

# Public Economics

Level 2

2020-2021

Microeconomics recap

Stéphane Benveniste

[stephane.benveniste@sciencespo.fr](mailto:stephane.benveniste@sciencespo.fr)

**SciencesPo**

# Microeconomics recap

Microeconomics **modelizes** the **behavior of economic agents** (consumers, households, firms, etc.) and **their interactions** on the markets.

These are stylized reasoning, which do not aim at precisely describing the complex functioning of those agents, but rather the main mechanisms.

# Three fundamental principles in microeconomics

❖ Each choice has an opportunity cost

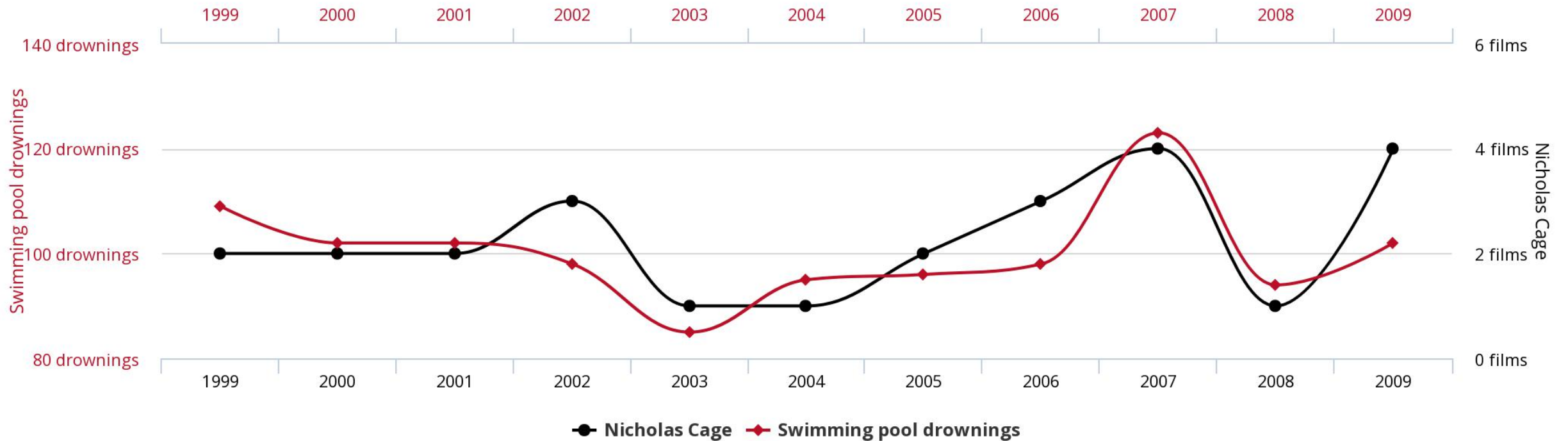
The satisfaction from the best alternative that we give up when taking a decision

❖ Individuals optimize their choices and the resources they devote to it

❖ Rational individuals use marginal reasoning

# Distinction correlation / causality

Number of people who drowned by falling into a pool  
correlates with  
Films Nicolas Cage appeared in



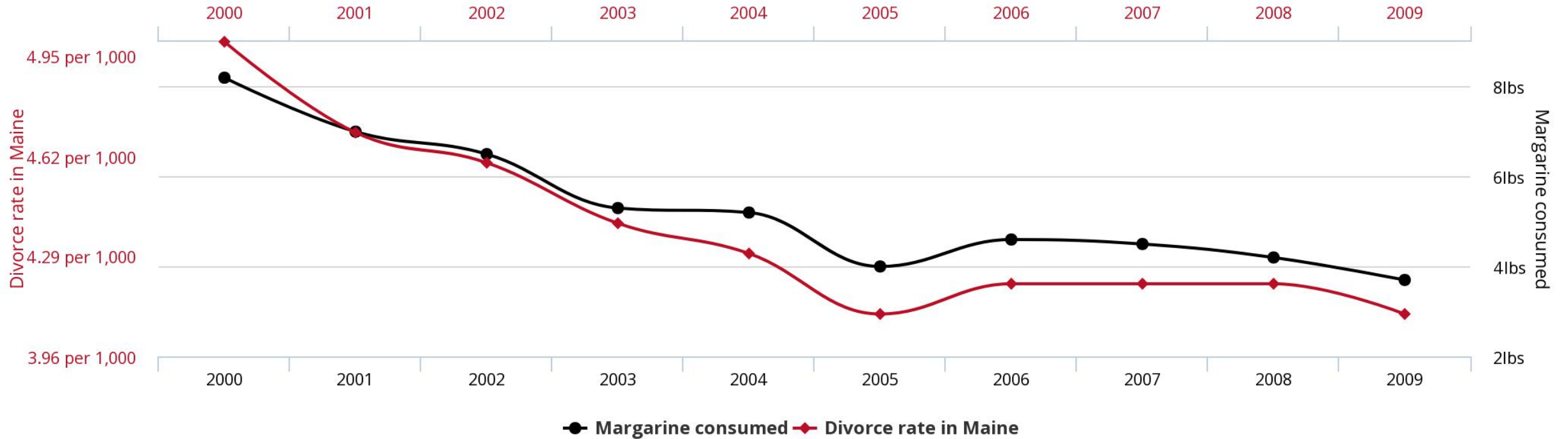
tylervigen.com

Obviously, we may encounter many spurious correlations, that should not be interpreted as causal.

This holds true even when we talk about a reform and an economic outcome that theoretically make more sense than this.

# Distinction correlation / causality

## Divorce rate in Maine correlates with Per capita consumption of margarine



# Pure and perfect competition: 4 hypotheses

- ❖ **Atomicity of agents:** sellers and buyers are **price-takers**
- ❖ **Homogeneity of goods:** no product differentiation
- ❖ **Transparency of the market:** prices convey all information
- ❖ **Fluidity of the market:** no entry, exit, or transaction costs

# Consumer theory: preferences

- ❖ We suppose that individuals have preferences over **baskets of goods**
- ❖ Two hypothesis:
  - ❖ **Atomicity**: agents are too small to influence the market. They are price-takers
  - ❖ Consumer choices do not influence their income (happens on the labour market, not the goods market)
- ❖ We observe **choices**, not directly preferences  
Under the principle of revealed preferences, we can however infer preferences from choices
- ❖ Preferences allow to construct **indifference curves**  
(Vilfredo Pareto)
- ❖ Preferences are **constrained** by the budget, time, and the goods prices

# Indifference curves: some properties

## 1. Completeness of preferences

Implication: there exists an infinity of indifference curves

## 2. Non-satiation of preferences

An individual always prefer to consume more

Let  $P'(x'; y)$  and  $P(x; y)$ , if  $x' > x$ , then  $P' \succ P$

Implication: indifference curves are decreasing

## 3. Transitivity of preferences

If  $A \succ B$  and  $B \succ C$ , then  $A \succ C$

Implication: indifference curves never cross

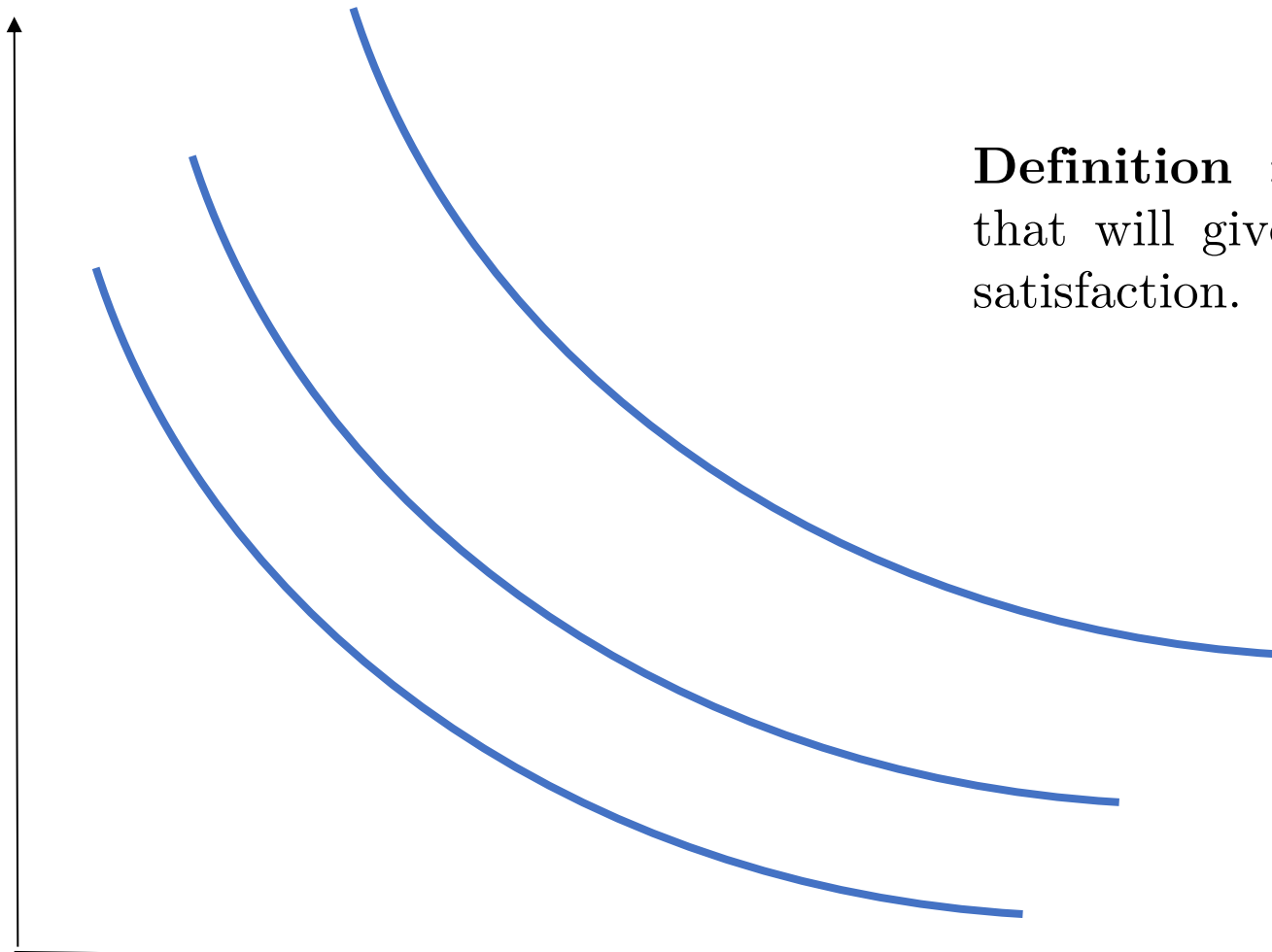
## 4. Convexity of preferences

Taste for diversity, preference for a mix



# Indifference curves: representation

Quantity of good B



**Definition** : all combinations of two goods that will give the consumer a similar level of satisfaction.

Quantity of good C

# Marginal rate of substitution (MRS)

- ❖ Framework with two goods
- ❖ The MRS is the quantity of a good that a consumer is ready to exchange against one unit of another good, keeping constant his level of satisfaction
- ❖ The absolute value of the slope of the indifference curve is the MRS  
It varies along the curve

