



Section 12

Monopoly

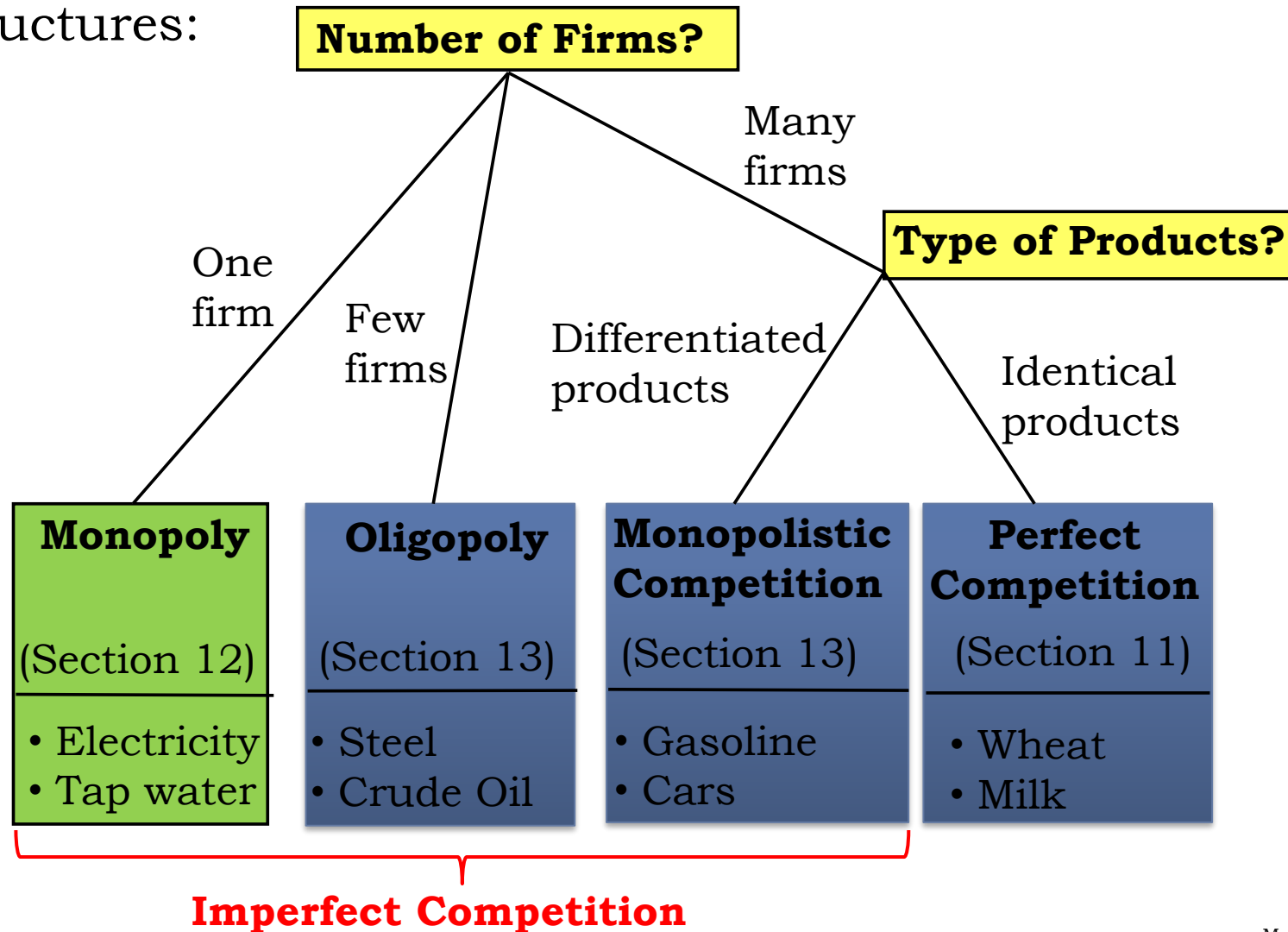
Reference:

N. Gregory Mankiw and Mark P. Taylor (2023), “*Microeconomics*”, Cengage Learning, Chapter 11

The slides of this section are mainly based on the 6th edition of the book by Mankiw and Taylor (2023). In some slides we reproduce figures, sentences and definitions given in the book.

Models of Imperfect Competition

Different Market Structures:



Introductory Article: Renationalization of UK's Railways



Privatisation, when introduced to the railways in 1996, was intended to bring new private investment, and expertise, reduce costs and make the sector more efficient. Rather than providing new capital, privatisation has created opportunities for private companies to extract value from public services. While subsidies to private companies has increased, investment in new rolling stock has actually fallen, and is currently 60% less than the five-year period prior to rail privatisation.

Commuters wait on a quiet platform at Hassocks train station during morning peak travel time as trains suffer cancellations (West Sussex) (Jane Sherwood/ Getty Images)

<https://www.ibtimes.co.uk/could-we-renationalise-our-railways-1599735>

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Protect faith in privatised monopolies with tougher regulation

An overhaul of industry watchdogs will head off calls for renationalisation

DIANE COYLE [+ Add to myFT](#)



Diane Coyle OCTOBER 6, 2017 46

For those of us growing up in Britain in the 1970s, they were dark times. Not metaphorically, but literally. Industrial action by miners led to regular power cuts, so it was homework by candlelight. Rubbish went uncollected. In some cities, even municipal gravediggers left the dead unburied. The notorious Winter of Discontent, as the public sector strikes of 1978-79 came to be known, paved the way for Margaret Thatcher's first election victory, and the [privatisation](#) of nationalised industries in the 1980s and 1990s.

Yet the change of ownership from public to private did nothing to solve the challenge of regulating [natural monopolies](#) such as electricity and rail, or of constraining market power in industries with economies of scale. The failures of regulation and competition policy over the intervening decades are now all too apparent.

Financial investors have wrung every drop they can out of the [water industry](#) rather than reinvesting profits. In spite of a recent Competition and Markets Authority inquiry into the electricity market, even Conservative politicians are proposing [price controls](#). Telecoms companies and their regulator Ofcom are [at loggerheads](#). And where there has been competition, as in the airline industry, the collapse of Monarch raises doubts about consumer protection. No wonder that a [study](#) by the Legatum Institute reported wide support for the idea that capitalism is in crisis.

Capitalism is not the problem. It is regulatory policy that is in crisis.

Renationalisation would not serve the public any better without careful design of incentives and accountability. The experience of the past four decades underlines fundamental challenges.

It is hard to make natural monopoly industries competitive. Even when there are auctions for licences or franchises, bidding companies know far more than the regulator about costs, technological possibilities and demand. As Nobel laureate economist [Jean Tirole](#) argues in his new book *Economics for the Common Good*, [asymmetry of information](#) between regulator and provider can never be wholly overcome. This understanding led to the UK's use of fixed price bids for franchises, giving operating companies stronger incentives to be efficient. If a privatised operator misjudged costs or demand, and made less profit than anticipated, tough.

“
Regulatory independence is more important than ever in febrile times; it is also harder to achieve

The trouble is that regulators and politicians like the idea of business stumping up if things go wrong, but not of them reaping the reward if things go well. The temptation to claw back some of the return by changing the rules is strong — in many sectors there has been almost

constant change. No wonder all the businesses concerned employ teams to handle relations with the regulator — which brings the danger of regulatory capture. Some sector regulators are clearly far too lenient with “their” companies.

Source: <https://www.ft.com/content/21956baa-a932-11e7-ab66-21cc87a2edde>

Introductory video: is Amazon a monopoly?



<https://www.youtube.com/watch?v=q1J3cnyGIUY>

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- A. Monopoly and its Causes
- B. Production & Pricing Decision of a Monopoly
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- D. Price Discrimination
- E. Regulation

A. Monopoly and its Causes

Monopoly and Market power

Monopoly: a firm that is the sole seller of a product without close substitutes

Market power: where a firm is able to raise the price of its product and not lose all its sales to rivals

Barriers to Entry

The fundamental cause of monopoly is the presence of barriers to entry.

Barrier to entry: anything which prevents a firm from entering a market or industry.

Main sources for barriers to entry:

1. A key resource is owned by a single firm
2. The government gives a single firm the exclusive right to produce some good or service.
3. Natural Monopolies: Costs of production make a single producer more efficient than a large number of producers (economies of scale).

1. Key Resource

DeBeers is a South African diamond company

DeBeers controls more than 80 percent of the world's diamond production, enabling it to influence diamond prices.



