Monopoly

Market structure	No. of firms	Product differentiation	Barriers to entry	Market power	Degree of competition	Examples
Perfect competition	Large no. of small firms	Homogeneous products (identical, no brand names)	No barriers to entry	None	Perfect	Agriculture, silver and gold, stock and bond, foreign exchange market
Monopolistic competition	Large No. of small/ medium firms	Product differentiation	No barriers to entry	Some	A good amount	Shoe, clothing, computer, restaurant, novel
Oligopoly	Small no. of large firms	Differentiated or undifferentiated	High barriers to entry	Significant	Some	Coca-Cola & Pepsi, car industry, airlines Oil, steel, aluminum, copper
Monopoly	Single seller or dominant firm	Unique goods without close substitutes	High barriers to entry	Very significant	None	Electricity supply, water supply, train system in China. Microsoft operating system with windows

Characteristics of Monopoly

1. There is a **single firm** in the industry
   - A single firm producing a good/service for the entire market
   - OR one firm that dominates the market with a very large market share.
2. The firm produces and sells a **unique** good or service, with **no close substitutes**.
3. There are **high barriers to entry** in the industry.
4. **No competition**
5. **Price maker** (substantial market power)

Barriers to entry

Definition: Anything that can prevent a firm from entering an industry and beginning production, as a result limiting the degree of competition in the industry.

1. Economies of scale
2. Natural monopolies
3. Branding
4. Legal barriers
5. Control of essential resources
6. Aggressive tactics

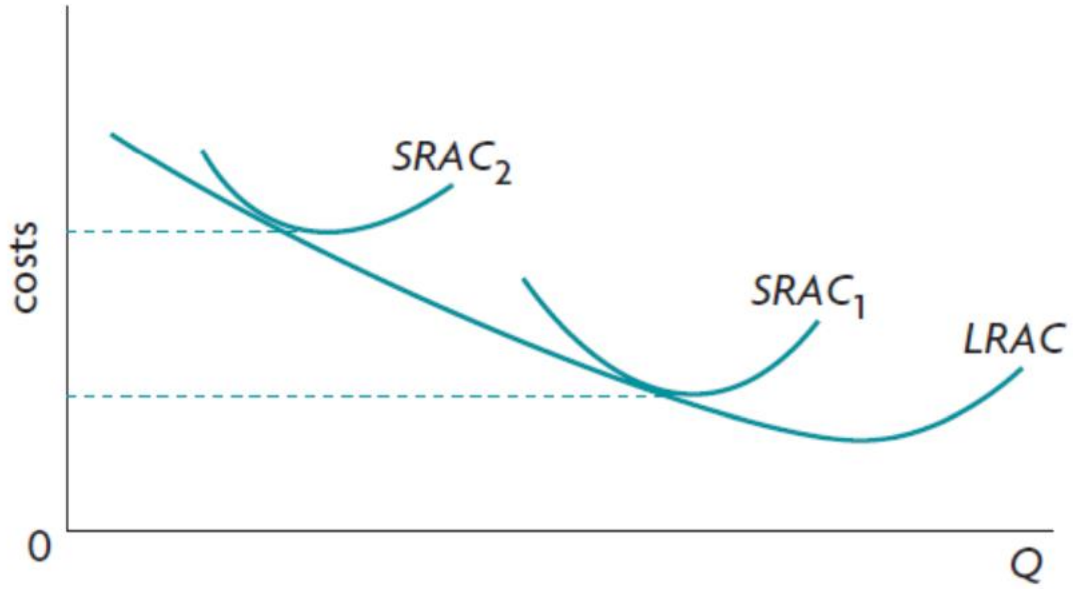
Barriers to entry

1. Economies of scale

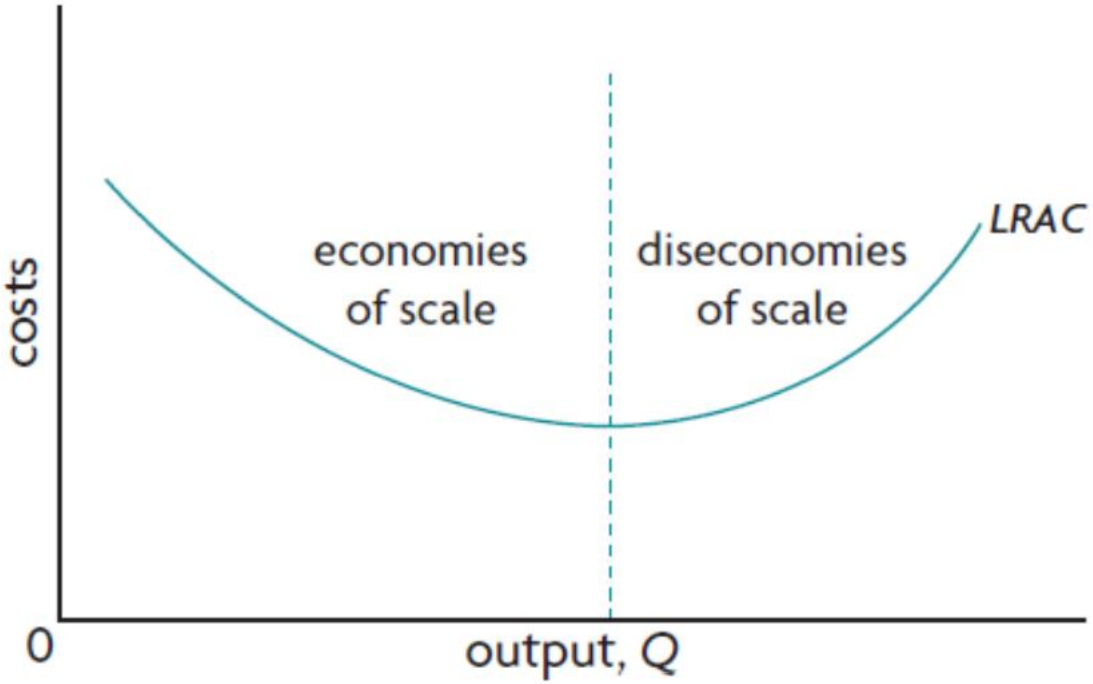
Economies of scale

- Economies of scale result in the downward-sloping portion of a firm's long-run average cost curve (LRAC), resulting in lower average costs as the firm increases its size.
- Large economies of scale create a barrier to entry. (SRAC2>SRAC1)

- With its lower average cost($SRAC_1$), large firm can charge a lower price. those small firms/new firms on a small scale with higher average cost($SRAC_2$) will not able to cover its costs with this price.
- A new firm on a very large scale would encounter huge start-up cost, unlikely to take the risk.



Economies and diseconomies of scale



Economies of scale: decreases in average costs of production over the long run as a firm increases all its factors of production.

Reasons for downward-sloping portion of the LRAC curve:

1. Specialisation of labour
2. Specialisation of management
3. Bulk buying of inputs (factors of production)
4. Efficiency of capital equipment.
5. Indivisibilities of capital equipment
6. Indivisibilities of efficient processes
7. Financing economies (larger firms may have lower interest rate)
8. Spreading of certain costs over larger volumes of output (marketing, advertising, design, R&D, etc.)

Barriers to entry

2. Natural monopolies

- Firms that have economies of scale so large that they can produce for an entire market and still not exhaust their economies of scale.

Barriers to entry

3. Branding

- Branding involves the creation by a firm of a unique image and name of a product.
- It works through advertising campaigns that try to influence consumer tastes in favour of the product, attempting to establish consumer loyalty.
- Limiting the number of new competitor firms that enter a market.
- May lead to monopoly as well as monopolistic competition and oligopoly.

Barriers to entry

4. Legal barriers

- **Patents**: rights given by the government to a firm that has developed a new product or invention to be its sole producer for a specified period of time.

- **License** are granted by governments for particular professions or particular industries.

- **Copyrights** guarantee that an author has the sole rights to print, publish and sell copyrighted works.

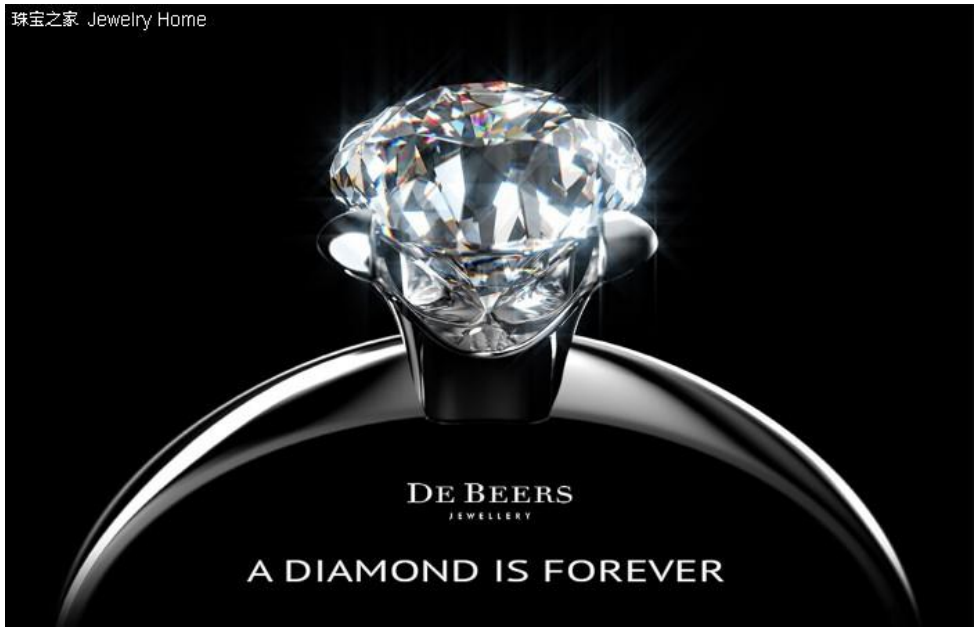
- **Tariffs, quotas and other trade restrictions** limit the quantities of a good that can be imported into a country.

