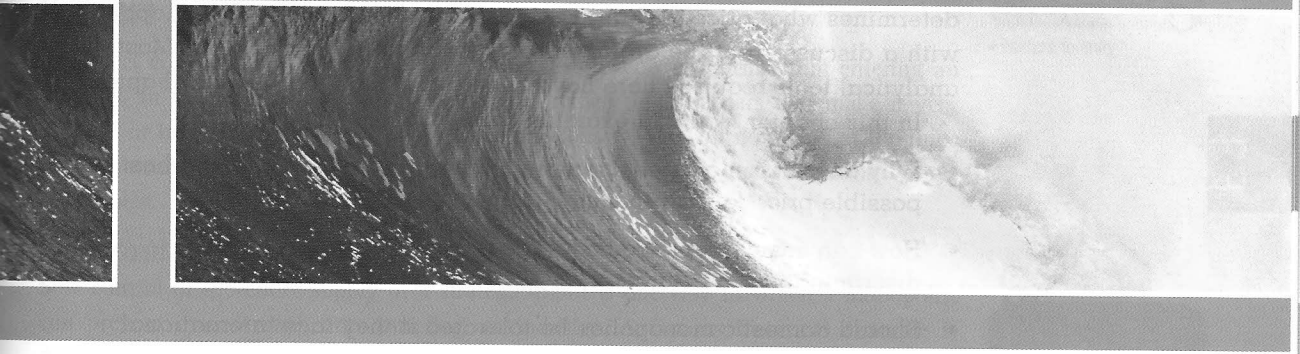




When you play the popular board game Monopoly you unwittingly learn some of the characteristics of monopoly theory presented in this chapter. In the game version, players win by gaining as much economic power as possible. They strive to own sites with railway stations and utilities, or to acquire streets such as Regent Street or Bond Street. Then each player tries to gain maximum monopoly power by owning more than one railway station, more than one utility or more than one street in a given location. Players who roll the dice and land on another player's property have no choice. They must pay rent on the capital improvements on the site, be it the railway station, the utility or the houses and hotels that have been erected on the street. The winning player is the one who is able, as a result of the high rents he or she charges, to bankrupt all other players.

In the previous chapter we studied perfect competition, which may be viewed as the paragon of economic virtue. Why? Under perfect competition there are many sellers, each lacking any power to influence price. Perfect competition and monopoly are polar extremes. The word *monopoly* is derived from the Greek words *mono* and *poleo*, which translate as 'single seller'. A monopoly has the market power to set its price and not worry about competitors. If you have ever been on a cruise ship or holidayed at a remote resort perhaps you have noticed that there is just one outlet where you can buy alcohol. In this situation you may be paying higher prices for alcohol than



Source: Shutterstock/rsool

would be the case if many sellers competed in this market. Check out the vending machine prices on your university campus. Are they higher than prices at shops in the local shopping centre?

This chapter explains why firms do not or cannot enter a particular market and compete with a monopolist. Then we explore some of the interesting actual monopolies around the world. We study how a monopolist determines what price to charge and how much to produce. The chapter ends with a discussion of the arguments for and against monopolies. Most of the analytical tools required here have been introduced in previous chapters.

In this chapter, you will examine these economics questions:

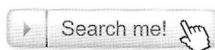
- Why doesn't a monopolist choose to charge consumers the highest possible price for its product?
- How can some people consider the practice known as price discrimination to be ethical?
- Should domestic monopolies be tolerated if they face international competition?
- Why would rare earths minerals be seen to be like oil?

The monopoly market structure

Recall from Exhibit 7.1 in the previous chapter that the market structure at the opposite extreme from perfect competition is monopoly. Under **monopoly**, the consumer has a simple choice – either to buy the monopolist's product or to do without it. Monopoly is a market structure characterised by (1) a single seller, (2) a unique product and (3) extremely difficult or impossible entry into the market. Unlike the product of a perfectly competitive firm, there are no close substitutes for the monopolist's product. Monopoly, like perfect competition, corresponds only approximately to real-world industries, but, as is the case with perfect competition, it serves as a useful benchmark model. Let's look at a brief description of each monopoly characteristic.

