



Section 11

Firms in Competitive Markets

Reference:

N. Gregory Mankiw and Mark P. Taylor (2023), *“Microeconomics”*, Cengage Learning, Chapter 6

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.

Introductory Video: Agricultural markets and example of a «pseudo» competitive markets



<https://www.youtube.com/watch?v=Yb6z308mVLg>

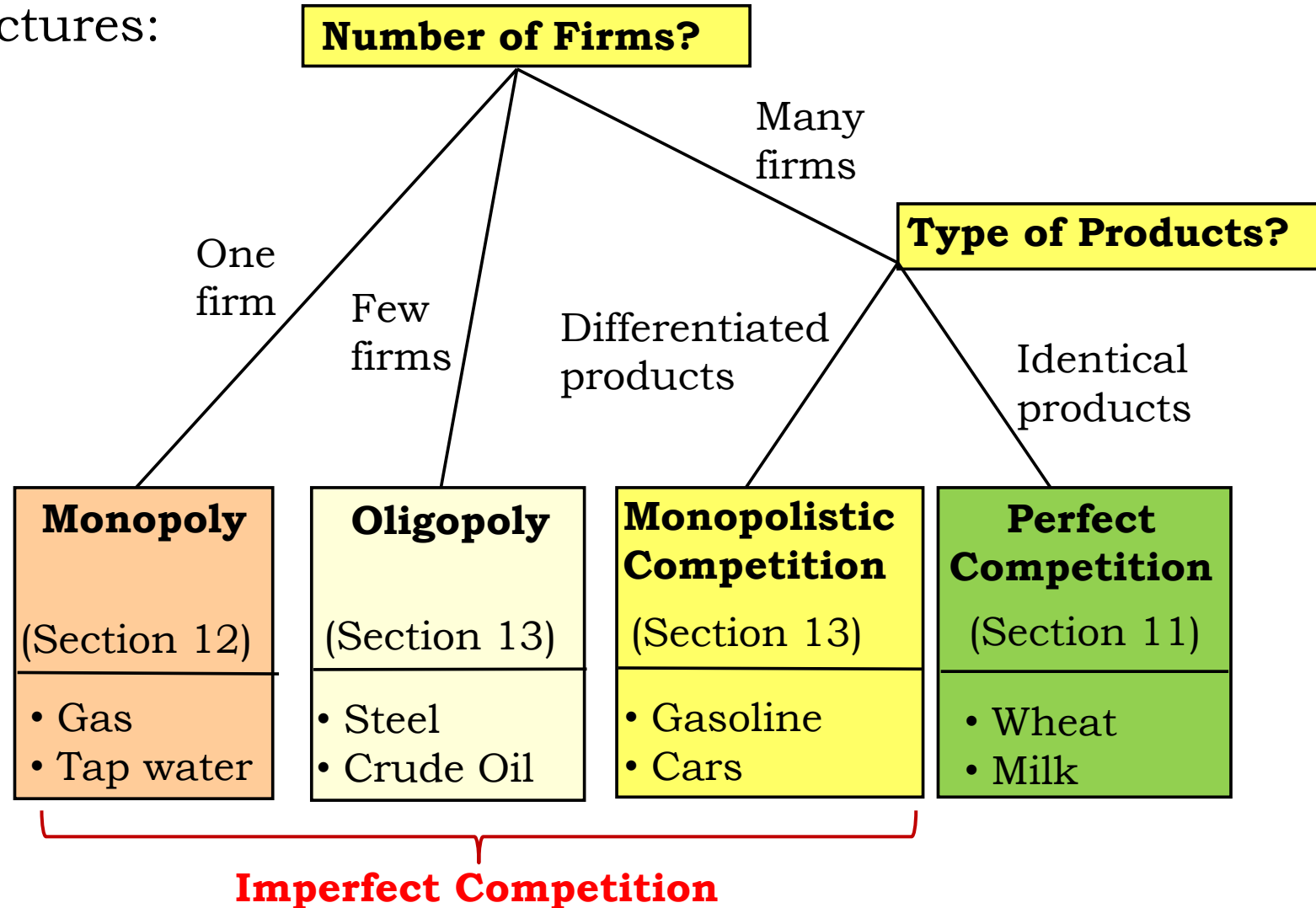
Contents

- A. Market Structures and Competitive Market
- B. Behavior of Competitive Firms
- C. Supply Curve in the Competitive Market
- D. A behavioral theory of the firm

A. Market Structures and Competitive Market

Market Structures and Competitive Market

Different Market Structures:



Average Cost, Optimal Size, Market Structure

Perfect Competition

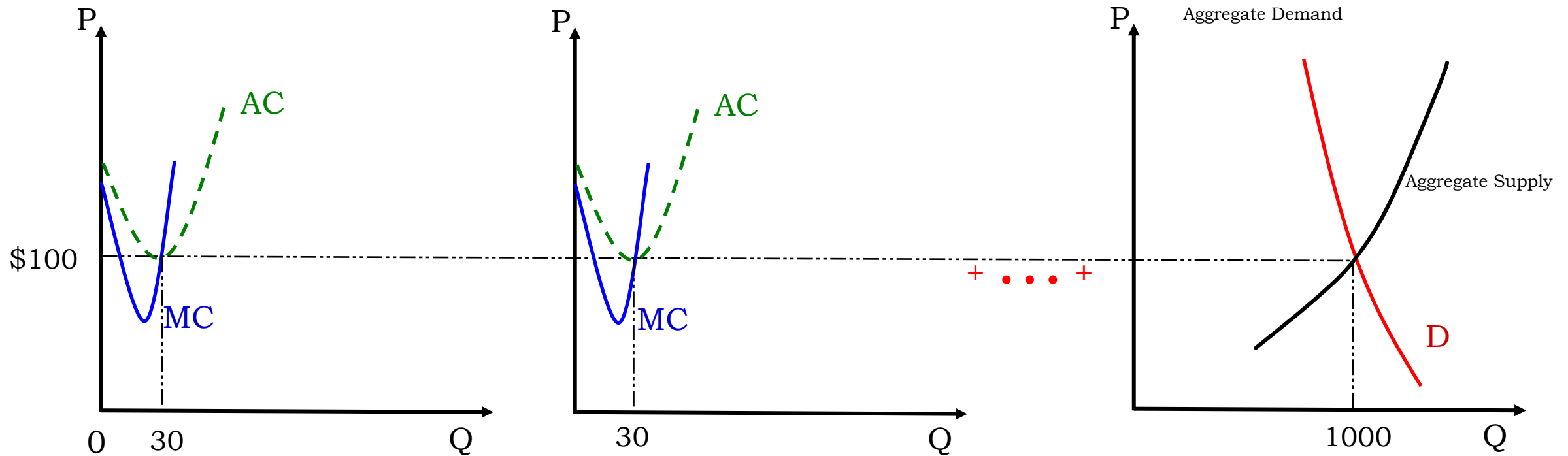
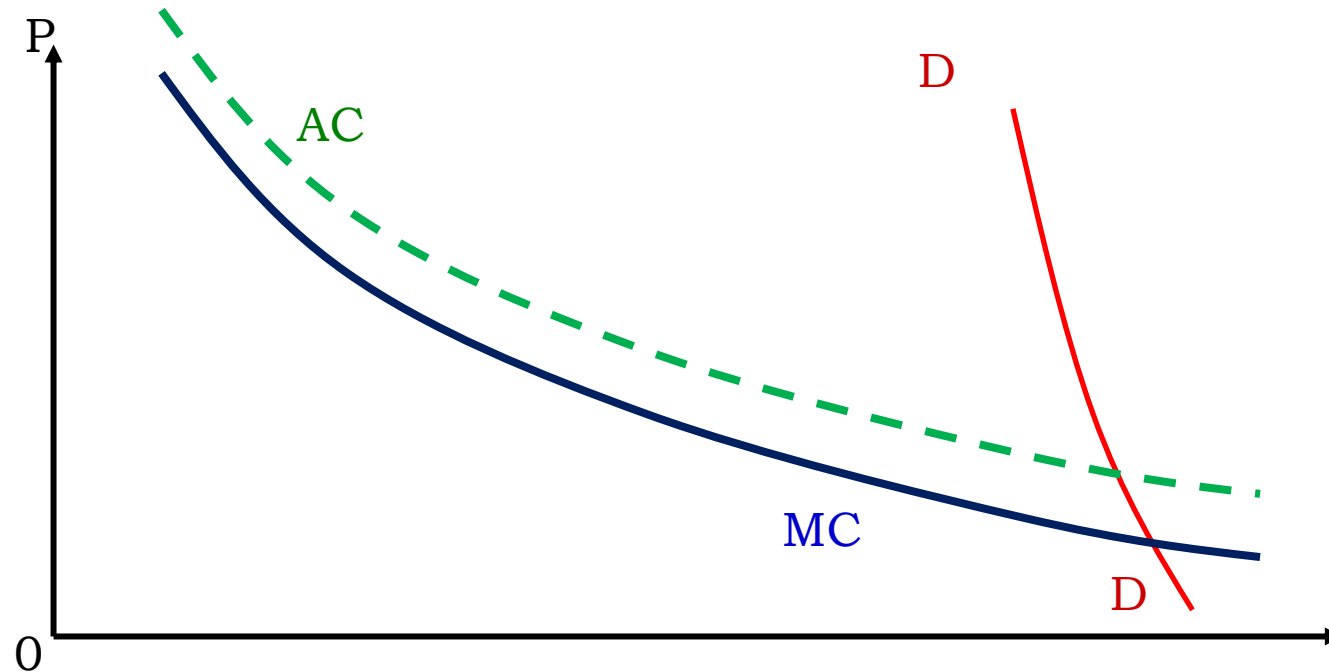


Figure: The market structure is subject to the corresponding cost and demand

Average Cost, Optimal Size, Market Structure

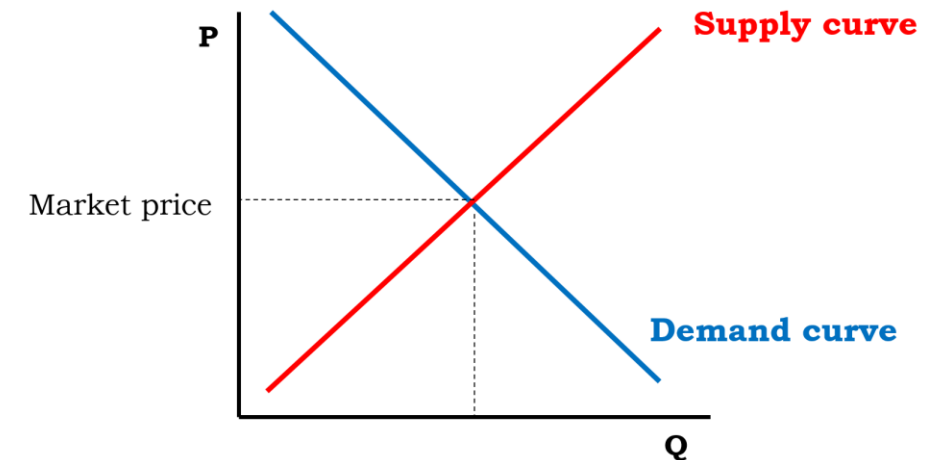
Perfect Competition? Not possible



Competitive Market

Review: A **perfectly competitive market** has the following characteristics:

