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Introductory Microeconomics ECO/1A1Y

Perfect competition

Outline for Spring 2014

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• Week 1:	Perfect Competition 1	Ch. 11
• Week 2:	Perfect Competition 2	Ch. 11
• Week 3:	Monopoly	Ch. 12
• Week 4:	Imperfect Competition	Ch. 13
• Week 5:	Imperfect Competition	Ch. 13
• Week 6:	Factor Markets: Labour	Ch. 14
• Week 7:	General equilibrium and Market efficiency	Ch. 16
• Week 8:	Externalities	Ch. 16 & 17
• Week 9:	Public Goods	Ch. 16 & 18
• Week 10:	Asymmetric Information and Moral Hazard	Ch. 6
• Week 11:	Summary/Review	

Outline

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- Topics and key concepts
  - Market structures
  - Perfect competition: the short run
  - Deriving the supply curve
  - Perfect competition: the long run

Profits

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- ***Economic profit:*** the difference between total revenue and total cost, where total cost includes all costs—both explicit and implicit—associated with resources used by the firm.
- *Accounting profit* is simply total revenue less all explicit costs incurred.
  - does not subtract the implicit costs.
- Economists assume that the goal of firms is to maximize economic profit.

Market structures

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- Classifying markets by degree of competition
  - Number of firms
  - Freedom of entry to industry
  - Market power
  - Nature of product
  - Nature of demand curve (*elasticity*)
- Market structures
  - Perfect competition (this and next lecture)
  - Monopoly (later on)
  - Imperfect competition: Monopolistic competition and oligopoly
- Structure ⇒ Behaviour⇒ Performance
  - *At the firm and market level!!*

Market	Firms	Entry	Product	Demand curve
Perfect competition	Very many	Unrestricted	Homogeneous	Horizontal
Monopolistic competition Oligopoly	Several/few	Restricted	Differentiated	Downward (elastic/inelastic)
Monopoly	One	Blocked	Unique	Downward, inelastic+

The Four Conditions For Perfect Competition

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- Firms Sell a Standardized Product
  - The product sold by one firm is assumed to be a perfect substitute for the product sold by any other.
- Firms Are Price Takers
  - This means that the individual firm treats the market price of the product as given.
- Free Entry and Exit
  - With Perfectly Mobile Factors of Production in the Long Run
- Firms and Consumers Have Perfect Information

Perfect Competition

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- General Assumptions
  - Many firms: firms are price takers
  - Many buyers
  - Identical products (no brand loyalty)
  - Perfect information
- Assumption about short run
  - Each firm has some fixed inputs
  - Number of firms is fixed (no entry no exit)
  - Supernormal profits
- Assumption about long run
  - Each firm can change all inputs
  - Free entry and free exit
  - Normal profits

The Short-run Condition For Profit Maximization

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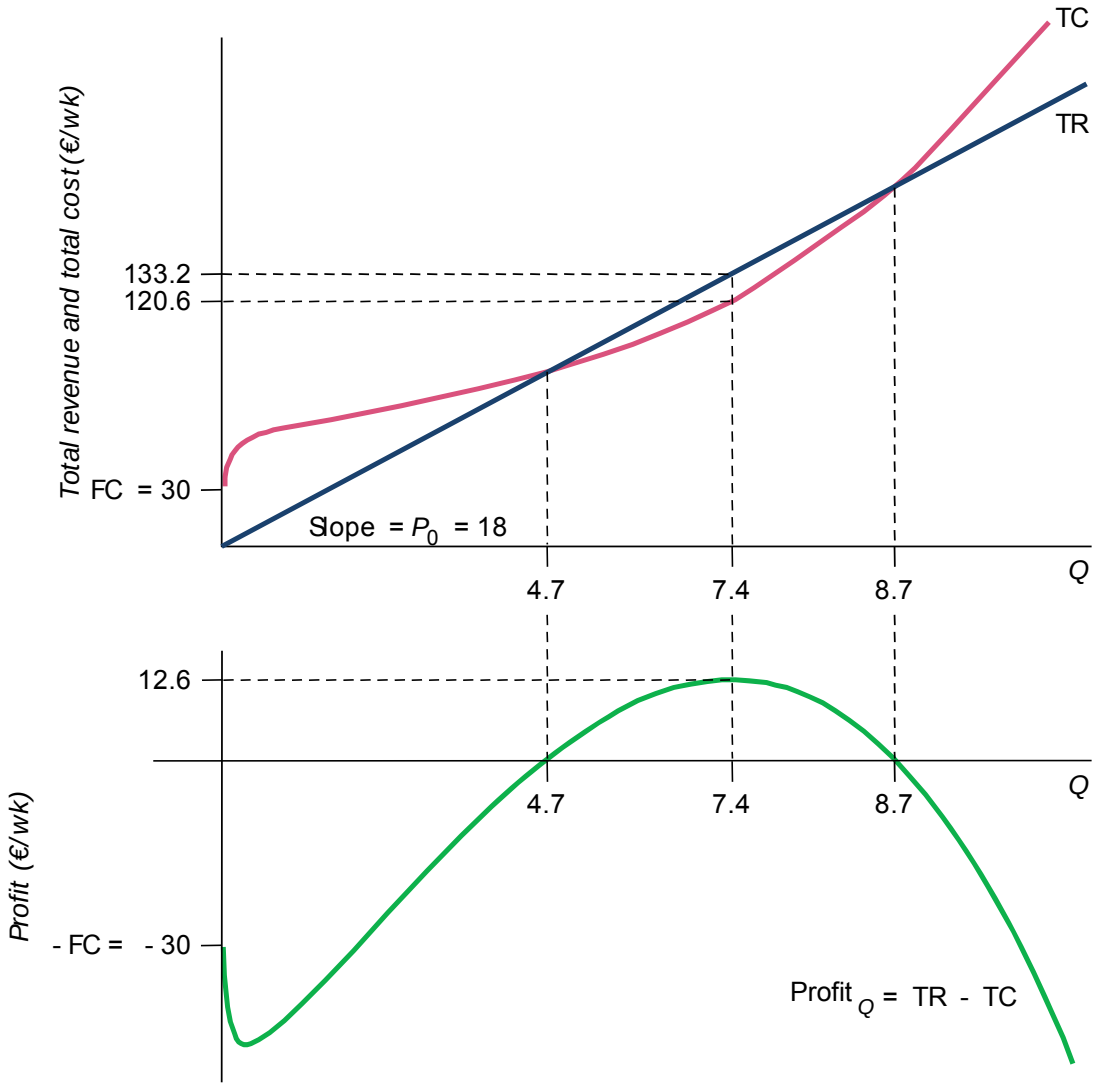
- To maximize profit the firm will choose that level of output for which the difference between total revenue and total cost is largest.

- ***Marginal revenue (MR):*** the change in total revenue (TR) that occurs as a result of a unit change in sales (Q).

- To maximize profits the firm should produce a level of output for which marginal revenue is equal to **marginal cost** on the rising portion of the MC curve.

Revenue, Cost, and Economic Profit



Perfect Competition
Short Run Decisions

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- The market price is given
- The firm has to make two decisions
  - #1 Produce or shut down?
  - #2 If produce, then how much?
  - The answer depends on how high the price is, relative to AVC

Lets look at decision # 2 first

Decision #2: How much to produce?

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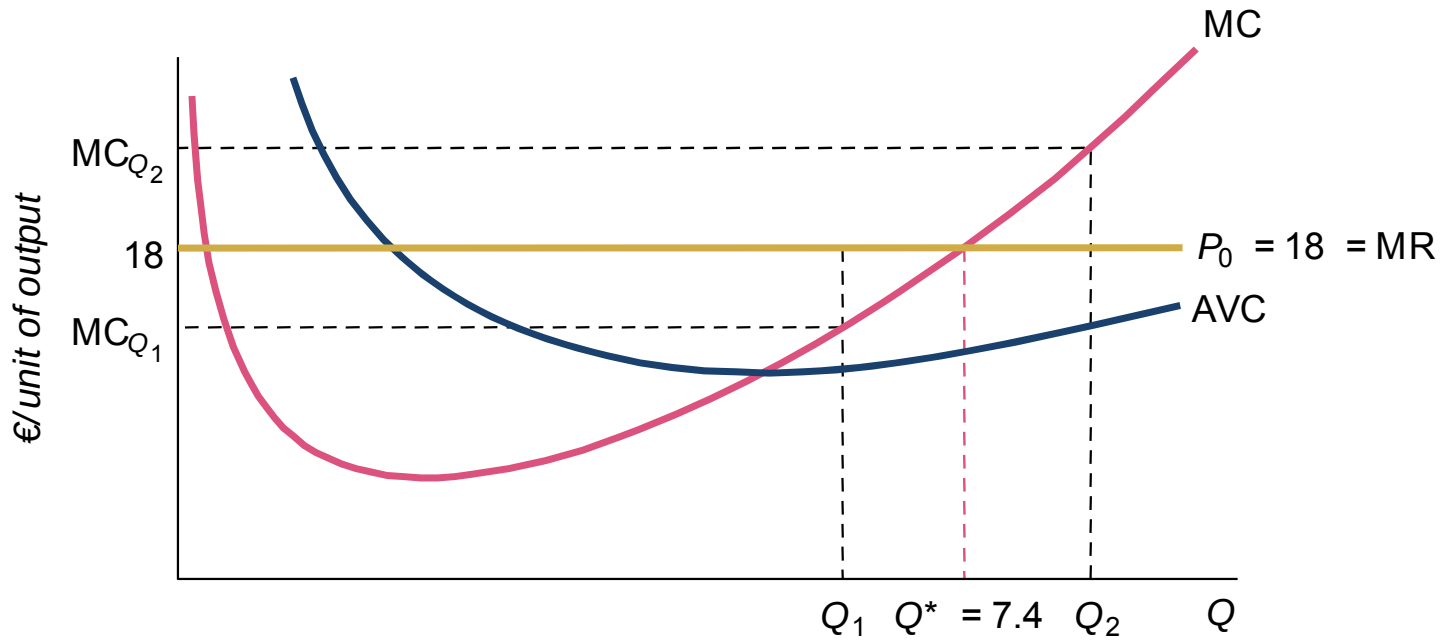
- Price is given
- Starting from any level of output, by selling one extra unit, the firm gets the prevailing price as extra revenue
- But in order to produce this extra unit, the firm must pay "marginal cost"
- As long as Price > Marginal cost (or MC), keep increasing the output
- Stopping point: Price = Marginal cost
- This will yield maximum profit

Profit-Maximizing Output Level in the Short-Run

- A necessary condition for profit maximization is that $P = MC$ on the rising portion of the marginal cost curve



Decision #1: Produce?