Barriers to entry

5. Control of essential resources

- **Ownership or control of an essential resource.**

- Until the start of the 21st century, De Beers effectively had total control over the **diamond market** as a monopoly. Competition has since dismantled the complete monopoly, though the De Beers Group still sells approximately 35% of the world's rough diamond production through its global sight holder and auction sales businesses. **The De Beers Group of Companies** has a leading role in the diamond exploration, diamond mining, diamond retail, diamond trading and industrial diamond manufacturing sectors.



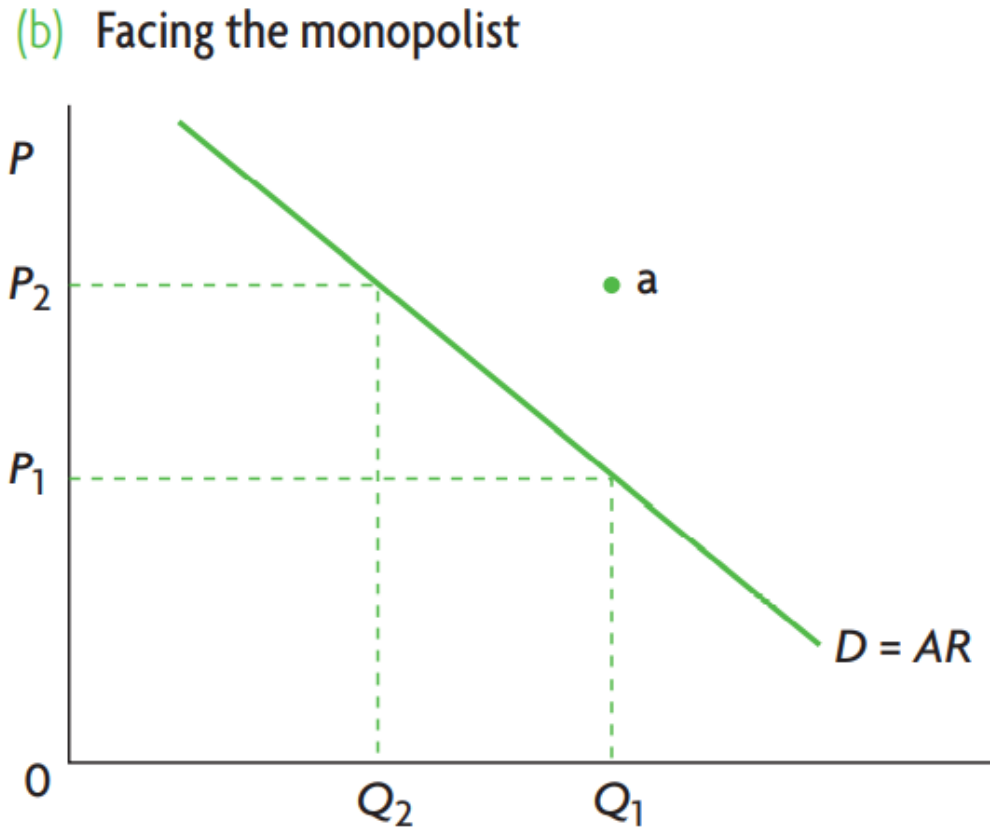
Barriers to entry

6. Aggressive tactics

- Existing monopoly firms can create entry barriers by cutting its price, advertising aggressively, threatening a takeover of the potential entrant.

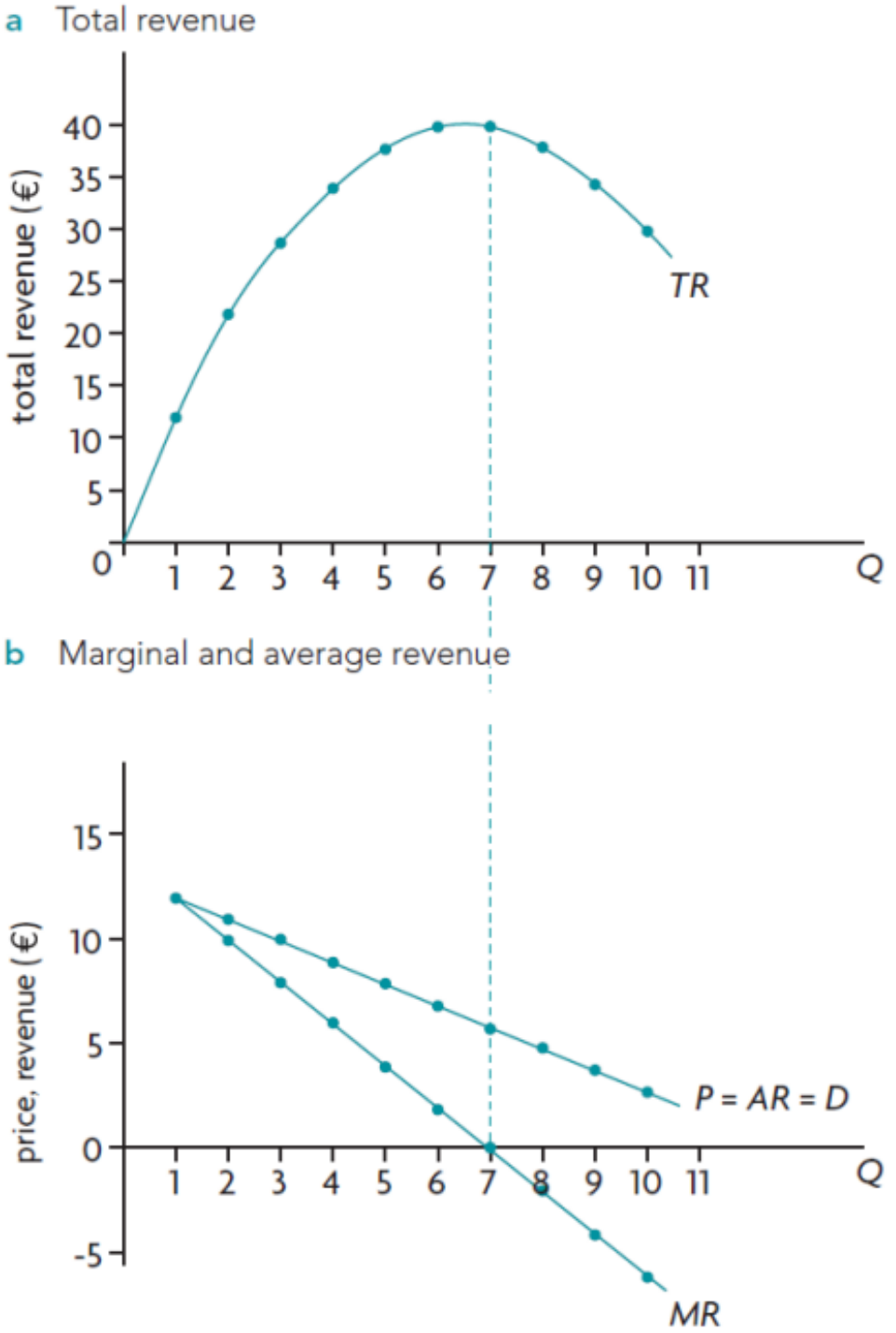
Demand curves facing the monopolist

- A pure monopolist is the entire industry, so the demand curve facing the individual monopolist firm and the market is **downward-sloping.**
- Market power arises whenever a firm faces a downward-sloping demand curve. (except perfect competition)
- Monopolist has the **greatest degrees of market power** to control the price at which they sell their output.
- **Relatively inelastic demand curve** (no close substitutes)
- The monopolist cannot make independent decisions on both price and quantity; it can only **choose price–quantity combinations** that are **on the market demand curve.**



The monopolist's revenue curves

1 Units of output (Q)	2 Product price (P) (€)	3 Total revenue TR = P × Q (€)	4 Marginal revenue MR= ΔTR ΔQ (€)	5 Average revenue AR= TR Q (€)
0	–	–	–	–
1	12	12	12	12
2	11	22	10	11
3	10	30	8	10
4	9	36	6	9
5	8	40	4	8
6	7	42	2	7
7	6	42	0	6
8	5	40	–2	5
9	4	36	–4	4
10	3	30	–6	3