# Constraint (budget, time, etc.)

❖ The constraint is represented by a straight line, which is a function of relative prices

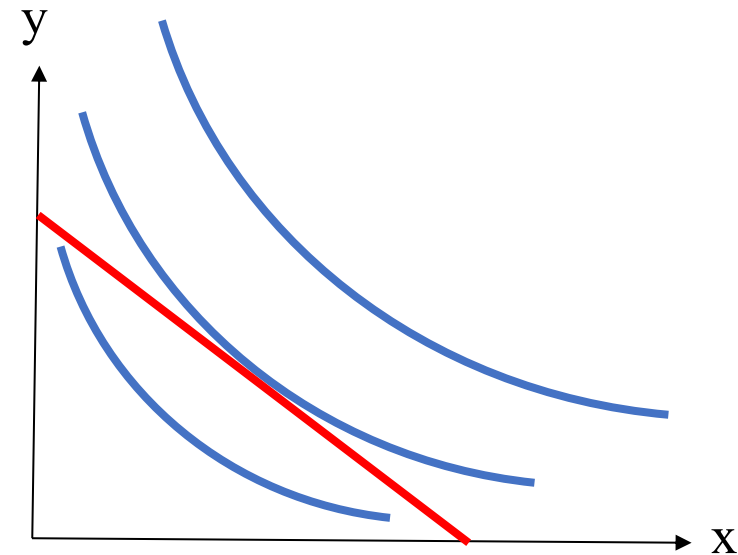
❖ Spendings cannot exceed the budget  $B$

We have  $B \geq p_x \cdot x + p_y \cdot y$ , or,

when the constraint is saturated  $B = p_x \cdot x + p_y \cdot y$

❖ Reworking the equation

$$y = -\frac{p_x}{p_y} \cdot x + \frac{R}{p_y}$$

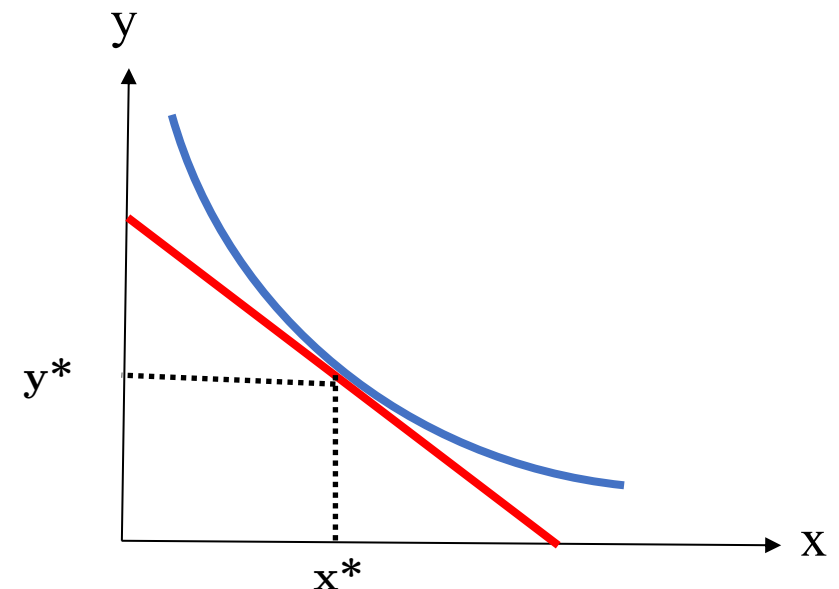


# The optimal choice

- ❖ The optimal choice corresponds to the situation when the marginal rate of substitution (MRS) is equal to relative prices

Intuition: as long as the preference of an individual for a specific good compared to another one is higher than their relative prices, the individual will favor the preferred good and exchange the other one

- ❖ Graphically, it corresponds to the tangency between the **constraint line** (relative prices) and the **indifference curve** (MRS), which is the further away possible from the origin



# Utility theory

- ❖ The **utility** quantifies the level of satisfaction procured by a basket of consumption relatively to other baskets.
- ❖ Utility is **ordinal** (not cardinal)  
In no instance the value of utility indicates an absolute level of satisfaction
- ❖ Thus, the level of utility does not matter, what does is its variation, the marginal utility
- ❖ The **marginal utility is decreasing**
- ❖ At equilibrium, the **optimality condition** specifies that the **ratio of marginal utilities** is equal to the **relative prices**

# Complexifications of the consumer theory

- ❖ Intertemporal choices
- ❖ Choices under uncertainty

# Producer theory

- ❖ The objective of the producer is symmetric: **profit maximization under a cost constraint**  
The cost function depends on the quantity produced  $C(Q)$
- ❖ Two hypothesis under perfect competition
  - ❖ Atomicity: the firm is too small to influence prices, it is also price-taker
  - ❖ The firm is not limited by demand and can sell whatever quantity it produces
- ❖ The firm chooses an optimal production level and sells at market price

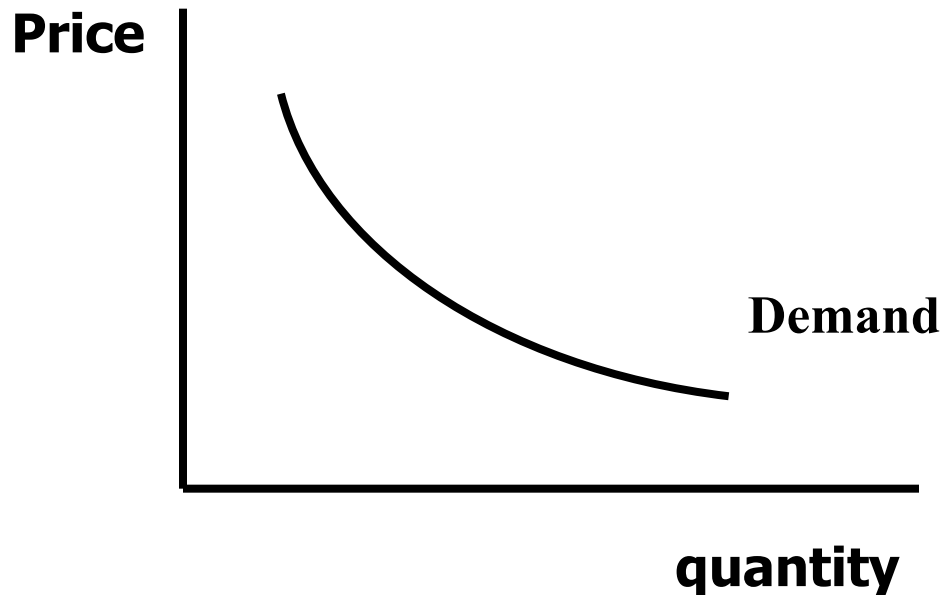
# Producer optimization

- ❖ The marginal cost of the firm is increasing
- ❖ Optimization principle: the firm produces up to the level where its marginal cost reaches its marginal benefit (which is the market price)
- ❖ Marginal productivity of factors allow the capital / labour arbitrage  
Under this framework, the isoproduction curves (isoquant) correspond to a similar level of production for different combinations of capital and labour
- ❖ The **Technical marginal substitution rate (TMSR)** is the implicit price of a factor as a function of the other one.  
It indicates what quantity of capital must be substituted to one unit of labour in order to maintain production constant.



# Aggregate demand (partial equilibrium)

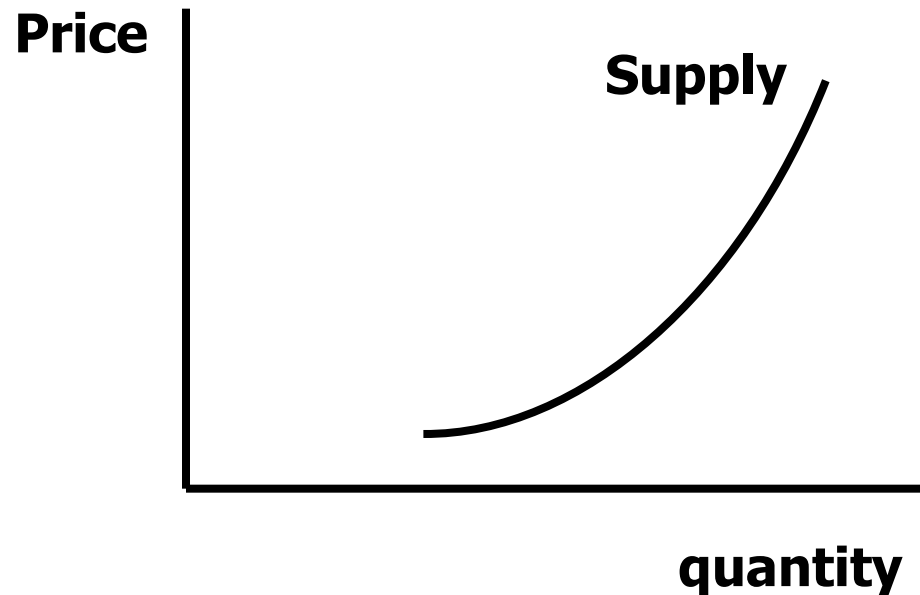
- ❖ The quantity demanded for a specific good (partial equilibrium) is decreasing when its price increases
- ❖ The demand curve represents at every price the total quantity demanded at that price



- ❖ Demand curve shifts due to changes in:
  - incomes,
  - tastes,
  - prices of substitute or complement goods,
  - expectations about future
  - etc.