Monopoly

A market structure characterised by (1) a single seller, (2) a unique product and (3) extremely difficult or impossible entry into the market.



► monopoly

Single seller

In perfect competition, many firms make up the industry. In contrast, a monopoly means that a single firm is the industry. One firm provides the total supply of a product in a given market. Local monopolies are more common real-world approximations of the model than national or world-market monopolies. For example, the campus bookshop, the supplier of reticulated water and the supplier of electric power to your home may be local monopolies. The only service station or hotel in a small, isolated country town and the only hot dog stand at a football game are also examples of monopolies. Nationally, the National Broadband Network (NBN) is expected to have a monopoly of provision of high-speed internet services in Australia.

Unique product

A unique product means there are *no close substitutes* for the monopolist's product. Thus, the monopolist faces little or no competition. In reality, however, there are few products that do not have close or fairly close substitutes. For example, students can buy new and used textbooks from sources other than the campus bookshop. Gas is a good substitute

for electricity for cooking and heating. Similarly, in some applications texting is a good substitute for email. On the other hand, there are no good substitutes for electricity for lighting, and it is likely that the producer of electricity in your area has a monopoly in this application. Increasingly, the internet is providing competition for domestic monopolies which supply easily transported consumer goods.

Barriers to entry

In perfect competition, there are no constraints to prevent new firms from entering an industry. In the case of monopoly, there are extremely high barriers that make it very difficult or impossible for new firms to enter an industry. We will now look at the three major barriers that prevent new sellers from entering a market and competing with a monopolist.

Ownership of a vital resource

Sole control of the entire supply of a strategic input is one way in which a monopolist can prevent a newcomer from entering an industry. A famous historical example is Alcoa's monopoly in the US aluminium market from the late 19th century until the end of the Second World War. The source of Alcoa's monopoly was its control of bauxite ore, which is necessary to produce aluminium.

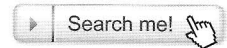
Rather than the vital resource being a mineral, it could be human resources (labour) over which the monopolist has control. For example, it would be very difficult for a new professional tennis organisation to compete successfully with the ATP (Association of Tennis Professionals), which has contracts with the best players and links to the most prestigious tournaments.

Legal barriers

The oldest and most effective barriers protecting a firm from potential competitors are the result of government ownership or the issuing of franchises and licences. This means that government operates the monopoly itself or permits a single firm to provide a certain product or service and excludes competing firms by law. For example, in many countries the reticulation of electric power, water and gas is often undertaken by monopolies established by national, state or local government. Many of Australia's state governments issue licences for monopoly casinos and have a monopoly in off-course betting on horse races. These gambling monopolies are usually supported by laws that apply severe penalties to persons setting themselves up in competition to the state-sponsored monopoly. Although governments often argue that these monopoly controls are designed to minimise the ill-effects of gambling, economists argue that the purpose of these laws is to guarantee the stream of revenue that government collects from these monopolists in the form of licence fees and taxes.

Government-granted licences restrict entry into some industries and occupations. For example, radio and television stations must be licensed. In most cases, doctors, lawyers, dentists, nurses, teachers, real estate agents, taxis, hotels and other professions and businesses are required to have a licence. In the case of the professions, the need for a licence does not preclude competition between licensed practitioners; however, it may serve to encourage them to form a professional association or union, which then behaves as a monopolistic supplier on behalf of its members.

Patents and copyrights are another form of government-initiated barrier to entry. The government grants patents to inventors, thereby legally prohibiting other firms from



► barriers to entry

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The history of the ATP can be accessed at www.atptennis.com/en/aboutatp/history.asp



Australia Post has exclusive rights to deliver certain classes of mail. Read about its monopoly at www.apf.gov.au/library/pubs/bd/2000-01/01BD001.htm

producing the patented product for the duration of the patent (20 years in most countries). Copyrights give creators of literature, art, music and films exclusive rights to sell or license their works. The major purpose behind granting patents and copyrights is to encourage innovation and new products by guaranteeing, for a limited period, exclusive rights to profit from new ideas.