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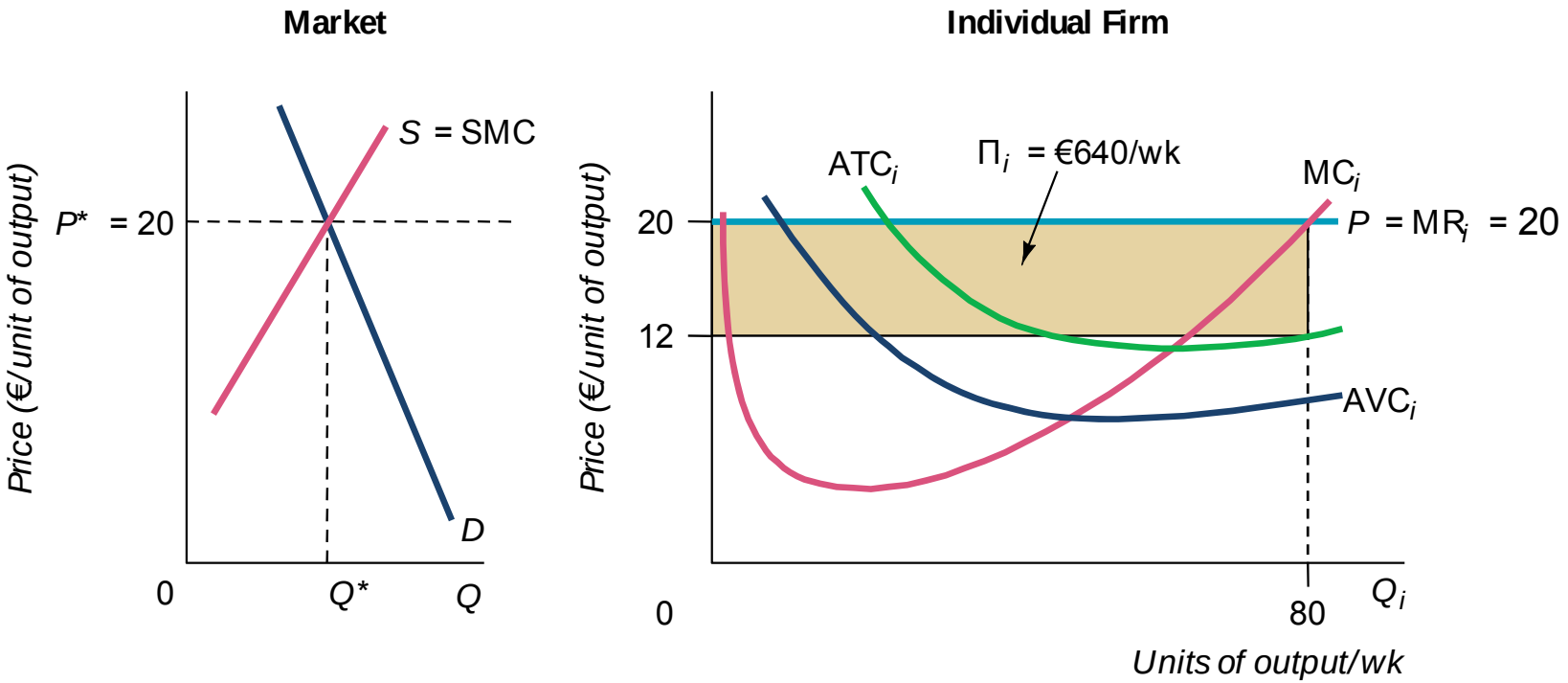
- **Profit = (Price – AC) x output**

- **Case 1: Price is high enough**
  - Price > AC
  - Profits will be positive
  - The firm must produce

- **Case 2: The price is not high enough**
  - Price < AC → losses
  - Should a rational firm shut down? Two cases (!?)
  - **Case 2.1** If AVC< Price < AC a rational firm should still produce (!?)
  - **Case 2.2** If Price < AVC, must shut down

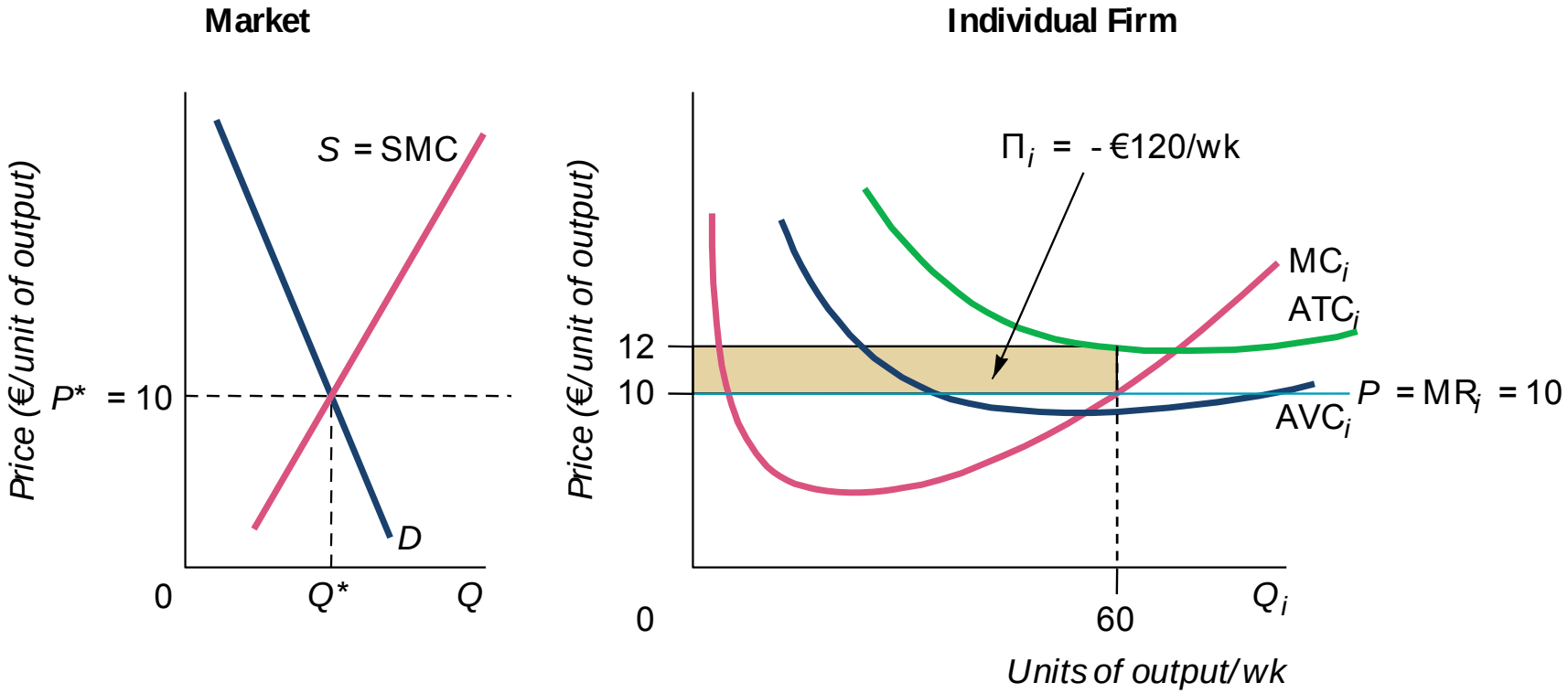
Decision #1: Produce?
If P > AC

- Price > AC
- Profits will be positive
- The firm must produce



Decision #1: Produce?
If P < AC (Losses)

- Price < AC → losses
- Should a rational firm shut down?
- **Case 2.1** If AVC< Price < AC a rational firm should still produce (!?)
- **Case 2.2** If Price < AVC, must shut down



Decision #1: Produce?
If P < AC (Losses)

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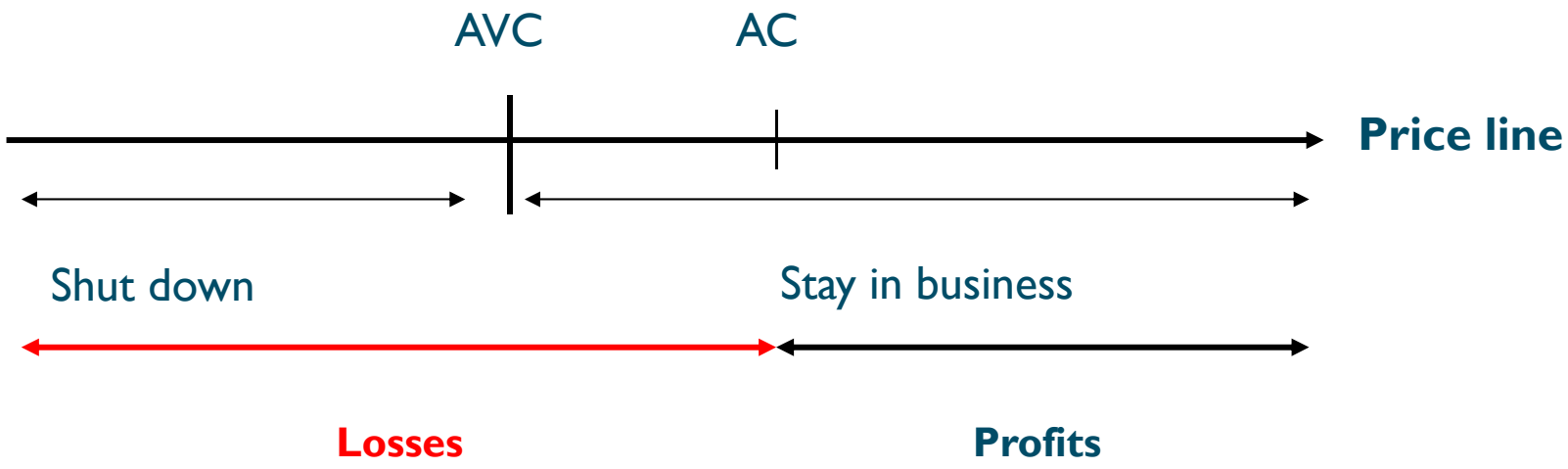
- **Case 2.1**: AVC < Price < AC
  - Why should the firm produce when it is making losses?
  - *The firm is making **some** losses*
  - *But as long as the firm is able to cover its variable costs (P>AVC), the firm is still minimising losses because it covers **some** fixed costs*
  - Good enough reason to stay in business??
  - Counterfactual: By shutting down it cannot avoid the loss on fixed cost
- **Case 2.2** Price < AVC
  - Why should the firm shut down?
  - *Because by shutting down it could avoid the losses on variable inputs*
  - *Fixed costs are to be paid anyway, so this minimizes losses*
  - *Critical: the **shutdown point***

The Shutdown Condition

- ***Shutdown condition:*** if price falls below the minimum of average variable cost, the firm should shut down in the short run



Example: Produce? How much?