# Aggregate supply

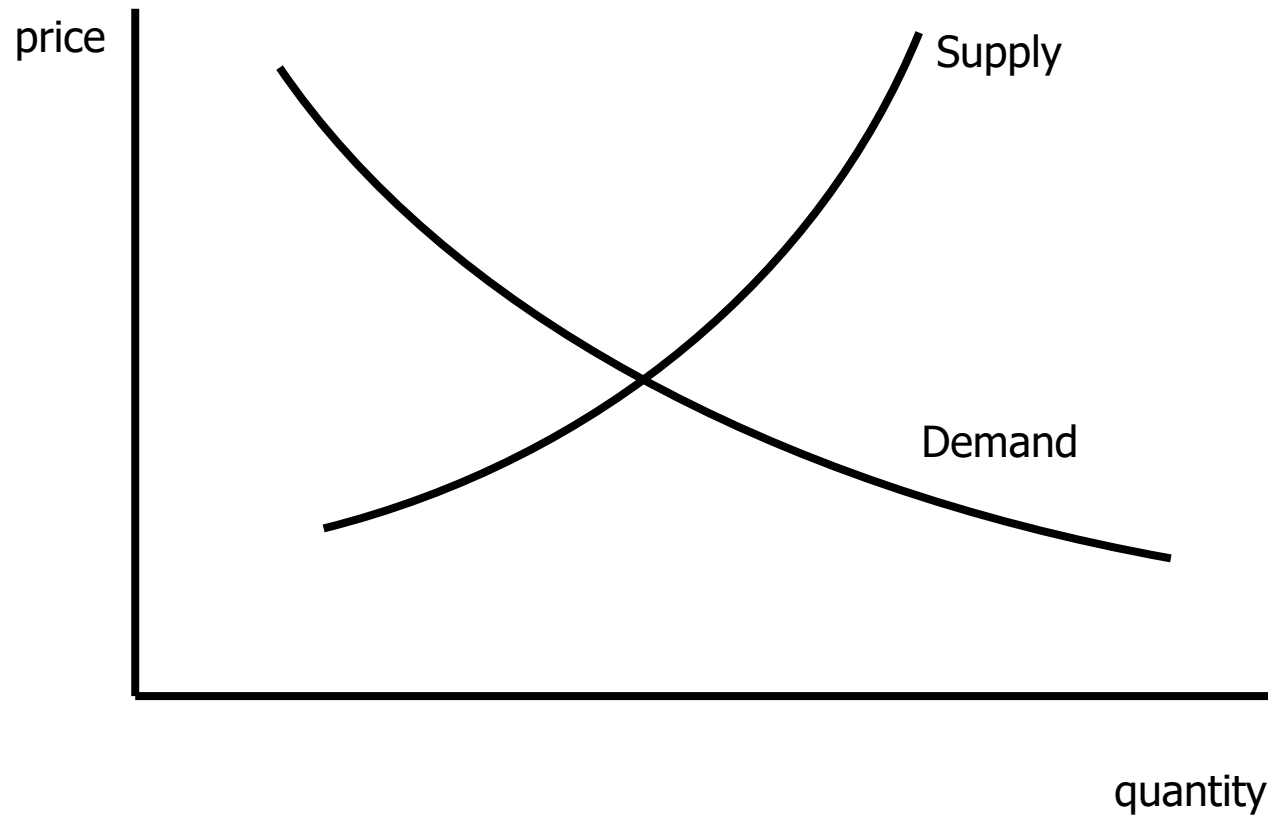
- ❖ The quantity offered for a specific good (partial equilibrium) is increasing when its price increases
- ❖ The supply curve represents at every price the total quantity offered at that price



- ❖ Supply curve shifts due to changes in:
  - technology,
  - input prices,
  - policies,
  - etc.

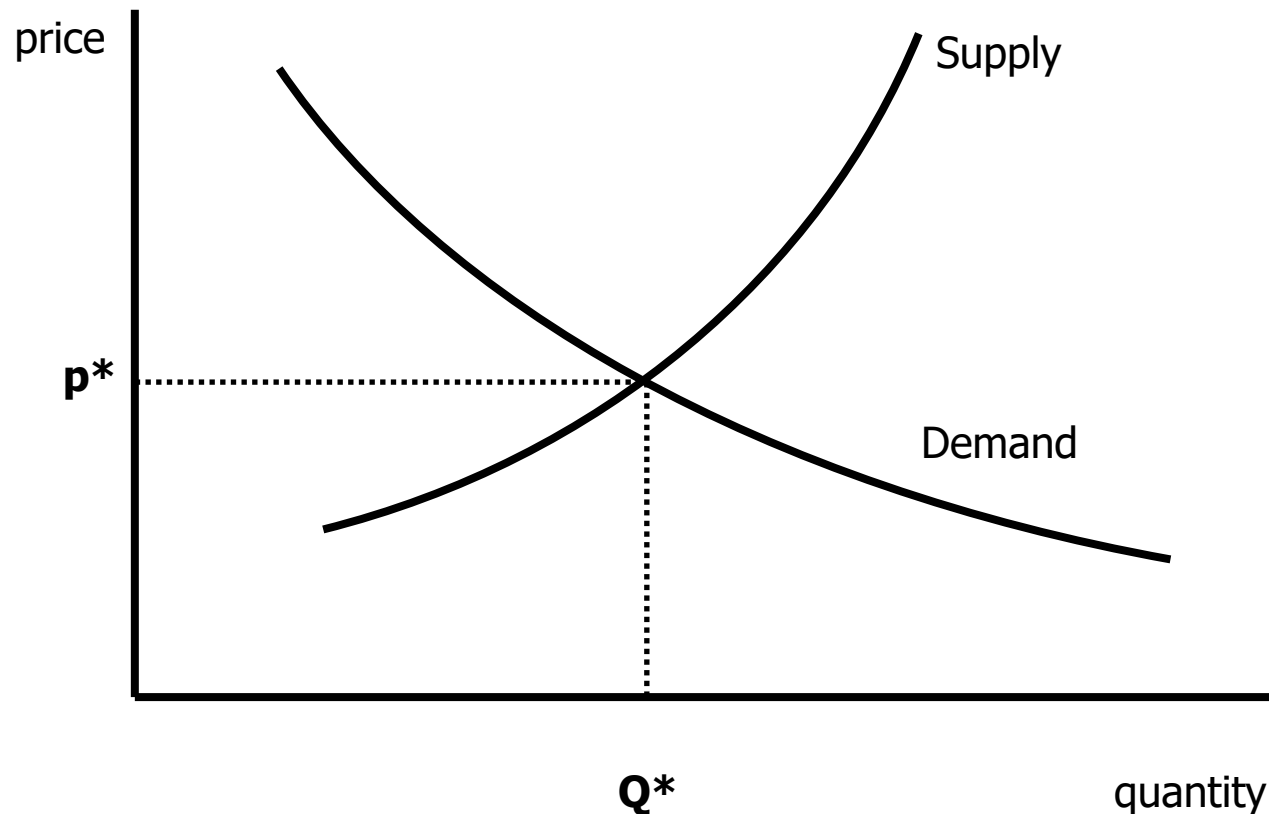
# Supply and demand

- ❖ When supply and demand are combined, what are the prices and quantity?



# Supply and demand

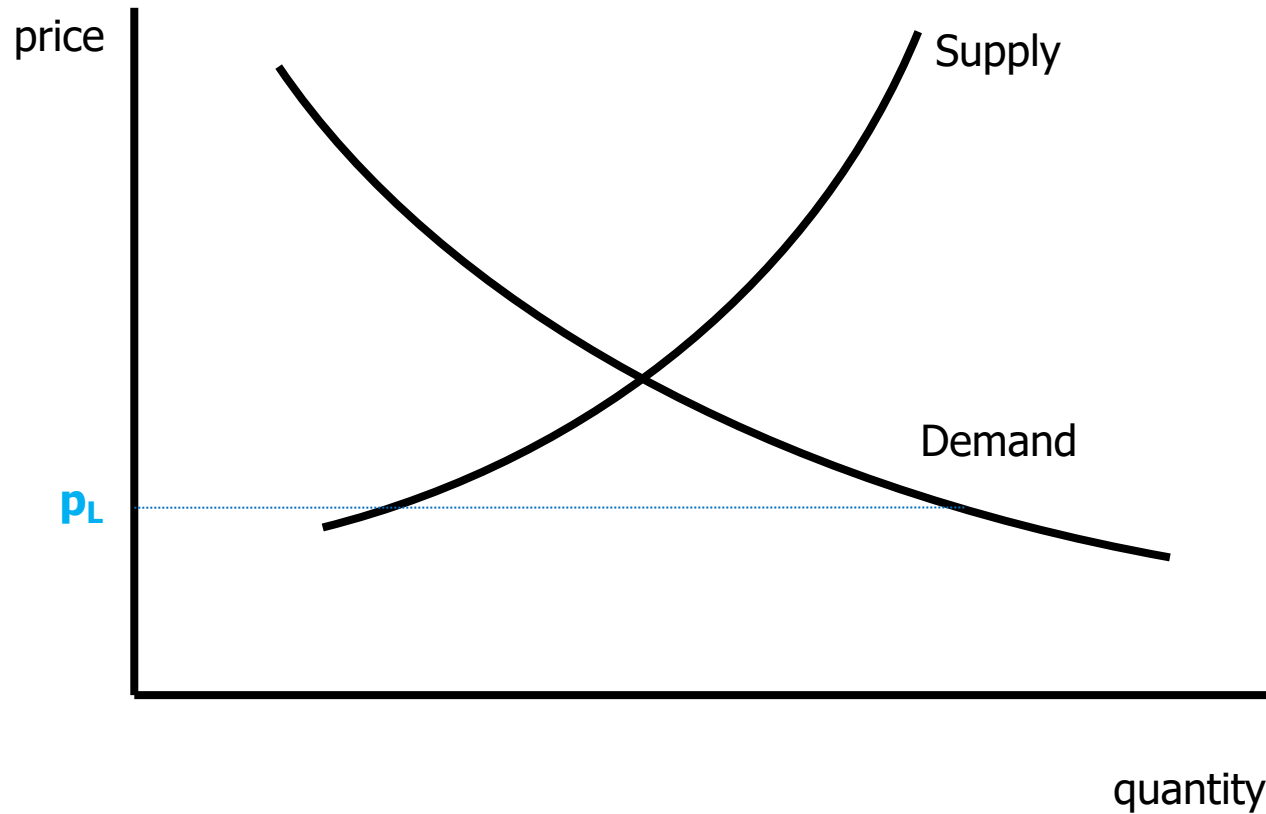
- ❖ When supply and demand are combined, what are the prices and quantity?  $\Rightarrow$  **Equilibrium price  $p^*$  and quantity  $Q^*$  at the intersection of both curves**



# Walrasian auction and general equilibrium

- ❖ Léon Walras (French mathematical economist, 1834-1910)
- ❖ Fictive approximation of the "tâtonnement" (trial and error)
  - ❖ The Walrasian auctioneer (“*crieur*” initially) centrally receives all demands for the good at every possible price
  - ❖ Through this process, the market clearing price is found
  - ❖ At this price, demand equals supply
- ❖ Alternative interpretation: convergence forces of market dynamics
  - ❖ Potentially temporary disequilibrium where supply and demand differ
  - ❖ Adaptation of prices if excess demand or supply

