. Setting marginal revenue equal to marginal cost implies: $MR = \$1 - \frac{2}{1,000,000}Q = 0.25 \rightarrow \frac{2}{1,000,000}Q = 0.75 \rightarrow Q = 375,000$.

Proceeding perpendicularly from the profit maximizing rate of output to the demand curve, we find that the profit maximizing price for 375,000 newspapers is \$0.625 (rounded to \$0.63).



Charging \$0.63 for a newspaper that costs \$0.25 to print is economically inefficient. One way that newspapers cover their overhead is by selling advertising. It stands to reason that advertisers will pay higher advertising rates as newspaper circulation increases. If it could earn greater profit from advertising than from marking-up newspaper prices, it would pay the publisher to reduce the price of newspapers themselves to their marginal cost – here \$0.25, thereby increasing newspaper circulation to 750,000.

Maximizing Profit vs. Monopolizing the News

The combined effect of increased competition from the 24-hour cable-television/talk-radio news cycle and the "free" (if somewhat unreliable) internet news sources, daily newspapers

[7] Recall that a demand function depicts quantity demanded as a function of price. The monopolist determines its output, and consumers determine the market-clearing price. Hence, the monopolist's price-quantity relation is obtained as the mathematical inverse of the market demand curve.

are undergoing a competitive squeeze. It is rare to see competing daily newspapers in any cities except the largest media markets – New York, Los Angeles, Washington DC. In fact, the consolidation of daily newspaper publishing has been ongoing for centuries. In 1946, the year before my birth, my parents both worked for the *Dayton Daily News*, the flagship newspaper of the *Cox* newspaper chain.[8] The publisher, and their boss, was James M. Cox, former Democratic governor of Ohio and unsuccessful presidential candidate in 1920.[9] A few years after I was born The *Daily News* bought out the morning *Journal Herald*, which had a moderately conservative-Republican editorial policy. One might expect that a newspaper owned by a staunch Democrat would modify the editorial policy of the Republican paper. But this did not happen. Until it recently ceased publication, the *Dayton Journal Herald* maintained its Republican-leaning editorial policy. As a family interested in both points of view, our household subscribed to both papers, as did about 40% of Dayton-area households. Those that did not subscribe to one paper typically subscribed to the other, giving the two papers much higher circulation (and advertising revenue) than would have been the case had they colluded on reporting slanted news. More recently we have seen collaboration between the Conservative *Las Vegas Review Journal* and the moderate *Las Vegas Sun*. If newspaper publishers wish to maximize profit, they should provide a comfort zone for all potential subscribers.

Persistent Monopoly: Patents and Occupational Licensing

In chapter two we learned that clear, exclusive property rights are crucial to the functioning of a market economy. If people can trespass on my land without fear of eviction, they have no incentive to pay rent for the use of that land. If theft is legal, "customers" have no incentive to pay me for what I produce. In order for markets to exist, police arrest thieves and sheriffs evict trespassers. There are classes of productive resources which are not so naturally excludable. For instance, governments award patents to people and companies who register new ideas. Without exclusive rights to their ideas, poachers would "steal" those ideas, denying inventors the chance to recover their research and development costs. But patents do not actually provide exclusive rights to ideas. Indeed, in order to receive (that is, register) a patent, the claimant must publish the idea so that potential users of that idea would know that they had to pay for the privilege. In fact, patents represent the legal right to exclude potential competitors from the market in which that idea is used. Patents "cure" one problem – property failure – by creating another – monopoly, which is a form of market failure.

In Figure 6-2 we present the output and price decision for a patent holder. The only legal seller of ColdBGone (CBG), a cure for the common cold, the patent holder faces a negatively sloped demand curve, which is based on the willingness of cold suffers to pay for relief. Since the idea is a profitable one, the demand curve for the product exceeds the average cost curve over some range. In order to maximize profit, the monopolist sets output where the marginal revenue curve intersects the marginal cost curve, then sets the price according to the demand curve. The marginal cost is close to zero – the ingredients that go into a CBG pill probably would cost a few pennies. As a monopolist, the patent holder would set output at P_m where its marginal revenue curve intersects the market demand curve. The price would be set at P_m, no doubt at several

[8] This is the parent company of Cox Cable.