1. There are many buyers and sellers in the market;
2. firms are price-takers
3. Homogeneous goods
4. Firms can freely enter or exit the market.
5. No externalities;
6. Perfect and complete information
7. Economic agents are rational



Results of a competitive market:

- **Equilibrium; maximum welfare**

B. Behavior of Competitive Firms

The Competitive Firm's Goal

In the following analysis, we assume that:

- Firms in **perfectly competitive markets** maximize their profits
(Profits = Total Revenues – Total Cost).
- **Firms produce in an efficient way (minimize the cost)** and firms make the **right decisions** in order to maximize the economic profit.
- Firms behave in a **rational** and consistent way and exploit all complete and certain information.
- **Long term** vision more interesting: **Maximizing the market value** of the firm:
 - ↳ market value includes the stream of profits that the firm earns over time
 - ↳ direct interest of shareholders (long-term)

Economic Profit

Economists measure the **economic profit**:

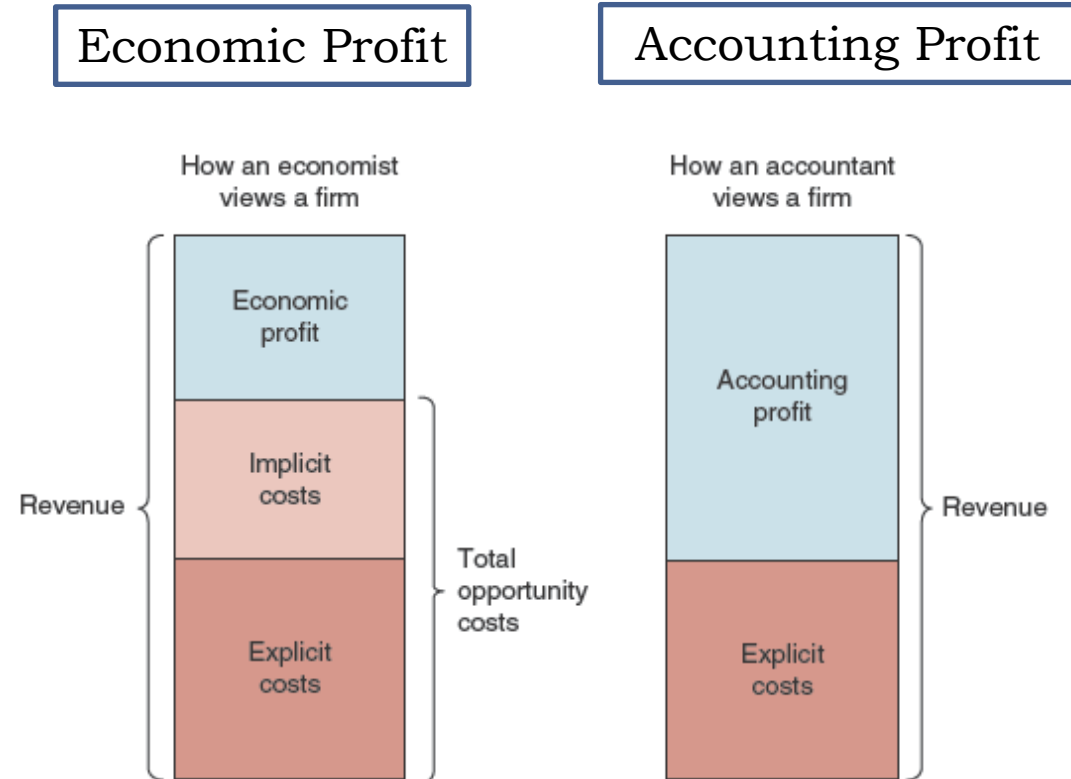
$$\text{Total Revenues} - \text{Total Costs}$$

$$\text{Total Costs} = (\text{Explicit} + \text{Implicit Costs})$$

Accountants measure the **accounting profit**:

$$\text{Total Revenues} - \text{Total Explicit Costs}$$

Economists include all opportunity costs when analysing the firm.



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

Competitive Firm

Total Revenue of a Firm:

$$TR = P \times Q$$

Average Revenue: tells us how much revenue a firm receives for the typical unit sold.

↳ For competitive firms, average revenue equals the price of the good.

$$AR = \frac{TR}{Q} = \frac{P \times Q}{Q} = P$$

The Revenue of a Competitive Firm

Marginal Revenue: is the change in total revenue from an additional unit sold.

↳ For competitive firms, marginal revenue equals the price of the good.

↳ Price-taker

$$MR = \frac{\Delta TR}{\Delta Q} = P$$

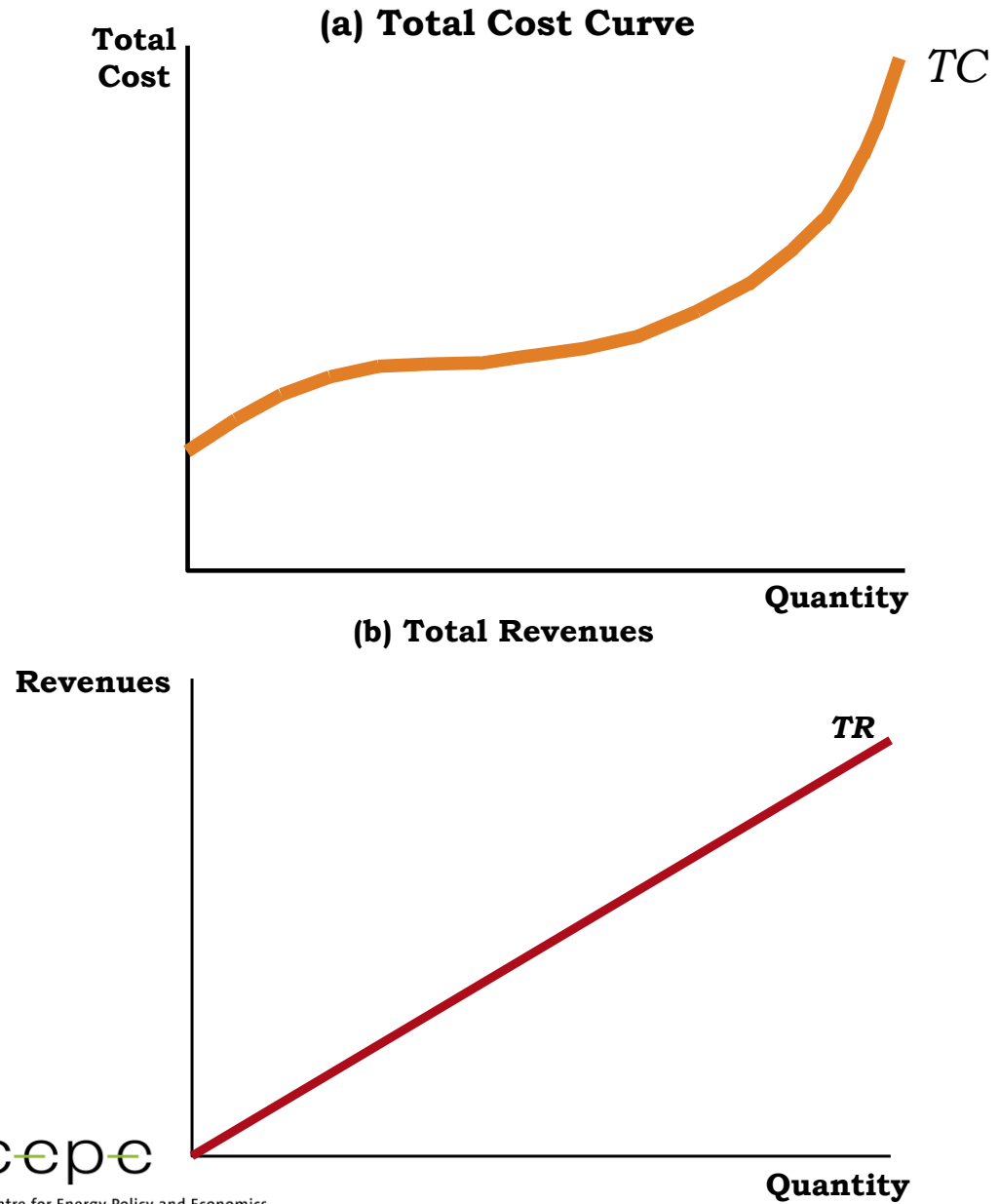
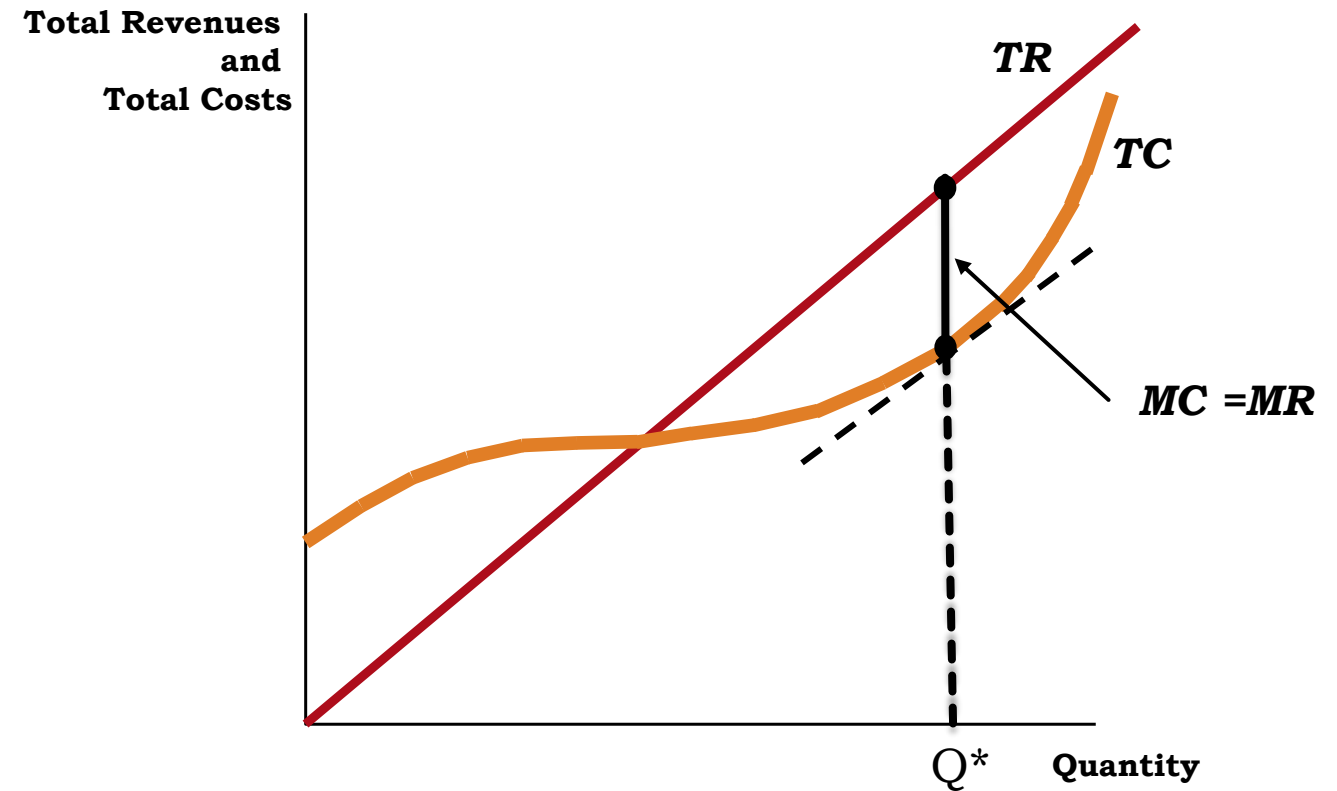
**SHORT-RUN****Total Revenues and Total Costs**