Economies of scale

Why might competition among firms in a free market be unsustainable, so that eventually one firm becomes a monopolist? Recall the concept of economies of scale from the chapter on production costs (Chapter 6). As a result of large-scale production, the long-run average cost of production falls. This means that a monopoly can emerge in time naturally because of the relationship between average cost and the scale of an operation. As a firm becomes larger, its cost per unit of output is lower than it would be for a smaller competitor. In the long run, this 'survival of the fittest' cost advantage forces the smaller firms to leave the industry. Because new firms cannot hope to produce and sell quantities of output similar to that of the monopolist, thereby achieving the low costs of the monopolist, they will not enter the industry. Thus, a monopoly can arise over time and remain dominant in an industry, even though the monopolist does not own an essential resource or have protection from legal barriers.

Economists call the situation in which one seller emerges in an industry because of economies of scale a **natural monopoly**. A natural monopoly is an industry in which the long-run average cost of production declines throughout the entire range of output. As a result, a single firm can supply the entire market demand at a lower cost than two or more smaller firms. Utilities such as electricity, gas and water are examples of natural monopolies. You can see why they are natural monopolies by considering whether a competitor would be likely to set up against, say, the monopoly supplier of water to householders. This competitor would have to risk spending billions of dollars to set up an additional distribution network in the knowledge that, because it would have to share the market with the existing supplier, it would have higher costs per unit of output than those currently experienced by the existing supplier. If a competitor were to enter, the outcome in this particular market would involve an approximate doubling of the fixed cost of the distribution network with no increase in sales volume.

Exhibit 8.1 depicts the *LRAC* curve for a natural monopoly. A single firm can produce 100 units at an average cost of \$15 and a total cost of \$1500. Another option is for two firms to produce 50 units each, with the total cost rising to \$2500. With five firms producing 20 units each, the total cost rises to \$3500.

In the past, in order to prevent exploitation of consumers by these powerful natural monopolies, it was usual for them to be government-owned. Today, it is increasingly common to have these industries in private hands, with a regulatory authority such as the Australian Competition and Consumer Commission (ACCC) or the New Zealand Commerce Commission (NZCC) charged with preventing these private firms from exploiting their monopoly power. In some cases the regulatory authority limits exploitation by requiring these monopolists to give competitors access to their distribution network. For example, gas producers that own gas pipelines in Australia may be required to give access to other producers, as may mining companies and state governments that own railway lines.

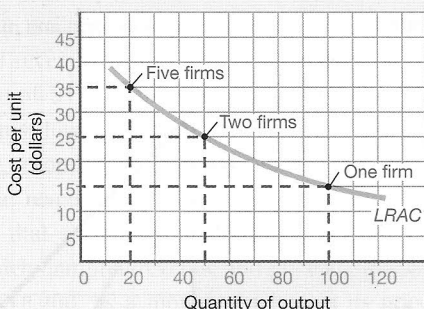
Natural monopoly

An industry in which the long-run average cost of production declines throughout the entire range of output. As a result, a single firm can supply the entire market demand at a lower cost than two or more smaller firms.



The *Competition and Consumer Act 2010* (formerly known as the *Trade Practices Act*) provides for access by competitors to the infrastructure of certain natural monopolies. Read about aspects of this so-called third-party access provision by bringing up the ACCC home page at www.accc.gov.au and using the search facility to search for *third party access*.

Exhibit 8.1 Minimising costs in a natural monopoly



In a natural monopoly, a single firm can produce at a lower cost than two or more firms in an industry. This condition occurs because the *LRAC* curve for any firm decreases over the relevant range. For example, one firm can produce 100 units at an average cost of \$15 and a total cost of \$1500. Two firms in the industry can produce 100 units of output (50 units each) for a total cost of \$2500, and five firms can produce the same total output for a total cost of \$3500.

In a natural monopoly, a single firm will produce output at a lower per-unit cost than two or more firms in the industry.