[9] James M. Cox lost to Warren G. Harding, then an incumbent Republican US Senator from Ohio. Cox's running mate for vice-president was a little known politician from New York, one Franklin Delano Roosevelt.

dollars a pill. Part of the markup[10] covers overhead, and the remainder, $(P_m\text{-}AC_m)Q_m$. At the monopoly price, consumer surplus equals area $P_{max}P_mA$. Area **ABC** represents the **excess burden** of the monopoly.[11] Pharmaceutical companies are quick to argue that the economic profit from successful drugs are justified by the expenditures on research and development on unsuccessful drugs, plus, ironically, the large amount of marketing expenses used to convince patients to continue to use brand-name drugs, instead of generic equivalents. One proposal would transfer the costs of research and development to government-sponsored research in medical schools and other universities. Any successful drugs would qualify academic researchers for Nobel prizes or other honors. Once a drug was found to be safe and effective, the government would license the right to produce the drug to all drug companies whose only qualification would be the certification of quality control.

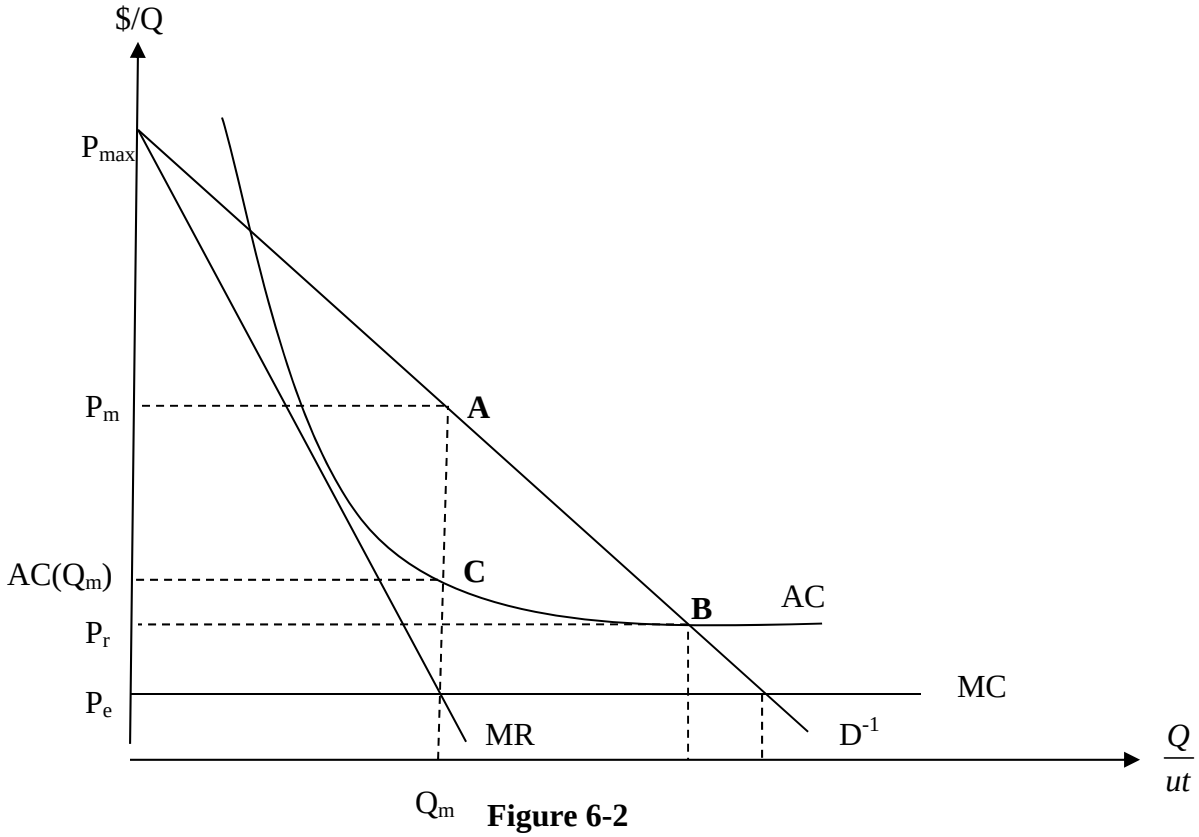


Figure 6-2

Price and Output for a Patent Monopolist: Why Monopolies Are Inefficient

Monopoly certainly seems like a wonderful racket: Monopolies earn higher profits by producing less (than competitive firms would). However, monopolies create an **excess burden** on society because, in reducing output, they increase producer surplus by less than they reduce

[10] Remember the markup price is $P_m = MC\left(\frac{E}{E+1}\right)$, where E = the price elasticity of demand and $E < -1$.