TABLE 5.5**Total, Average and Marginal Revenue for a Competitive Firm**

Quantity (Q) Litres	Price (€) (P)	Total revenue (€) ($TR = P \times Q$)	Average revenue (€) ($AR = TR/Q$)	Marginal revenue (€) ($MR = \Delta TR / \Delta Q$)
1,000	0.40	400	0.40	0.40
2,000	0.40	800	0.40	0.40
3,000	0.40	1,200	0.40	0.40
4,000	0.40	1,600	0.40	0.40
5,000	0.40	2,000	0.40	0.40
6,000	0.40	2,400	0.40	0.40
7,000	0.40	2,800	0.40	0.40
8,000	0.40	3,200	0.40	0.40

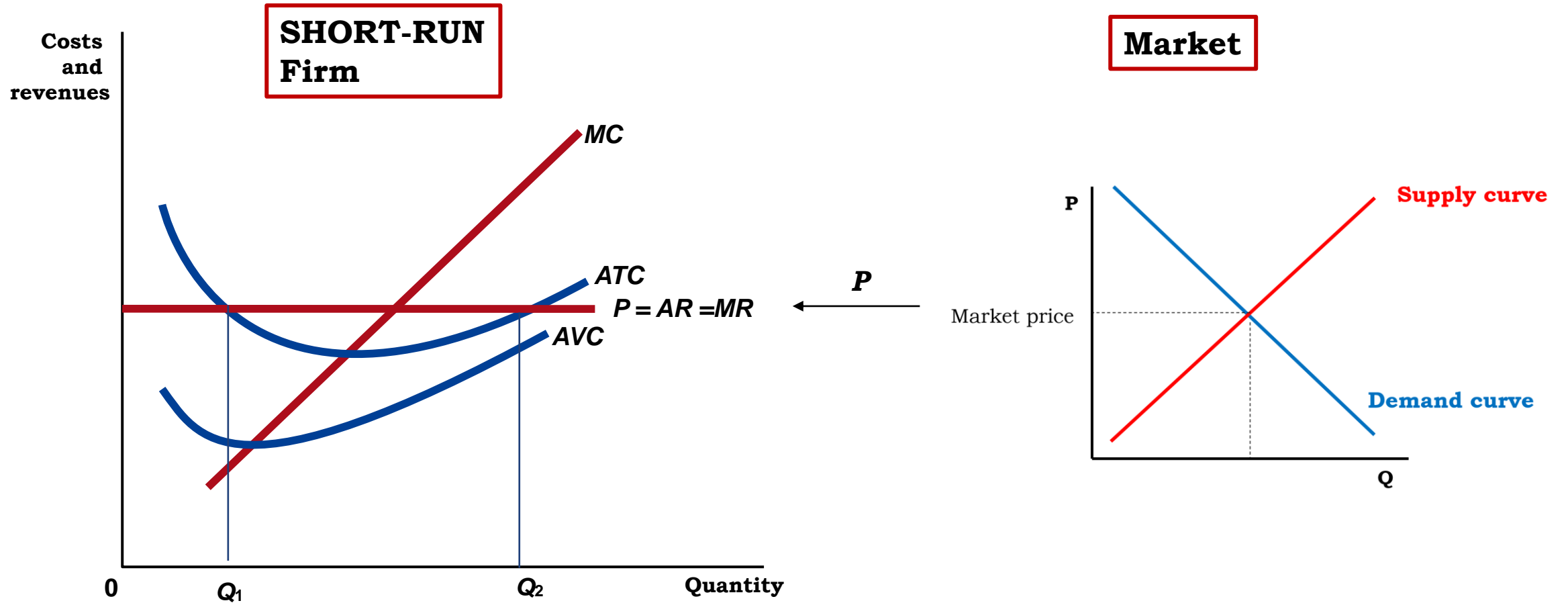
Source: Mankiw & Taylor (2020), “Microeconomics”, ch.5, p. 123

TABLE 5.6**Profit Maximization: A Numerical Example**

Quantity (<i>Q</i>) <i>Litres</i>	Total revenue (€) (<i>TR</i>)	Total cost (€) (<i>TC</i>)	Profit (€) (<i>TR</i> – <i>TC</i>)	Marginal revenue (€) (<i>MR</i> = $\Delta TR / \Delta Q$)	Marginal cost (€) (<i>MC</i> = $\Delta TC / \Delta Q$)	Change in profit (€) (<i>MR</i> – <i>MC</i>)
0	0	200	–200			
1,000	400	300	100	0.4	0.1	0.3
2,000	800	500	300	0.4	0.2	0.2
3,000	1,200	800	400	0.4	0.3	0.1
4,000	1,600	1,200	400	0.4	0.4	0
5,000	2,000	1,700	300	0.4	0.5	–0.1
6,000	2,400	2,300	100	0.4	0.6	–0.2
7,000	2,800	3,000	–200	0.4	0.7	–0.3
8,000	3,200	3,800	–600	0.4	0.8	–0.4

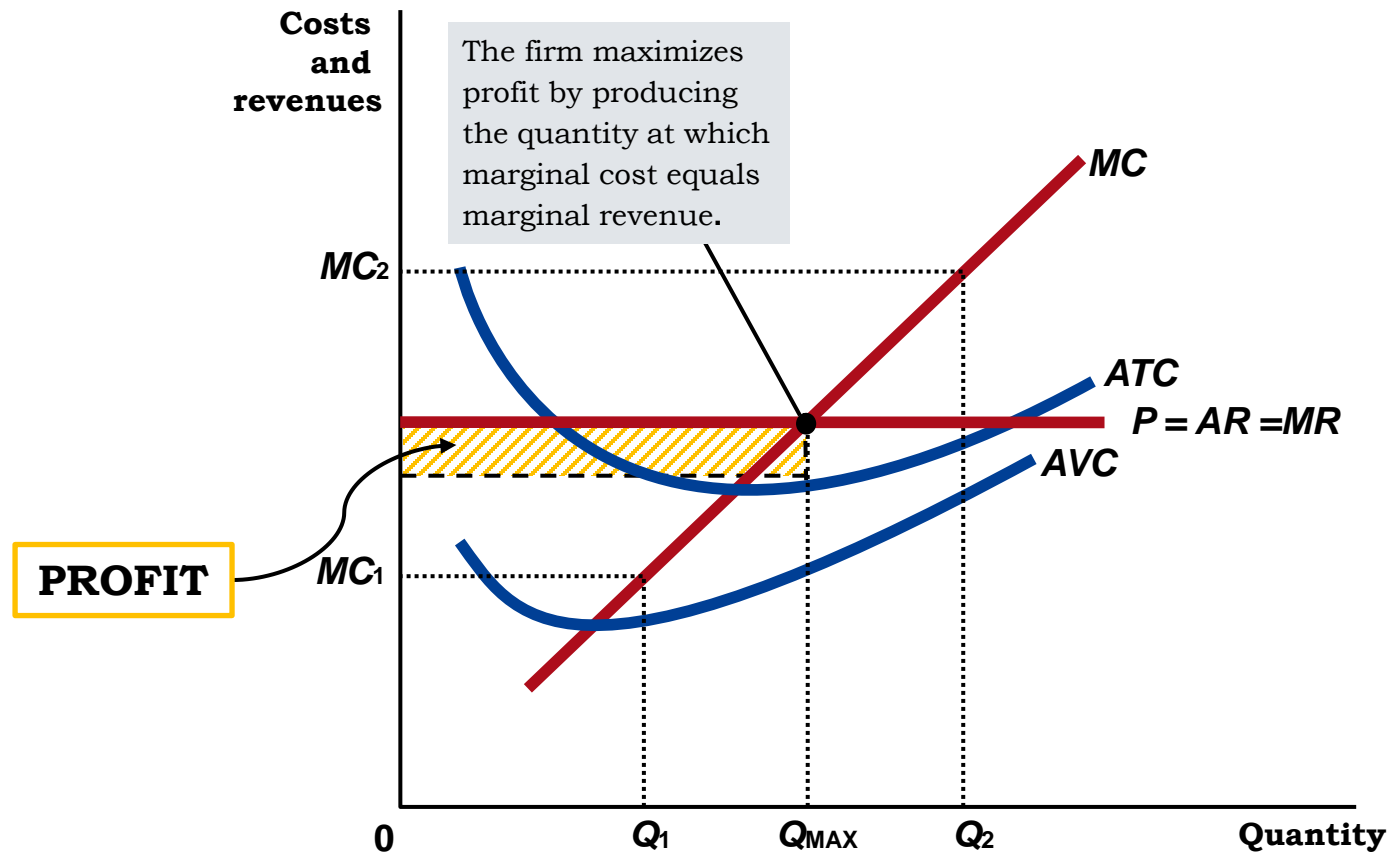
Source: Mankiw & Taylor (2023), “Microeconomics”