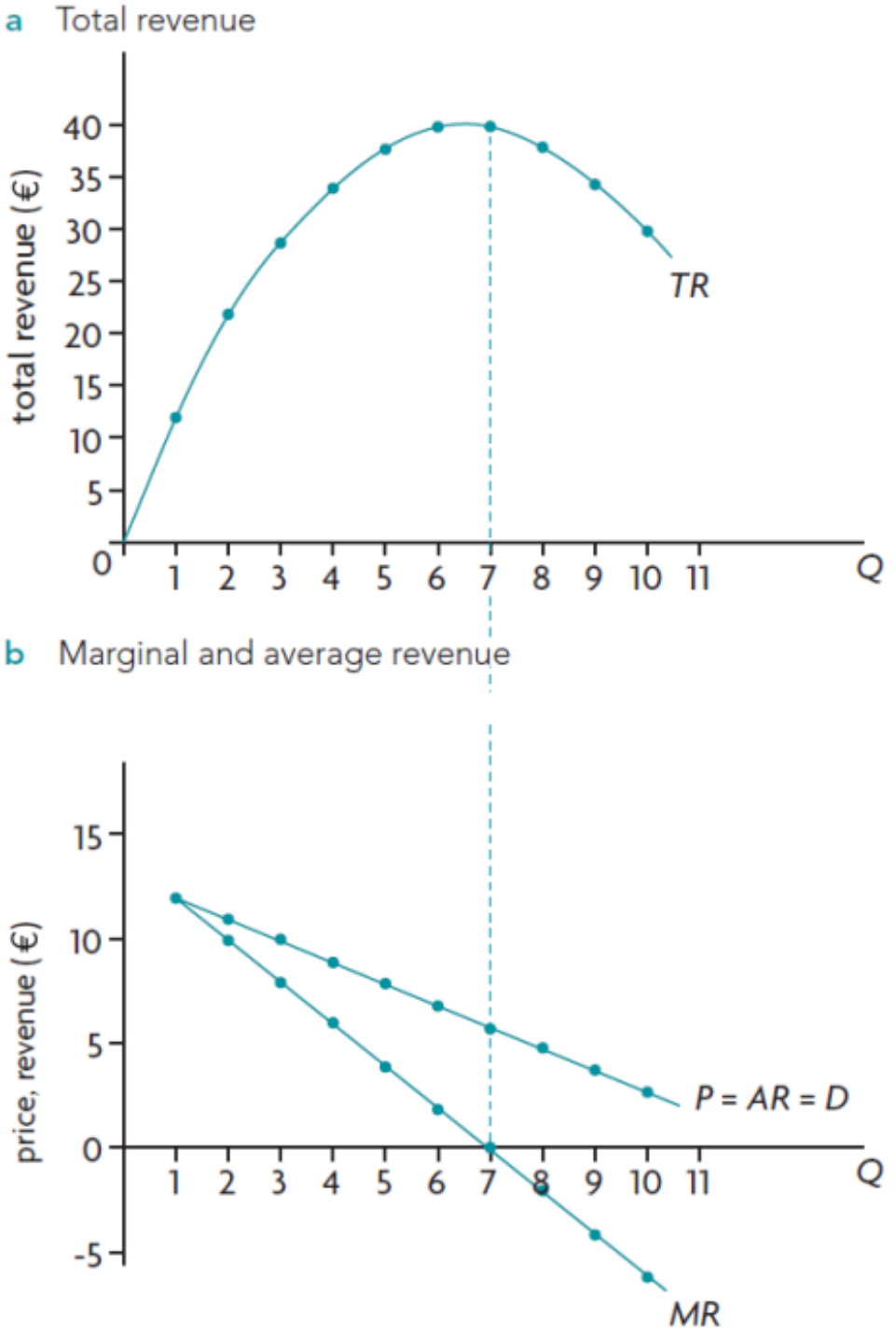


The monopolist's revenue curves

- MR showing the **change in total revenue** resulting from a **change in output**, falls continuously.
- **MR > 0 when TR increases**
- **MR = 0 when TR is at its maximum.**
- **MR < 0, when TR falls.**

- **MR curve lies below the demand curve.**
  - In order to sell more output, firm must lower its price. The lower price is charged not only for the last unit of output but all the previous units of output sold.

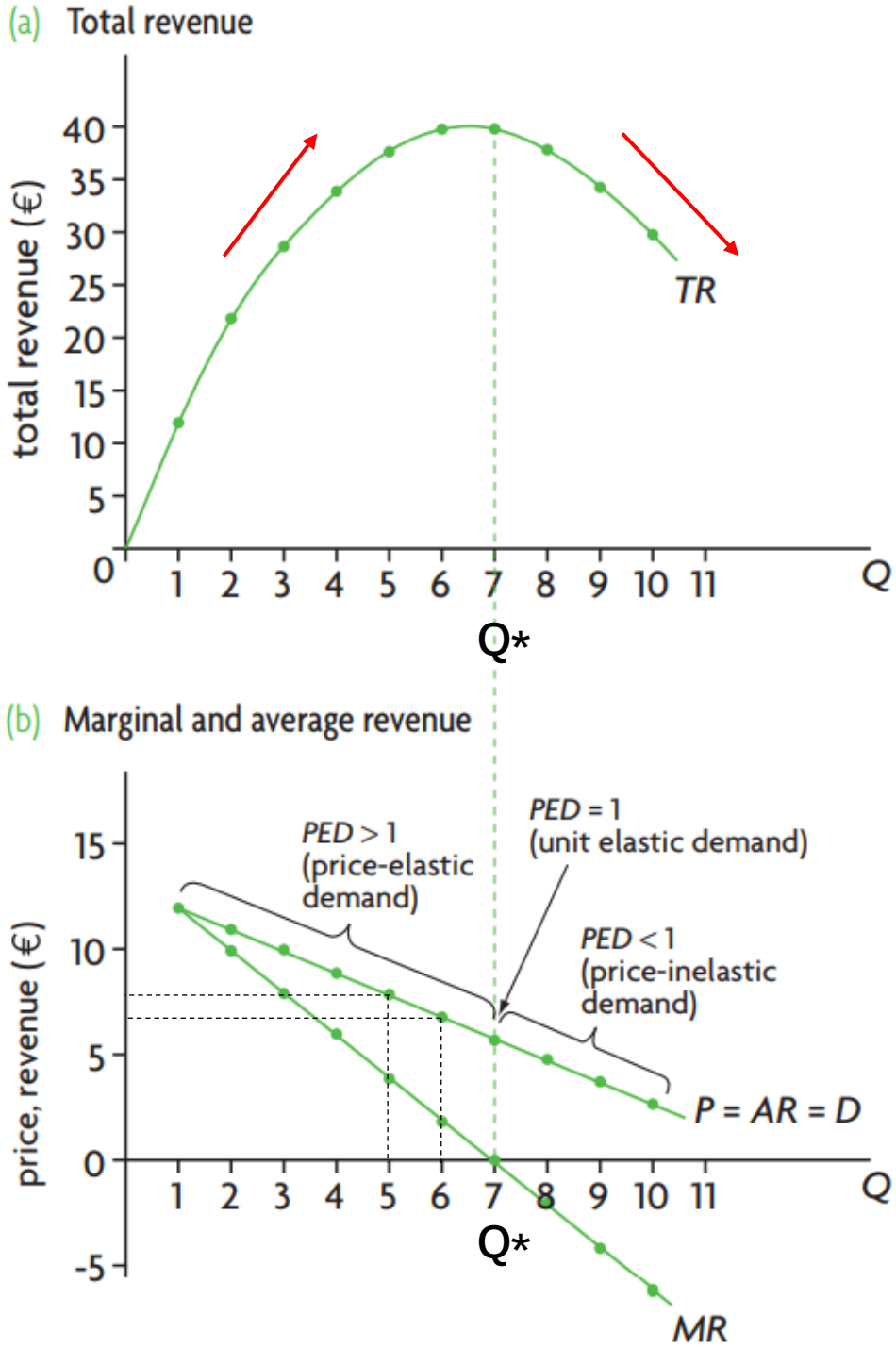
  → MR = the amount of the price of the last unit sold – what is lost by selling all the other units of output at the now lower price.



The monopolist's output and PED

- **Output 1-7**: PED>1, price **elastic** of demand. Price and TR change in opposite direction. When price increases, MR is positive →TR is increasing.
- **Output = 7**: **unit elastic** of demand. **TR maximum, PED = 1, MR = 0**
- **Output > 7**: price **inelastic** of demand. Price and TR change in same direction. When price increases, MR is negative →TR is decreasing.