[11] The break-even price would be P_r, where the average cost curve (AC) intersects the inverse demand curve D^{-1}; by setting the monopoly price, the monopolist "destroys" the consumer surplus on the Q_r-Q_m units that are not produced. Ideally, a government-subsidized monopoly would charge the economically efficient price P_e, but would require tax revenue to cover the difference between the economically efficient marginal-cost price and average cost.

consumer surplus. In Figure 6-11 we depict what happens if a competitive market were successfully organized into a **cartel**, collusion among sellers that agree to restrict output in order to generate a monopoly price. The left panel shows the market supply and demand curves, while the right panel shows the output of a typical producer.

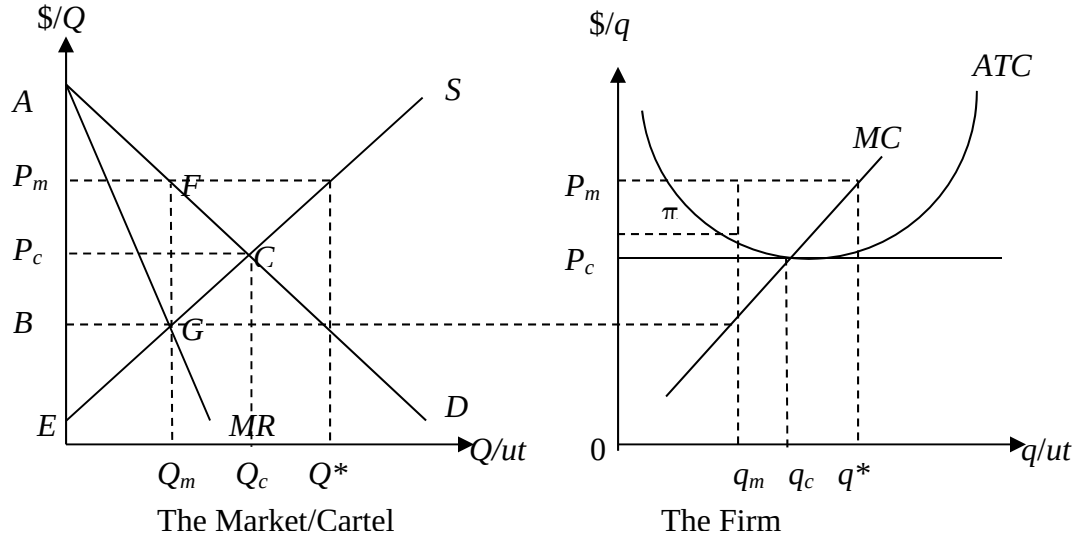


Figure 6-3

In competitive equilibrium, the price settles at P_c, and consumers enjoy a surplus equal to the area of triangle ACP_c and the producer surplus, equal to the area of triangle P_cEC is exactly equal to total fixed costs. If all the firms conspired to charge a monopoly price, they would try to reduce output to Q_m, where (cartel) marginal revenue intersects the supply (collective marginal cost) curve. The increase in price would increase producer surplus to the combined areas of $EBG + (P_m - B)(Q_m)$. Also as a result of the price and output change, consumer surplus decreases to the area of triangle AP_mF. The excess burden is the sum of the lost consumer and producer surpluses for the output $Q_c - Q_m$; because this output was not produced, the net loss to society from the monopoly is the area of triangle FGC.

The good news for consumers is that successful cartels are just about as rare as honest politicians. Consider how forming a cartel affects the typical member firm. Before the cartel, the firm is in long-run competitive equilibrium, producing where $MC = P_c$. In order to reduce total output from Q_c to Q_m, each firm's output must be decreased, in this case from q_c to q_m.[12] By producing and selling this amount, the individual plant owner's profit increases from 0 to π, shown as $[P_m - ATC(q_m)]q_m$. However, if the owner believed he could increase output undetected (for a multi-plant monopoly, this would be embezzling), he would prefer to produce q^*, where $MC = P_m$. Of course, what one cheater could do, all would try to do. If all firms increased their output, total output would equal Q^*, and price would actually fall below the competitive level.