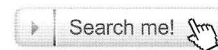
IN SUMMARY

Price and output decisions for a monopolist

A major difference between perfect competition and monopoly is the slope of the demand curve faced by the firm. Recall from the previous chapter that the demand curve faced by the firm shows the price–quantity combinations at which the firm can sell its output. As explained in the previous chapter, a perfectly competitive firm is a *price taker*. In contrast, the next sections explain that a monopolist is a **price maker**. A price maker is a firm that faces a downward-sloping demand curve. This means that a monopolist has the ability to select the product's price. In short, a monopolist can set the price with its corresponding level of output, rather than simply determining its production level in response to the going industry price. To understand the monopolist, we apply the marginal approach to a hypothetical electronics company, Atmach.

Price maker

A firm that faces a downward-sloping demand curve and can therefore choose among price and output combinations along the demand curve.



► price maker

Marginal revenue, total revenue and price elasticity of demand

Suppose engineers at a firm called Atmach invent an inexpensive electronic device they call 'SAV-U-GAS', which anyone can easily attach to their car's engine. Once installed, the device halves fuel consumption. The government grants Atmach a patent and the company becomes a monopolist selling these fuel-saving gadgets. Because of this barrier to entry, Atmach is the only seller in the industry. Although other firms try to compete with this invention, they create poor substitutes and fail. Because Atmach is the only firm in the industry this means the downward-sloping demand curve for the industry and for the monopolist are identical.

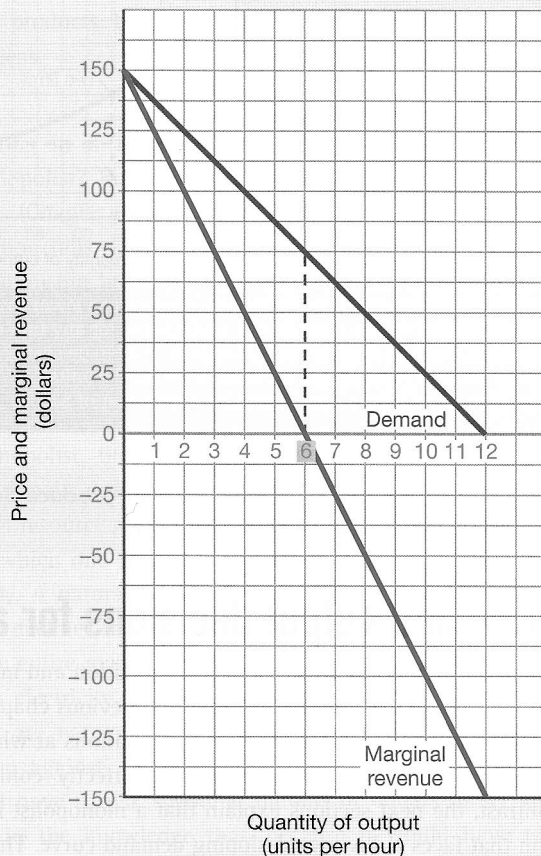
Exhibit 8.2(a) illustrates the demand and the marginal revenue curves for a monopolist such as Atmach. As the monopolist lowers its price to increase the quantity demanded, changes in both price and quantity affect the firm's total revenue (price times quantity), as shown graphically in Exhibit 8.2(b). If Atmach charges \$150, consumers purchase zero units and, therefore, total revenue is zero. To sell one unit, Atmach must lower the price to \$138 and total revenue rises from zero to \$138. Because the marginal revenue is the

Exhibit 8.2 Demand, marginal revenue and total revenue

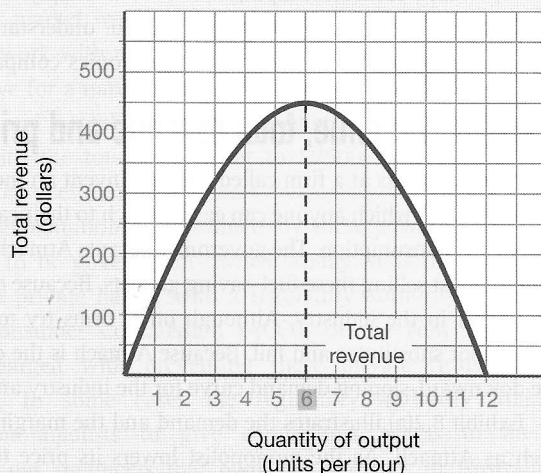
Demand, marginal revenue and total revenue for Atmach as a monopolist