→ The monopolist will not produce any output beyond 7. (in inelastic portion of its demand curve (AR curve)



Profit maximization by the monopolist

MR & MC approach:

1. The monopolist determines the profit-maximizing (or loss-minimizing) level output using the MC = MR rule.

2. For that level of output, it determines profit per unit or loss per unit by using

   profit/Q = P – AC

   - P = AR > AC, the monopolist is making abnormal profit
   - P = AR = AC, normal profit (zero profit)
   - P = AR < AC, negative profit (loss)

3. The firm multiplies profit/Q by Q to determine total profit, or loss/Q by Q to determine total loss.

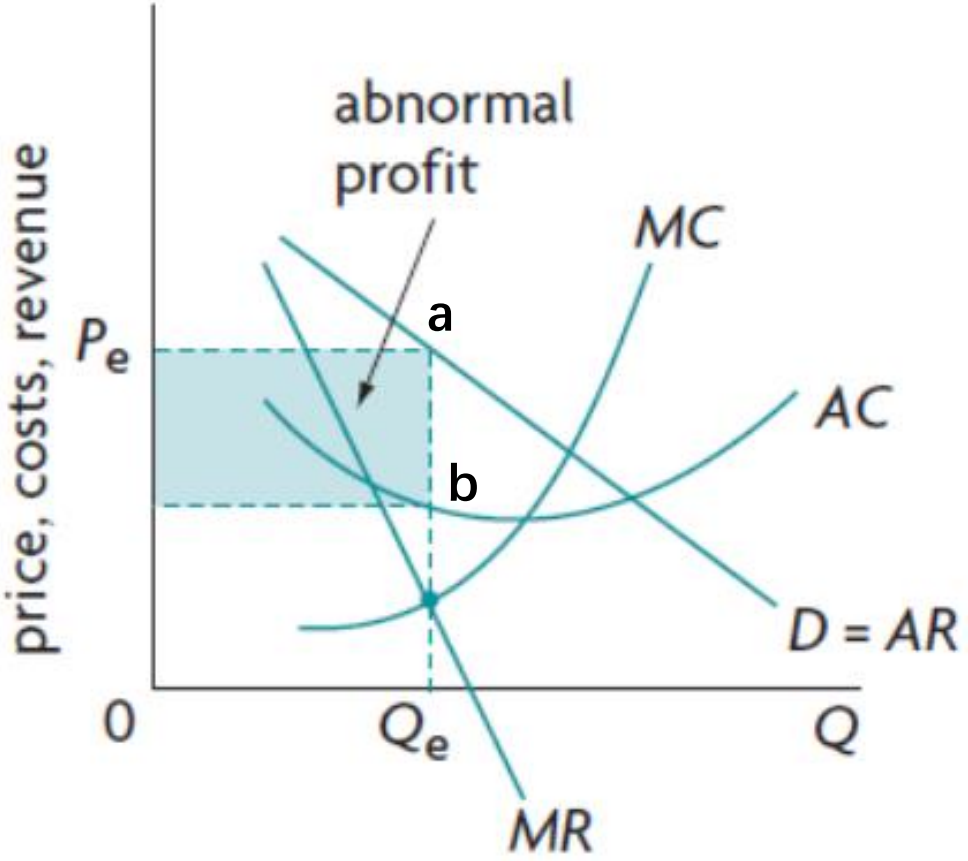
Firm with abnormal profit

Step 1: Find MR=MC for profit-maximizing (or loss-minimizing) level of output. →Q_e

Step 2: Compare AR (P) and ATC to determine the amount of profit (loss) per unit of output. → **ab (P-AC)**

Step 3: find total profit (loss) → **ab * Qe**

→ **Abnormal profit**



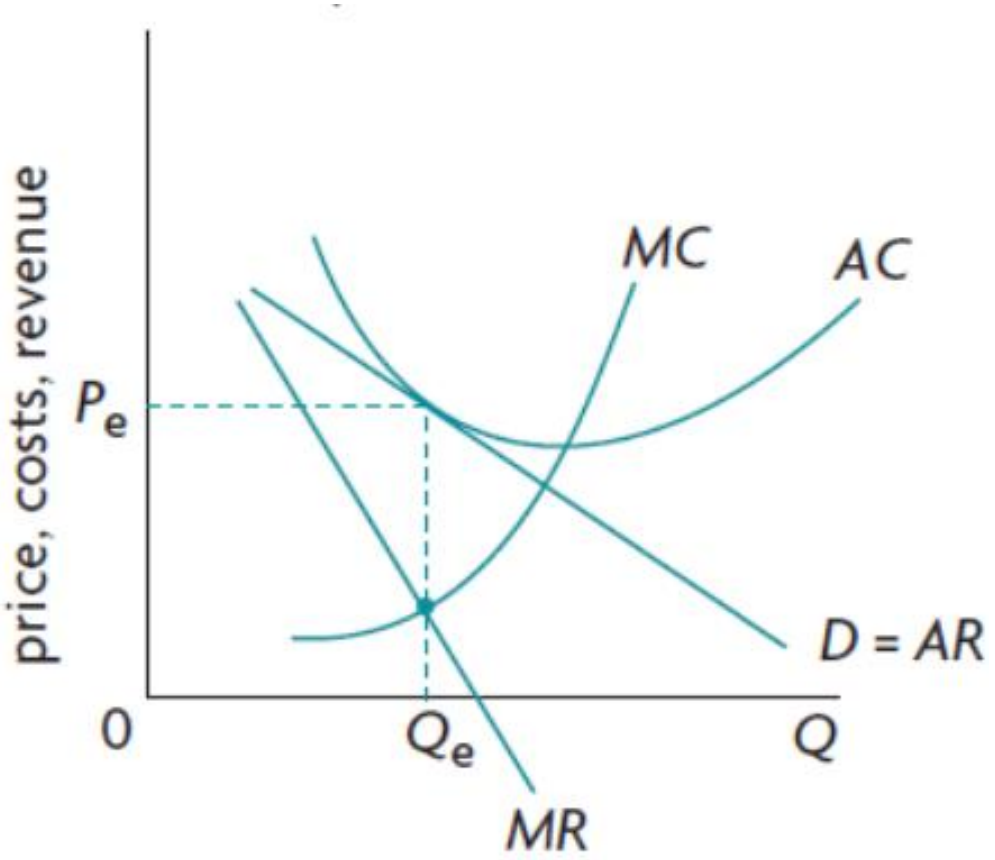
Firm with normal profit

Step 1: Find MR=MC for profit-maximizing (or loss-minimizing) level of output. →Q_e

Step 2: Compare AR (P) and ATC to determine the amount of profit (loss) per unit of output. → **0 * (P-AC)**

Step 3: find total profit (loss) → **0 * Qe**

→ **Normal profit**



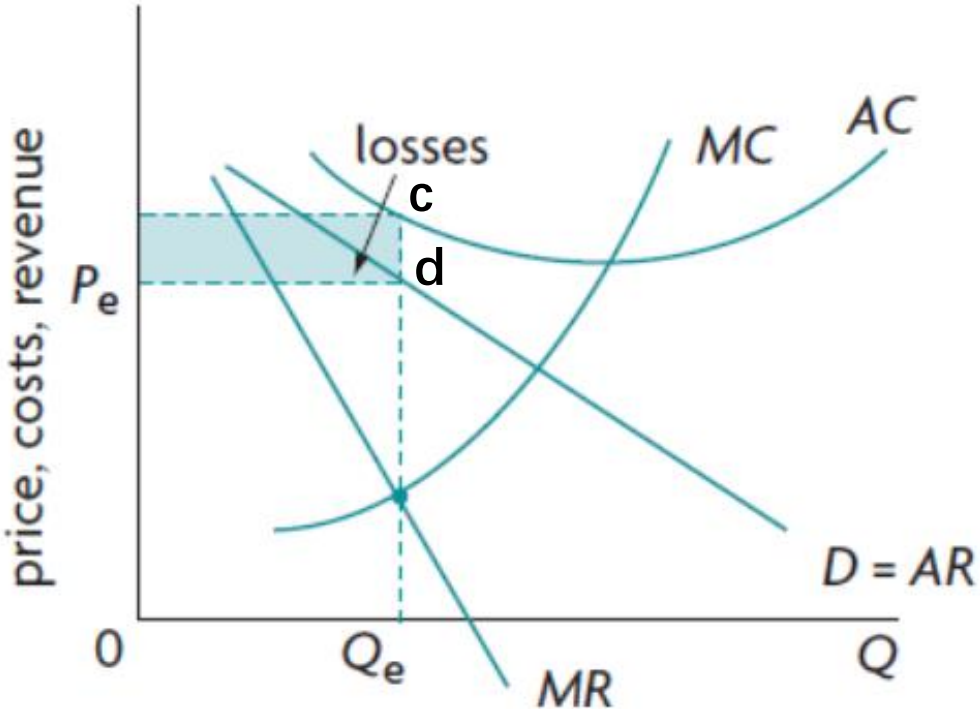
Firm in loss

Step 1: Find MR=MC for profit-maximizing (or loss-minimizing) level of output. →Q_e

Step 2: Compare AR (P) and ATC to determine the amount of profit (loss) per unit of output. → **cd (P-AC)**

Step 3: find total profit (loss) → **cd * Qe**

→ **Negative profit (loss)**



Monopoly: short-run & long run

- Just as in perfect competition, the loss-making monopolist continues to produce in the short run as long as its losses are smaller than its fixed costs (P > minimum AVC).
- In the long run (when all resources are variable), the loss-making monopolist is likely to shut down or move its resources to another more profitable industry.
- Short-run and long run is not important for monopoly due to the presence of barriers to entry.
- Under monopoly, high barriers to entry prevent potential competitor firms from entering a profit-making industry, and the monopolist can therefore continue making abnormal profits in the long run.