# Low price means excess demand

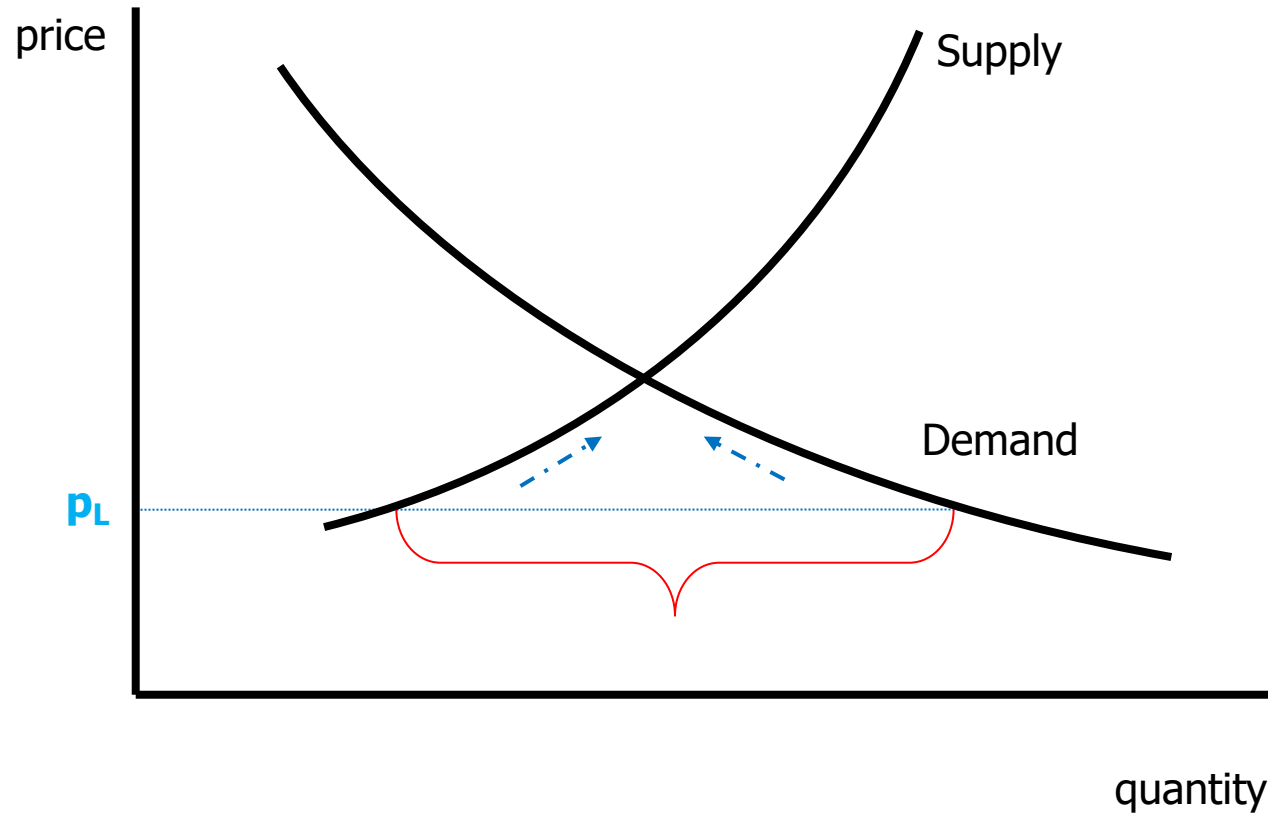


❖ The price of the good is temporarily too low

Consumers want to consume but they cannot because at this price there is too little production

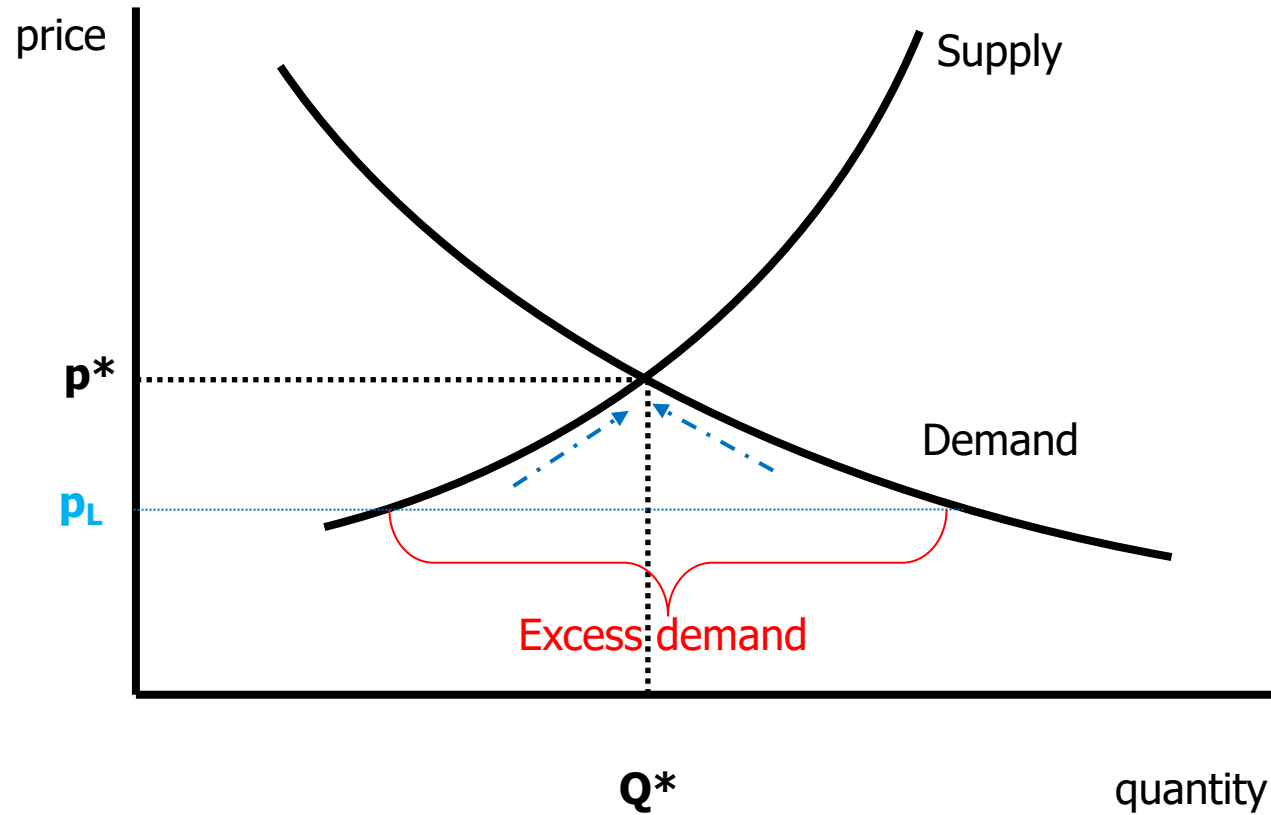
Consumers are willing to pay more. Producers will anticipate this and produce more