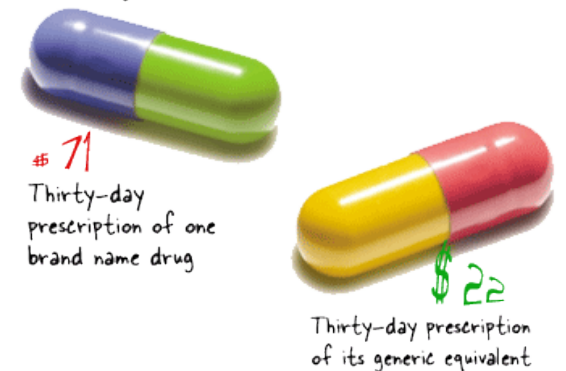
Just one water well on a island



2. Government-created Monopolies

- Governments may restrict the entry to a market by giving a single firm the exclusive right to sell a particular good in certain markets.
- **Patent** and **copyright** laws are two important examples of how government creates a monopoly to serve the public interest
- **A patent for the production of a drug creates a monopoly**
 - ⇒ **Patents** give the company the exclusive right to manufacture and sell the product for a fixed number of years – often **20 years**.
 - ⇒ **Copyright** - “the right of an individual or organization to own things they create in the same way as a physical object to prevent others from copying or reproducing the same”
 - ⇒ Why patent and copyright laws? To provide incentives to firms to invest in for R&D activities → innovations → new products and benefits not only for the firms but also for the society

Your prescription,
your choice.



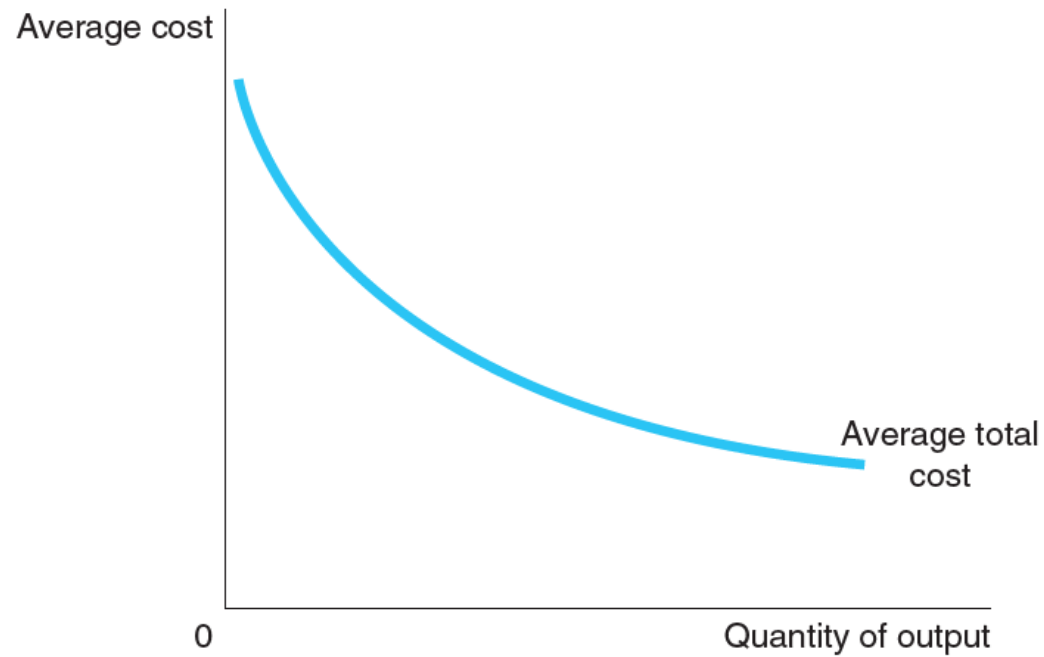
3. Natural Monopoly

- 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.
- A natural monopoly arises when there are economies of scale over the relevant range of output.
- Example: **Distribution of Water**
 - ↳ Firm must build a network of pipes → high fix costs!
 - ↳ If two or more firms would offer this service, each would have to pay the fix costs of building an own network of pipes.



Source: <http://www.stadtwerke-jena.de>

Economies of Scale as a Cause of Monopoly



Source: Mankiw & Taylor (2023), “Microeconomics”

Networks and Monopolies



ARE MUNICIPAL ELECTRICITY DISTRIBUTION UTILITIES NATURAL MONOPOLIES?

by

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Received September 1996; final revision accepted December 1997

ABSTRACT:** *The purpose of this study is to analyse the cost structure of the Swiss electricity distribution utilities in order to assess economies of scale and density and the desirability of competition in the distribution of electric power. A translog cost function was estimated using panel data for a sample of 39 municipal utilities over the period 1988–1991. The results indicate the existence of economies of density for most output levels and the existence of economies of scale only for small and medium-sized electric utilities. The empirical evidence suggests that franchised monopolies, rather than side-by-side competition, is the most efficient form of production organization in the electric power distribution industry. Further, the majority of the utilities analysed do not operate at an optimal service territory size. Therefore, the consolidation of small utilities whose service territories are adjacent is likely to reduce costs.*



Energy Conversion, Transportation/Transmission, and Storage

Scale economies and optimal size in the Swiss gas distribution sector

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HIGHLIGHTS

- Presence of unexploited scale economies for small and medium sized companies.
- Scale economies vary considerably with customer density.
- Higher density or greater complexity is associated with lower optimal size.
- Optimal size varies across the companies through unobserved heterogeneity.
- Firms with low density can gain more from expanding firm size.

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ABSTRACT

This paper studies the cost structure of Swiss gas distribution utilities. Several econometric models are applied to a panel of 26 companies over 1996–2000. Our main objective is to estimate the optimal size and scale economies of the industry and to study their possible variation with respect to network characteristics. The results indicate the presence of unexploited scale economies. However, very large companies in the sample and companies with a disproportionate mixture of output and density present an exception. Furthermore, the estimated optimal size for majority of companies in the sample has shown a value far greater than the actual size, suggesting remarkable efficiency gains by reorganization of the industry. The results also highlight the effect of customer density on optimal size. Networks with higher density or greater complexity have a lower optimal size.

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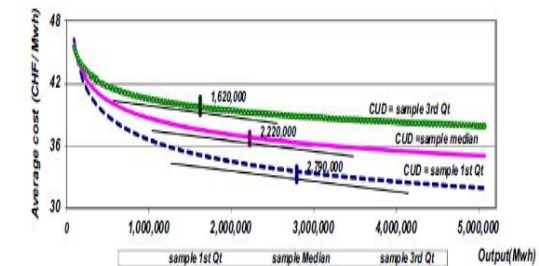
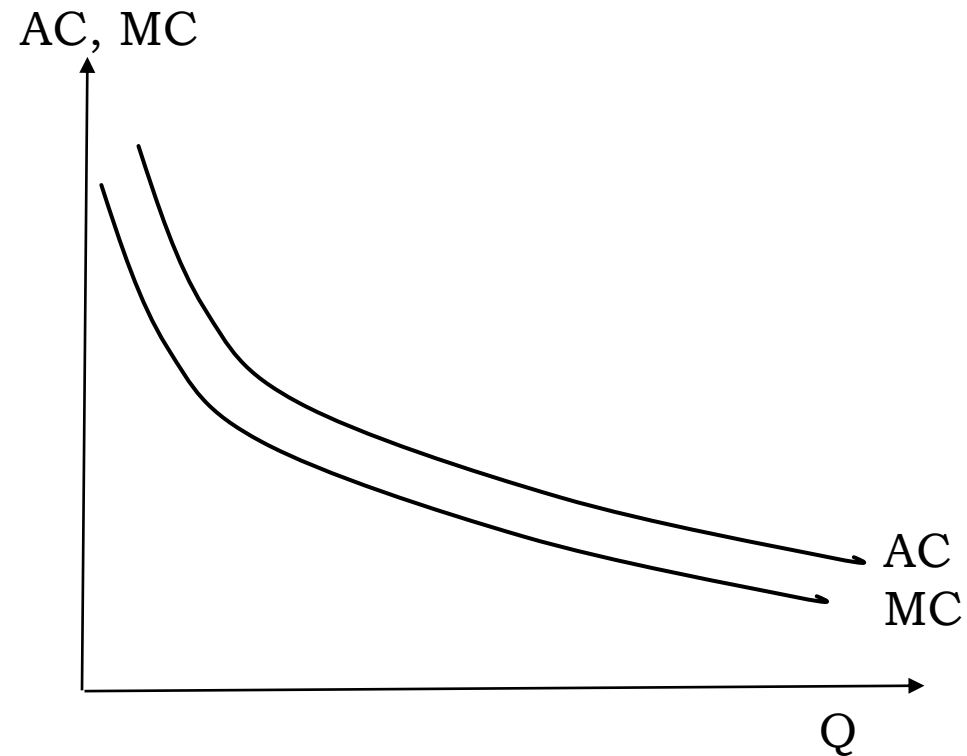