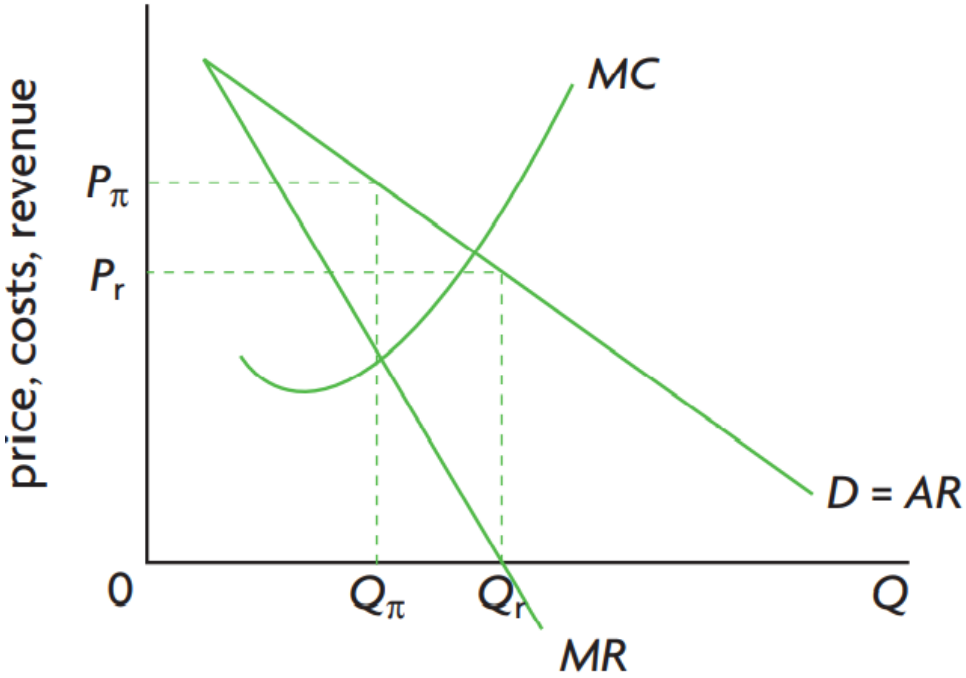
Revenue maximization

- Firm owner's objective: profit maximization
- Firm management's objective: revenue maximization
  - Reasons:
    ① Sales are easier to identified and measured.
    ② Sales are linked with the rewards for managers and employees.
    ③ Assumption that revenue from more sales will increase more rapidly than costs. Profit will increase as a result.
    ④ Increased sales → feeling of success; Decreased sales→ feeling of failure.

Revenue maximization by the monopoly

- TR is maximized when MR = 0.
- Therefore, the revenue maximising monopolist produces that level of output where MR = 0
- **Profit maximizing** firm will produce when **MC=MR** at Q_π with higher price P_π
- **Revenue maximizing** firm will produce when **MR = 0** at **Qr** with lower price **Pr**.
- $Q_r > Q_\pi$

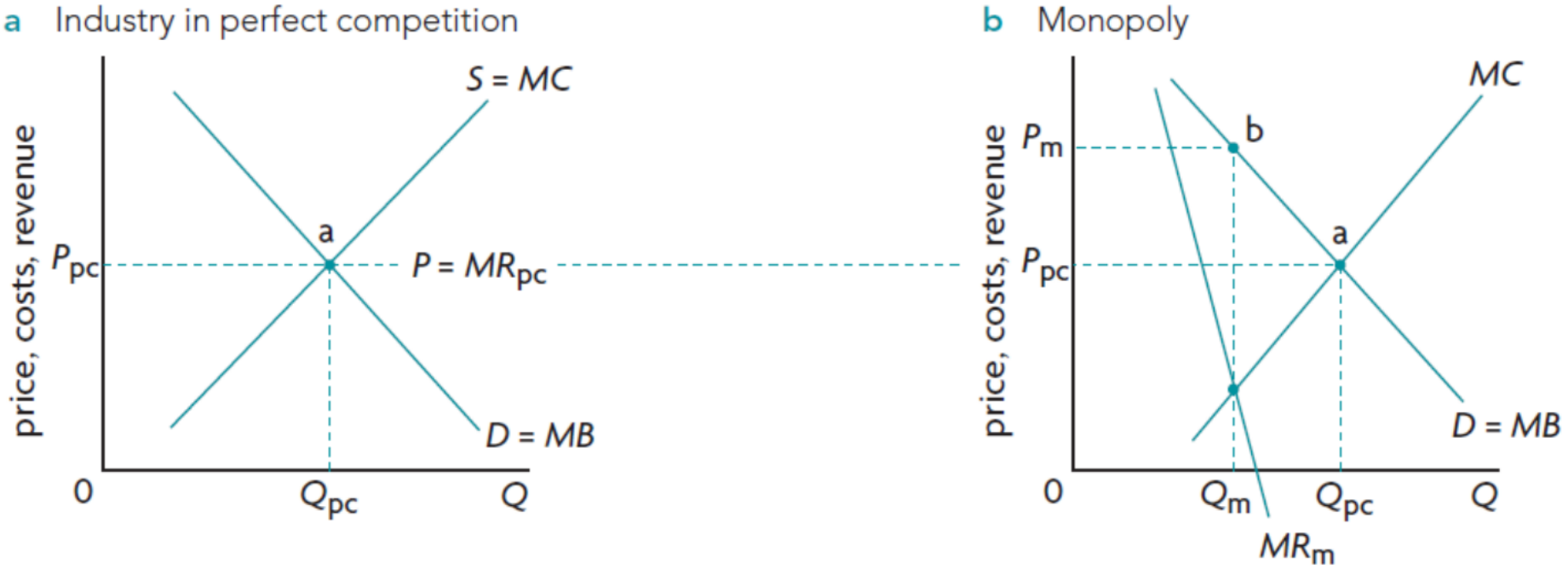
→ the revenue maximiser produces a **larger quantity** of output and sells it at a **lower price** than the profit maximiser.



Monopoly market outcomes and efficiency

The monopoly's marginal revenue (MR_m) curve lies below D curve. When the profit-maximizing monopolist applies the MR=MC, the result is output Q_m and Price P_m.

- **$Q_m < Q_{pc}$**, monopolist produces a smaller quantity of output than producer under perfect competition.
- **$P_m > P_{pc}$**, the monopolist sells output at a higher price than the perfectly competitive industry. → **go against consumers' interests**