There is a **fallacy of composition** at work here. While one firm might hope to increase profit by cheating on a cartel agreement, if all firms cheat, the agreement is destroyed. Once

[12] A multi-plant monopolist (a single monopoly firm with multiple production facilities) would allocate output so that the marginal cost from each plant equaled the monopoly's marginal revenue.

upon a time, groups of firms could draw up contracts (called trusts) promising to reduce output and agreeing to pay penalties if they cheated (and were caught). The Sherman Anti-Trust Act took the courts out of the business of enforcing cartel agreements, and went so far as to make such agreements evidence of a crime. Nevertheless, the desire for firms to collude to obtain monopoly profits (egoistic businesspeople have little concern for consumer or social welfare) causes them to try other means. Ironically, if they cannot use the judicial branch of government to achieve their monopolistic ends, they can often use the legislative branch. Much of so-called government regulation is actually government cartelization. The requirement that casinos be licensed by the government gives incumbent casino companies the ability to exclude competitors; this is especially true when they contribute to gubernatorial and legislative campaigns. The Taxi Cab Authority punishes "gypsy cabs," which would otherwise cut taxi fares below government-mandated minimums. The list is virtually endless. But what if the government is not interested in protecting incumbents from competition? Then firms turn to organized crime. The Nevada casino industry has always been a cartel, only now it is the Nevada Gaming Commission, rather than the Gambino Crime Family, that punishes cartel cheaters.

Regulating Monopoly

Figure 6-4 depicts the demand for an average cost of mail delivery. Since 1972, when the U.S. Postal Service was set up as an autonomous corporation, private companies—such as Federal Express and the United Parcel Service—have been whittling away at the government's monopoly position. Figure 6-4 imagines a not-so-distant future when the combination of e-mail and private competition have moved the market demand curve for "snail mail" everywhere below the average cost of mail delivery. In this example, we imagine that the Postal Service was previously breaking even, charging a price of P_0 for delivering a letter, and receiving just enough revenue to cover all costs, including the cost of capital. Now, as more people switch from snail mail to e-mail, the demand curve shifts from D_0 to D_1. Since the Postal Service is mandated to cover its costs, the temptation would be to seek congressional approval to increase the cost of a stamp from P_0 to P_1. However, this higher price would reduce the quantity demanded to Q_1, which, in turn, would increase average total cost, resulting in another loss. You follow the bouncing lines to see how the Postal Service could price itself out of the market.

Libertarians may proclaim "good riddance!" but the question remains whether society would be better off with or without a postal service. Because of the position of the demand curve and the average cost curve, the private sector would not deliver the commodity, since there is no price-quantity combination along D_1 that would allow a firm to cover the opportunity cost of all factors of production. The government, however, could *reduce* the price from P_0 to P_e, using revenue to cover only the marginal cost of mail delivery. The "loss" of $\boldsymbol{A - B}$ per unit could be covered out of general tax revenue. As a result, consumer citizens would receive a net consumer surplus equal to $\frac{1}{2}(P_1^{\max} - P_e)Q_0 - (P_0 - P_e)Q_0$. As we learned in the theory of perfect competition, the price that maximizes the sum of the producer surplus and consumer surplus is the price where the marginal cost curve (supply curve) intersects the market demand curve. In this case, the efficient producer surplus would be negative, so if consumer surplus is to exist at all, it must occur partly at public (taxpayer) expense. But remember, the claims we make for market efficiency under competition are no longer valid if the market is monopolist.