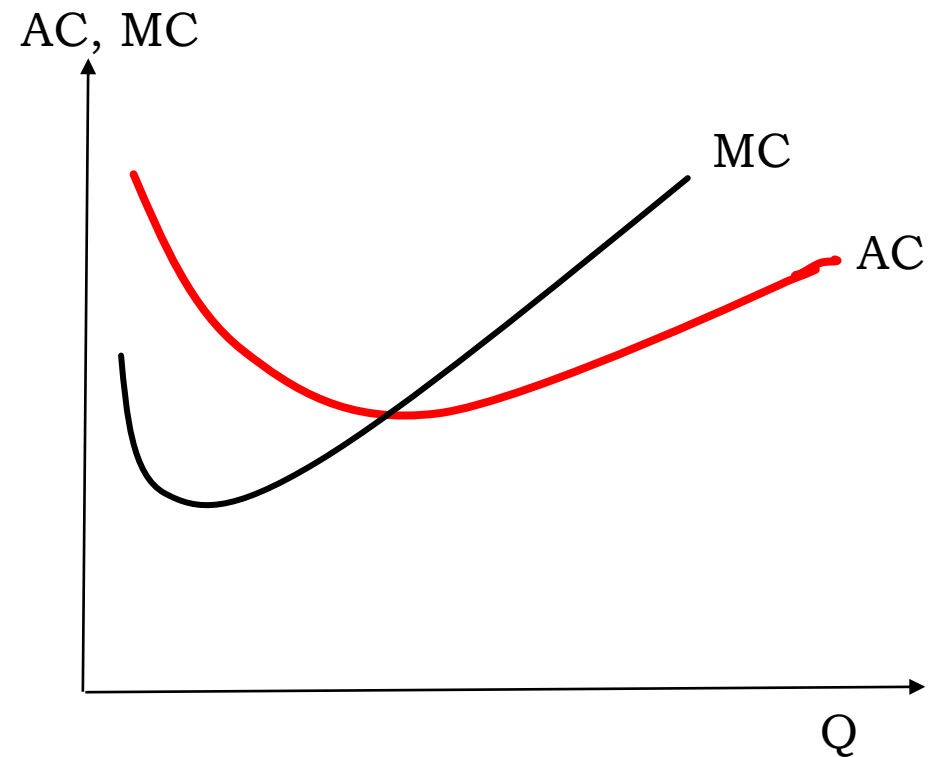
Fig. 1. Average cost curve.

AC and MC in the two monopoly cases

Natural Monopoly



Key Resource or Government created Monopoly



B. Production and Pricing Decision of a Monopoly

Production and Pricing Decision of a Monopolist

The key difference between a competitive firm and a firm operating in a monopoly, is the monopolist's ability to influence the price of its output.

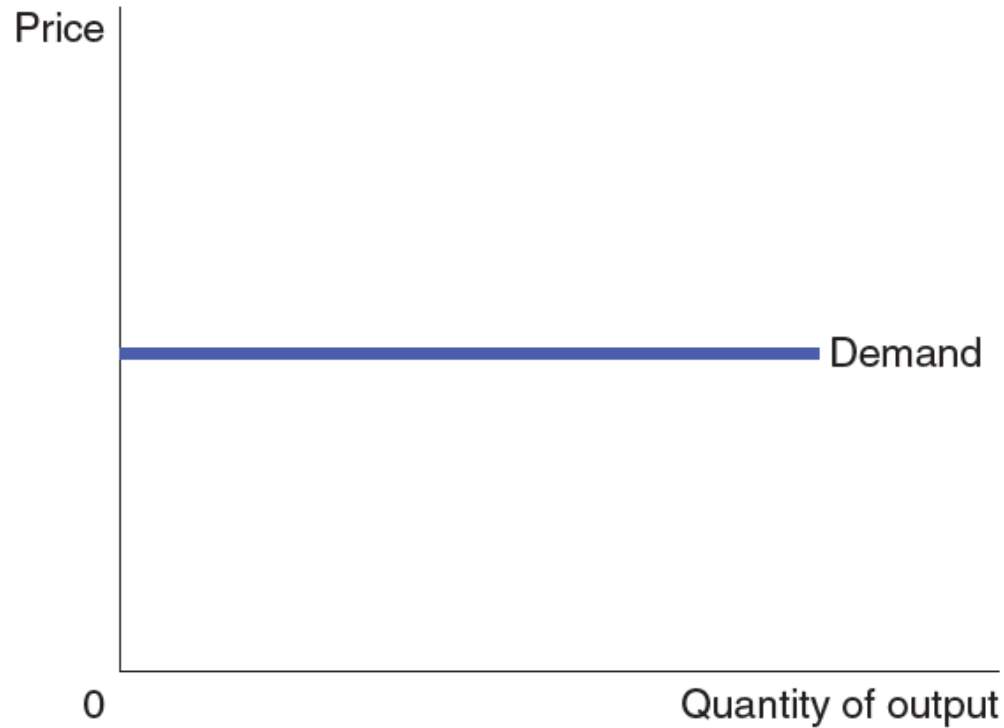
Monopoly

- ↳ Is the sole producer
- ↳ Faces a downward-sloping demand curve
- ↳ Is a price maker
- ↳ Reduces price to increase sales

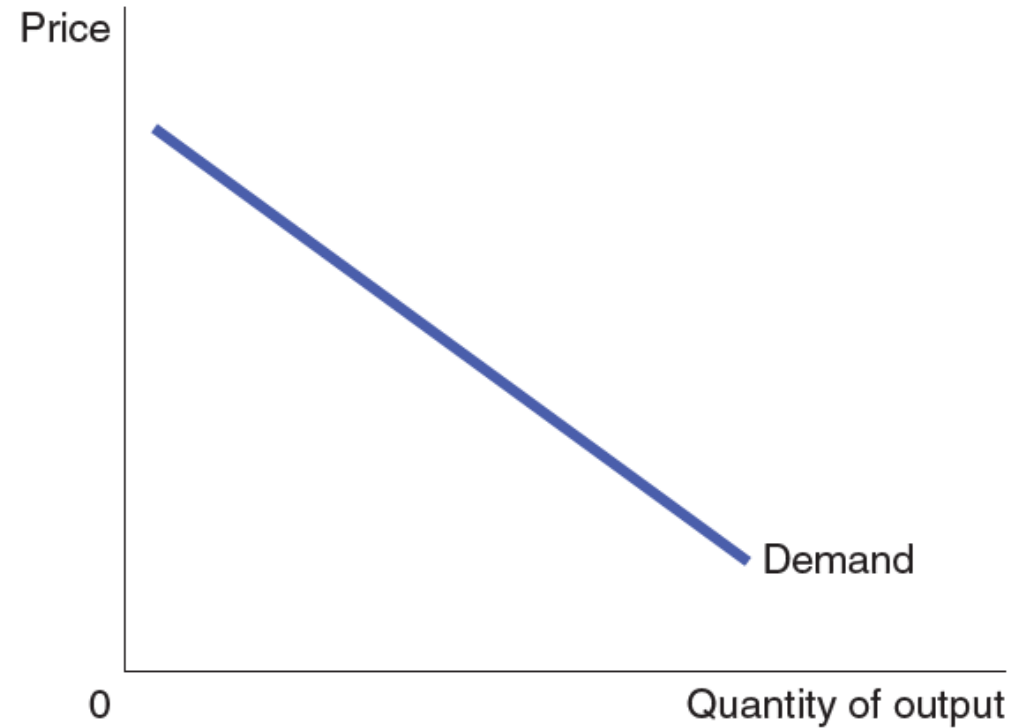
Competitive Firm

- ↳ Is one of many producers
- ↳ Faces a horizontal demand curve
- ↳ Is a price taker
- ↳ Sells as much or as little at the same price

Demand Curves for Competitive and Monopoly Firms



(a) A competitive firm's demand curve



(b) A monopolist's demand curve

Source: Mankiw & Taylor (2023), "Microeconomics"

Monopolist's Revenue

When a monopolist increases the amount it sells, it has two effects on **total revenue** ($P \times Q$).