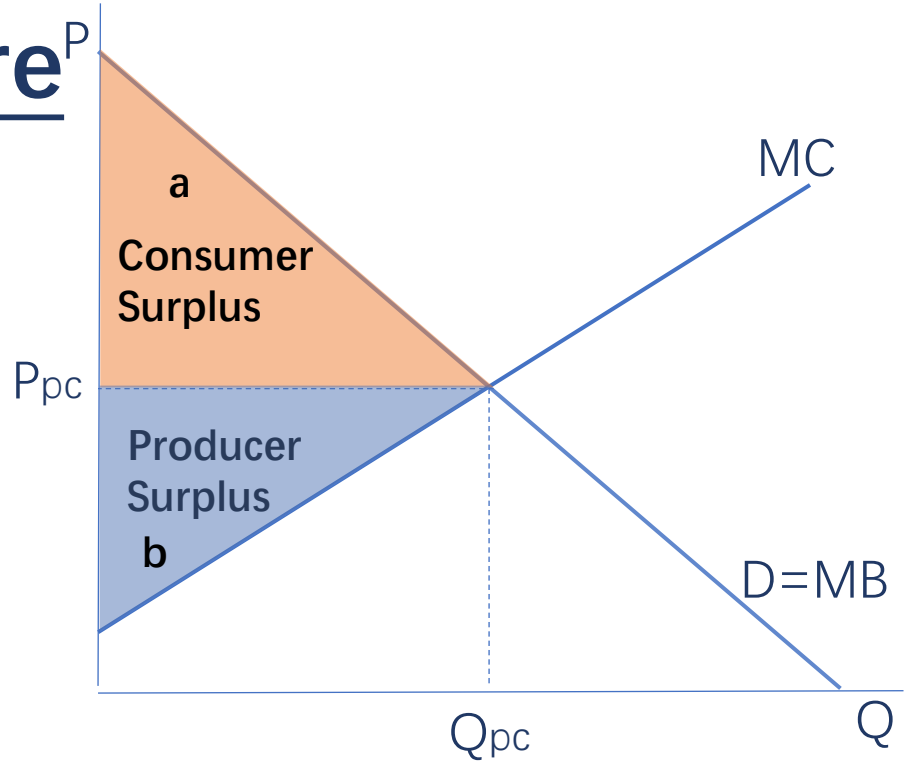


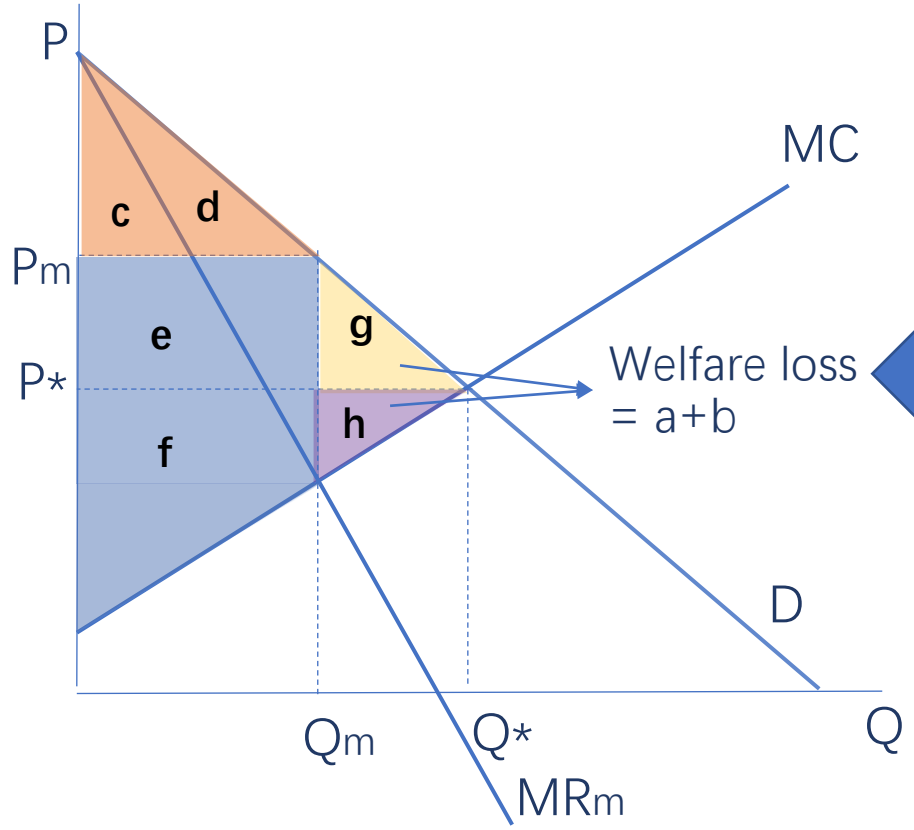
Allocative efficiency & market failure

In competitive market:

Consumer surplus = **a**

Producer surplus = **b**





In Monopoly:

- CS = **c+d**
  - Due to the higher price, $CS_{monopoly} < CS_{competitive\ market}$
  - Losing area h to producer and losing area g due to lower quantity.
- PS = **e+f**
  - Gain: Part of CS (area e) was converted into PS in monopoly due to higher price.
  - Losing area h due to the monopolist's lower quantity.
- Welfare loss = **g+h → underallocation of resources**

Allocative efficiency & productive efficiency

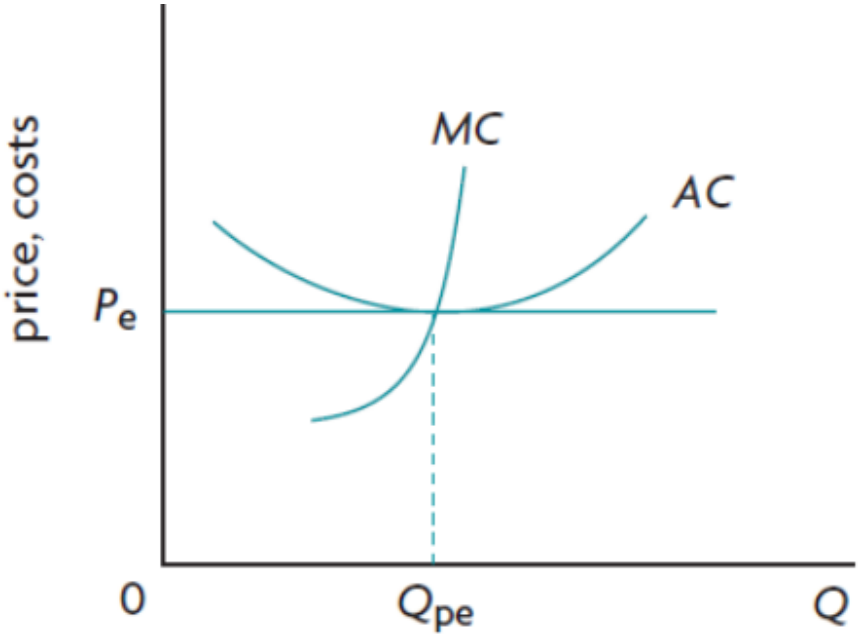
In competitive market:

At long-run equilibrium, at profit maximization level of output Q_{pe}, P_e=MC

→ **Allocative efficiency**

Production takes place at min ATC

→ **Productive efficiency.**



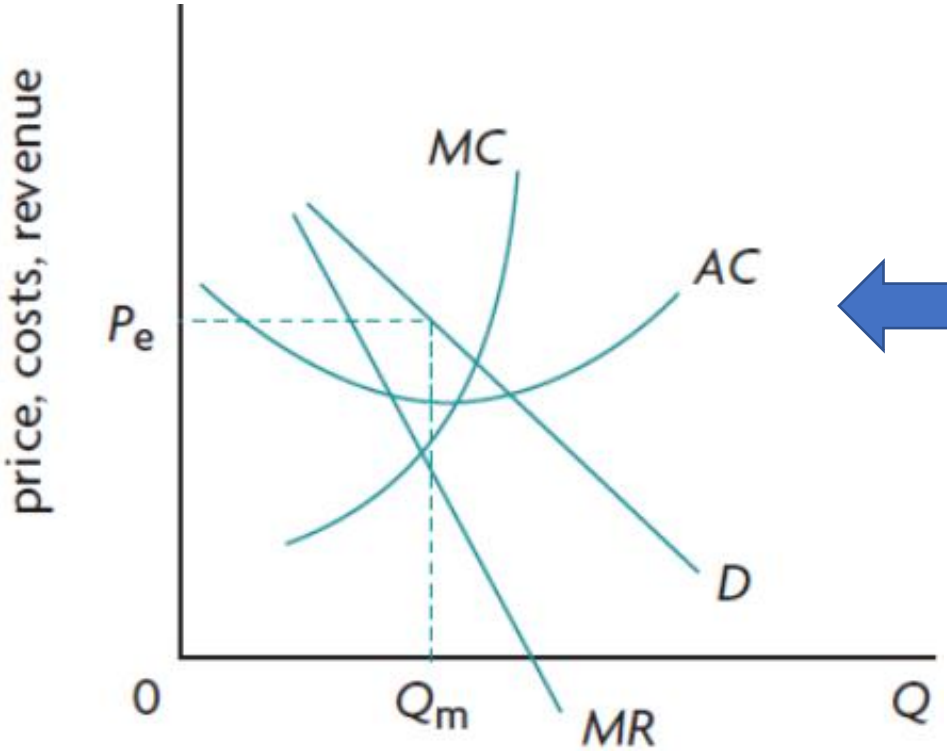
In Monopoly:

- At long run equilibrium, at profit maximization level of output Qm, Pe>MC

→ **Allocative inefficiency. (both for profit/loss)**

- Production takes place at greater than min ATC

→ **Productive inefficiency**



Natural monopoly

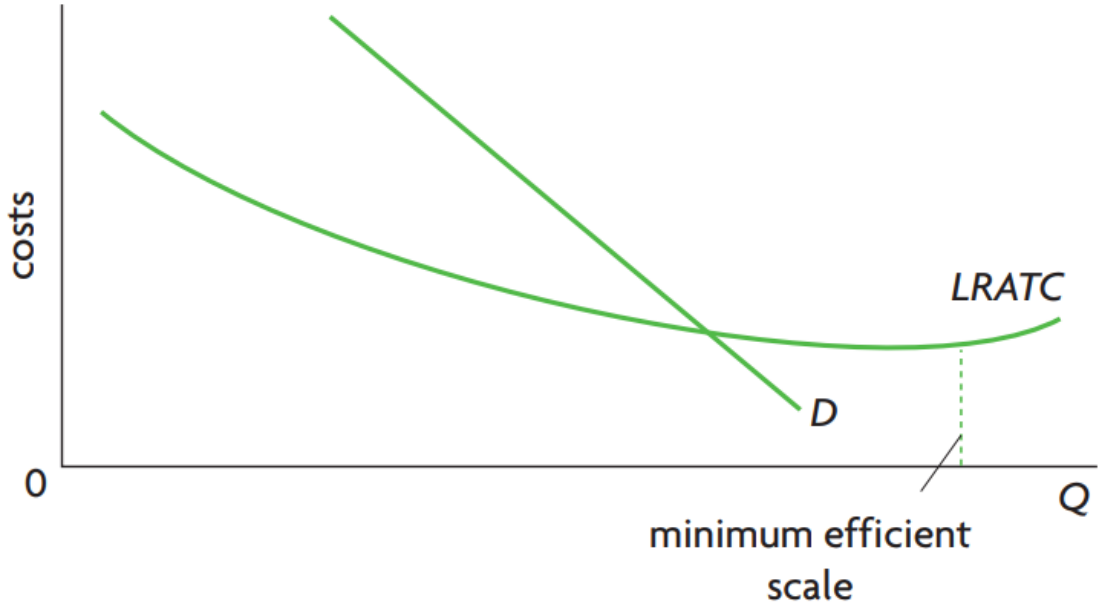
A **natural monopoly** is a firm that has economies of scale so large that it is possible for the single firm alone to supply the entire market at a lower average cost than two or more firms.