Profit Maximization for a Competitive Firm

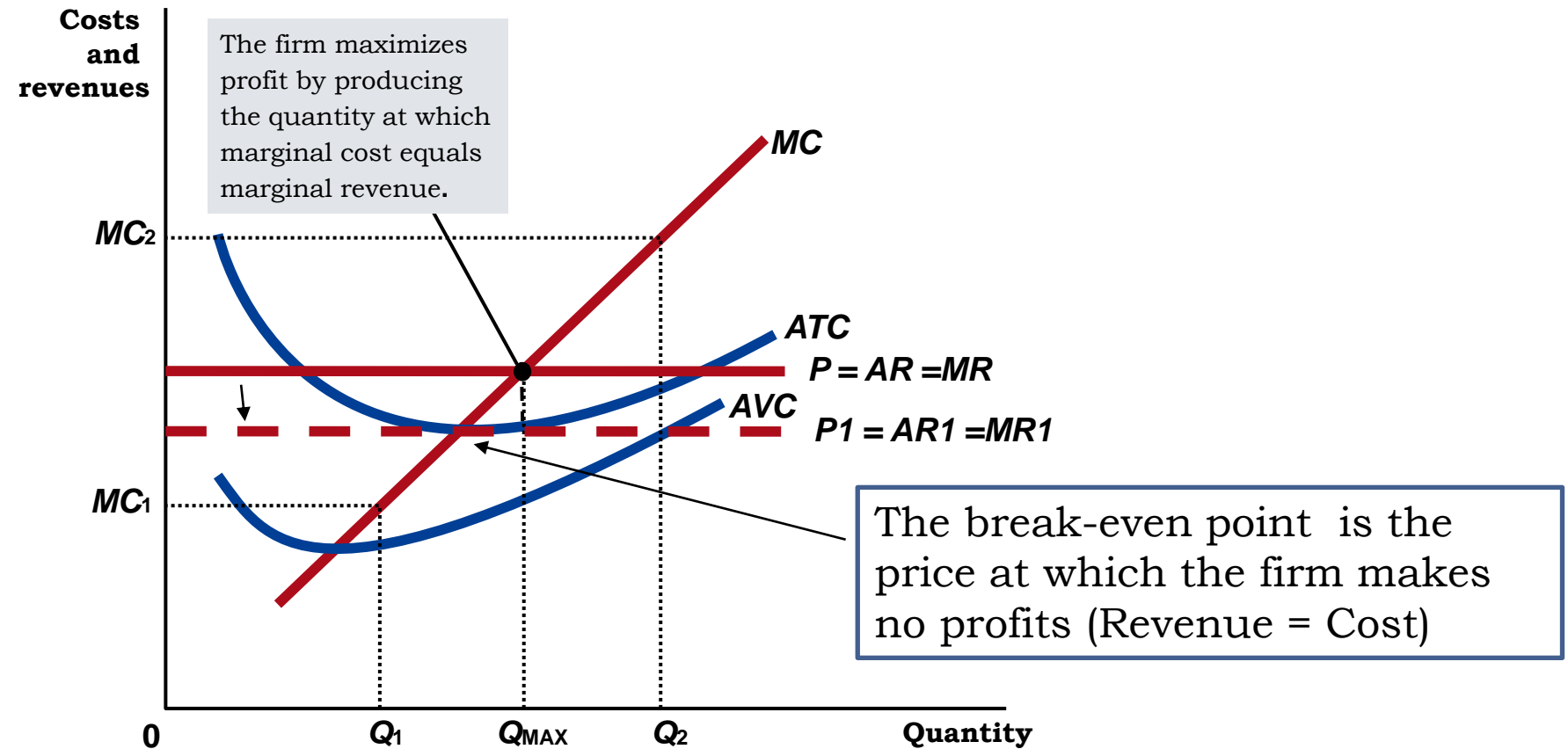


All opportunity costs are considered in ATC; also an adequate cost of capital

SHORT-RUN



SHORT-RUN



Firm Behavior under Perfect Competition

- The profit maximizing condition is

↳ Marginal Cost (MC) = Marginal Revenue (MR)

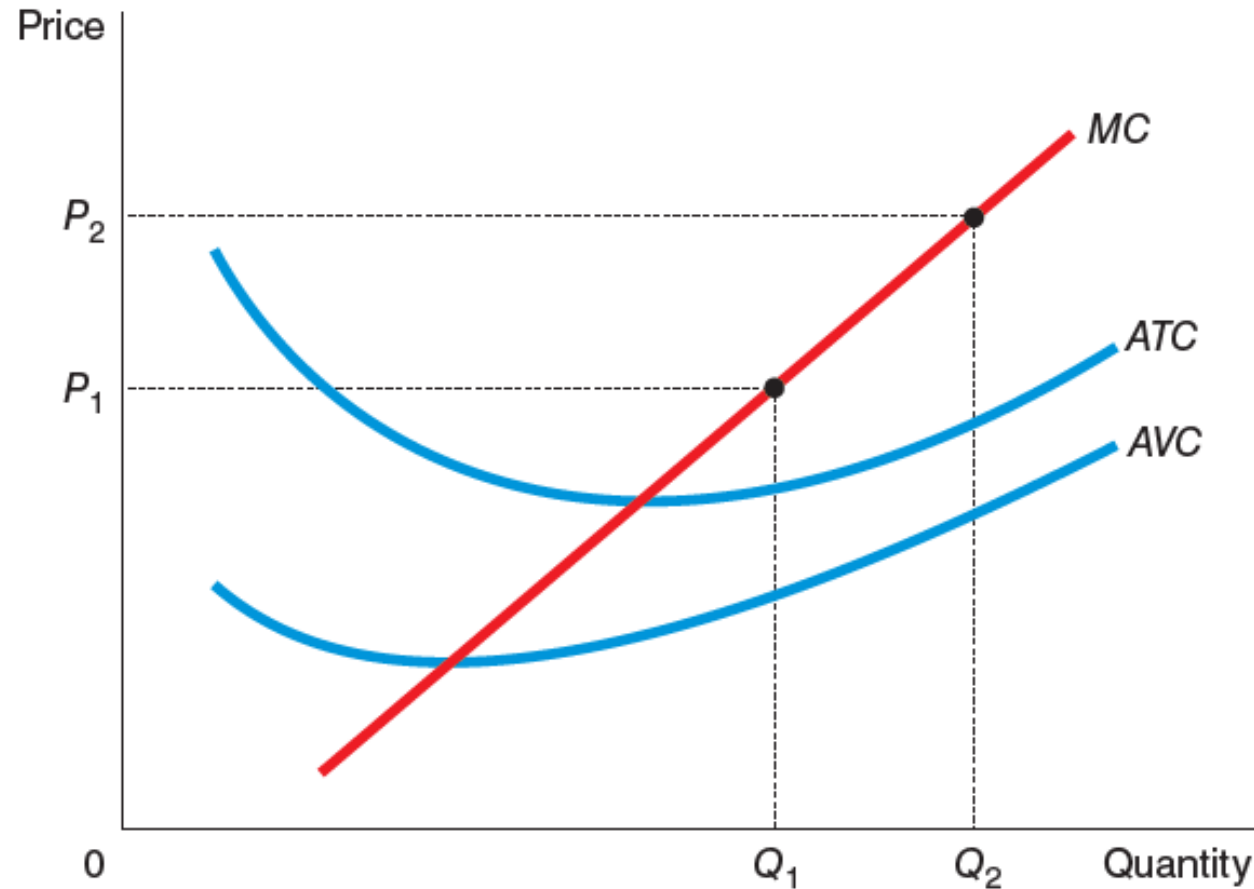
↳ In a competitive market $MR = \text{price}$

- Therefore, the profit maximizing condition is:

Marginal Cost (MC) = Price (P) = Marginal Revenue (MR)

- **This condition implies that a firm's marginal cost curve also describes its supply curve.**

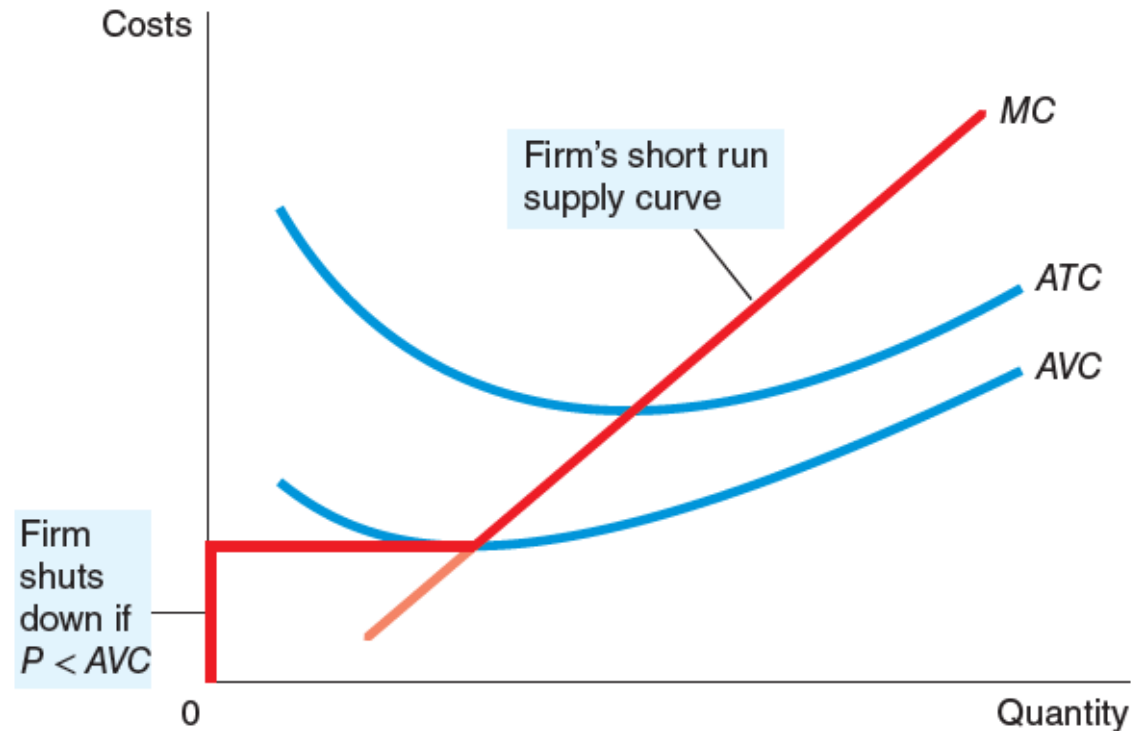
Marginal Cost as the Competitive Firm's Supply Curve



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

Firm's Short-Run Supply Curve

The portion of the marginal cost curve that lies above average variable cost is the competitive firm's **short run supply curve**.