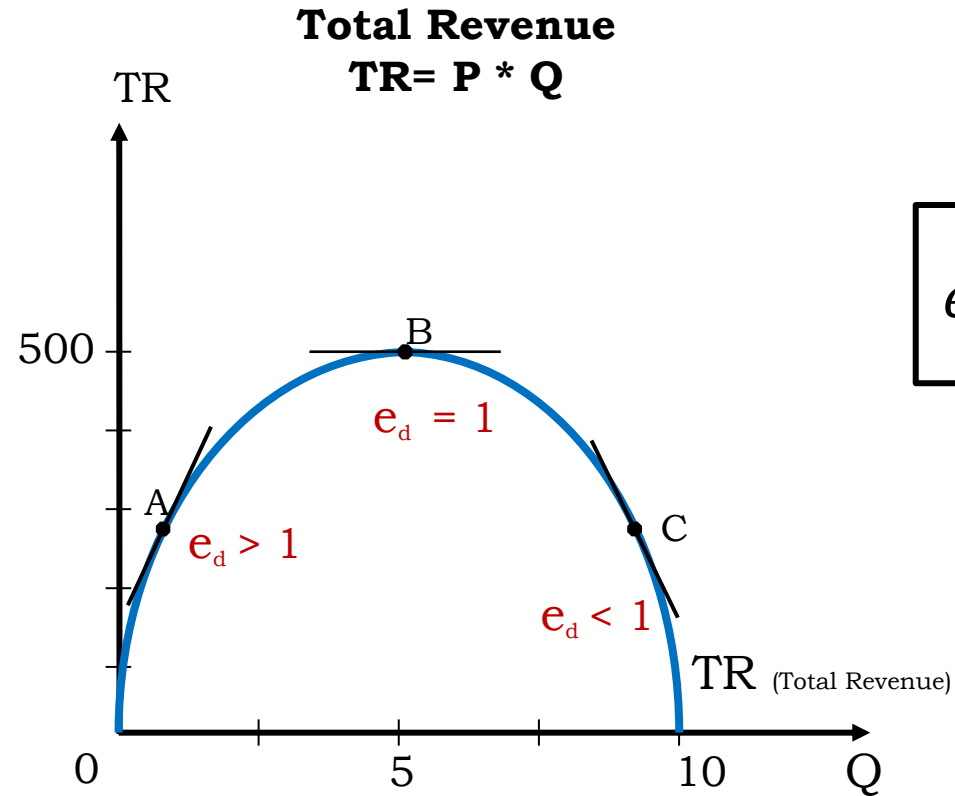
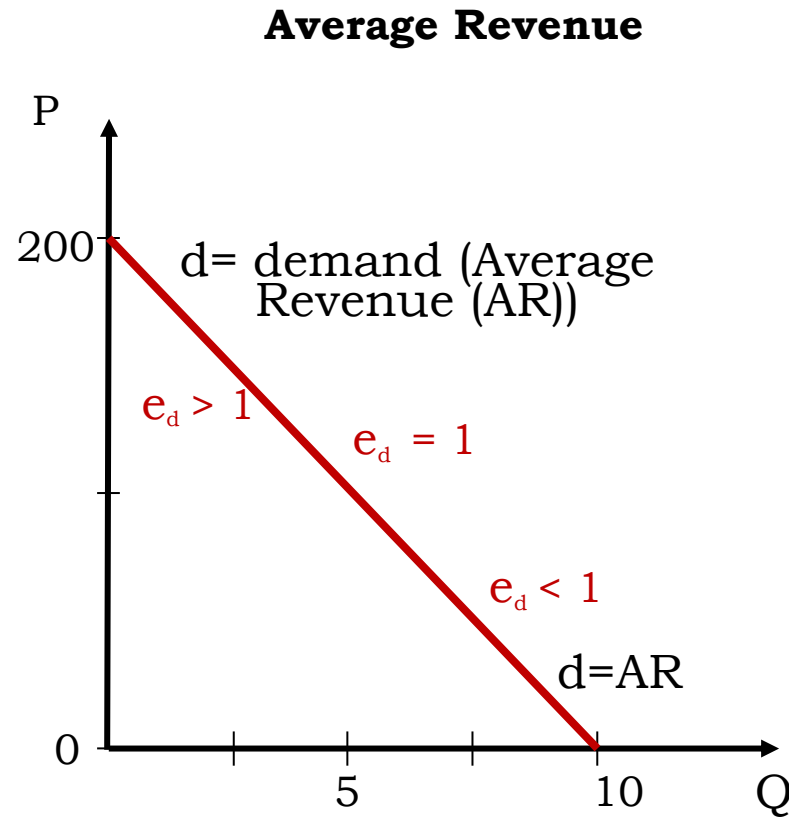
↳ **The output effect** → more output is sold, so Q is higher.

↳ **The price effect** → price falls, so P is lower.

↳ Impact on total revenue depends on the value of the price elasticity

Total Revenue (TR) and Demand

How TR changes depends on the price elasticity of demand e_d



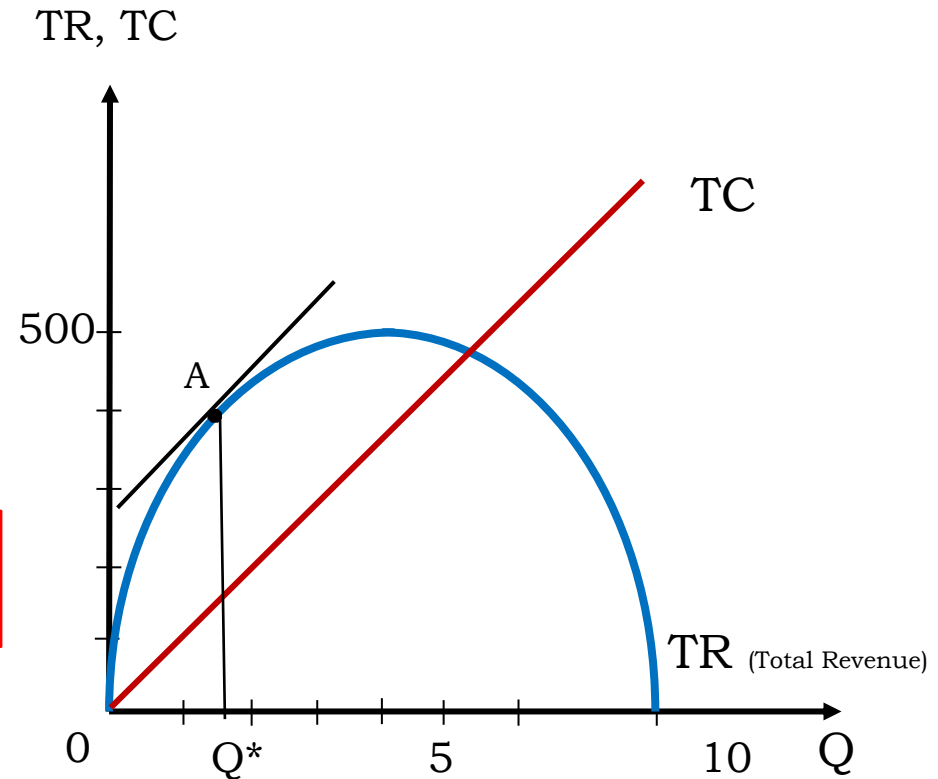
$$e_d = \frac{\partial Q}{\partial P} \cdot \frac{P}{Q}$$