# Low price means excess demand



- ❖ The adjustment process will continue until the equilibrium price is reached

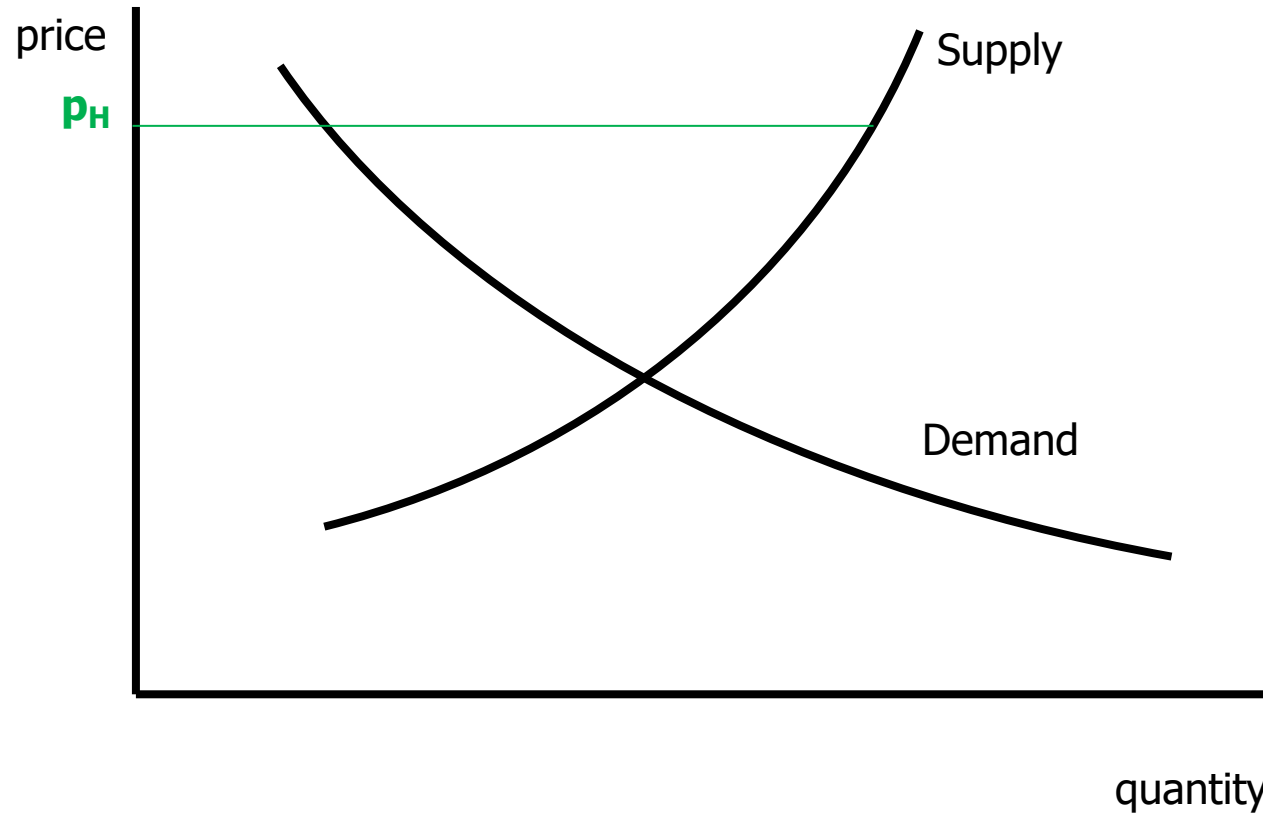
# Low price means excess demand



- ❖ The adjustment process will continue until the equilibrium price is reached



# High price means excess supply

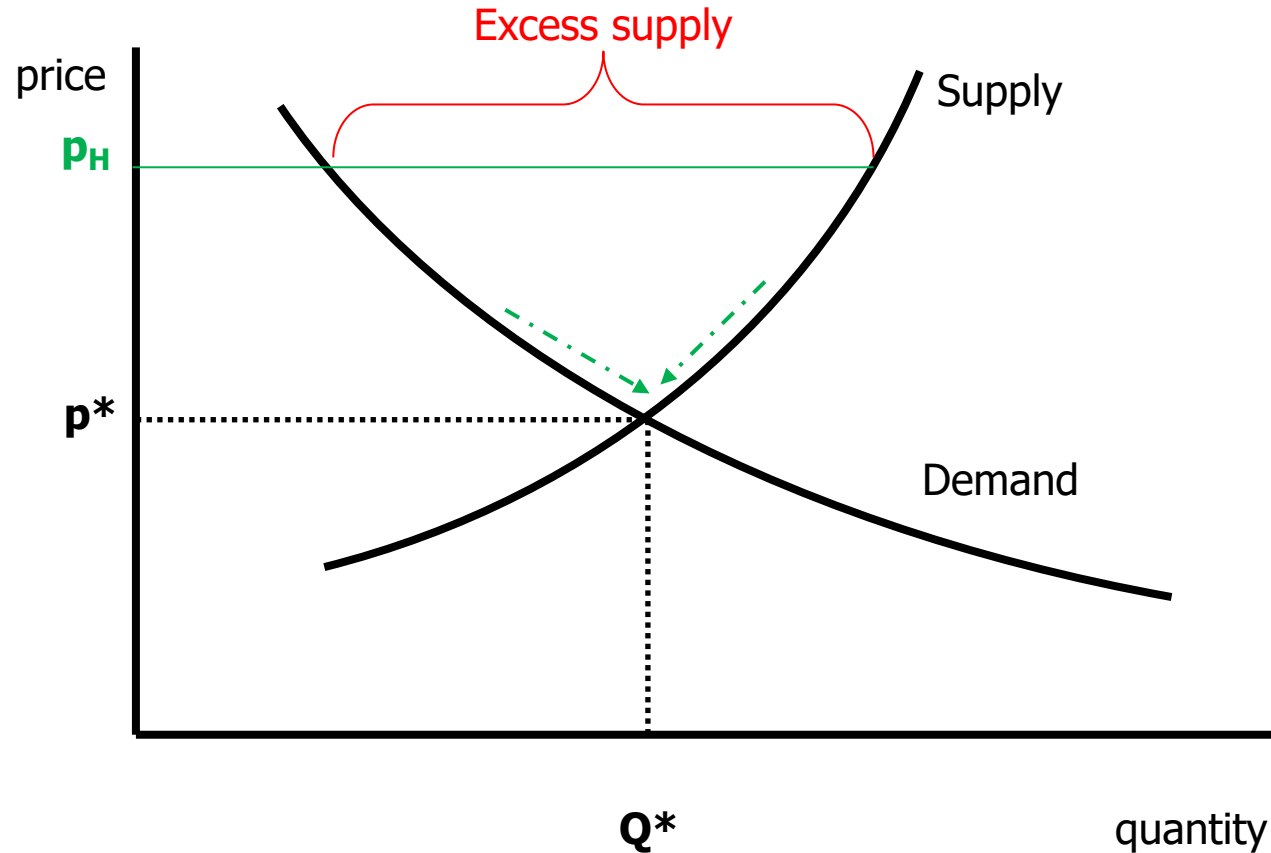


❖ The price of the good is temporarily too high

Producers produce too much and the consumers do not want to buy that quantity for such a price

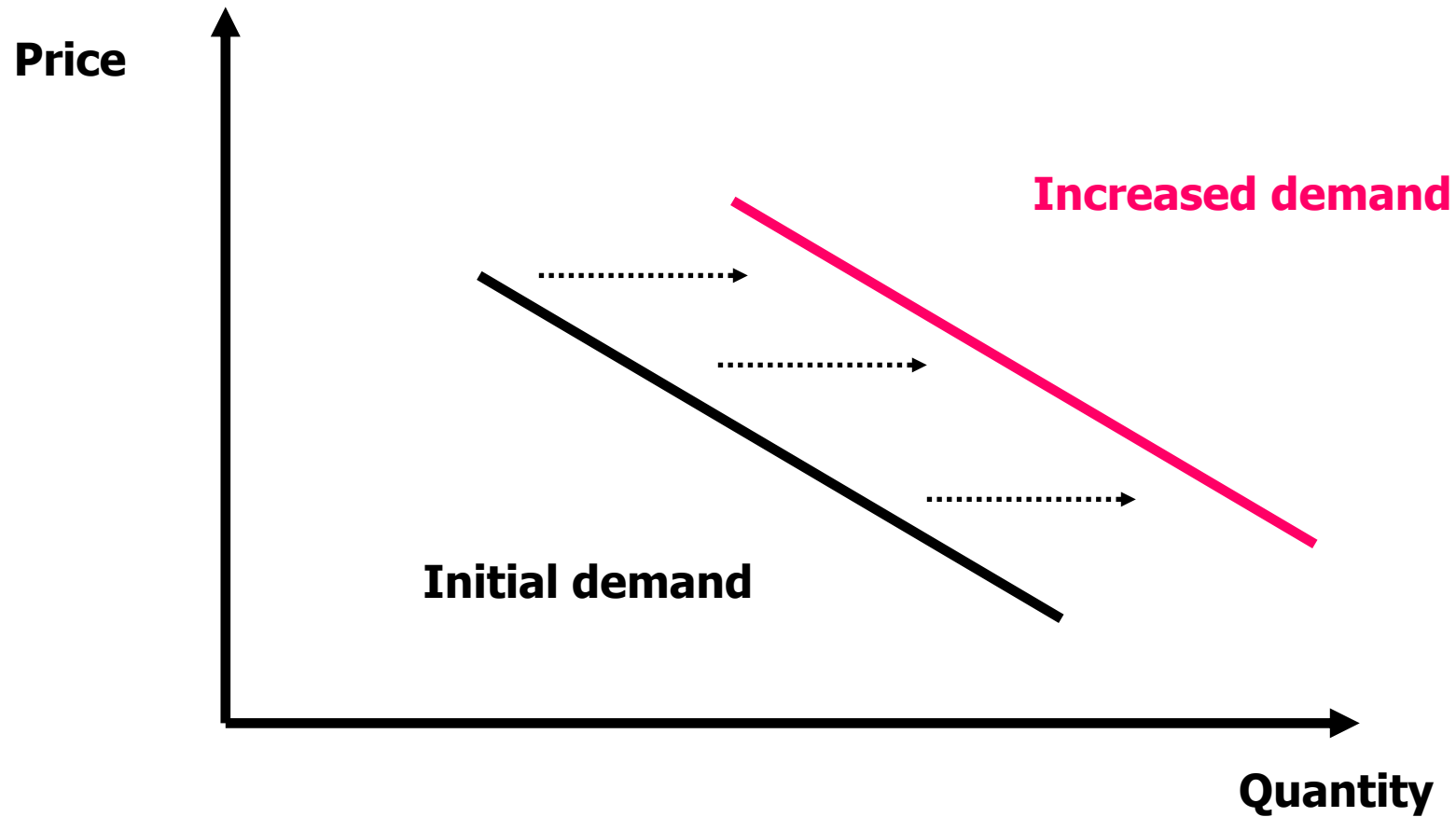
Producers will decrease the price, in order to be able to sell

# High price means excess supply

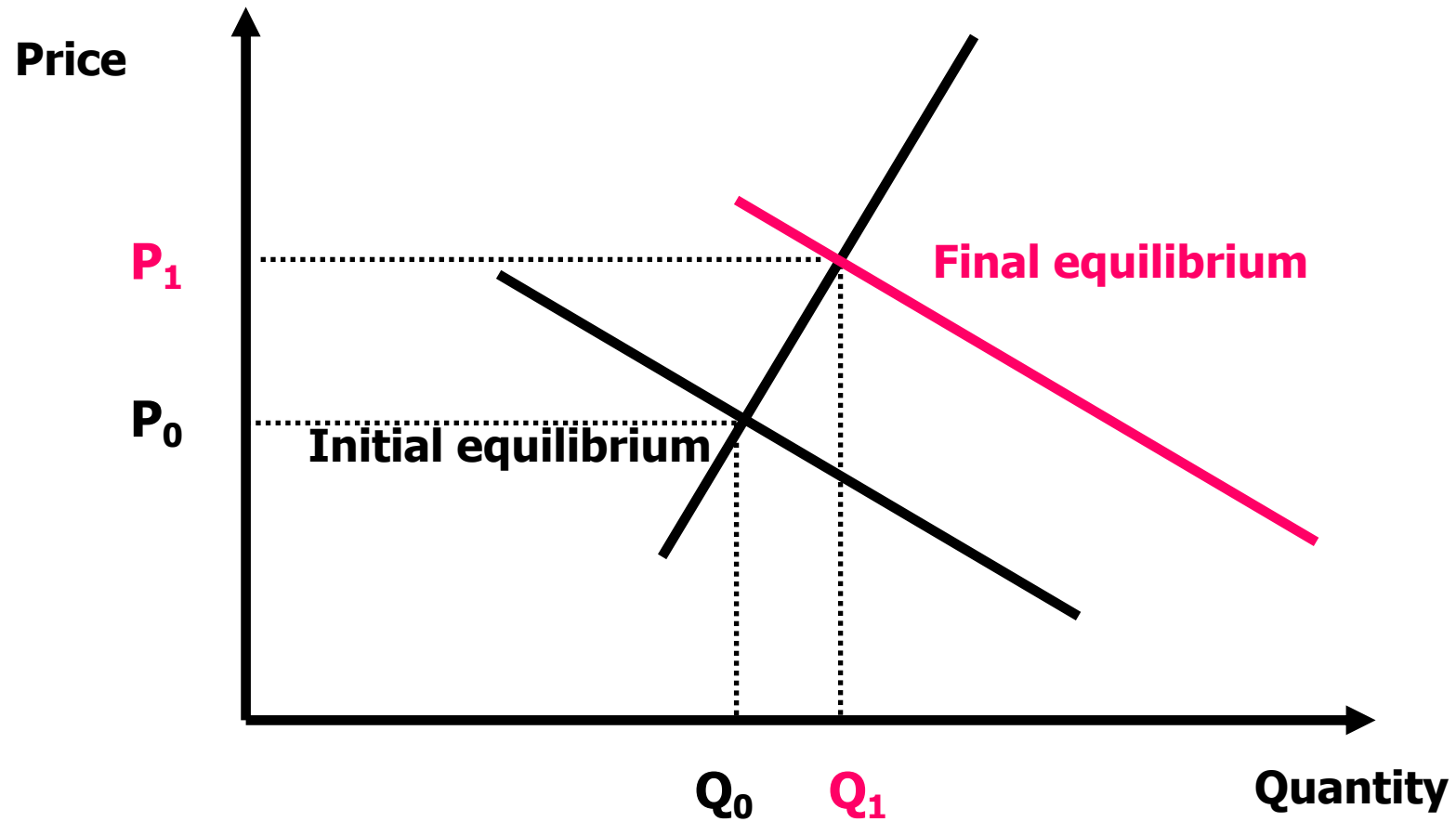


- ❖ The adjustment process will continue until the equilibrium price is reached  
For some industries, it is also possible to adjust temporarily through storage and maintain a high price