- Say fixed cost = £500
- If Price = £ 40, how much should the firm produce?
- Produce at level where price equals marginal cost … so produce 60 units

Output	AVC	AC	MC
20	50	75	50
40	40	52.5	30
60	40	48.33	40
80	50	56.25	80

Example: Produce? How much?

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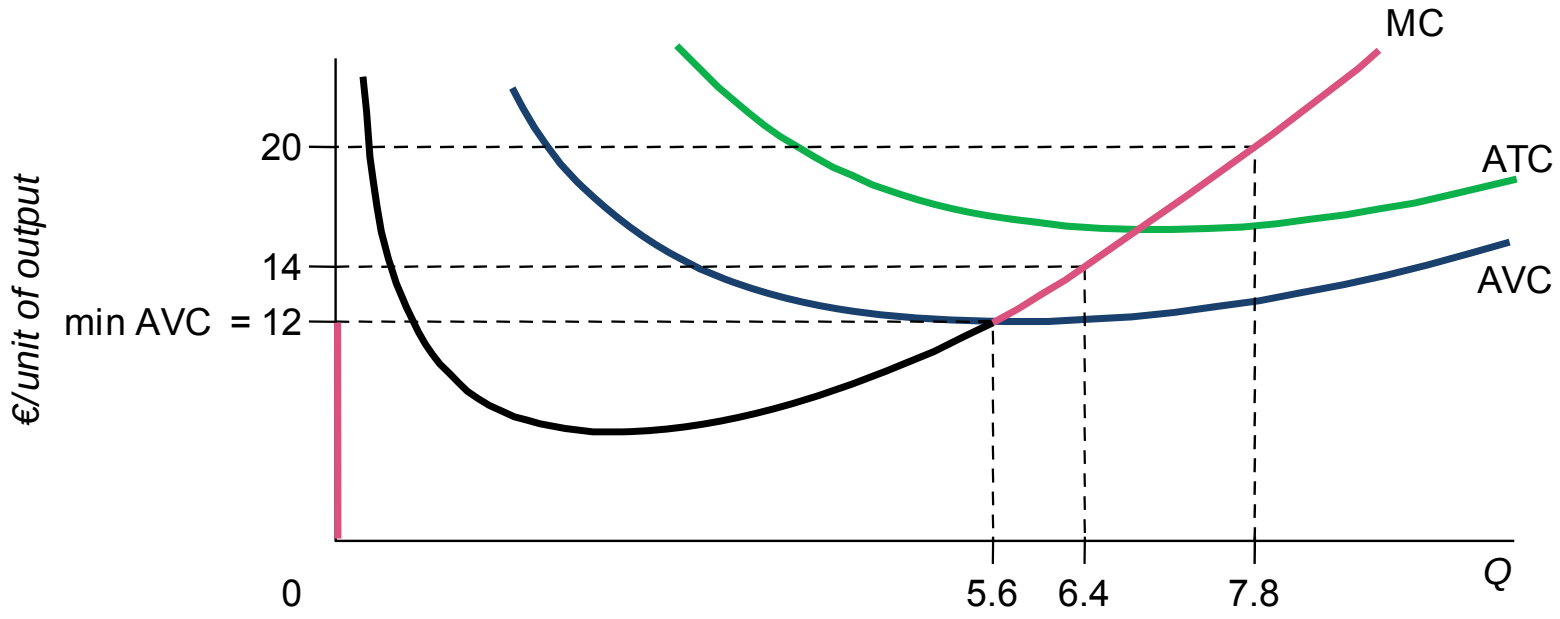
- **At price = £40, how much is the profit?**
  - Revenue = £40 x 60 = £2400
  - Total cost = £48.33 x 60 = 2900
  - Profit = - £500 (loss).
  - The firm is making a loss, **but the loss is no more than the fixed cost**. So it should produce.

- **What if the price were £80?**
  - Same way figure out: Should produce 80 units of the output.
  - Profit = £80 x 80 - £56.25 x80 = £6400 - £4500 = £1900

- **What if the price drops to £30?**
  - Run through the AVC column. Price (£30) is below the minimum of AVC. So the firm should shut down

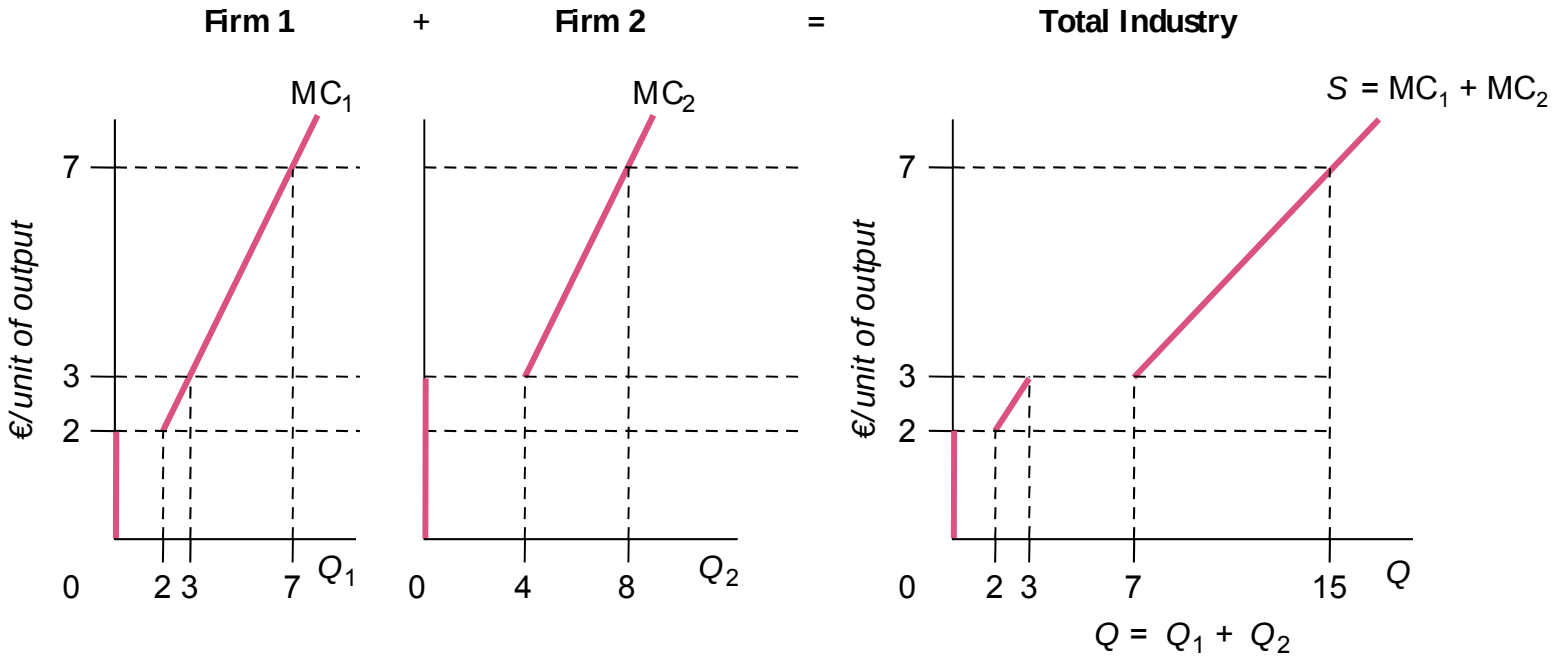
Short-Run Supply Curve of a Perfectly Competitive Firm

- The ***short-run supply curve*** of the perfectly competitive firm is the rising portion of the short-run marginal cost curve that lies above the minimum value of the average variable cost curve



Short-Run Competitive Industry Supply Curve

- Market supply curve: Add (horizontally) all firms supply (add quantities)



Short-Run Competitive Industry Supply Curve

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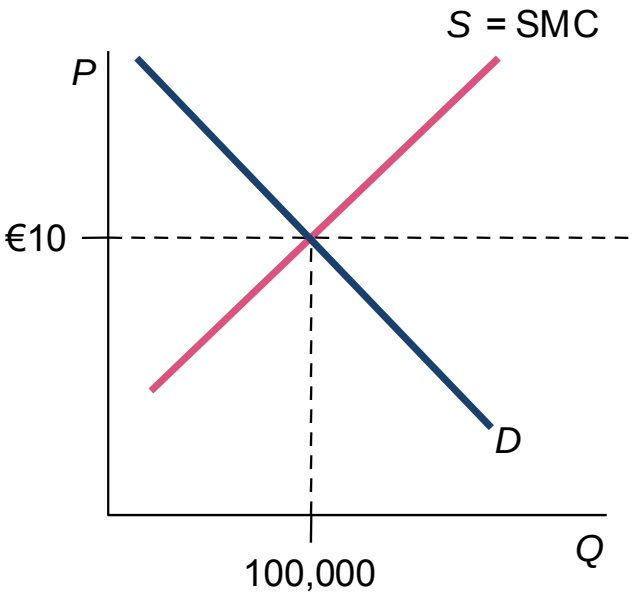
- Example
  - An industry has 25 identical firms and each firms supply curve is given by $P = 10 + 100\, q_i$. What is the industry supply curve?
  - Express q_i as a function of price: $q_i = \frac{P}{100} - \frac{10}{100}$
  - Industry output: $Q = 25q_i = 25\left(\frac{P}{100} - \frac{10}{100}\right)$
  - Simplify price as a function of total output: $P = 10 + 4Q$

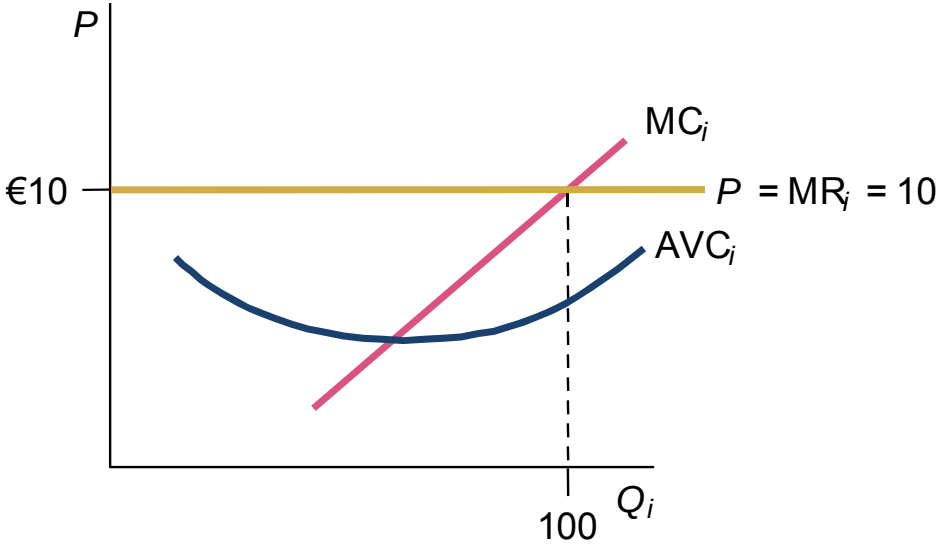
Efficiency Of Short-run Competitive Equilibrium

- ***Allocative efficiency:*** a condition in which all possible gains from exchange are realized
  - At the short run competitive equilibrium price and quantity, the value of resources used to produce the last unit of output (i.e., MC) is exactly equal to the value of that last unit to consumers (i.e. price).
  - The two parties – consumers and producers – have no incentive to trade at any other price other than the equilibrium price.