Profit maximization

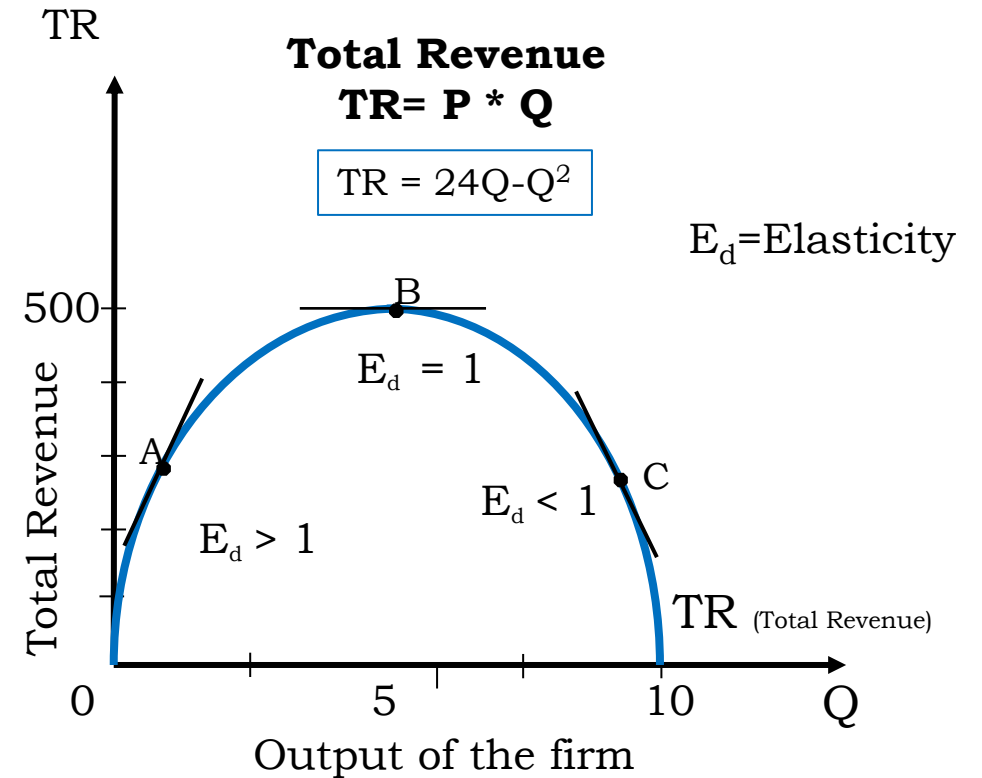
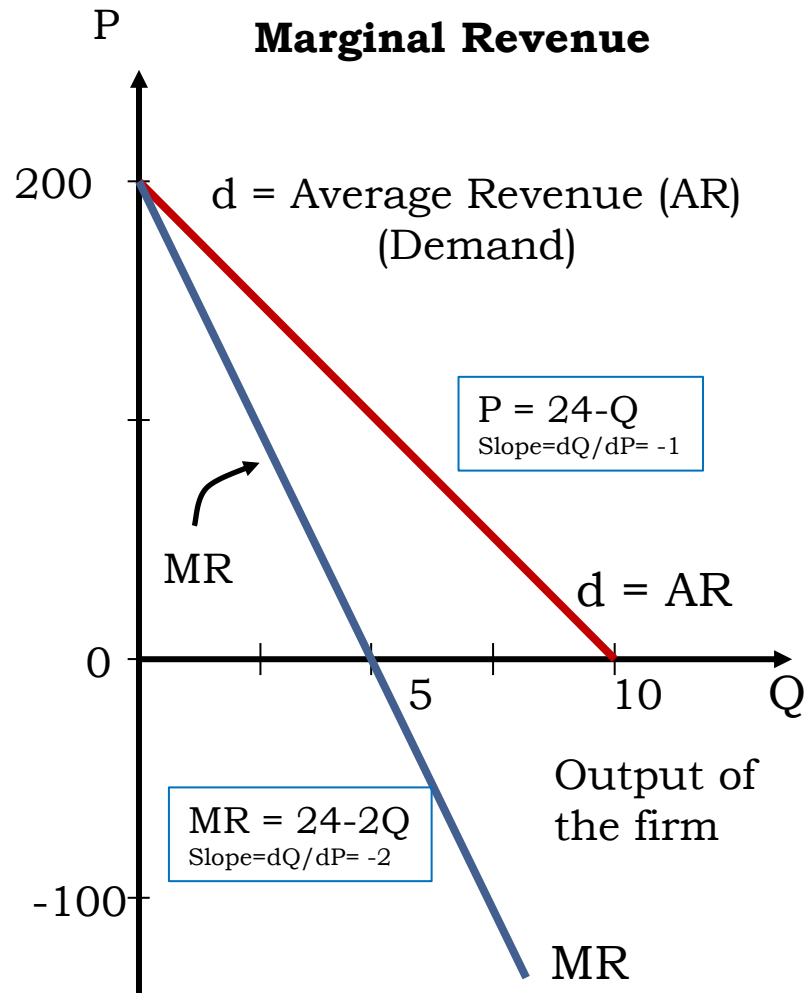
Optimal output (Q^*): $MR=MC \rightarrow \text{slope TR} = \text{slope TC}$

MR= first derivative TR function
MC= first derivative TC function

Optimal price: obtained by using Q^* in the demand function



Marginal Revenue (MR)



Marginal Revenue:

- is the change in total revenue that results from a change in output by one unit (can be both positive and negative)
- first derivative of the total revenue function

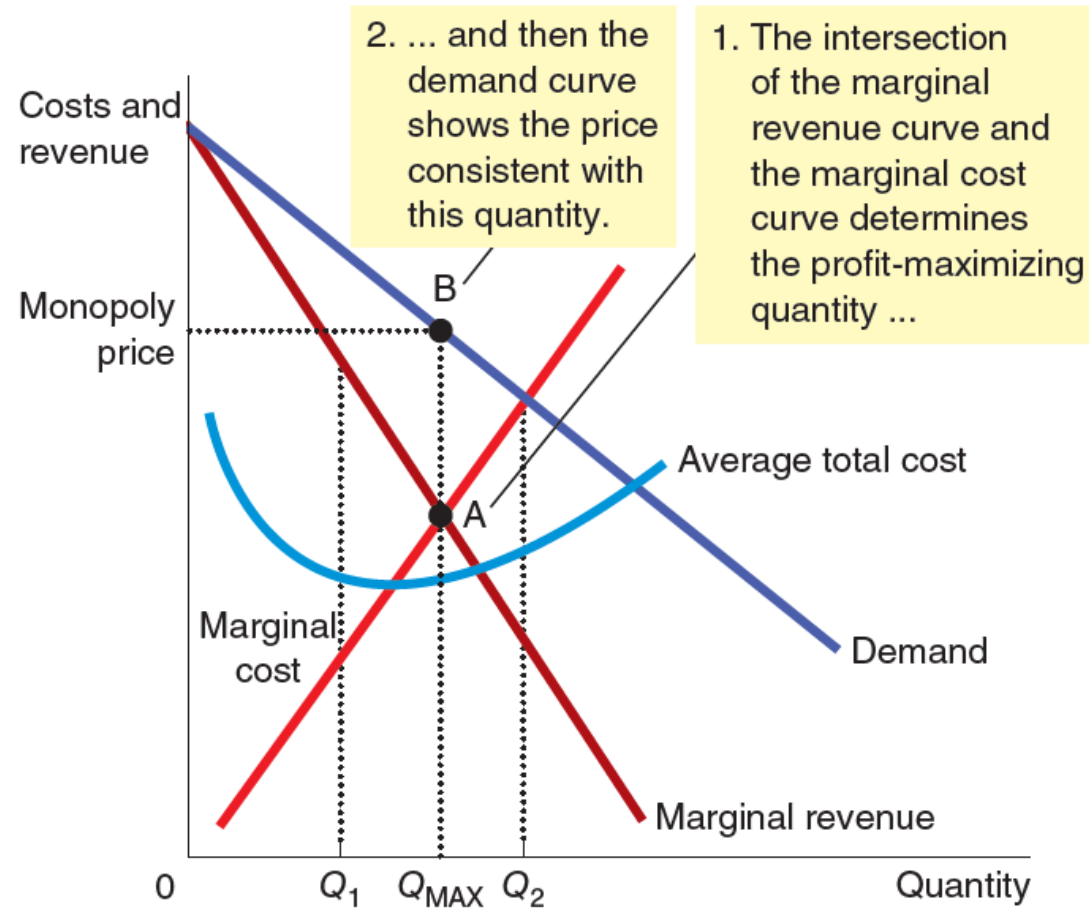
Profit Maximization for a Monopoly

For a competitive firm:

$$P = MR = MC$$

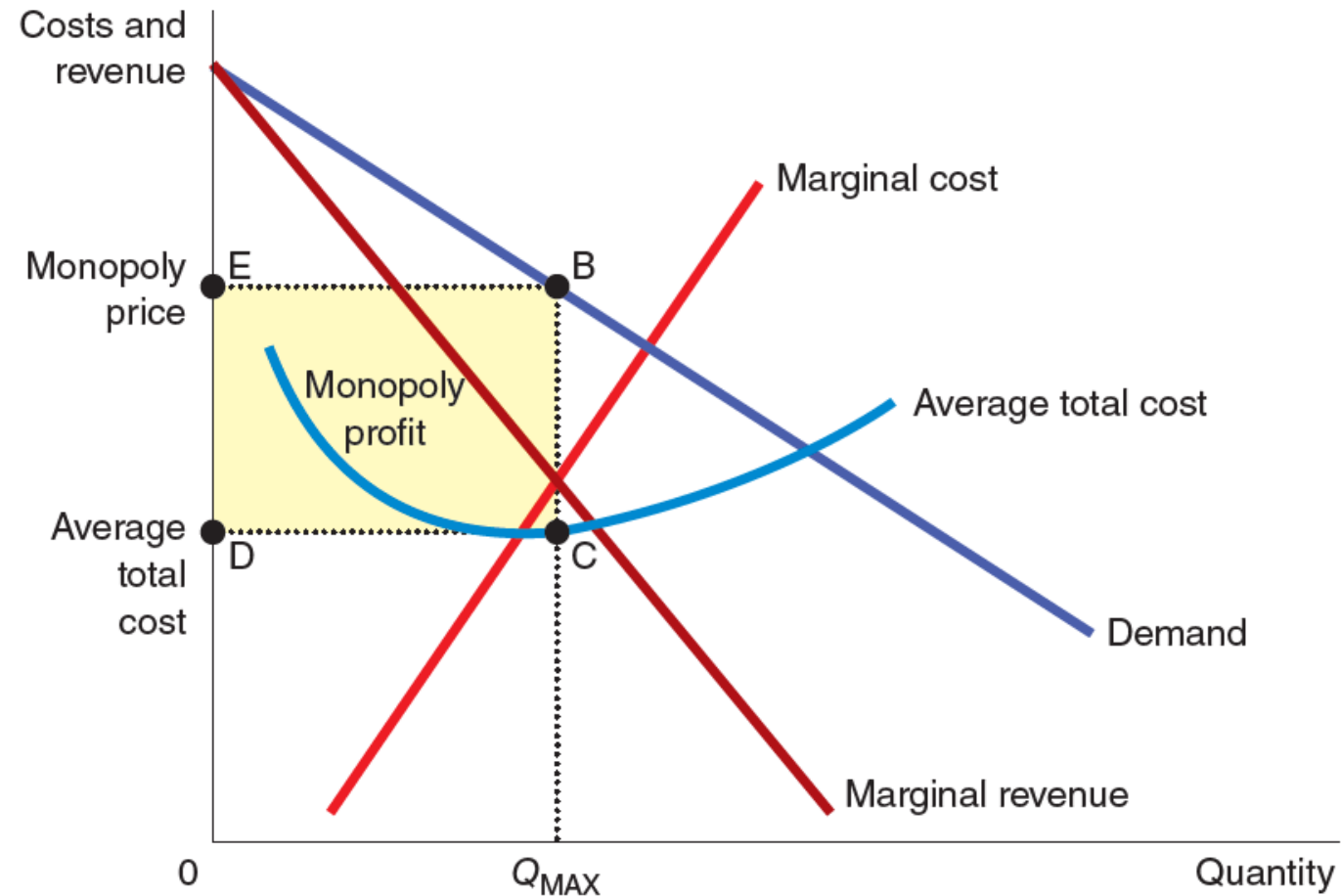
For a monopoly firm:

$$P > MR = MC$$



Source: Mankiw & Taylor (2023), "Microeconomics"

The Monopolist's Profit



Source: Mankiw & Taylor (2023), "Microeconomics"

CASE STUDY Monopoly Drugs versus Generic Drugs

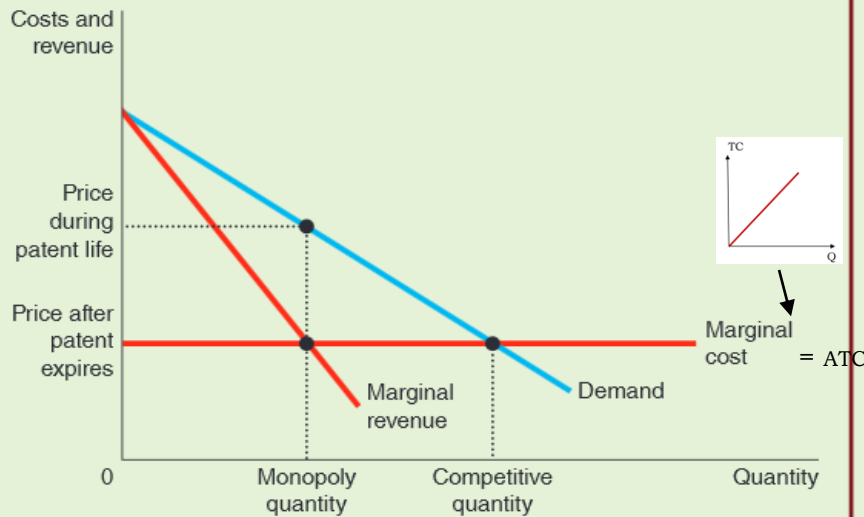
According to our analysis, prices are determined quite differently in markets where a firm has a monopoly compared to the way they are in competitive markets. A natural place to test this theory is the market for pharmaceutical drugs, because this market takes on both market structures. When a firm discovers a new drug, patent laws give the firm a monopoly on the sale of that drug. But eventually the firm's patent runs out, and any company can make and sell the drug. At that time, the market switches from being a monopoly to being competitive.

What should happen to the price of a drug when the patent runs out? Figure 14.6 shows the market for a typical drug. In this figure, the marginal cost of producing the drug is constant. (This is approximately true for many drugs.)

FIGURE 14.6

The Market for Drugs

When a patent gives a firm a monopoly over the sale of a drug, the firm charges the monopoly price, which is well above the marginal cost of making the drug. When the patent on a drug runs out, new firms enter the market, making it more competitive. As a result, the price falls from the monopoly price to marginal cost.



(Continued)

During the life of the patent, the monopoly firm maximizes profit by producing the quantity at which marginal revenue equals marginal cost and charging a price well above marginal cost. But when the patent runs out, the profit from making the drug should encourage new firms to enter the market. As the market becomes more competitive, the price should fall to equal marginal cost.

Experience is, in fact, consistent with our theory. When the patent on a drug expires, other companies quickly enter and begin selling so-called generic products that are chemically identical to the former monopolist's brand-name product. And just as our analysis predicts, the price of the competitively produced generic drug is well below the price that the monopolist was charging.

The expiration of a patent, however, does not cause the monopolist to lose all its market power. Some consumers remain loyal to the brand-name drug, perhaps out of fear that the new generic drugs are not actually the same as the drug they have been using for years. As a result, the former monopolist can continue to charge a price somewhat above the price charged by its new competitors.



Pfizer held the patent for the drug Viagra until July 2013. When the patent ran out, the market for this particular drug could be flooded with generic versions priced much lower than Pfizer's Viagra.

Source: Mankiw & Taylor (2014), figure 14.6 pp. 299-300

Video: Drug price increases 5,000 percent overnight

See:

<https://www.cbsnews.com/news/generic-drug-price-increases-5000-percent-overnight/>