Conditions of Shutdown in the Short-Run

- **As long as revenue minus variable cost covers fixed cost partly**, the firm should continue to produce at $MR=P=MC$.
- If the price decreases such that **total revenue is smaller than variable cost** ($P < AVC$) the firm minimizes its loss (which would exceed fixed cost here) by shutting down the production.
- The critical market price, the so called **shutdown point**, is the point where price equals average variable cost.

Example: electricity market price and swiss hydropower plants

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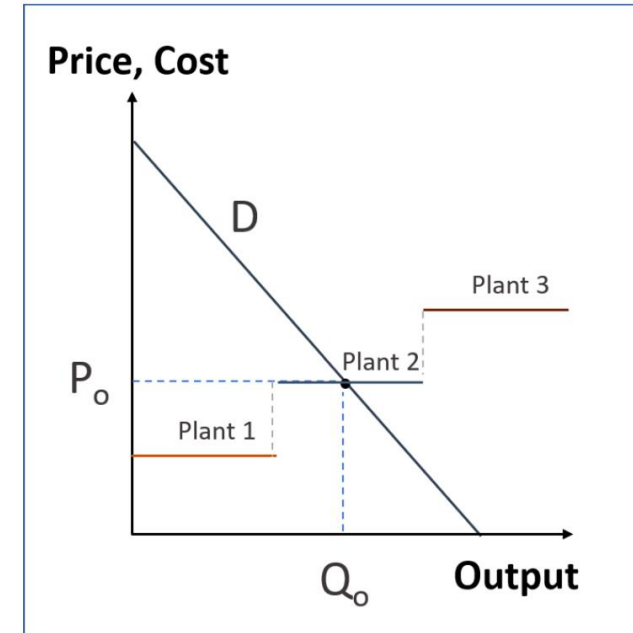
- 151001 - Press release - Power Trading Results 09 2015 [pdf]

EPEX SPOT and APX trading results of September 2015

Prices and Indices

	Price – monthly average (Base / Peak****) Price/MWh
Day-Ahead DE/AT – PHELIx	€31.88 / €38.78
Day-Ahead FR	€37.45 / €45.33
Day-Ahead UK	£41.55 / £44.39
Day-Ahead NL	€39.67 / €44.16
Day-Ahead BE	€52.50 / €64.05
Day-Ahead CH – SWISSIX	€36.58 / €43.90
European Electricity Index – ELIX	€32.11 / €39.72****
Intraday DE/AT (hourly continuous)	€31.75 / €38.93
Intraday 15-minute call auction DE	€32.02 / €38.69
Intraday FR	€37.00 / €44.57
Intraday NL	€42.53 / €51.77
Intraday BE	€50.22 / €60.70
Intraday CH (hourly continuous)	€36.77 / €44.17

*** Peak excl. weekend
**** calculated on the orders of DE/AT, FR & CH under the assumption of unlimited transmission capacity between the markets



Are the Swiss hydropower plants covering the AVC and the ATC?



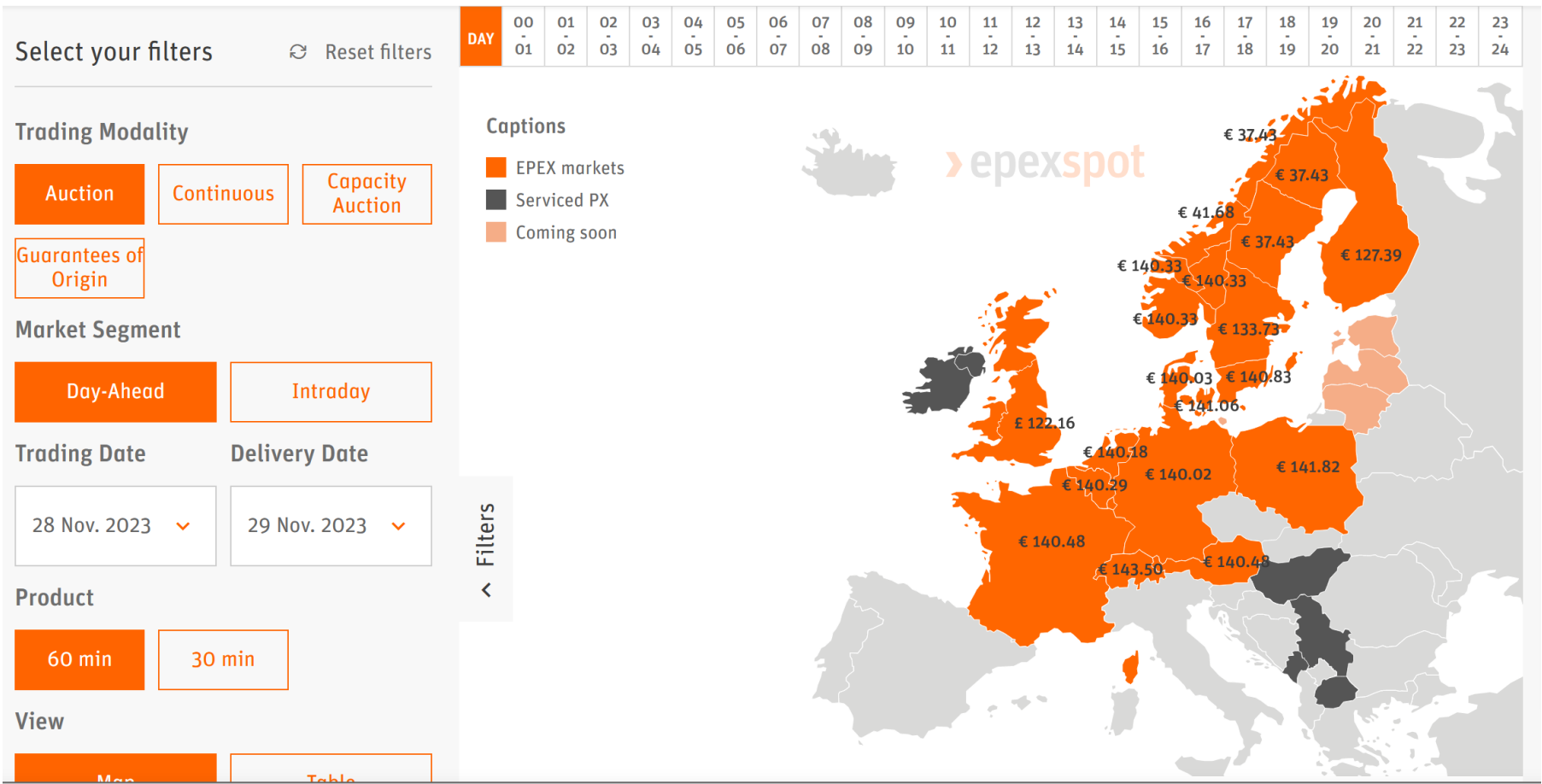
MARKET DATA

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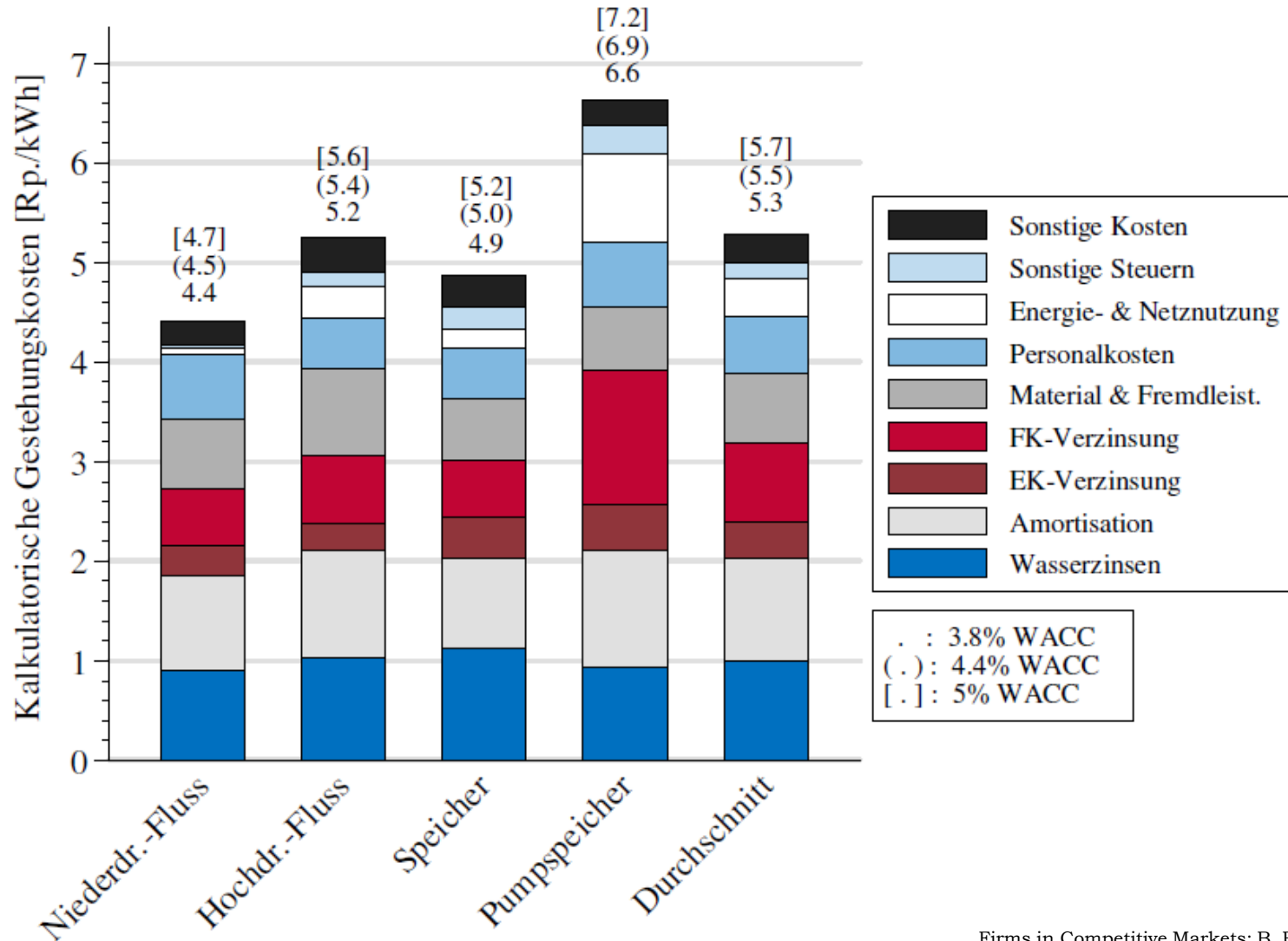
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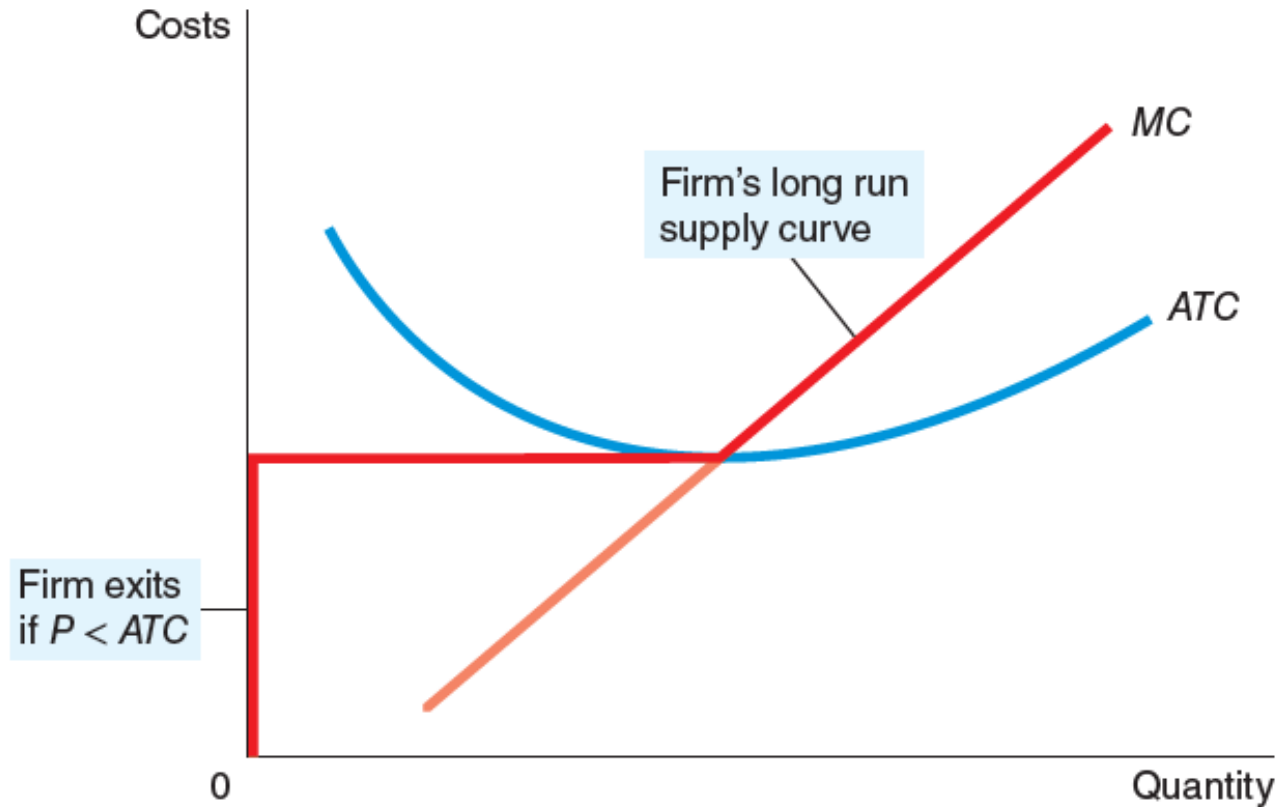