Market

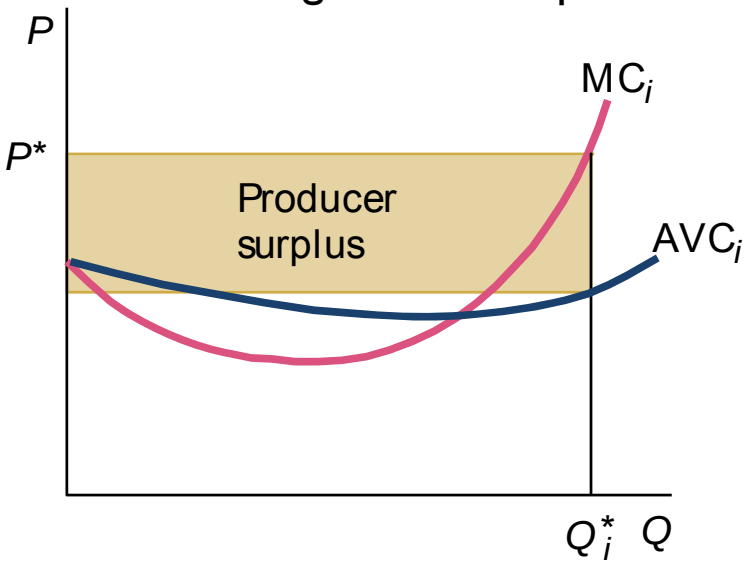


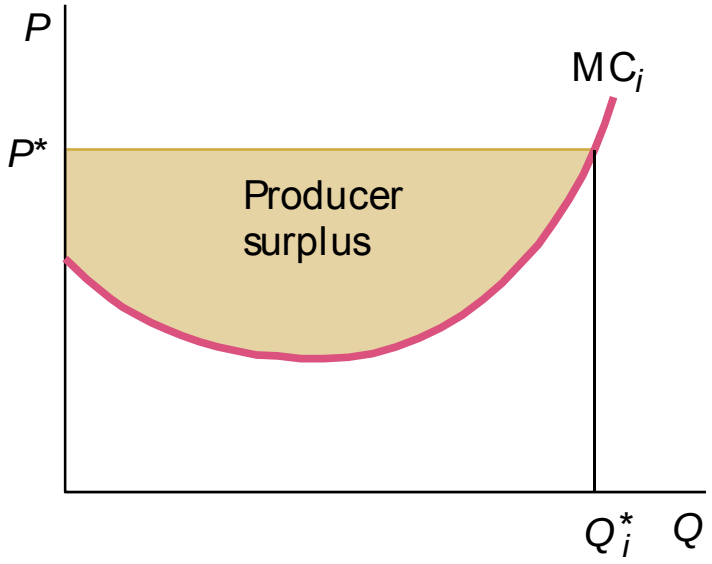
Individual Firm



Producer Surplus

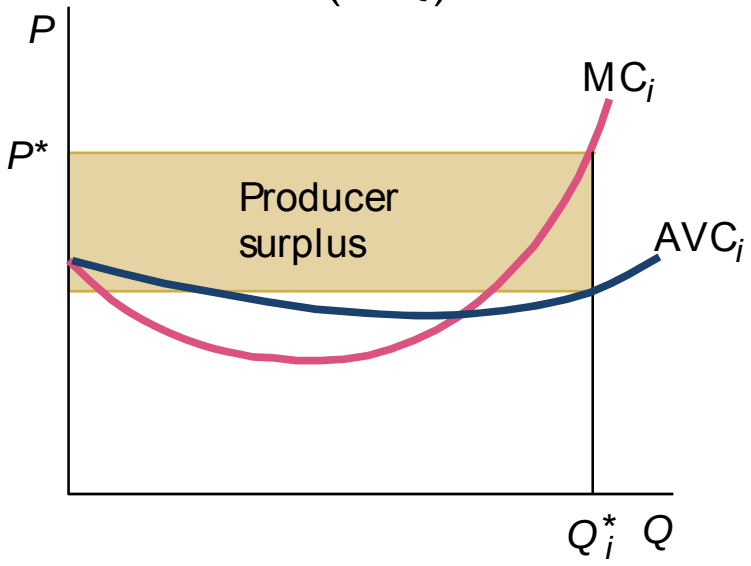
- A competitive market is efficient when it maximizes the net benefits to its participants.
- Benefits can be measured using the concepts of consumer and producers surplus
  - Consumer Surplus: Recall that CS is a measure of the benefit to consumers in participating in market exchange (area under the demand curve above the price line)
  - Producer surplus: the amount by which a firm benefits by producing a profit-maximizing level of output

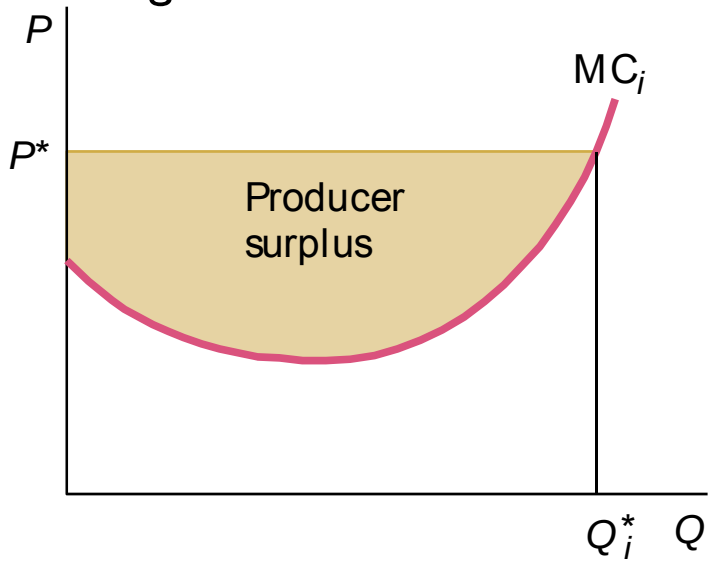




Producer Surplus

- Difference between total revenue and total variable cost is a measure of producers surplus
  - This is the gain to the producer from producing Q_i^* units rather than producing zero units
  - It can be measured as the difference between total revenue (P*Q) and AVC multiplied by output (left panel) OR as difference between total revenue (P*Q) and area under the marginal cost curve





Aggregate Producer Surplus

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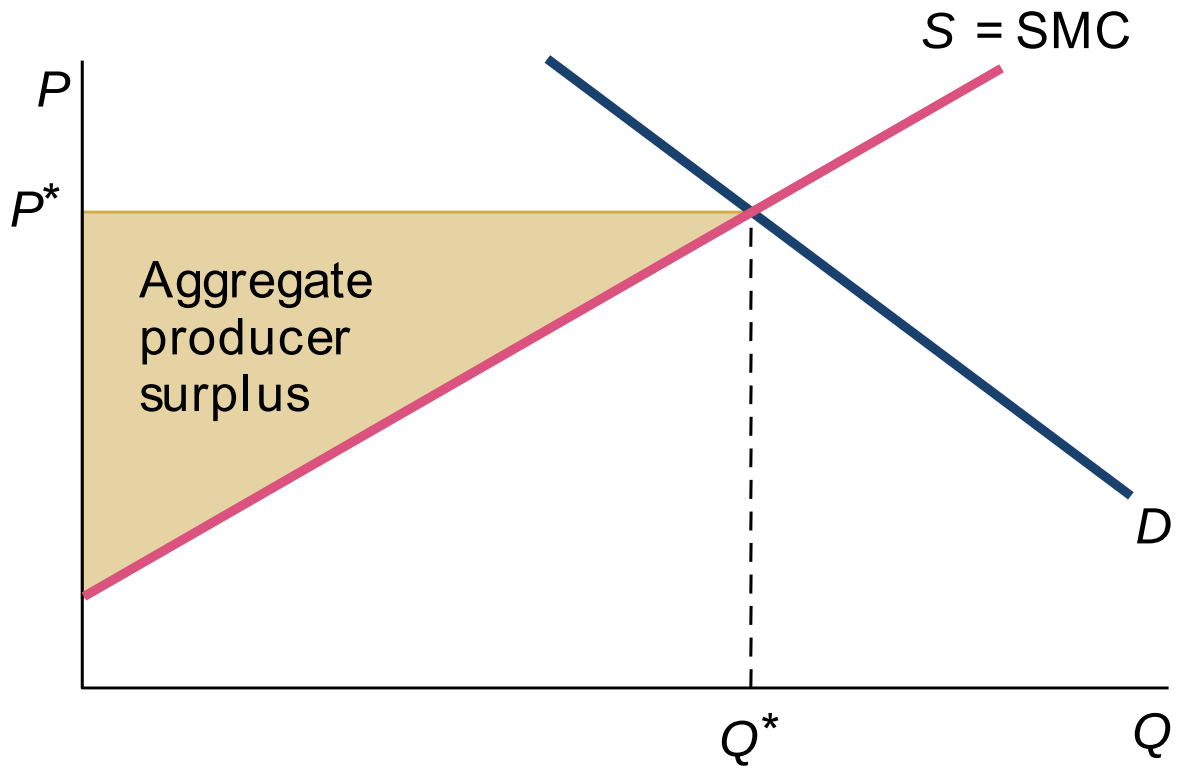
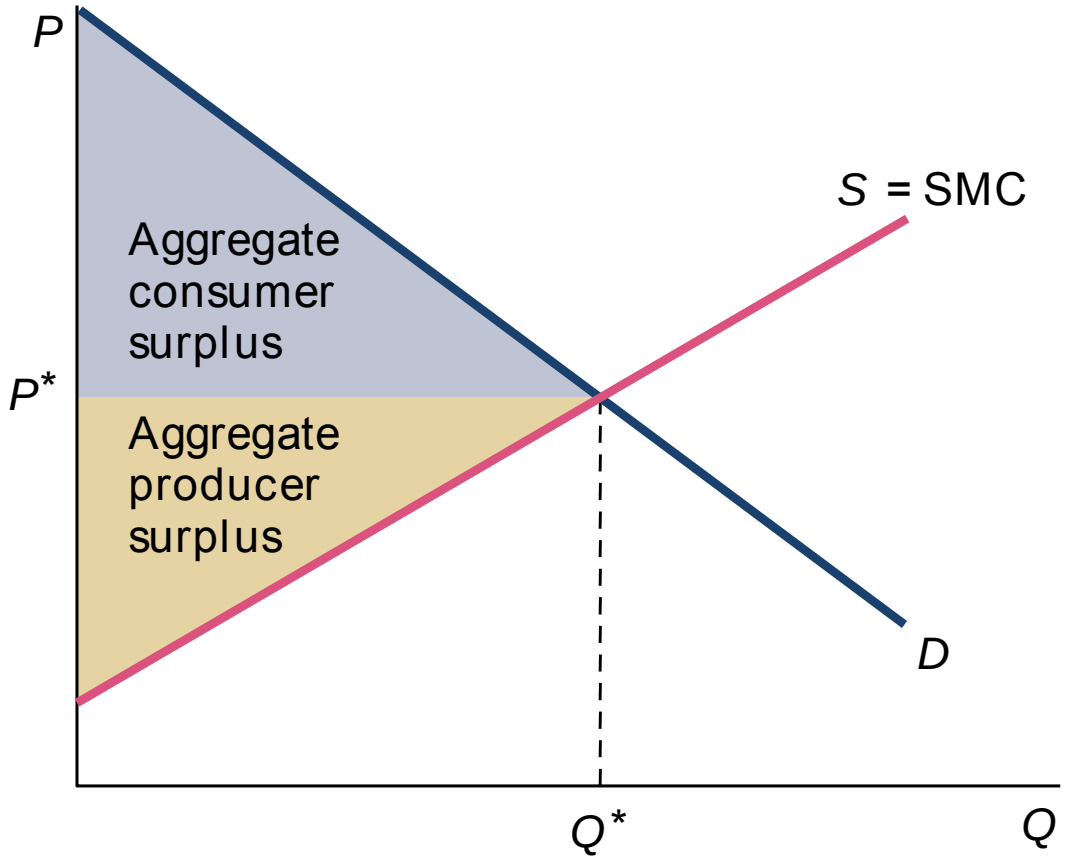
- When Individual Marginal Cost Curves are Upward Sloping Throughout