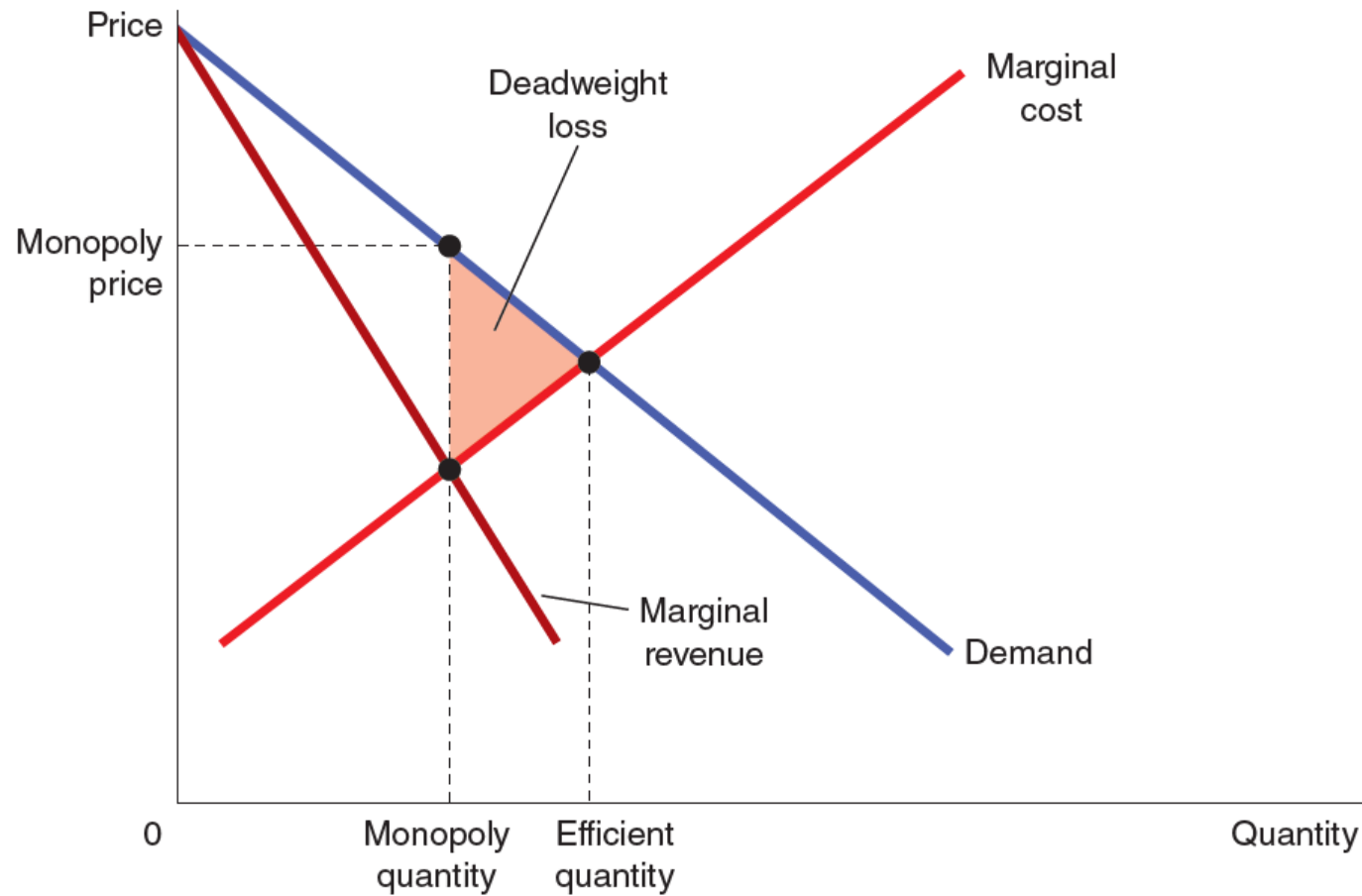


C. The Welfare Cost of Monopoly

The Welfare Cost of Monopoly

- In contrast to a competitive firm, the monopoly charges a price above the marginal cost.
- Because a monopoly sets its price above marginal cost, it places a wedge between the consumer's willingness to pay and the producer's cost.
- This wedge causes the quantity sold to fall short of the social optimum.

The Inefficiency of Monopoly



Source: Mankiw & Taylor (2023), "Microeconomics"

D. Price Discrimination

Price Discrimination

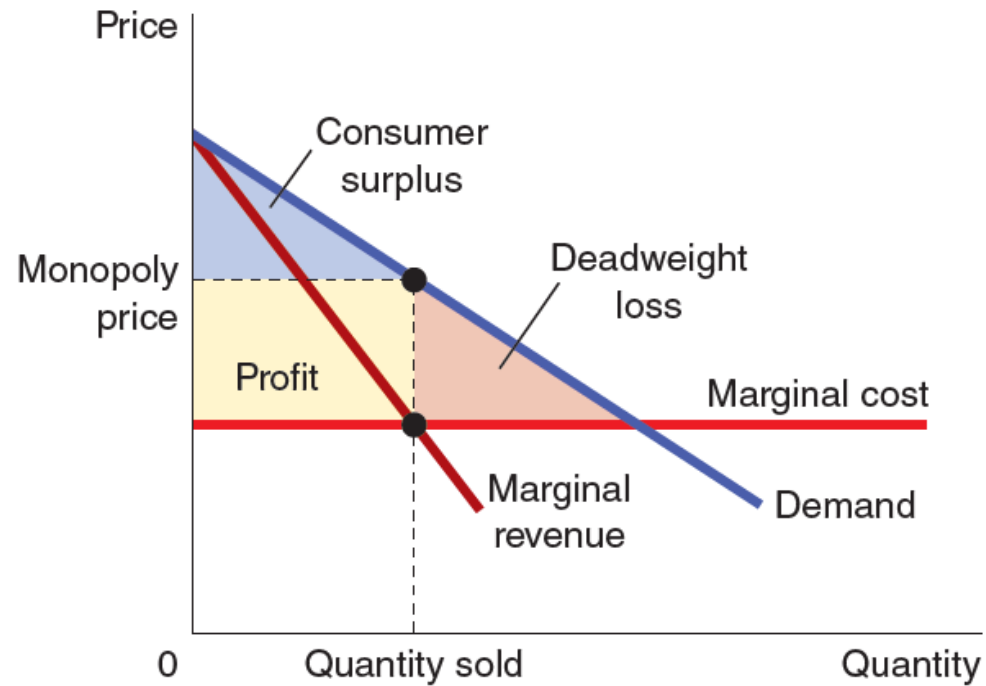
- **Price discrimination** - the business practice of selling the same good at different prices to different customers.
- Example:
 - Local railroads operate in a monopoly situation with different types of customers that have different willingness to pay for the transport service
 - Train tickets (lower prices for children, students and senior citizens)
 - Discrimination is possible because it is not possible to have **arbitrage** opportunities– possibility to make profit from a price difference in two different markets.
 - Students buy tickets and then sell the tickets to adults to a lower price than the adult's train price ticket

Price Discrimination

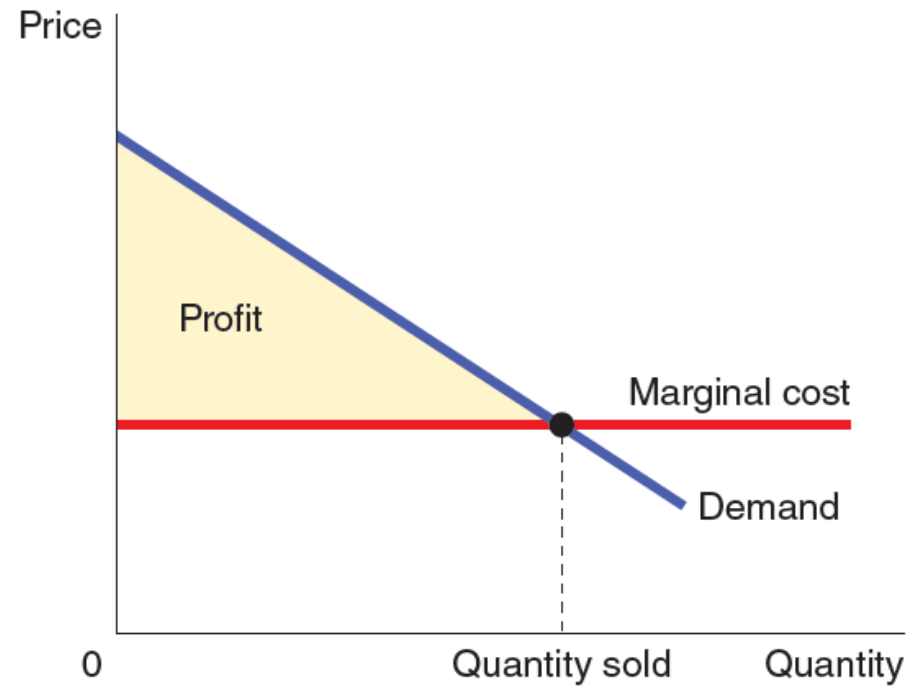
3 lessons about price discrimination:

- It is a **rational** strategy for profit-maximizing monopolist.
 - It requires the **ability to separate customers** according to their WTP, e.g. by geography, age, income, time of use (peak time/off-peak time) etc.
 - It **can raise economic welfare** compared to a situation where a monopolist only charges a single price!
- The increase in total welfare is due to higher producer surplus which shows up as higher profit for the monopolist.