Average Production Cost (2000 – 2016, price 2016)



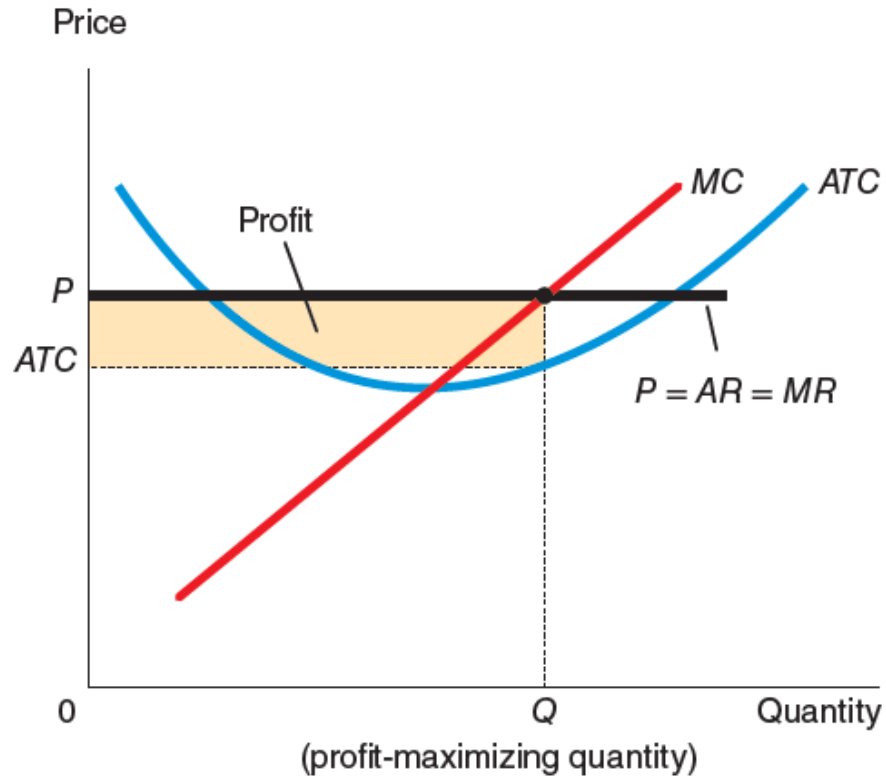
Filippini, M. & Geissmann, T. (2017) Kostenstruktur und Kosteneffizienz der Schweizer Wasserkraft. Bundesamt für Energie BFE / CEPE

Firm's Long-Run Supply Curve

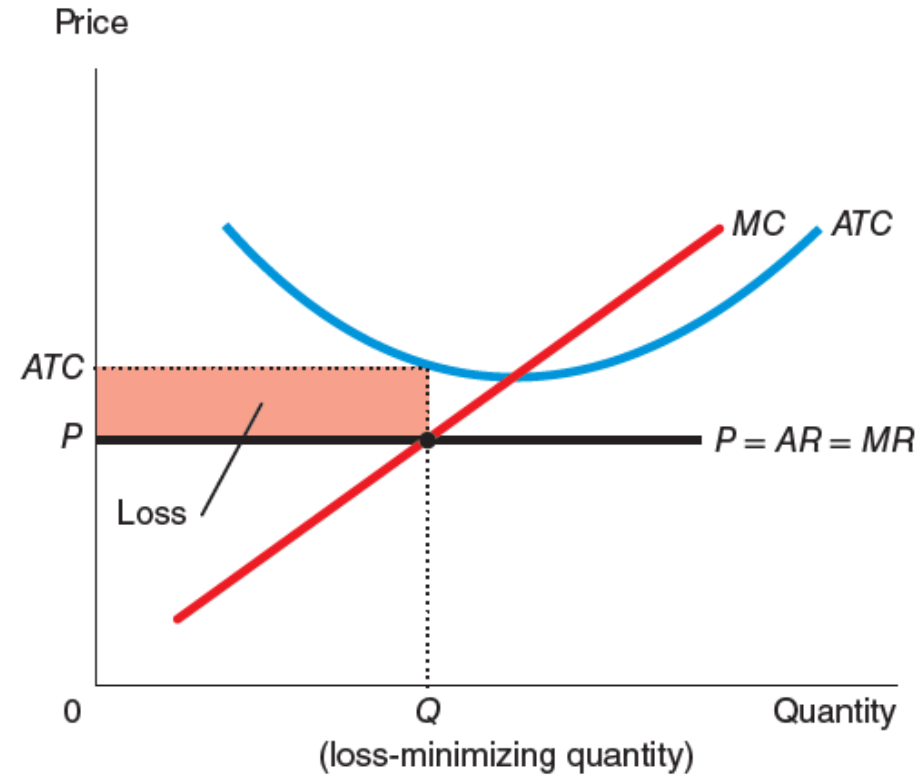


Source: Mankiw & Taylor (2023), "Microeconomics"