Output per hour	Price	Total revenue	Marginal revenue
0	\$150	\$0	
			\$138
1	138	138	
			112
2	125	250	
			89
3	113	339	
			61
4	100	400	
			40
5	88	440	
			10
6	75	450	
			0
			-9
7	63	441	
			-41
8	50	400	
			-58
9	38	342	
			-92
10	25	250	
			-107
11	13	143	
			-143
12	0	0	

(a) Demand and marginal revenue curves



(b) Total revenue curve



Part (a) shows the relationship between the demand and the marginal revenue curves. The MR curve is below the demand curve. Between zero and six units of output $MR > 0$; at six units of output $MR = 0$; beyond six units of output $MR < 0$.

The relationship between demand and total revenue is shown in part (b). When the price is \$150 ($Q=0$), total revenue is zero. When the price is set at zero ($Q=12$), total revenue is also zero. In between these two extreme prices, the price of \$75 maximises total revenue. This price corresponds to six units of output, which is where the MR curve intersects the quantity axis, halfway between the origin and the intercept of the demand curve.

increase in total revenue that results from a one-unit change in output, the marginal revenue from selling the first unit of output is \$138 (\$138 - \$0). Thus, the price and the marginal revenue from selling one unit are equal at \$138. Like all marginal measurements, marginal revenue is plotted midway between the quantities. So in Exhibit 8.2(a), marginal revenue of \$138 is plotted against 0.5 of a unit of output. To sell two units, the monopolist must lower the price to \$125 and total revenue rises to \$250. The marginal revenue of the second unit (plotted against 1.5 units of output) is \$112 (\$250 - \$138). Now the marginal revenue from selling the second unit is \$13 less than the price received. You can see that this outcome is different from the case of the perfectly competitive firm, for which marginal revenue and price are the same.

As shown in Exhibit 8.2(a), as a monopolist lowers its price the difference between price and marginal revenue becomes larger and larger. In Exhibit 8.2(a), observe that the *MR* curve cuts the quantity axis at six units, half of 12 units. Following an easy rule helps locate the point along the quantity axis where marginal revenue equals zero: *The marginal revenue curve for a straight-line demand curve intersects the quantity axis halfway between the origin and the quantity axis intercept of the demand curve.*

The demand and the marginal revenue curves of the monopolist are downward-sloping, in contrast to the horizontal demand and corresponding marginal revenue curves facing the perfectly competitive firm (compare Exhibit 8.2 with Exhibit 7.2 in the previous chapter).

IN SUMMARY

You can see that, starting from zero output, as the price falls, total revenue rises until it reaches a maximum at six units and then falls. Graphically, this is shown as the 'revenue hill' drawn in part (b) of Exhibit 8.2. The explanation was presented earlier in Chapter 5. Recall that a straight-line demand curve has an elastic ($E_d > 1$) upper half, a unit elastic ($E_d = 1$) midpoint and an inelastic ($E_d < 1$) lower half (see Exhibit 5.4 in Chapter 5). Recall from Chapter 5 that when $E_d > 1$, total revenue rises as the price drops and total revenue reaches a maximum where $E_d = 1$. When $E_d < 1$, total revenue falls as the price falls.

In Exhibit 8.2(b), you can see that total revenue for a monopolist is related to marginal revenue. When the *MR* curve is above the quantity axis (elastic demand), total revenue is increasing. At the intersection of the *MR* curve and the quantity axis (unit elastic demand), total revenue is at its maximum. When the *MR* curve is below the quantity axis, total revenue is decreasing (inelastic demand). The monopolist will never operate on the inelastic range of its demand curve that corresponds to negative marginal revenue. The reason is that it would be silly for a firm to incur the extra cost of increasing output only to find that sales revenue (total revenue) from selling this level of output is lower than for a smaller output. If a firm was operating in this inelastic range, cutting output and raising price would reduce total cost and increase total revenue. In our example, Atmach would not charge a price lower than \$75 or produce an output greater than six units per hour. But what price will the monopolist charge and how much output will it produce if it wishes to maximise profit? We will now look at the answer to this question.