Price Discrimination



(a) Monopolist with single price



(b) Monopolist with perfect price discrimination

Source: Mankiw & Taylor (2023), "Microeconomics"

E. Regulation of monopolies

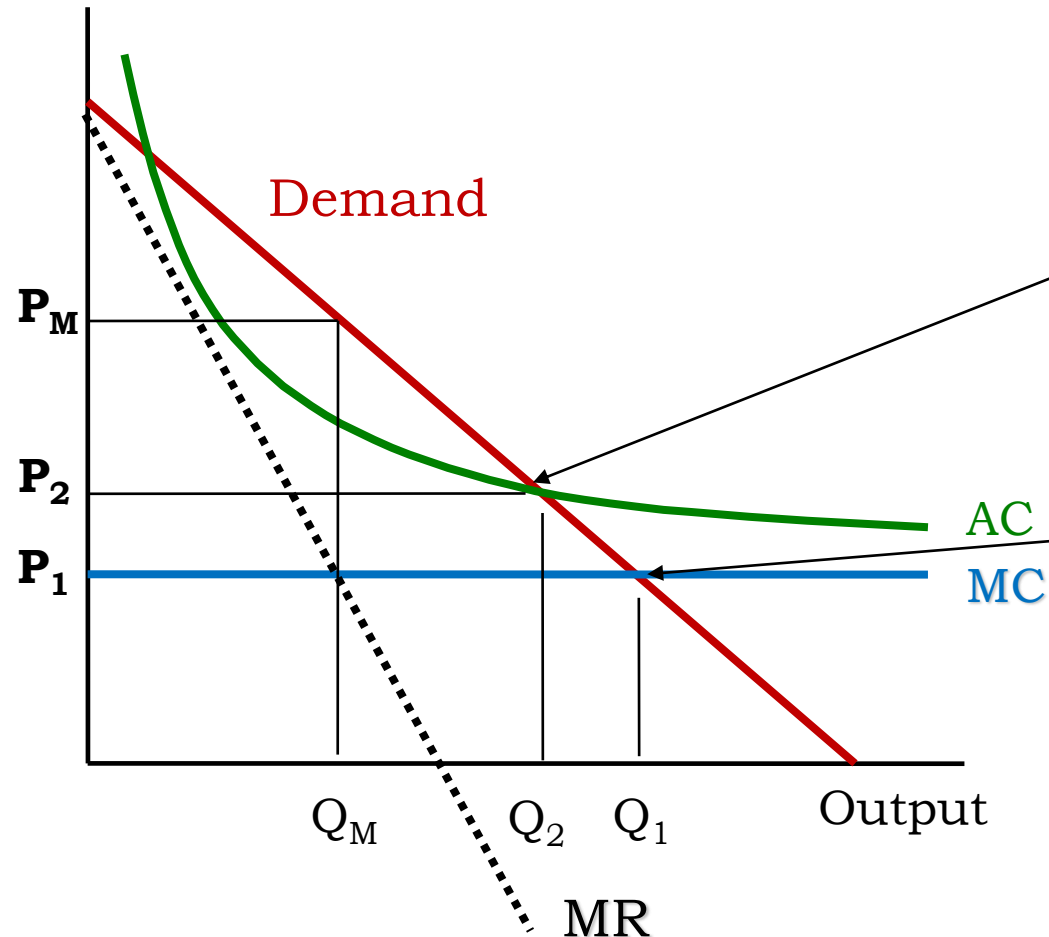
Regulation

- In general, the government intervenes by regulating the monopoly
- Regulation of the price, quality and economic profit



Price Regulation natural monopoly

P, AC, MC

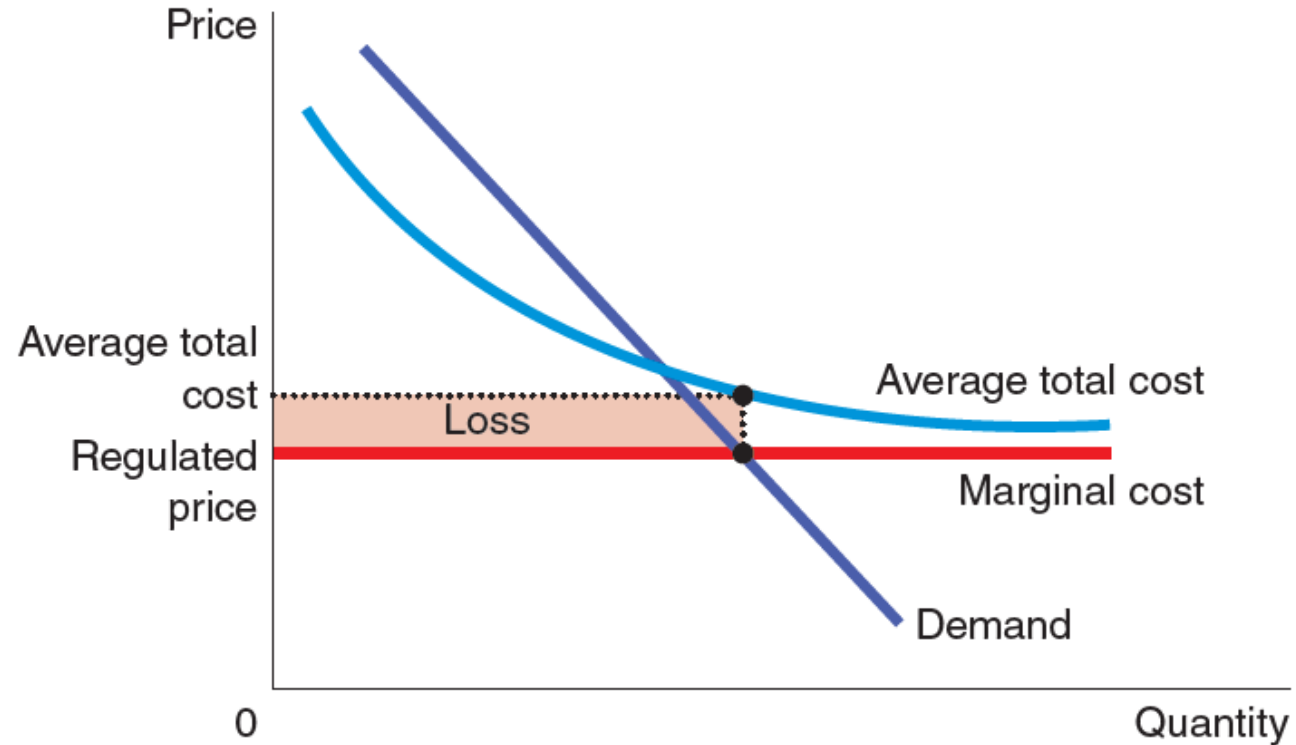


It consists of the limitation of monopoly profit by **imposing tariff controls** or more precisely by imposing the following tariff policies:

- $P = AC$ (second best) = P_2
 - Can be obtained by fixing the max return on equity
- $P = MC$ (first best) = P_1
 - Problem: loss
- $P = MC$ (first best) = $P_1 + \text{a fixed charge to cover the loss}$

Two part tariff: the company fixes a **tariff** to cover the loss and adds a **variable tariff** to cover **marginal cost**. (the allocation of resources is also efficient, price is set to equal **marginal cost**)

Marginal Cost Pricing for Natural Monopoly



Source: Mankiw & Taylor (2023), "Microeconomics"



Ihr Strompreis setzt sich zusammen aus

Energie	Tagpreis pro kWh	9.7 Rappen (10.48 Rappen inkl. MWSt.)
	Nachtpreis pro kWh	5.8 Rappen (6.26 Rappen inkl. MWSt.)
Netz	Tagpreis pro kWh	7.8 Rappen (8.42 Rappen inkl. MWSt.)
	Nachtpreis pro kWh	3.1 Rappen (3.35 Rappen inkl. MWSt.)
	Grundpreis pro Monat	9 Franken (9.72 Franken inkl. MWSt.)
Abgabe an Swissgrid (für allgemeine Systemdienstleistungen)	Pauschalpreis pro kWh	0.77 Rappen (0.83 Rappen inkl. MWSt.)
Abgabe an Gemeinde	10% der Netzkosten (inkl. Swissgrid)	
Abgabe für erneuerbare Energie (Kostendeckende Einspeisevergütung KEV)	vom Bundesamt für Energie festgelegt	0.45 Rappen pro kWh (0.49 Rappen inkl. MWSt.)

Ihr Strompreis total

Tagpreis pro kWh	19.58 Rappen (21.14 Rappen inkl. MWSt.)
Nachtpreis pro kWh	10.51 Rappen (11.35 Rappen inkl. MWSt.)
Grundpreis pro Monat	9.90 Franken (10.69 Franken inkl. MWSt.)

- Tagpreis: 06.00 bis 22.00 Uhr, Nachtpreis: 22.00 bis 06.00 Uhr
- Sperrzeiten gemäss ewl Werkvorschriften
- Der Netz Grundpreis fällt auch an, wenn kein Strom bezogen wird. Er wird pro Messstelle berechnet.

Source: <http://www.ewl-luzern.ch/>