Profit as the Area between Price and Average Total Cost



(a) A firm with profits



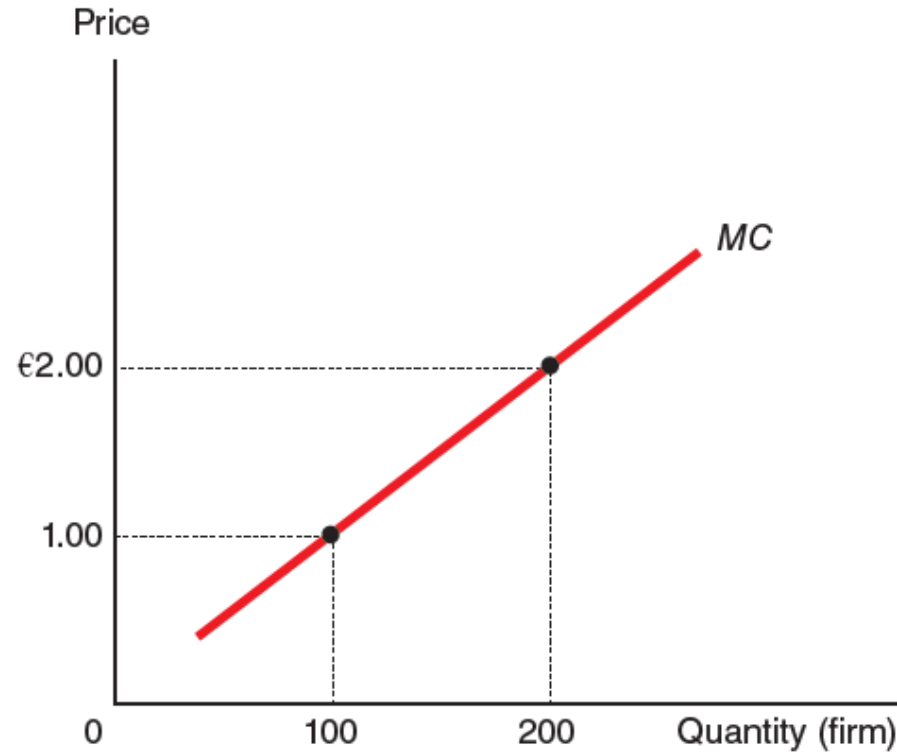
(b) A firm with losses

C. Supply Curve in the Competitive Market

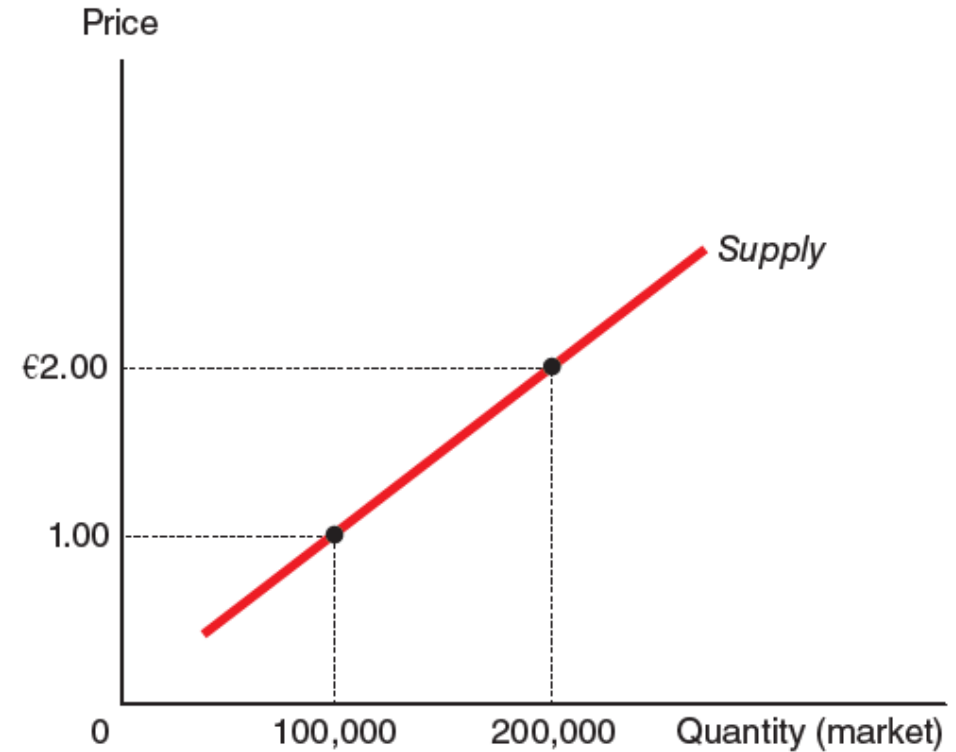
Supply Curve in the Competitive Market

- **Market supply** equals the sum of the quantities supplied by the individual firms in the market.
- **The Short Run:** Market Supply with a Fixed Number of Firms
 - For any given price, each firm supplies a quantity of output so that its marginal cost equals price.
 - The market supply curve reflects the individual firms' marginal cost curves.

Market Supply with a Fixed Number of Firms



(a) Individual firm supply



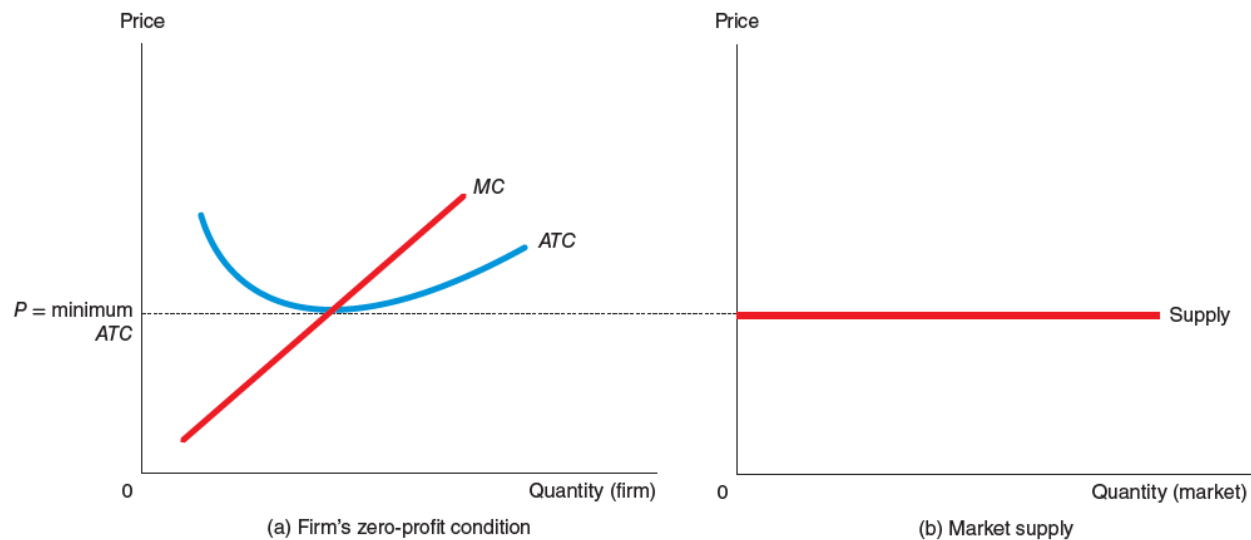
(b) Market supply

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

Long Run Market Supply

The Long Run: Market Supply with Entry and Exit

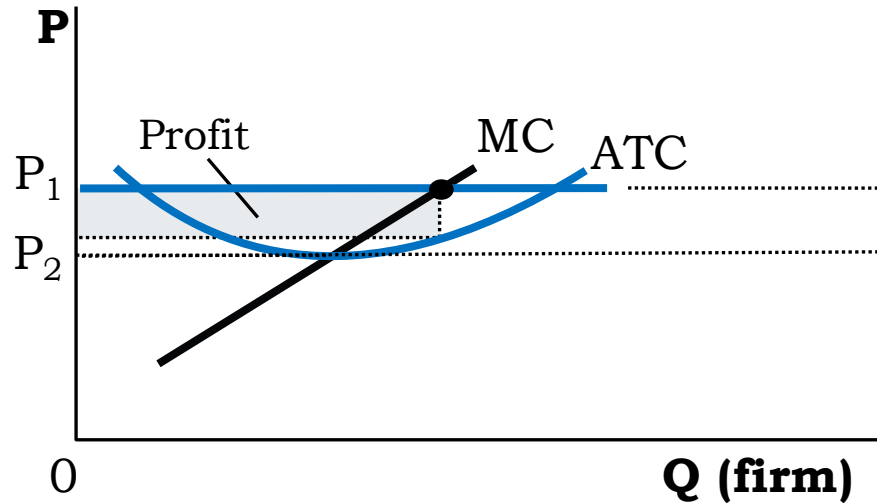
- ⇒ Firms will enter or exit the market until profit is driven to zero.
- ⇒ In the long run, price equals the minimum of average total cost.
- ⇒ The long run market supply curve is horizontal at this price.



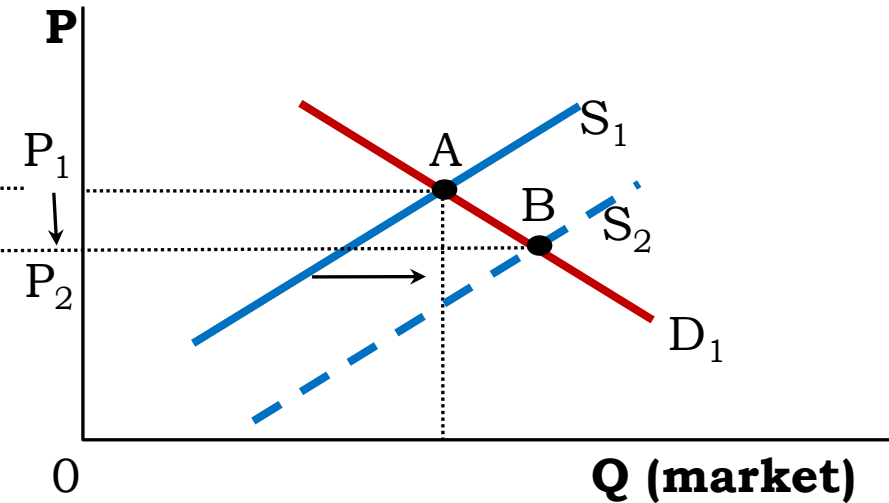
Source: Mankiw & Taylor (2023),
“Microeconomics”