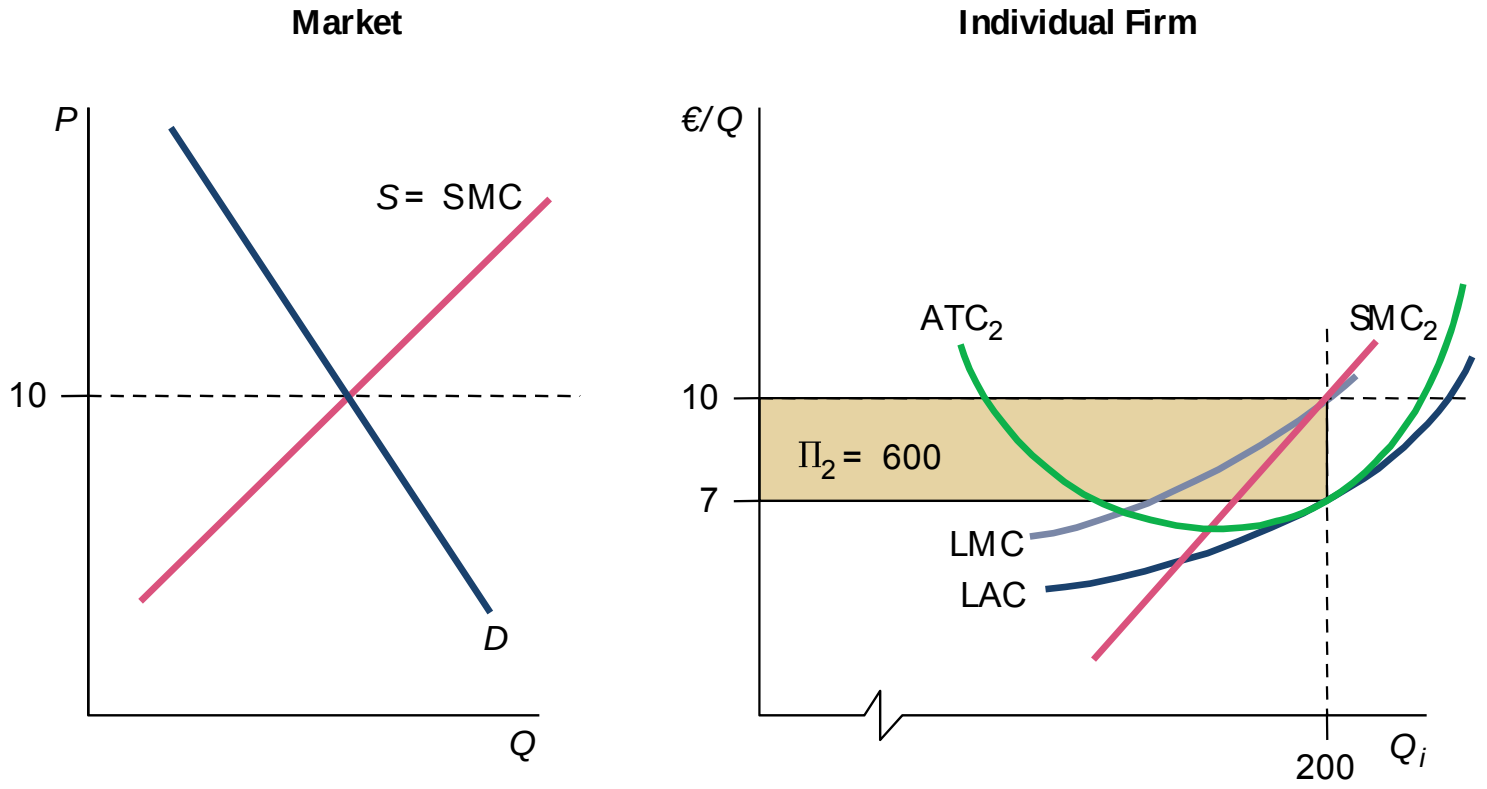


The Total Benefit from Exchange in a Market



Adjustments In The Long Run

- A Price Level that Generates Economic Profit



Adjustments In The Long Run

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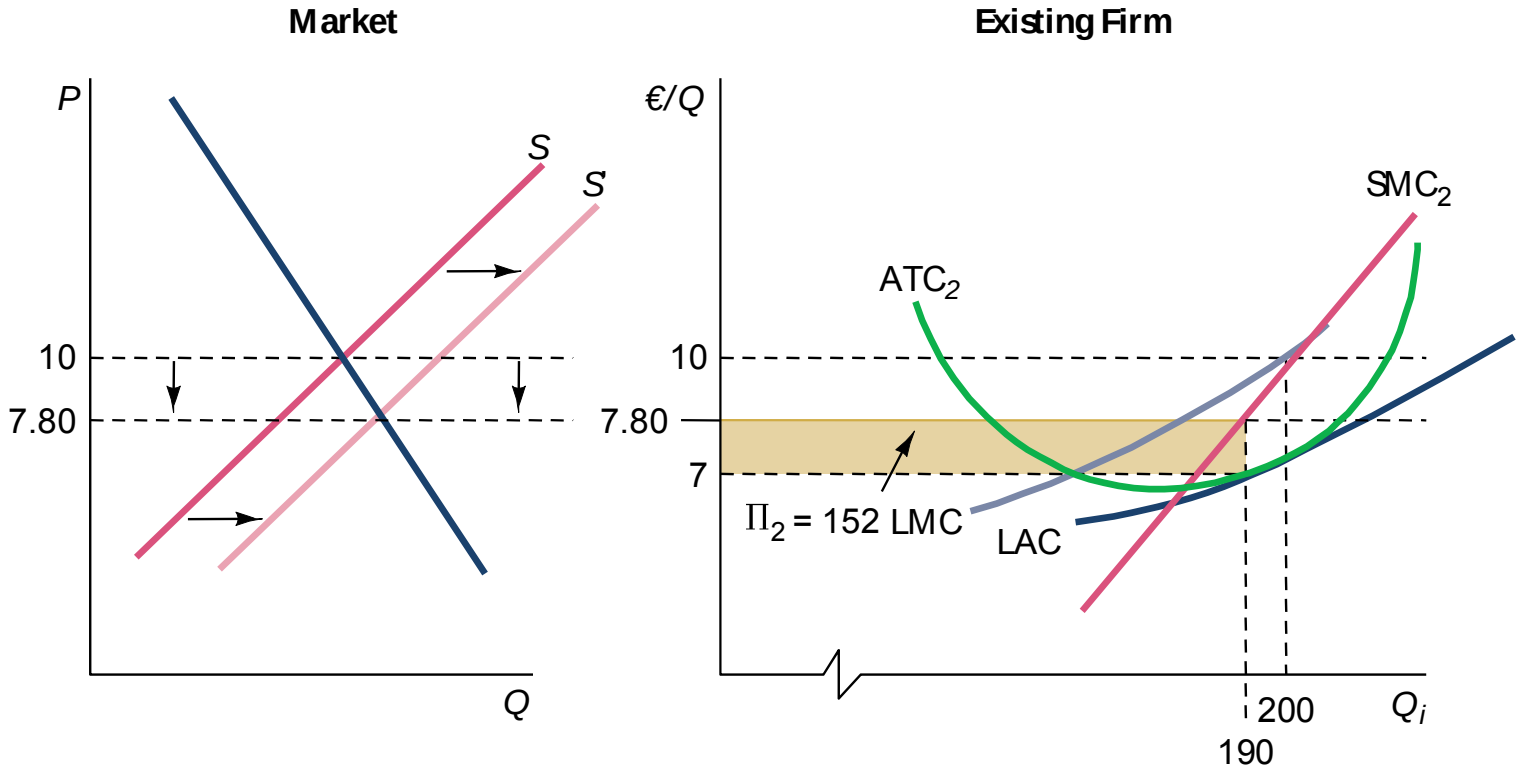
- Positive economic profit creates an incentive for outsiders to enter the industry.
- As additional firms enter the industry, the industry supply curve shifts to the right.
- This adjustment will continue until these two conditions are met:
  - (1) Price reaches the minimum point on the LAC curve
  - (2) All firms have moved to the capital stock size that gives rise to a short-run average total cost curve that is tangent to the LAC curve at its minimum point.