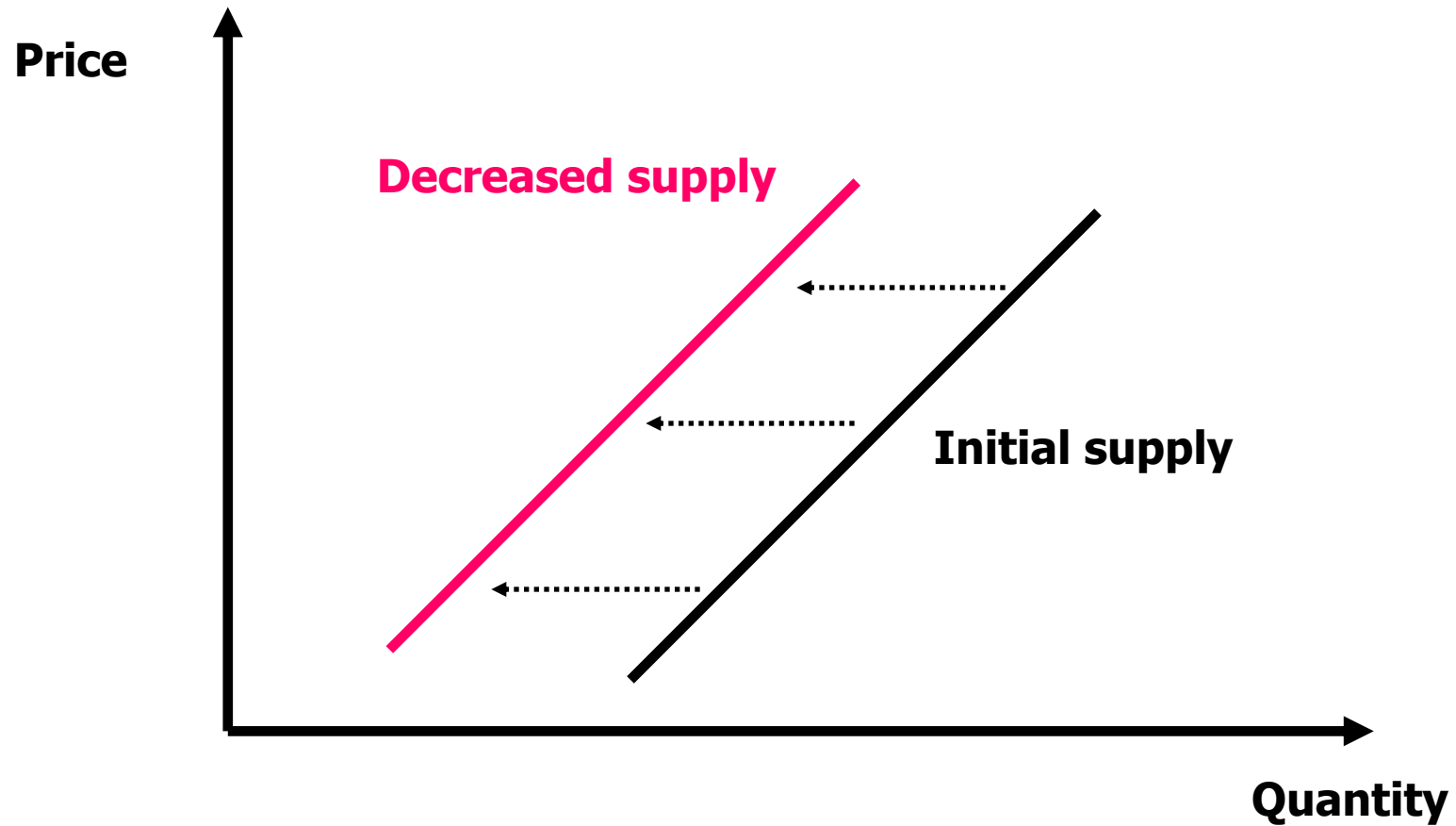
# Shifts in demand and supply



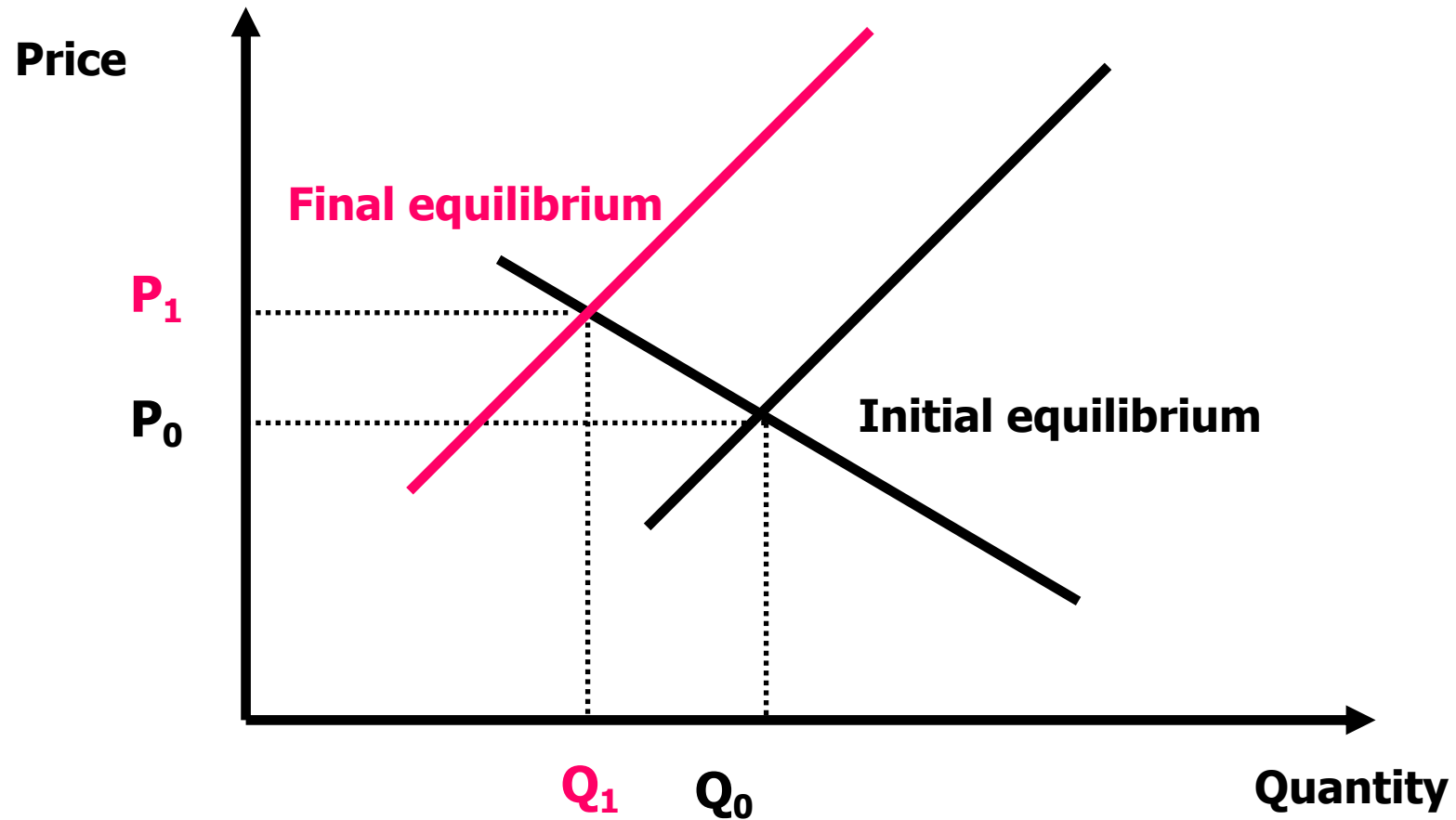
# Shifts in demand and supply



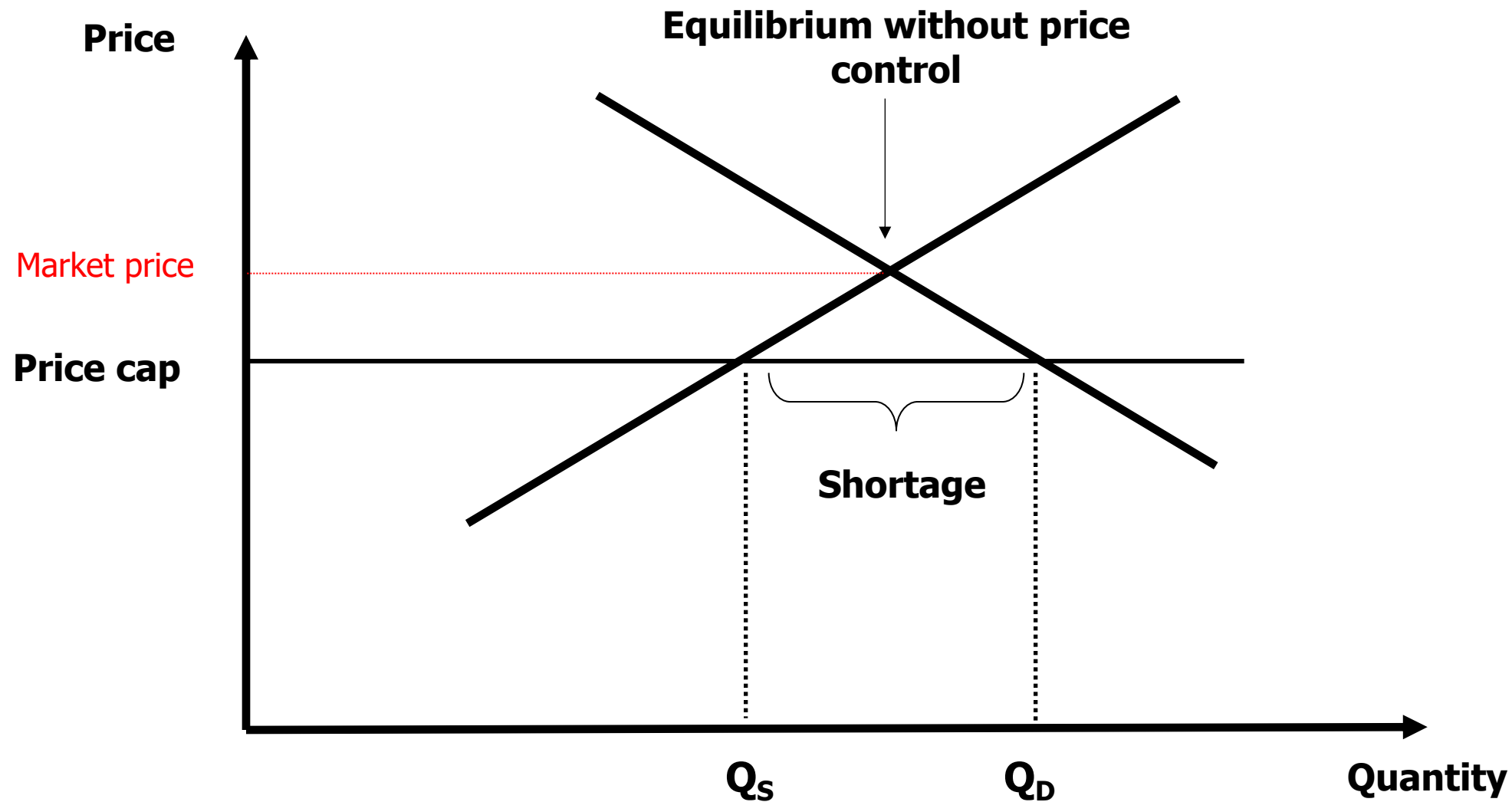
# Shifts in demand and supply



# Shifts in demand and supply



# Price control



# Price elasticities

❖ An essential characteristic of demand is how sensitive it is to price variation

❖ We want a notion that is scale free

For a 1% increase in prices, by what % does the quantity consumed fall?

$$\text{❖ } \epsilon_P = -\frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = -\frac{\Delta Q \cdot P}{\Delta P \cdot Q}$$



# Elasticities and typology of consumption goods

## ❖ Income-elasticity

Measures the reaction of consumption to an income variation

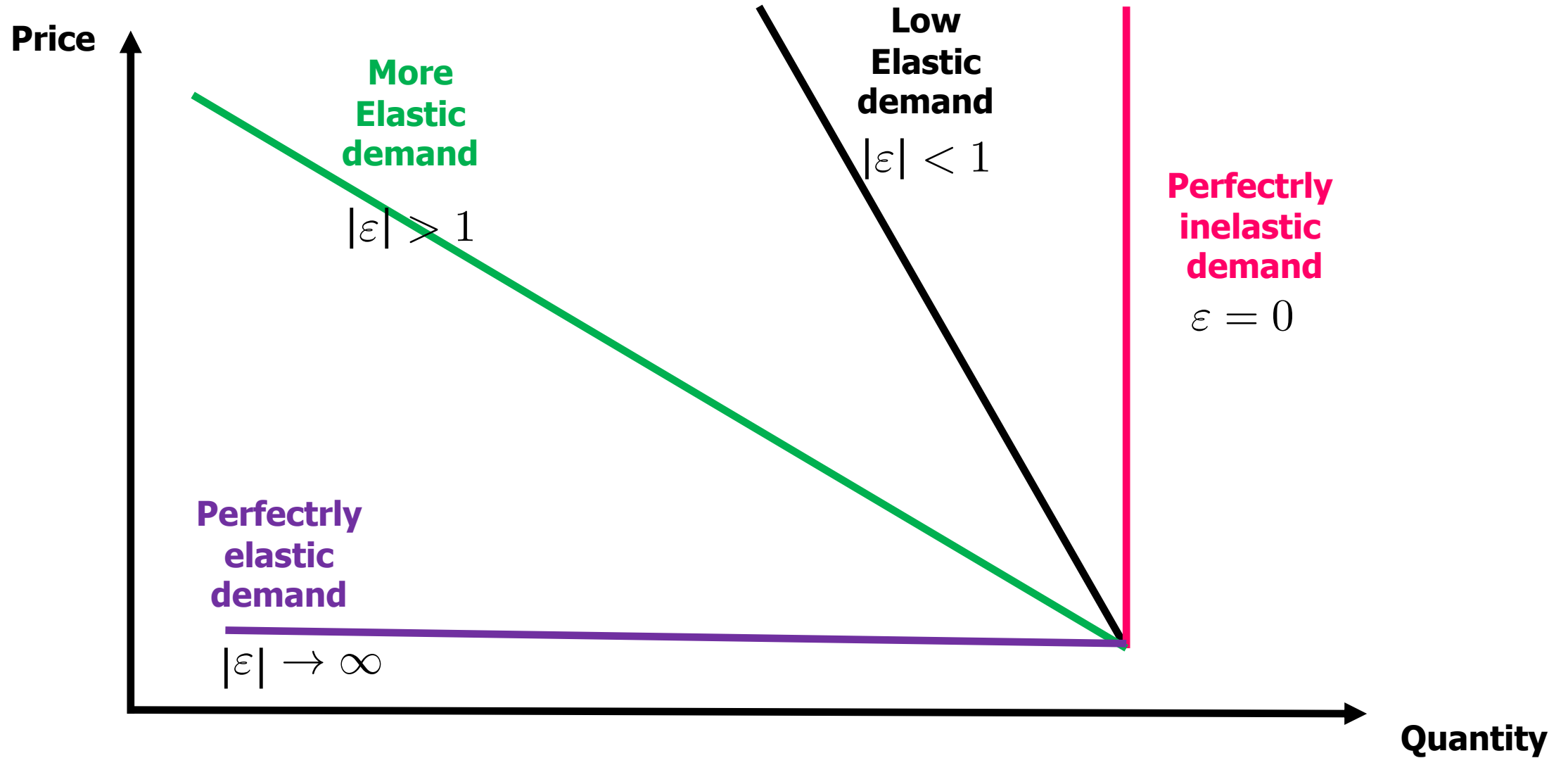
- ❖ Normal good:  $\varepsilon_R > 0$ , consumption increases with income
  - ❖ Luxury good: consumption increases faster than income
  - ❖ *Bien de nécessité* (basic good?): consumption increases slower than income
- ❖ Inferior good:  $\varepsilon_R < 0$ , consumption decreases with income (ex: discount products)

## ❖ Price-elasticity

Measures the reaction of consumption to a price variation