Increase in Supply in the Short and Long Run

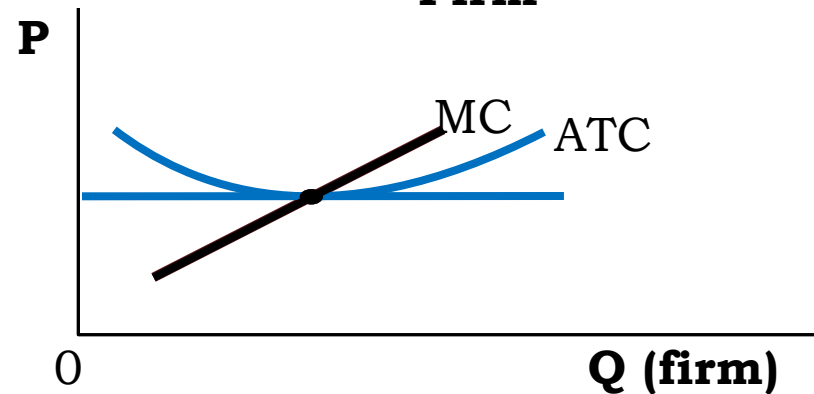
**Short Run
Firm**



**Long Run Response
Market**

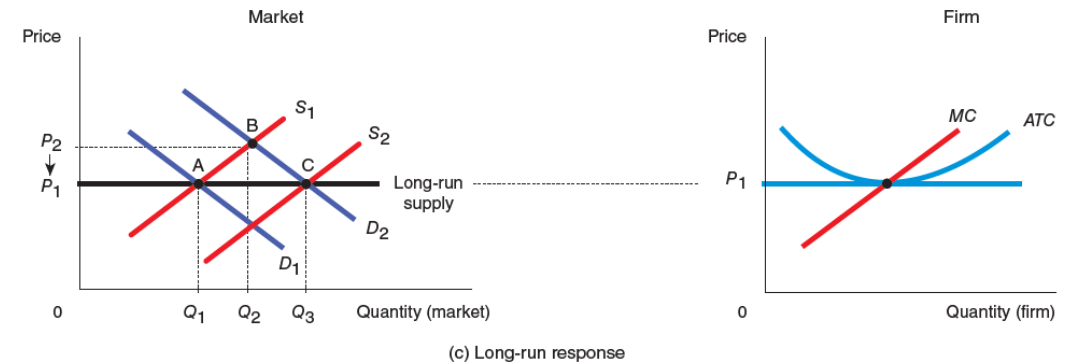
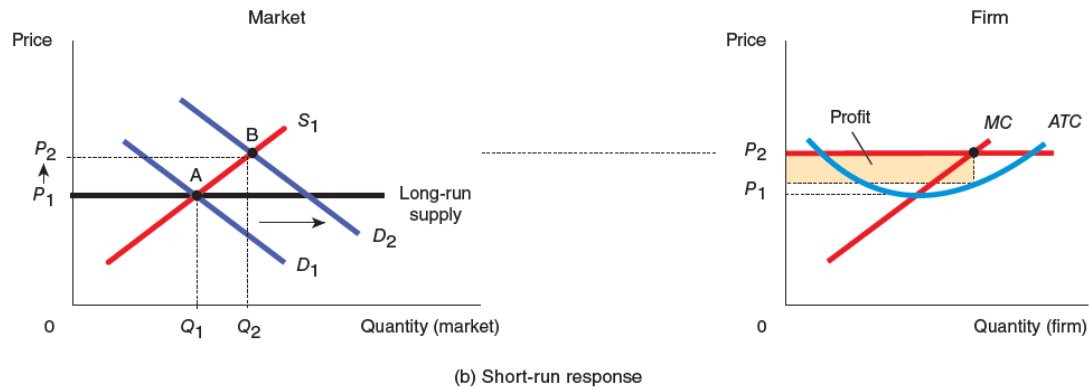
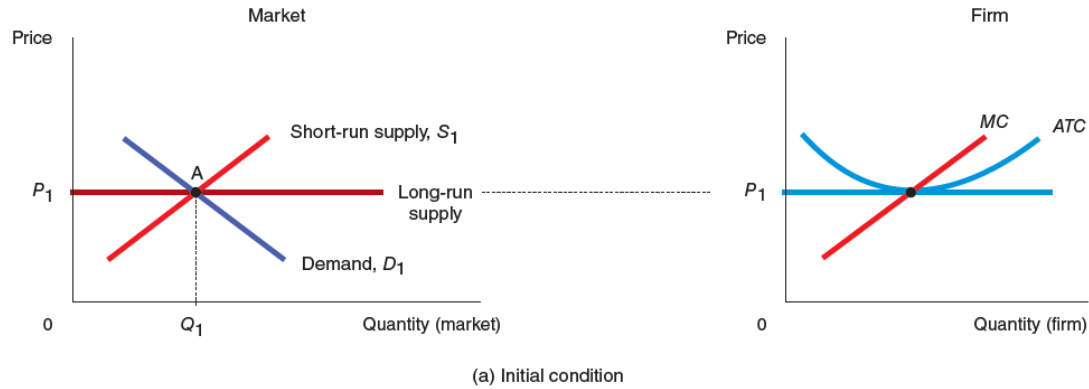


**Long Run
Firm**



Short vs. Long Run – Initial Condition

- At the end of the process of entry and exit, firms that remain must be making **zero economic profit**.
- Long run equilibrium must have firms operating at their **efficient scale**.



Do Firms maximize Profits?

Assumptions underlying the profit maximizing behavior:

- ↳ The profit can be clearly defined as the excess of revenue over all costs (including opportunity costs).
- ↳ A firm behaves as an individual entrepreneur would behave → complete control of the business and direction of the business in his own interests.
- ↳ That the firm's utility function has only one variable in it → profit.
- ↳ That the firm behaves in a rational and consistent way and exploits all complete and certain information.

D. Alternative theories of the firm

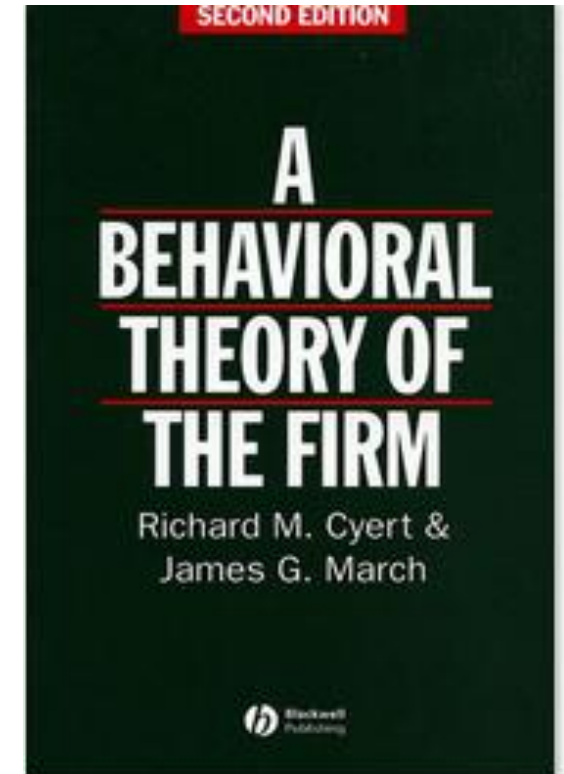
Alternative theories

	Optimizing theories		Non Optimizing theories
	Neoclassical microeconomics	Managerial theories	Behavioral theories
Firm organisation	Owner is also manager	Owners and manager	Owners, manager and workers
Goal	Profit maximisation	Management maximises the own utility, subject to a minimum profit constraint necessary to satisfy the owners	Management tries to achieve a satisfactory profit, or any other goal (e.g. welfare of the stakeholders in a non-profit organization) rather than aiming to maximise these goals.
Example		Baumol model: manager tries to maximise sales revenue subject to profit constraint	Simon model (1956): manager, due to the complexity of calculations, uncertainties of future, different interests within the organization and imperfection of information is not aiming to reach an optimal decision, but he is satisfied with something less. Bounded rationality

A Behavioral Theory of the Firm

The behavioral theory:

- ↪ Firm has several goals
- ↪ Firm's behavior is satisficing rather than maximizing
- ↪ Search for levels of profits, sales, rate of growth that are 'satisfactory'
- ↪ Behavior characterized by 'bounded' or 'limited' rationality
- ↪ Firm is an organisation made up of individuals who have different (and even conflicting) goals and expectations of each other.
- ↪ Management must make decisions that are satisfactory to all members of the company.

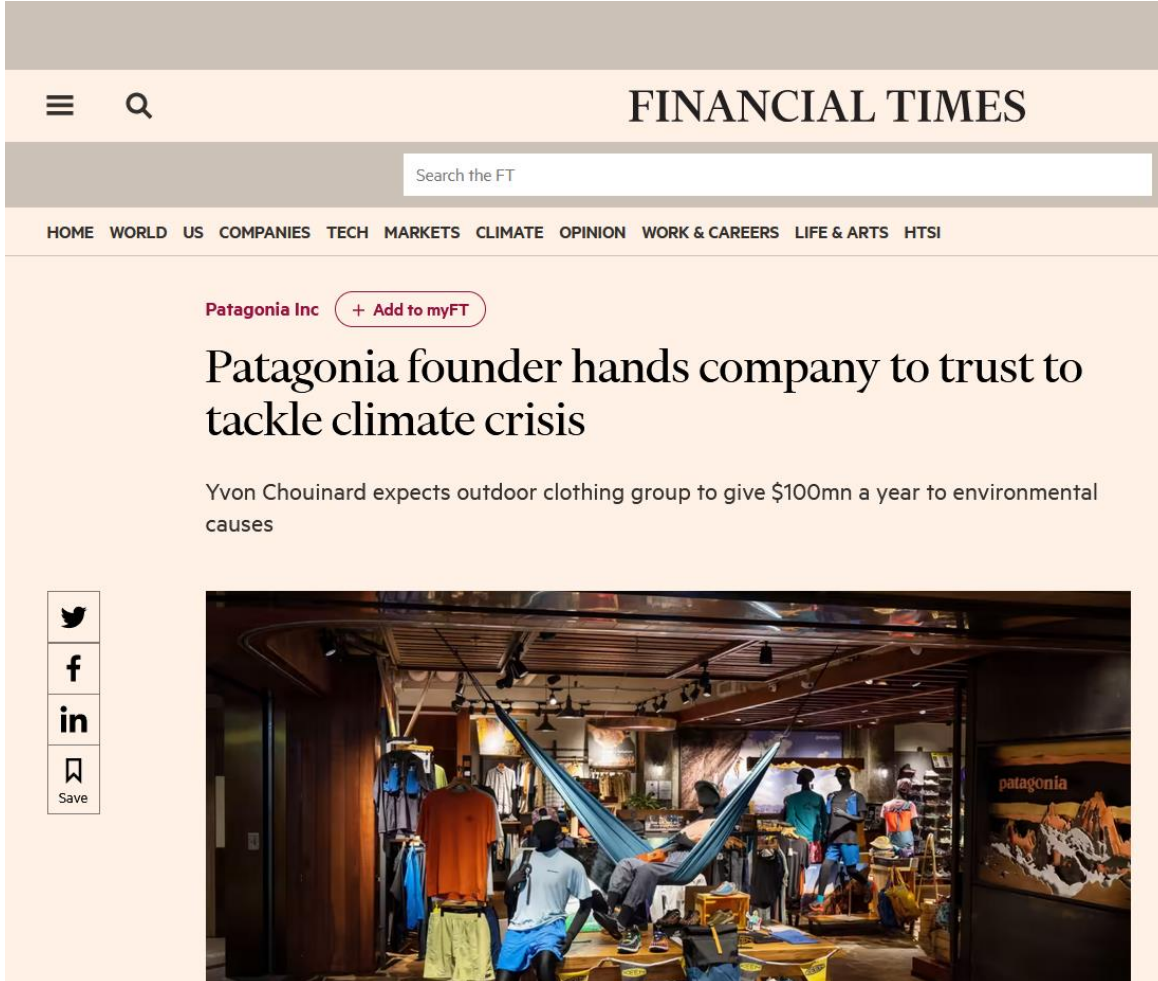


Nonprofit organisation

- A **nonprofit organization (NPO)**

- Legal entity with a collective, public, or social benefit primary goal,
- The main goal is not to generate a profit for its owners.
- A nonprofit is subject to the non-distribution constraint: profit must be committed to the organization's purpose, not taken by private economic agents.
- political organizations, schools, churches, social clubs, and consumer cooperatives, enterprise foundations
- Enterprise foundations: Bosch, Bertelsmann, Carlsberg, Hershey, Rolex, Patagonia → owned by foundations

Non-profit: Enterprise Foundations



- <https://www.enterprisefoundations.dk/what-is-an-enterprise-foundation/>
- <https://hbr.org/2022/10/what-happens-when-a-company-like-patagonia-becomes-a-nonprofit>
- <https://www.carolinapoliticalreview.org/editorial-content/2022/10/13/politics-philanthropy-and-patagonia-2022s-climate-change-reckoning>