Adjustments In The Long Run

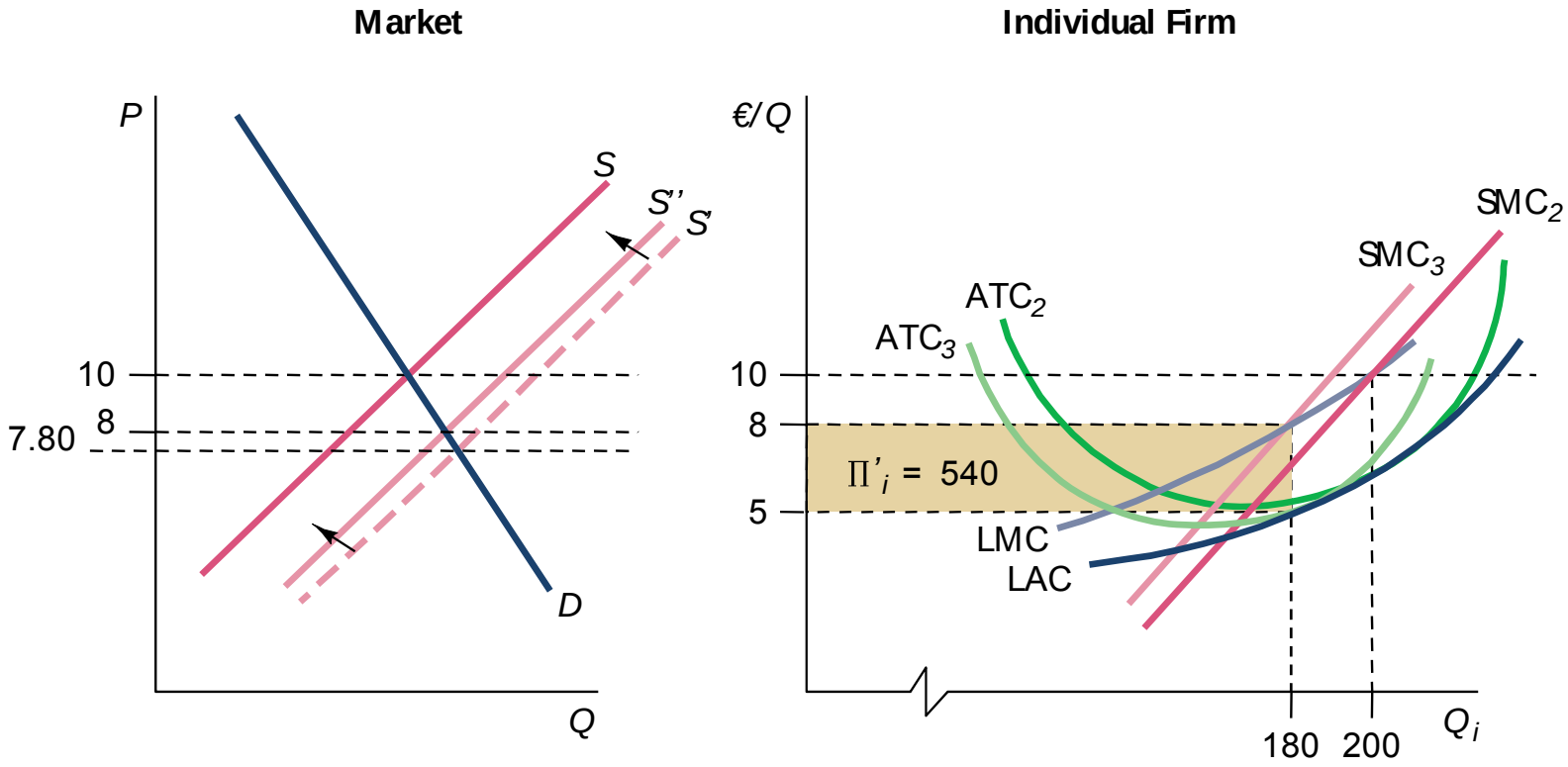
- First step along the path toward long-run equilibrium



  - Positive profit by incumbent induces an entry
  - Initially, entry by a new firm shifts the industry supply curve to the right – prices fall to 7.80 and incumbent reduces output to 190 (profit also falls)

Adjustments In The Long Run

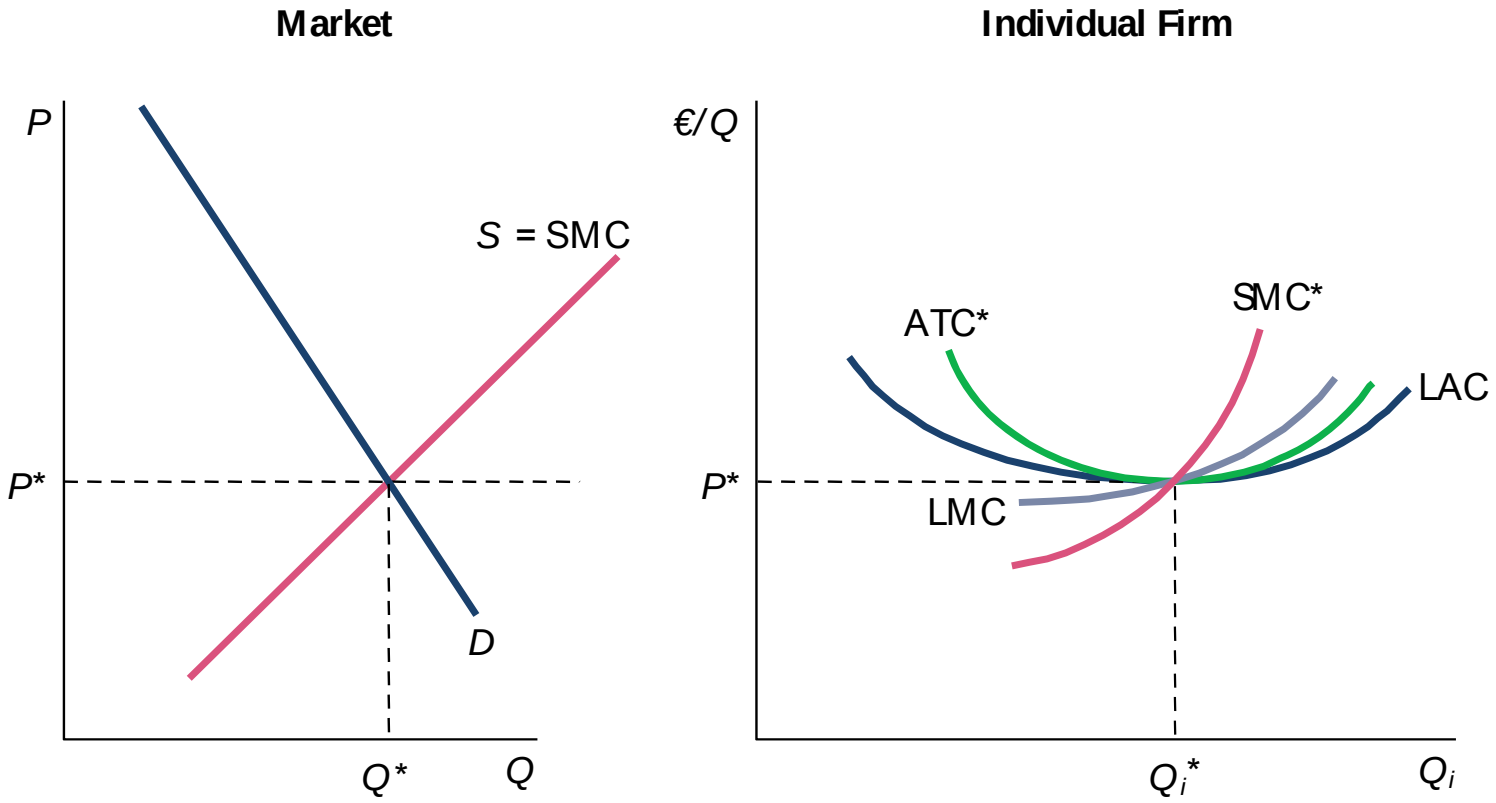
- Second step along the path toward long-run equilibrium



  - At output of 190, incumbent not using fixed inputs optimally (they were optimal for output of 200) – thus reduces capital to get new short run ATC_3 and SMC_3
  - SMC and industry supply curve shift back to the left (S") but new industry supply curve on net still to the right of the original one

Long-Run Equilibrium under Perfect Competition

- Since profits were still positive (540 instead of 600), yet another firm enters – followed by similar two step adjustments where incumbents adjust capital stock and average cost curve is lower … cycle repeats until all profits are zero



The Invisible Hand

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- Why are competitive markets attractive from the perspective of society as a whole?
  - Price is equal to Marginal Cost.
    - The last unit of output consumed is worth exactly the same to the buyer as the resources required to produce it.
  - Price is equal to the minimum point on the long-run average cost curve.
    - There is no less costly way of producing the product.
  - All producers earn only a normal rate of profit.
    - The public pays not a cent more than what it cost the firms to serve them.