- ❖ Ordinary good:  $\varepsilon_P < 0$ , consumption increases when price decreases
- ❖ Giffen good:  $\varepsilon_P > 0$ , consumption increases when price increases

# Price elasticities



# More indepth study of the supply curve

- ❖ Given a price, how much does a firm would like to supply?
- ❖ Objective: Maximize Profits = Revenues – Costs

# Marginal analysis of supply

- ❖ Marginal cost is increasing when the quantity produced is increasing
- ❖ Firms will produce more as long as marginal cost smaller than marginal benefit
- ❖ Therefore, optimization principle to determine the optimal level of production: **marginal cost = marginal benefit**
- ❖ In a perfectly competitive market, firms are price-taker  
=> **marginal benefit = price**
- ❖ New optimal rule: **marginal cost = price** (fixed costs are already paid)

# Firms decision

- ❖ Cost function is a function of quantity  $C(Q)$
- ❖ Firms maximize profits:  $\pi = PQ - C(Q)$
- ❖ First order condition:  $P = C'(Q)$   
Marginal cost is derivative of cost

# Entry of the firms

Long run  
perspective

Short run  
perspective

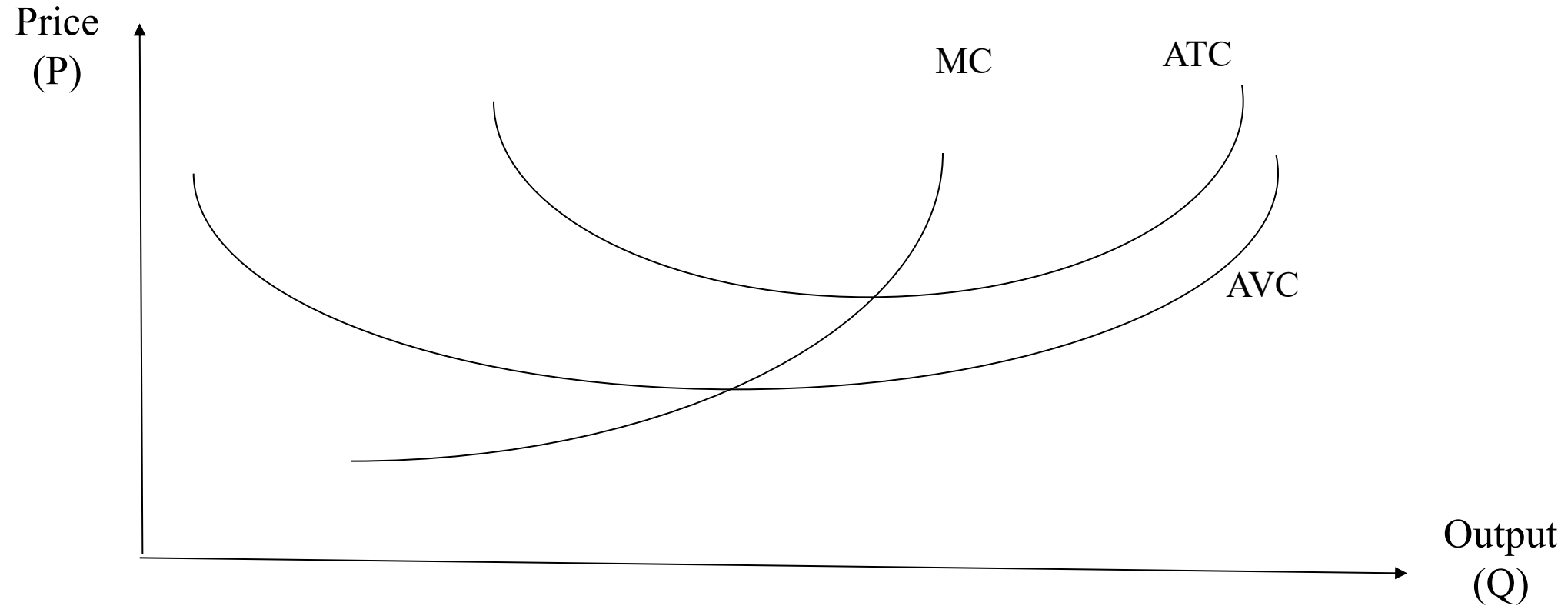
Build factory?

How much to produce?