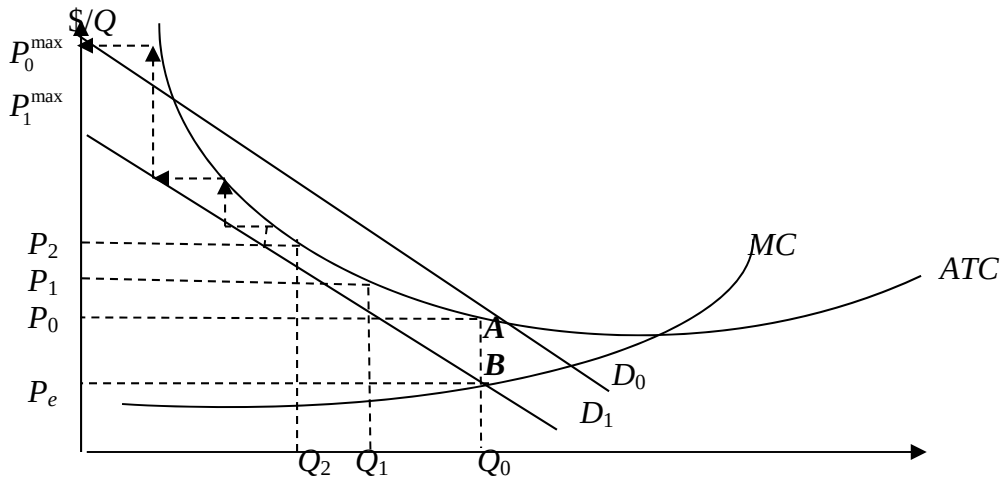


Figure 6-4

Monopolistic Competition: Free Entry and Differentiated Products

One way that a seller can exercise limited control over its market and, hence, the price that it charges, is by having a unique name—a brand name that is protected by the government. Consider a wonderful new drink, Carroll Cola, which imbues the drinker with a temporary knowledge of economics sufficient to pass the next economics exam. Unfortunately, there is a drawback. While the drink is quite tasty and has few calories, it is quite addictive, since who wouldn't want to spend all their time in blissful economic genius. Carroll Cola comes in a distinctive gray bottle (matching the hair color and personality of its inventor), which is easily copied. What is to stop some sociologist from substituting her worthless cola drink for Carroll Cola? Well, if Carroll Cola is a registered brand name, and the design of the bottle is protected by a trade mark, then Carroll Cola is a protected monopoly. But just how protected is it?

In Figure 6-5, we imagine a negatively sloped demand curve for Carroll Cola—some people value the drink so highly that they would pay almost as much as P_{max}, but, as with any product, the greater the output, the lower the price. Hence, given the inverse demand curve, $P = P_{max} - bq$, the marginal revenue curve is given by $MR = P_{max} - 2bq$. We further imagine that Carroll Cola is an initial success, so that P_m(or P*?), the monopoly price for that rate of output where $MC = MR$, exceeds average cost, resulting in profit.

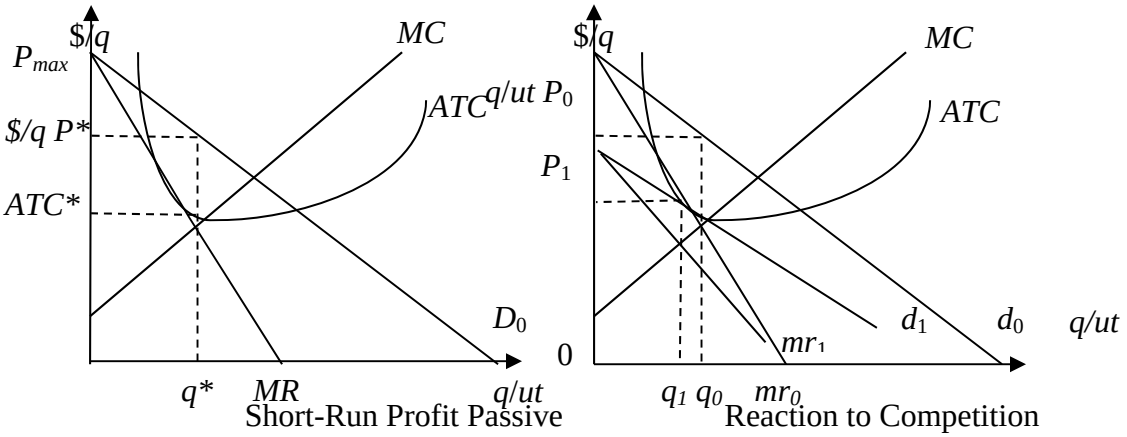


Figure 6-5

The maker of Carroll Cola has a monopoly; no other firm can sell a product called Carroll Cola. But a new firm might be allowed to market Saul's Soda, which promises to reward the drinker with religious ecstasy. Another firm might sell Paul's Pop, which promises to balance the drinker's checkbook. In all likelihood, the courts[13] will rule that those products do not infringe on the Carroll Cola recipe (patented), trade name or trade mark (both registered). Since the "imitators" are not exact replicas of Carroll Cola, market entry will not cause the maker of Carroll Cola to become a price taker; the seller will still face a negatively sloped demand curve. Some consumers will still buy Carroll Cola at a higher price, while others will buy only at a lower price.