The Long-run Competitive Industry Supply Curve

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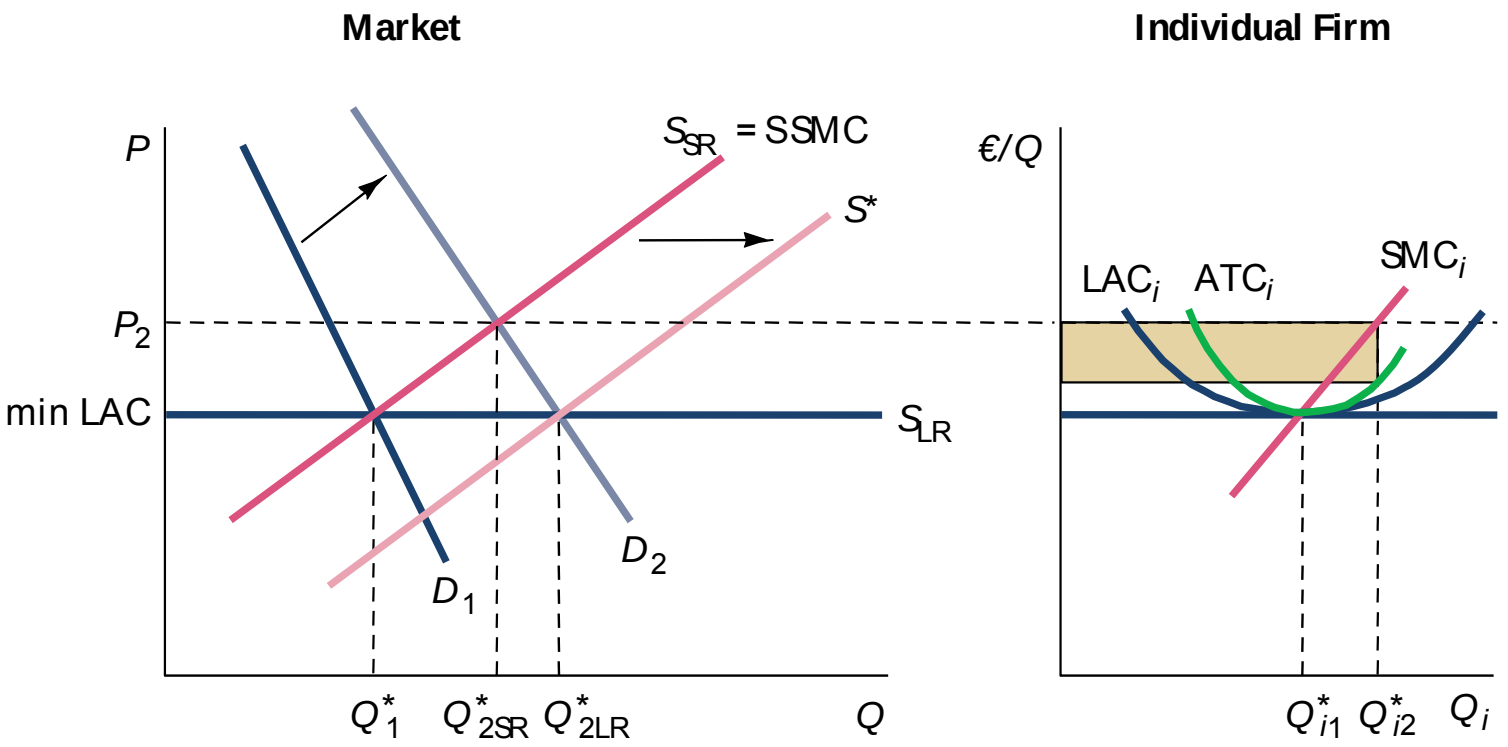
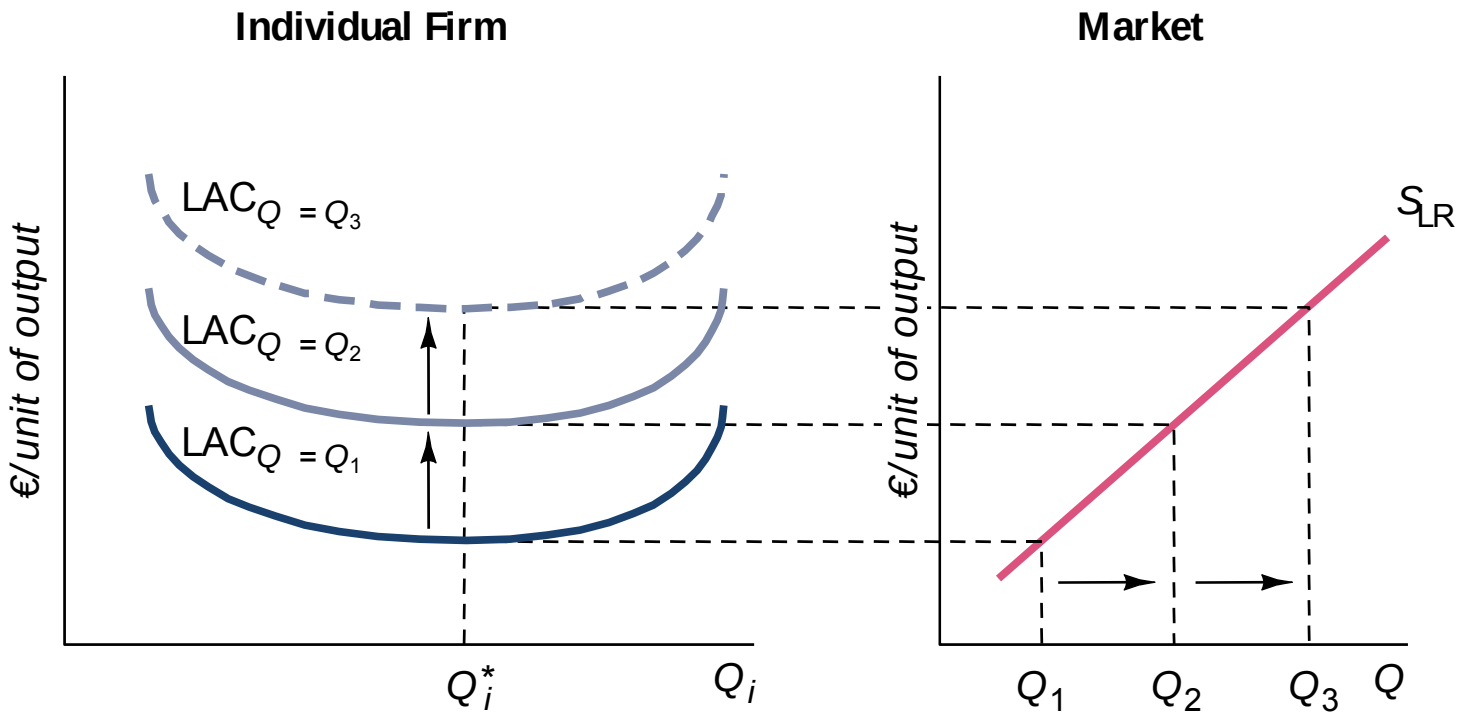
- ***Constant cost industries*:** long-run supply curve is a horizontal line at the minimum value of the LAC curve.
- ***Increasing cost industries*:** long-run supply curve is upward-sloping.
- ***Decreasing cost industries*:** long-run supply curve is downward-sloping.

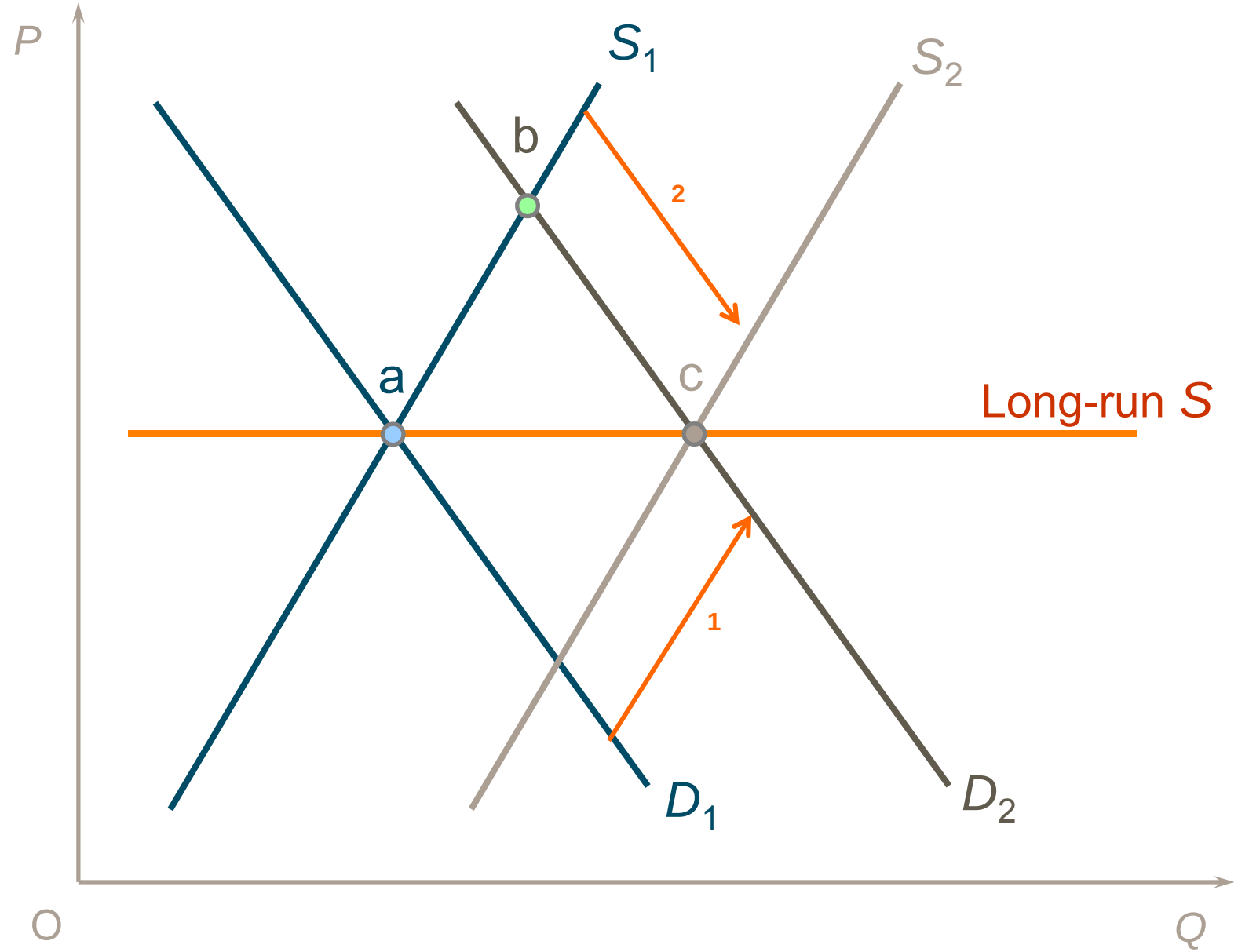
The Long-Run Competitive Industry Supply Curve