- high barriers to entry (high start-up capital costs)
- Powerful economies of scale (operate on a large scale)

- E.g., water, gas and electricity distribution, railway infrastructure, National fibre-optic broadband network, fire protection, cable television, etc.

Illustration in diagram

- **costs and market demand**: If the **market demand** for a product is within **the range of falling LRATC**, at the point where market demand, D, intersects the LRATC curve, LRATC is still declining, meaning that **economies of scale have not yet been fully exhausted** and the minimum efficient scale occurs at a higher level of output.
- This means that a **single large firm** can produce for the **entire market** at a **lower average total cost** than two or more smaller firms.

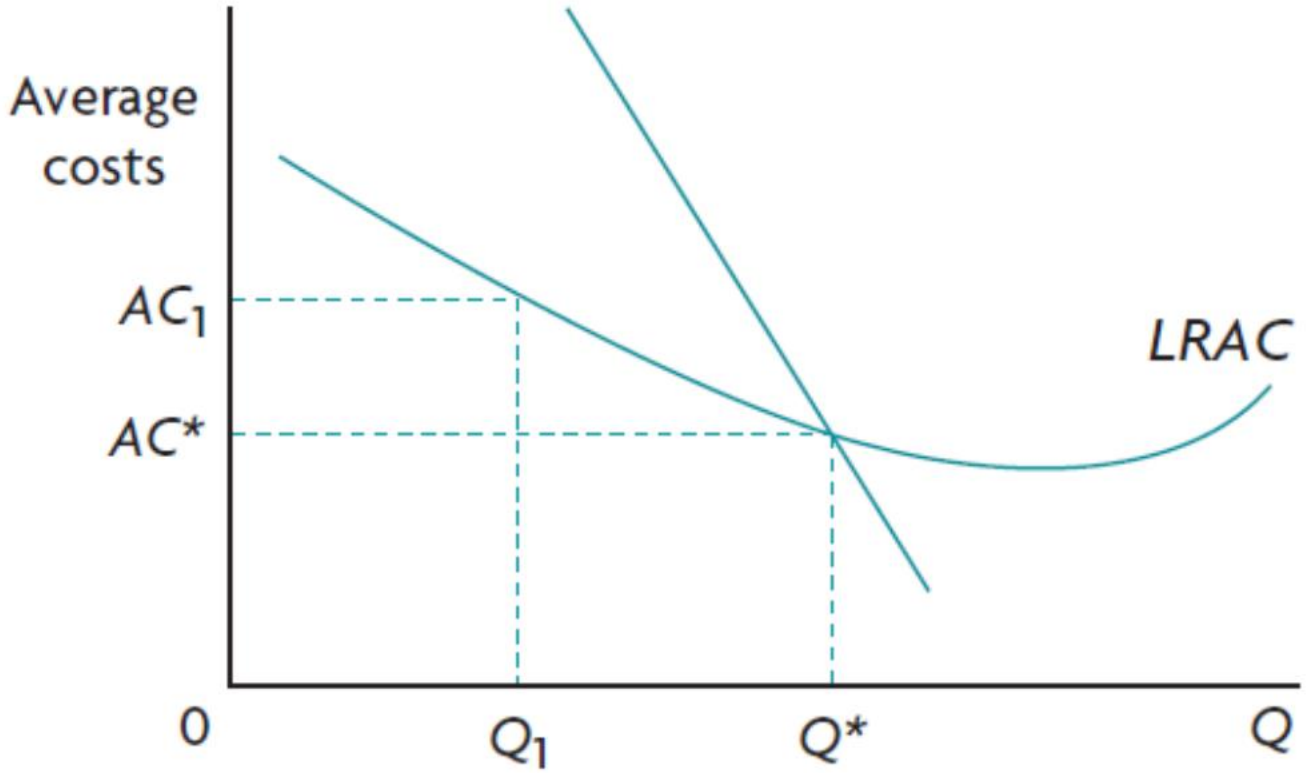


* **The minimum efficient scale (MES)** The minimum efficient scale is **lowest point on a cost curve** at which a company can produce its product at a competitive price. At the MES point, the company can achieve the economies of scale necessary for it to compete effectively in its industry.

Natural monopoly

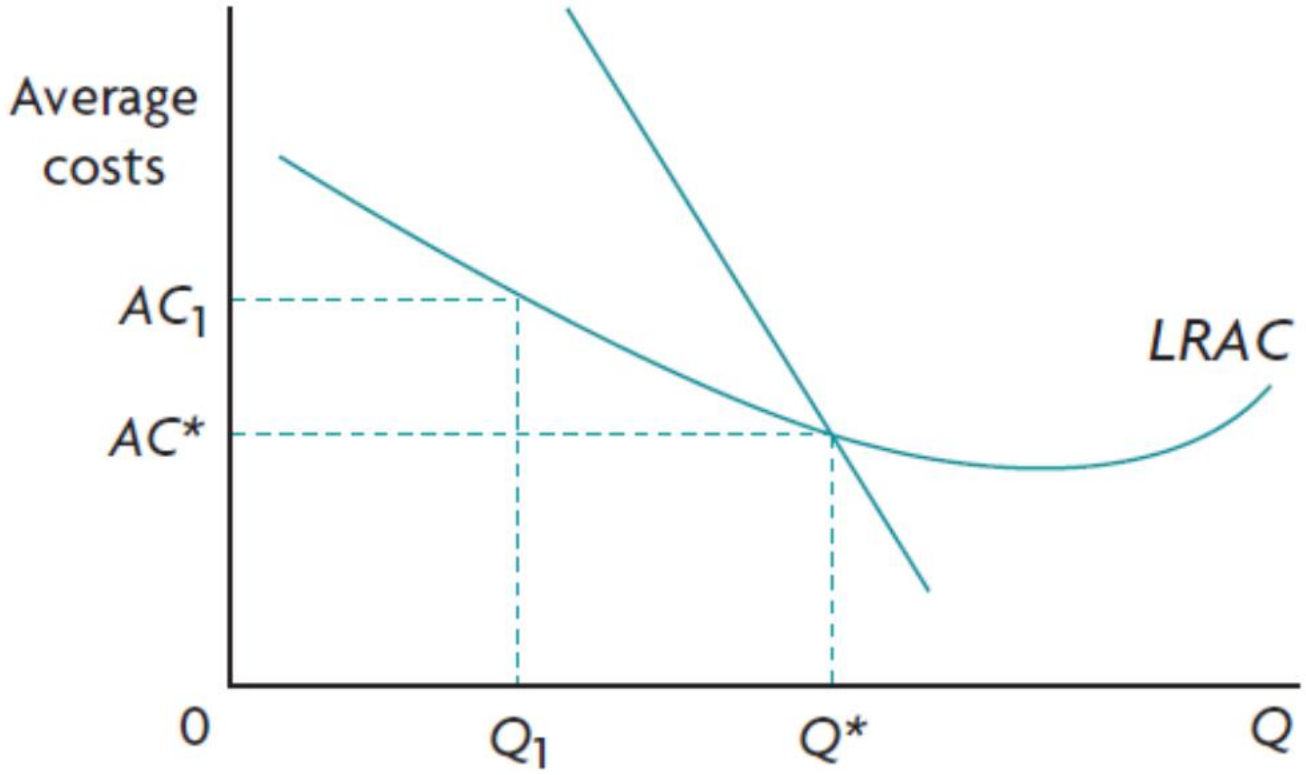
- D curve intersects its LRAC curve at a point where average costs are still falling. – **Q***
- If it produce more than Q*, the price given by D curve would be lower than LRAC. (loss)

→ It must produce a quantity less than or equal to Q*, charge price higher or equal to AC*



Natural monopoly

- If this firm is split into two firms of equal size
- Each firm would produce Q1 with AC1.
- Higher price and less efficient.



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More examples

- **Aero plane manufacture** – At the moment, this is a duopoly so it is not a natural monopoly, but it is close. There are very high fixed costs associated with Aero plane manufacturing, but with the global industry, two main producers can be supported.
- **Digital platforms**. In some cities, a product like Uber becomes ubiquitous for that segment of private taxi hire via an app. The fixed costs are not particularly high, but the dominant firm benefits from network economies, improved information, lower average prices
- **Bus services in one particular region**. – The most logical number of bus companies within a town is one. There are high fixed costs, but more importantly issues of practicality. Even on a busy route between two towns, it might be inefficient to have two bus companies competing over the same route and offering the same peak and off-peak services. One company can avoid:
  - Duplication of services
  - Congestion at peak times
  - Too much supply at off-peak times

Regulation on monopoly

- To ensure that natural monopolies do not take advantage of consumers, Natural monopolies are **often set up by governments** not to make profits but to regulate certain markets.
- Without competitors to offer choices, the government is the only option to ensure that a quality product at a reasonable price is delivered to consumers. So it may not be profitable, the government will often **subsidize** the firm's operations.