Market entry causes an inward shift of the firm's demand curve. First, some consumers may have bought Carroll Cola because they believed that knowledge of economics would help them balance their checkbook. When Paul's Pop hits the market, former buyers of Carroll Cola who merely want to balance their checkbooks will switch. So might other customers who decide that they want religious ecstasy and, hence, buy Saul's Soda, instead of Carroll Cola. Further, at least initially, the rival colas are likely to sell at lower prices; recall that a decrease in the price of a substitute reduces the demand for a good. The right-hand panel in Figure 5-13 shows the effect of a passive resistance to market entry. If Carroll Cola does nothing but change price along the new demand curve, eventually the demand curve will become tangent to the average total cost curve, so that, where *mc* = *mr*, price equals average total cost. This so-called **monopolistic competition** (monopoly pricing but competitive entry) results in zero economic profit, just like perfect competition.

Now, suppose that Carroll Cola aggressively resists market entry. When new producers tout the wonders of their products, Carroll Cola increases its advertising budget. When new colas differentiate their products, Carroll Cola provides new flavors: micro cola, macro cola, and the ever-popular econometric cola. These increased expenditures may actually prevent the firm's demand curve from shifting, but at a cost. The average total cost curve will shift up until it becomes tangent to the demand curve. Granted, the price does not necessarily fall, but the drinkers of Carroll Cola have more variety.

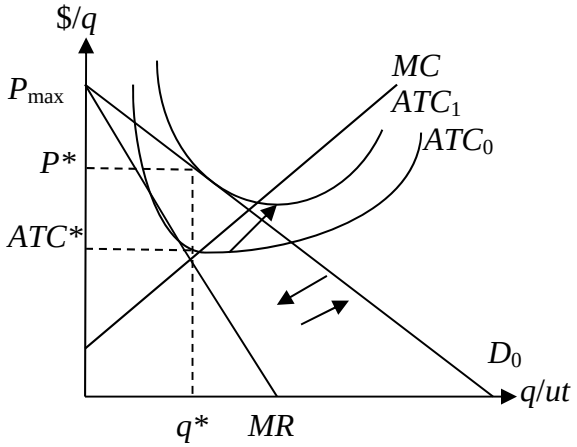


Figure 6-6

[13] Like the laws of trespass, trademark protection is enforced by civil law. The owner of the patent or trade name must sue in court, proving that the offending product is intended to confuse the consumers. If the plaintiff is successful, the judge will issue a cease and desist order.

In Figure 6-6, we show the other possible outcome to the imitators in a market with differentiated sellers. The entry would tend to push the demand curve to the right; offsetting expenditures—product redesign and aggressive advertising—counteracts that pressure. While the demand curve does not shift, those actions increase fixed costs, resulting in a shift of the average total cost curve from ATC_0 to ATC_1, until profit becomes zero at price P^*.

There is a continuing debate among economists about whether the product differentiation reduces economic efficiency. In Figure 6-5 and Figure 6-6, the long-run equilibrium price exceeds the break-even price. Prices are higher and output is lower under monopolistic competition than would be the case if all firms were price takers. However, as long as consumers have the option of purchasing generic products whose prices are determined by supply and demand, purchasing branded products at higher prices reflects consumer preferences. Consumers pay higher prices only if they believe that they are being made better off by that product. Others may wish to debate whether consumers really know what is good for them. However, as we saw in Chapter 1, economists do not usually concern themselves with what humans want, but with whether they are using scarce resources efficiently.