Long-Run Supply Curve for an Increasing Cost Industry

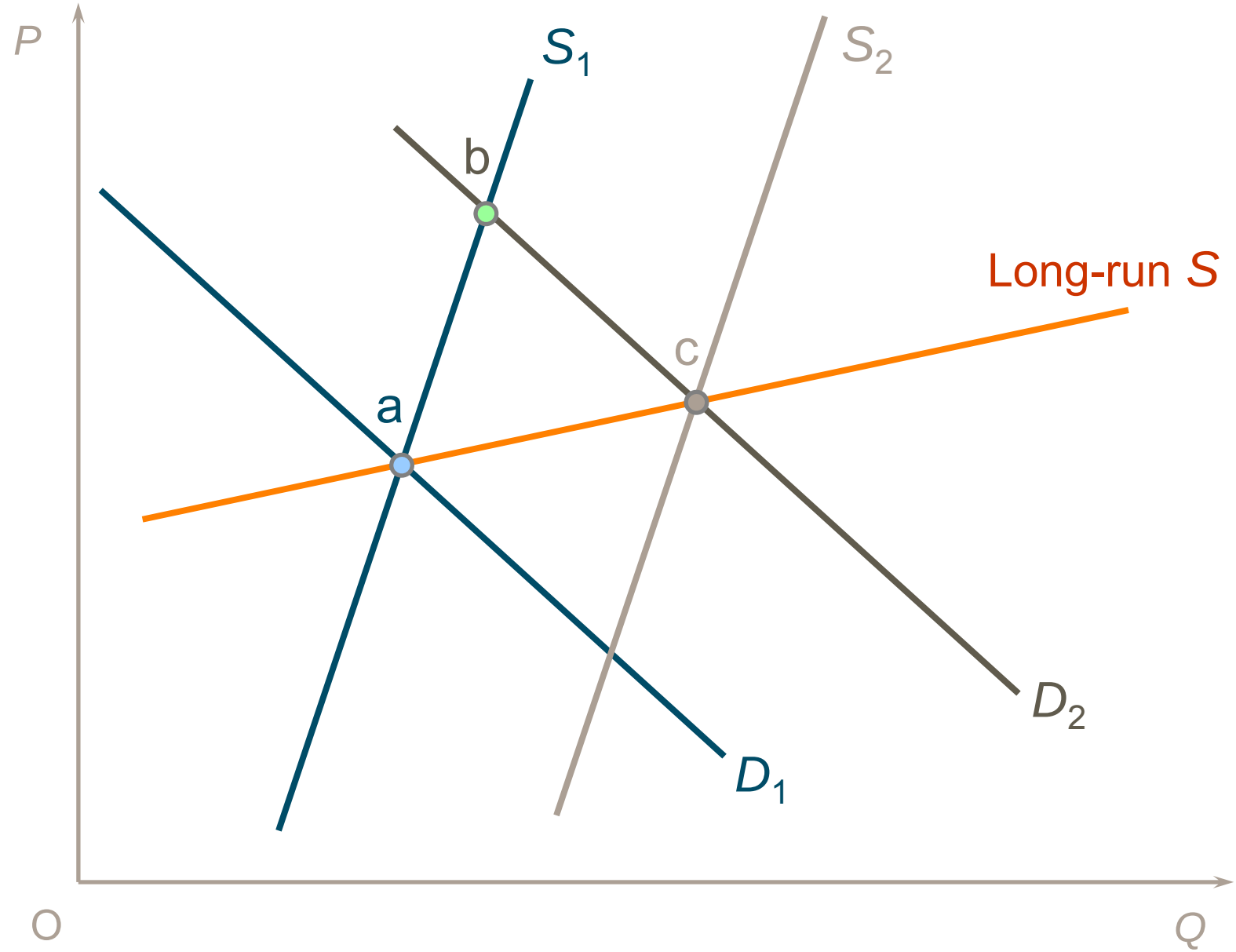


Various long-run industry supply curves under perfect competition



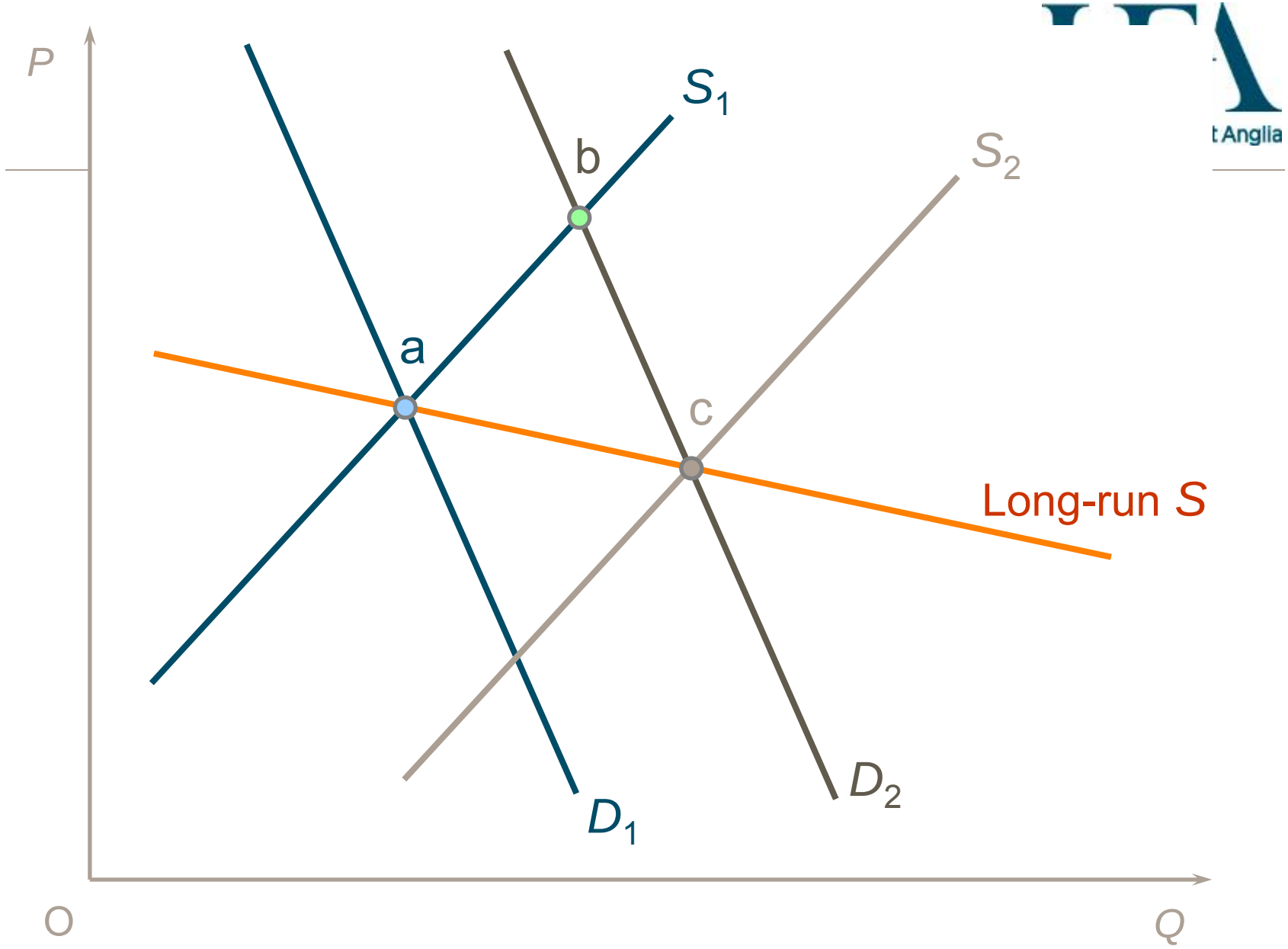
(a) Constant industry costs

Various long-run industry supply curves under perfect competition



(b) Increasing industry costs: external diseconomies of scale

Various long-run industry supply curves under perfect competition



(c) Decreasing industry costs: external economies of scale

The Elasticity Of Supply

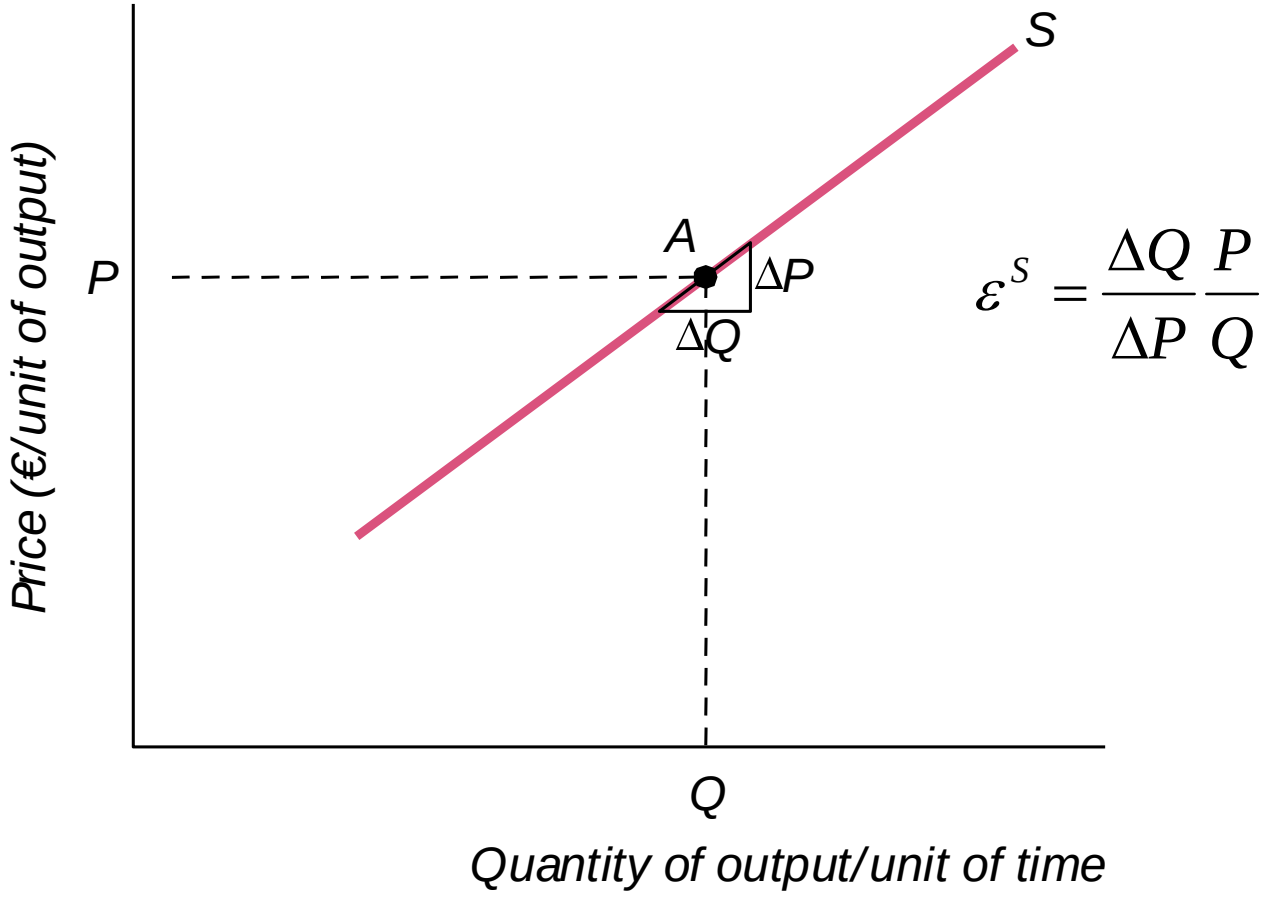
- ***Price elasticity of supply:*** the percentage change in quantity supplied that occurs in response to a 1 per cent change in product price.

$$\varepsilon^S = \frac{\Delta Q}{\Delta P}\frac{P}{Q}$$

- Can be interpreted relative to the slope of the supply curve

$$\varepsilon^S = \frac{P}{Q}\frac{1}{\text{slope}}$$

The Elasticity of Supply



$$\varepsilon^S = \frac{\Delta Q}{\Delta P}\frac{P}{Q}$$

Takeaway messages

Advantages and disadvantages of competition

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- Advantages of perfect competition
  - P = MC
  - production at minimum AC
  - only normal profits in long run
  - responsive to consumer wishes: consumer sovereignty
  - competition $\Rightarrow$ efficiency
- Disadvantages of perfect competition
  - insufficient profits for investment
  - lack of product variety
  - lack of competition over product design