X-inefficiency

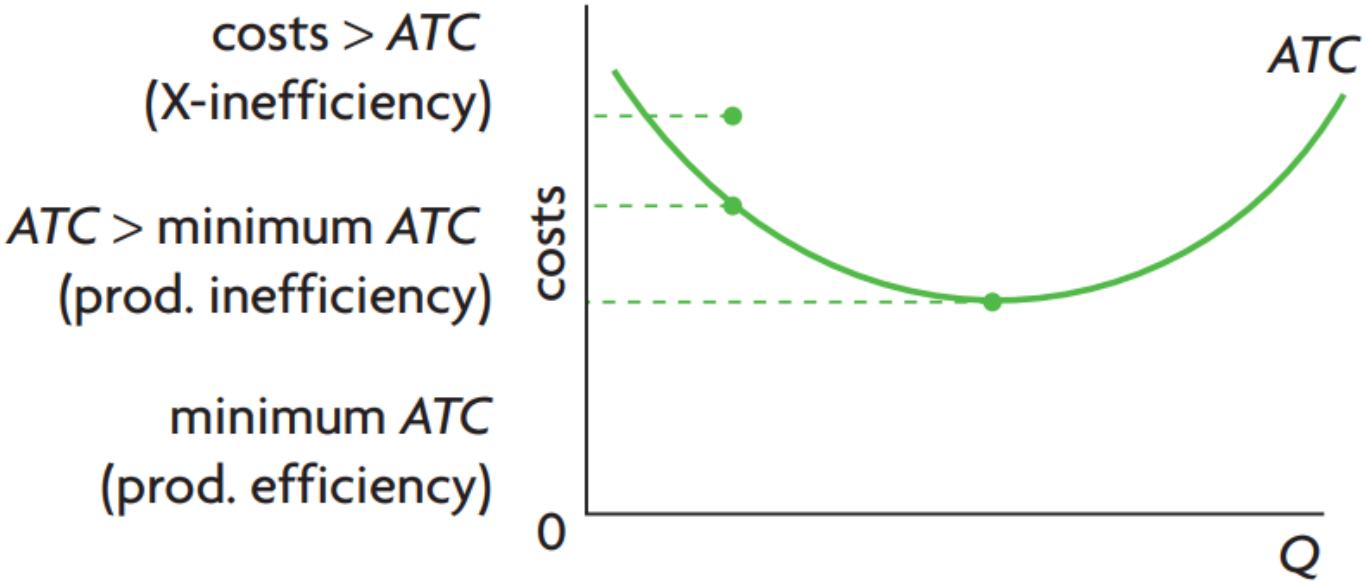
- in monopoly the lack of competition can make the monopolist less concerned about keeping costs low.
- High cost due to:
  - poor management
  - a poorly motivated workforce
  - lack of innovation
  - use of new technologies.

→X-inefficiency: producing at a higher than necessary ATC.

Illustration as diagram

- Lack of productive efficiency means that while the firm does not produce at the point of minimum ATC, it does produce at some point on the ATC curve.

- **X-inefficiency indicates that the firms' costs are higher than ATC**



Criticisms of monopoly

1. **Welfare loss, allocative inefficiency and market failure.**
2. **Higher price and lower output in monopoly.**
   - Compare with competitive market, it produces a smaller quantity of output and sells it at a higher price.
   - Not in the interests of consumers.
3. **Loss of consumer surplus to the monopolist.**
   - Monopolist gains at the expense of consumers.
4. **Negative impacts on the distribution of income.**
   - Higher price means there is a redistribution of income away from consumers who must pay the higher prices and toward the owners of the monopoly in the firm of higher profit.

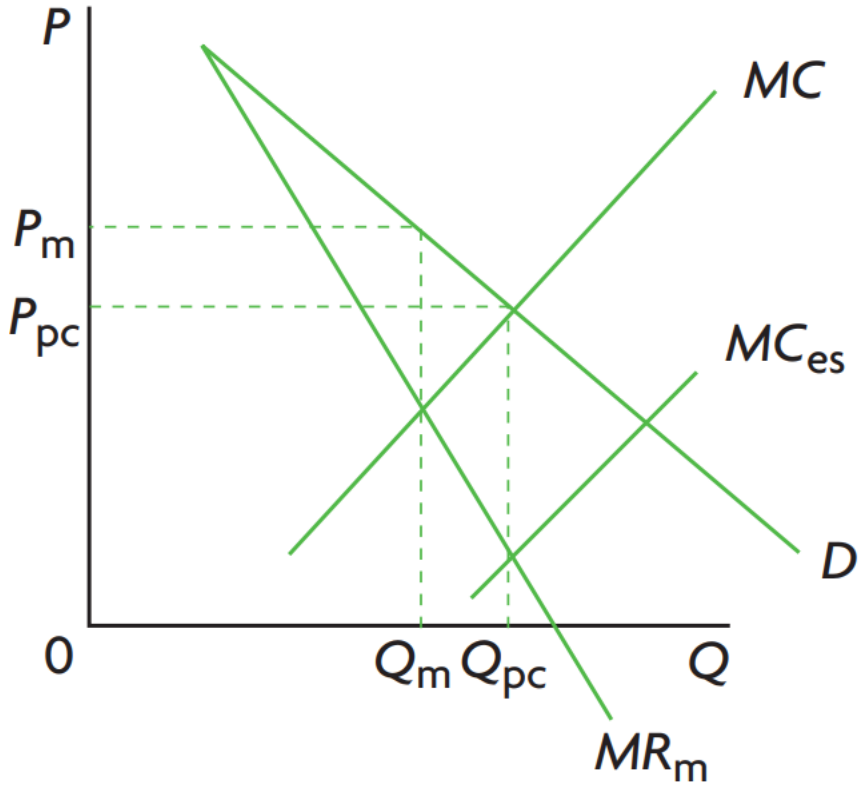
Criticisms of monopoly

5. **Lack of competition may give rise to higher costs.**
   - The absence of competitor firms may lead to higher average cost
   - X-inefficiency: Abnormal profit make the monopolist less concerned about keeping costs low.
     - Poorly motivated workforce
     - Poor management
     - avoidance of risk.
6. **Possibly less innovative.**
   - High barriers to entry, shielding monopolies from competition, could make them less likely to innovate than firms in monopolistic competition or oligopoly which are constant under pressure to innovate to maintain or increase their share of sales.

Potential benefits of monopoly

1. **Economies of scale lead to falling average costs over a large range of output and firm scale.**

- Monopolist with P_m and Q_m
- Perfect competition with P_{pc} and Q_{pc}
- When monopoly achieved significant economies of scale, its **MC curve shifts downward to MC_{es}.**
- **The intersection of MC_{es} with MR_m → profit maximization level of output at Q_{pc}.**
- Same with the perfect competition Q_{pc} and P_{pc}.
- It may achieve a even lower MC that its price may be lower than the perfect competition
- **Lower price, higher quantity of output → Consumer gain from the economies of scale.**



Potential benefits of monopoly

2. Natural monopoly

- Added benefits due to the achievement of very low average costs by the single firm.

3. Research and development (R&D) for product development and technological innovation.

- Abnormal profits provide them with the ability to **finance large R&D** projects.
- R&D offering firms the opportunities to enjoy the profits arising from their innovative activities (new inventions, new products, new technologies, etc.)
- In order to **maintain the high barriers to entry** and **abnormal profit,** monopolist may use product development and technological innovation to create barriers to entry for potential rivals.

4. Possibility of greater efficiency and lower prices due to technological innovations.

- The technological innovation, new production process may improve their **efficiency** and **lower their cost**. → potential lower price **for consumers**.

Adv. and disadv. of monopoly compared with P.C

1. **Price and output**
   - Perfect competition: Lower price with higher quantity
   - Monopoly: Higher price with lower quantity

2. **Efficiency**
   - Perfect competition:
     - allocative inefficiency & productive efficiency (in LR)
   - Monopoly:
     - allocative inefficiency & productive inefficiency
     - X-inefficiency
     - Technology innovation and development may lead to lower cost of production, thus lead to increased efficiency.

Adv. and disadv. of monopoly compared with P.C

3. Research and development (R&D)

- Perfect competition: less R&D
  - Absence of abnormal profit in LR.
  - Identical product, perfect information → less interested in product development.
  - No barriers to entry
- Monopoly: more R&D
  - Abnormal profit
  - In order to keep their monopoly position and high barriers to entry, they have the incentive for R&D (e.g. patent protection)
  - High barriers to entry may also lead to less incentives to do R&D.

4. Economies of scale

- Perfect competition: no possibility of achieving economies of scale due to their small size.
- Monopoly: the monopolist with large size will take advantages of economies of scale and use it to create high barriers to entry of new firms. Economies of scale with lower ATC could lead to lower price for consumers..