Monopoly in the short run

Exhibit 8.3, which reproduces the demand and the marginal revenue curves from Exhibit 8.2, also shows the firm's cost curves. Note that these cost curves display the familiar shape developed in Chapter 6. Exhibit 8.3(a) illustrates a situation in which Atmach can earn monopoly economic profit in the short run. As with the perfectly competitive firm, a

would not be following the $MR = MC$ profit-maximising rule. The only case in which a monopolist would maximise total revenue at the same time as it maximised profit would be where its marginal cost of production was zero. A monopolist producing with zero marginal cost is an unlikely case. Hence, the price charged to maximise profit is higher on the demand curve than the price that maximises total revenue.

Monopolies around the world

This section gives some interesting examples of monopolies in other countries. Let's begin with a historical example. In the period between the 16th and 18th centuries, monarchs granted monopoly rights for a variety of businesses. For example, in Britain in 1600, Queen Elizabeth I gave a charter to the British East India Company, which established a monopoly over England's trade with India. This company was even given the right to coin money and to make peace or war with non-Christian powers. As a result of its monopoly, the company made substantial profits from the trade in Indian cotton goods, silks and spices. In the late 1700s, the growing power of the company and the huge personal fortunes of its officers provoked increasing government control. Finally, its trade monopoly, great power and patronage ended in 1858 when the company was abolished.



Source: Shutterstock/majeczka

As the saying goes, 'diamonds are forever'. Whether or not the worldwide diamond monopoly that controlled the diamond market for most of the 20th century can be revived is, however, another matter. Until recently, De Beers, a South African corporation, was close to being a world monopoly. Through its Central Selling Organization (CSO), headquartered in London, De Beers controlled over 70 per cent of all the diamonds sold in the world. De Beers controlled the price of jewellery-quality diamonds by requiring suppliers in Russia, Zaire, Botswana, Namibia and other countries to sell their rough diamonds through De Beers' CSO. Why did the suppliers of rough diamonds allow De Beers to set the price and quantity of diamonds sold throughout the world? The

answer is that because the CSO controlled such a large proportion of the market, it could put any uncooperative seller out of business. All the CSO had to do was to reach into its huge stockpile of diamonds and flood the market with the type of diamonds being sold by an independent seller. Moreover, rather than the CSO actually doing this, it was its potential to do it that provided the ever-present threat to the non-compliant competitor. More recently, discovery of new diamond mines in countries such as Australia and Canada, along with a more independent stance on the part of some producers, has led to De Beers abandoning its monopoly control. Instead, it has chosen to use public relations and marketing strategies to differentiate its own diamonds from those of its smaller competitors. In an article in *The Economist* it was explained that, as a result of these changes, '... the diamond trade is starting to look more like any other ordinary industry'.¹ Whereas, in the early 1990s, De Beers sold about 80 per cent of the world's rough diamonds, today it sells less than 50 per cent.

There is a group of minerals known as rare earths. Although they are found in many countries and were previously produced in the United States, a virtual monopoly in their production is now held by China. In 2009 China produced 97 per cent of the world's output of these minerals which, because of their phosphorescent and magnetic properties, are vital inputs into the electronics industry. Among other products, they are used in the manufacture of hard drives, wind turbines and lasers. In an article in *The Economist* it was reported that former Chinese leader Deng Xiaoping had said that '... rare earths would be to China what oil was to the Middle East'.² Just how long this strong monopoly position will last is unknown. However, it appears that the small level of current production in other countries is being expanded and that new production will occur in the United States and Australia in the next few years. Until this time, however, China will be in a position to continue to use its monopoly power.

INTERNATIONAL FOCUS



Applicable concept:
monopoly

1 Anon, 'Changing facets', *The Economist*, 24 February 2007, p. 59.

2 Anon, 'Dirty business', *The Economist*, 2 October 2010, p. 56.