Conclusion

The problem economists have with monopoly is that it generates economic inefficiency – by restricting output to where marginal revenue = marginal cost (since marginal revenue is less than price) drives a wedge between the market price (on the demand curve) and the cost of production. As long as monopoly is a transitory phenomenon – the first producer of a new product is, by definition, a monopolist, the market will evolve into a competitive market as the market grows. However, when a monopoly is persistent, as in the case of protracted economies of scale or legal protections against competition, then the inefficiency of monopoly – by which monopoly pricing reduces consumer surplus more than it increases producer surplus – becomes problematic. The solution to such inefficiency is government regulation that sets the maximum price a monopolist can charge, or finding more efficient alternatives to patents and other monopoly restrictions on competition.

In the case of monopolistic competition we face a trade-off between consumer desires for variety, which confront sellers with negatively sloped demand curves for their products, and economic efficiency. As in the case of perfect competition, economic profit under monopolistic competition draws additional firms into the market, thereby eliminating economic profit in the long run. Unlike perfect competition, the tangency of the firm's demand curve and its average cost curve does not coincide with the minimum point on the firm's average cost curve. Ultimately, the premium that consumers pay for differentiated products reflects the resources that are required to prevent poaching on the incumbent firm's brands – the cost of copyrights, brand registration, and other market imperfections ultimately required to prevent the property failure of successful producers' reputations.

Summary

1. Monopoly markets confront sellers with a negatively sloped demand curve. Because monopoly sellers must cut price to all buyers to sell additional output, **marginal revenue** is less than price.
2. Like competitive firms, monopolies maximize profit by setting output so that marginal revenue equals marginal cost. Monopoly then sets price equal to the market clearing price of the profit-maximizing rate of output.

3. Monopolies stay in business as long as **producer surplus**, total revenue minus variable cost, exceeds zero. Like competitive firms, monopolies would cease operation when revenue for that output where marginal cost equals marginal revenue is less than variable cost.
4. When producer surplus exceeds overhead (or **fixed costs**) the monopolist receives positive economic profit. As with perfect competition, the existence of economic profit attracts new firms to the market. However, **barriers to entry** may prevent new firms from entering the market. Barriers to entry can be natural (**economies of scale)** or artificial (franchises, patents or copyrights).
5. Government may attempt to regulate **natural monopolies** by setting a ceiling price. The efficient ceiling price is the level where the marginal cost curve intersects the market demand curve; setting the efficient ceiling price typically requires a subsidy to cover the monopolist's overhead. A more prevalent – but less efficient – ceiling price occurs where the monopoly's average cost intersects the market demand curve, generating zero economic profit (normal accounting profit) when the monopolist produces the rate of output where marginal revenue equals average cost.
6. When firms can enter into a formerly monopoly market, the market is **contestable**. A contestable market will undergo evolution from duopoly (two firms) to oligopoly (a few firms) to monopolistic competition (many firms producing a differentiated product) or perfect competition (many firms producing a generic product).
7. Under duopoly and oligopoly, entry proceeds until the **residual demand curve** confronting a would-be entrant is tangent to (or everywhere below) that firm's long-run average cost curve.
8. Under monopolistic competition, long-run equilibrium price and quantity occur where the firm's demand curve is tangent to its long-run average cost curve. This tangency comes about through a combination of entry by new firms (which shifts the demand curves for incumbent firms to the left) and entry-deterring strategies (such as product innovation, pre-emptive location, and persuasive advertising) that increase the incumbent firms' costs.

Glossary

Monopoly: A market with one seller, which may be a single producer or a group of producers.

Cartel: A monopoly composed of two or more producers conspiring to charge a monopoly price.

Marginal revenue: The revenue from the last unit produced. Under perfect competition, marginal revenue equals price. Under imperfect competition, marginal revenue is less than price.

Duopoly: A market with two sellers, typically resulting from the entry of a second seller into a former monopoly market.

Oligopoly: A market with a few sellers; a duopoly is a special case of an oligopoly with just two competitors.

Contestable market: A monopoly market with room for a second firm.

Barrier to entry: A natural or artificial impediment to the entry of additional sellers into a market.

Natural monopoly: A monopoly with protracted economies of scale such that the residual demand curve for a would-be competitor is everywhere below the average cost curve of that firm.

Artificial monopoly: A monopoly protected by legal barriers to entry, such as patents, franchises, or copyrights.

Monopolistic competition: a market with many firms producing differentiated products. Monopolistically competitive firms set output and price like a monopoly, but experience zero economic profit in the long run, like perfectly competitive firms do.