- ❖ Total cost as a function fixed costs and variable costs (depending on quantity)

$$TC(Q) = FC + VC(Q)$$

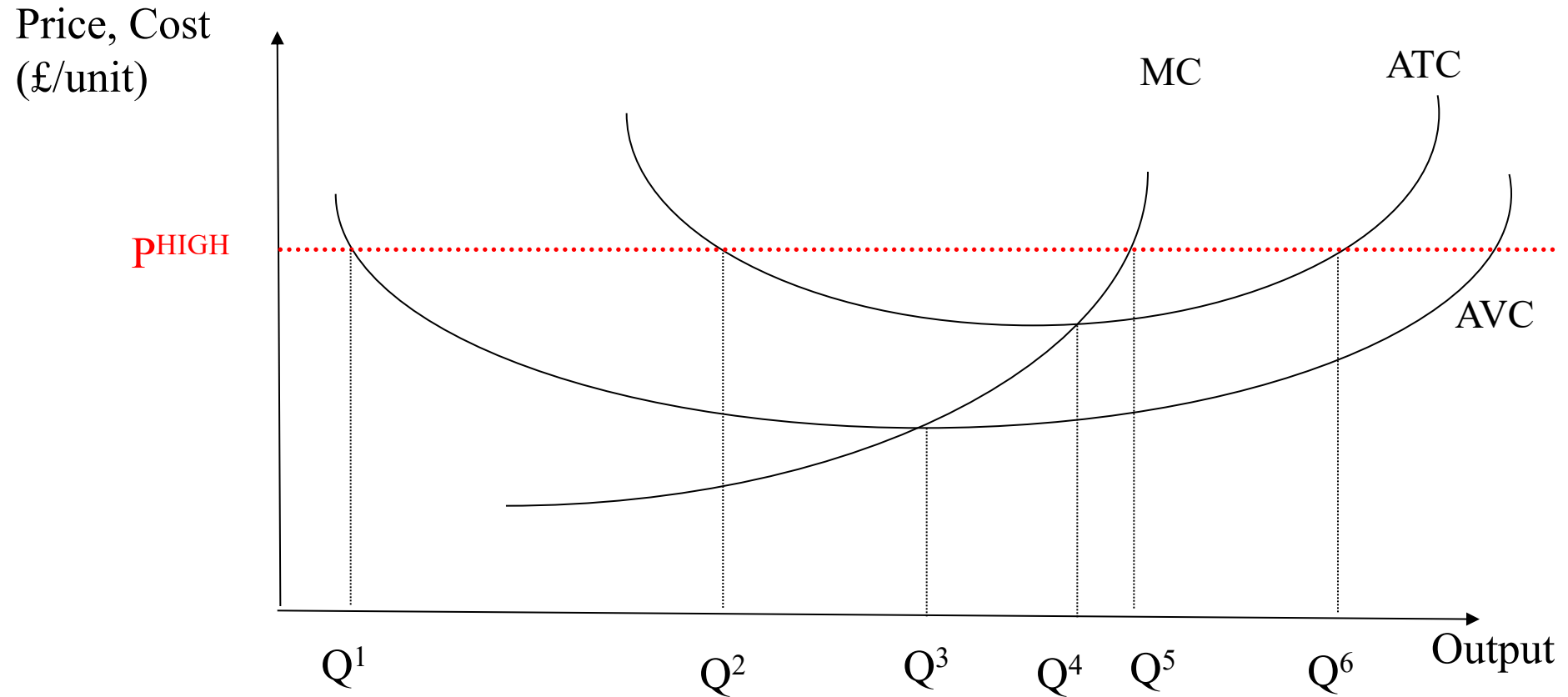
# Cost curves - graphically



❖ Marginal cost does not depend on total cost

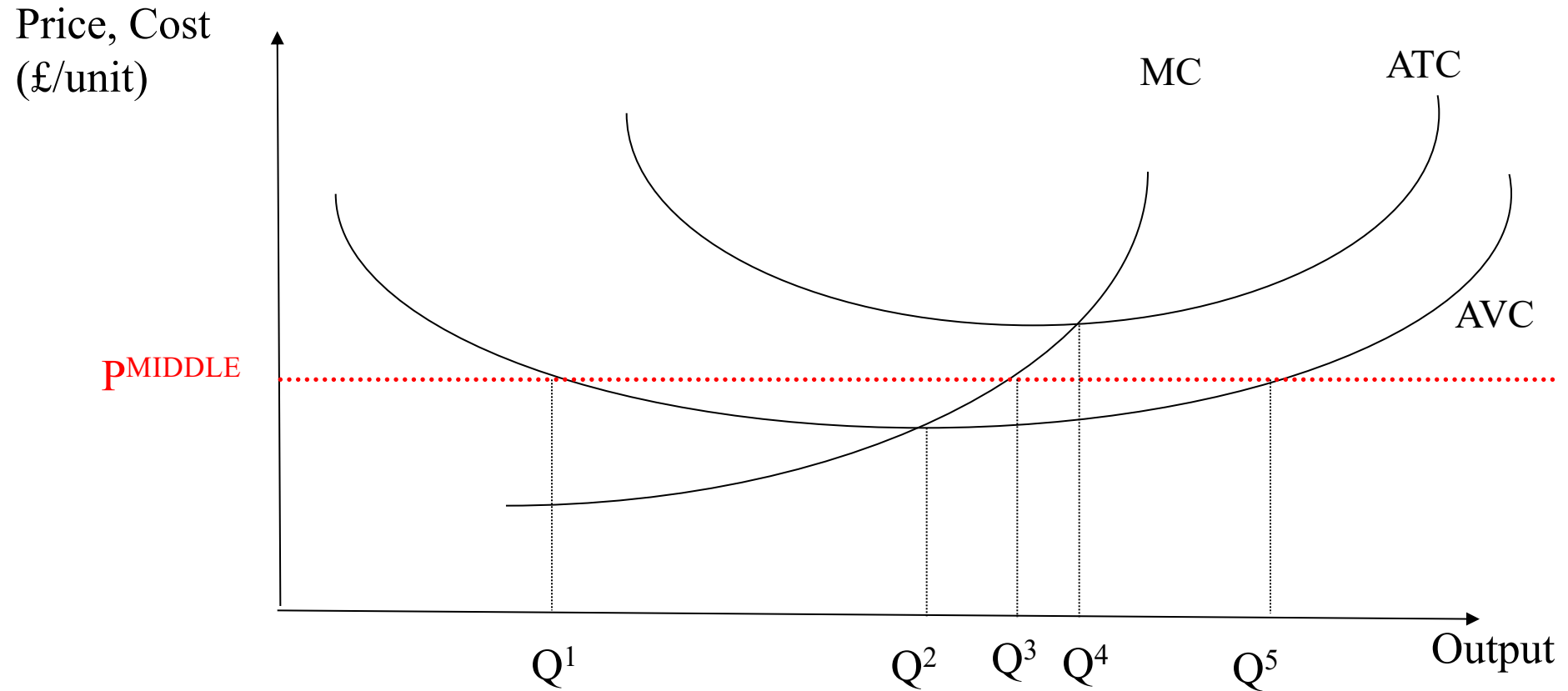
$$\begin{aligned} MC(Q) &= TC(Q + 1) - TC(Q) \\ &= FC(Q + 1) + VC(Q + 1) - FC(Q) - VC(Q) && \text{(fixed cost cancel out)} \\ &= VC(Q + 1) - VC(Q) \end{aligned}$$

# Supply of a competitive firm in the short run

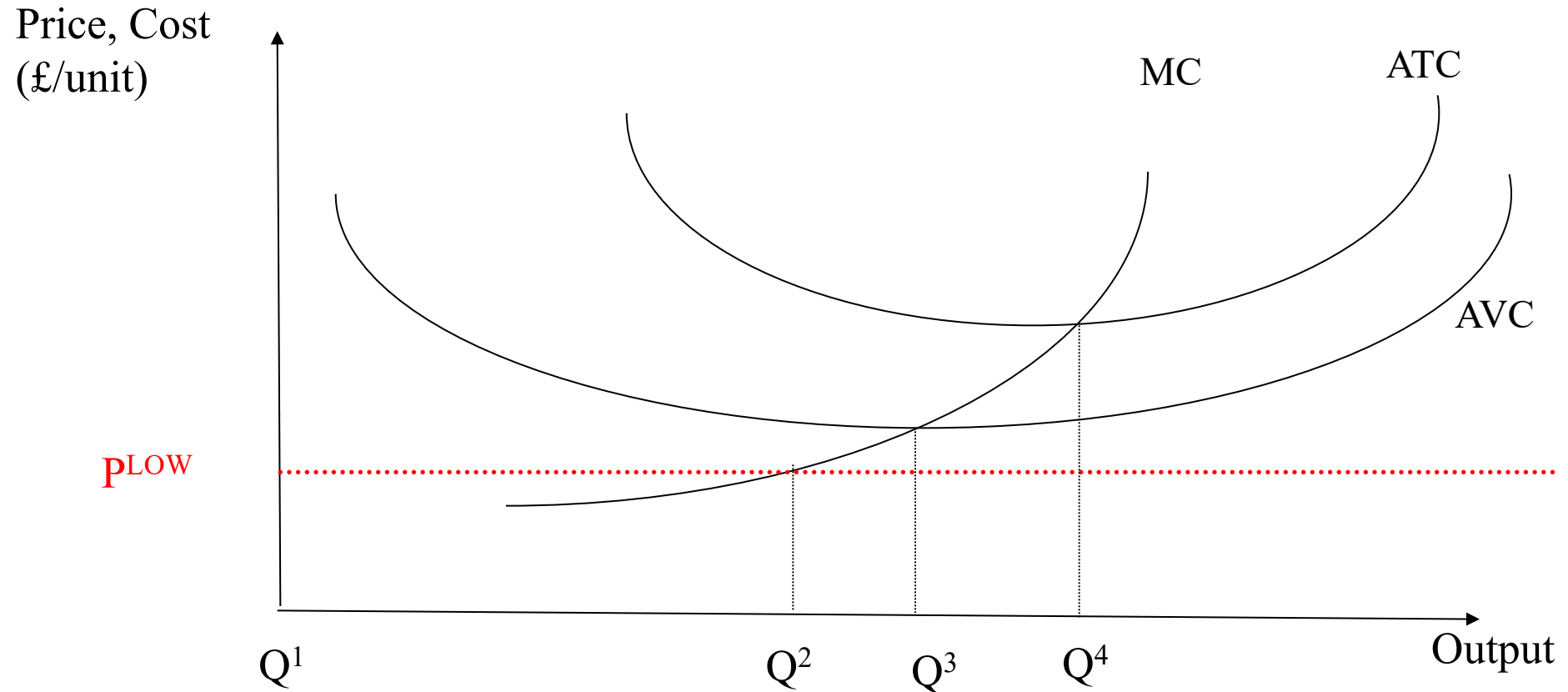




# Supply of a competitive firm in the short run

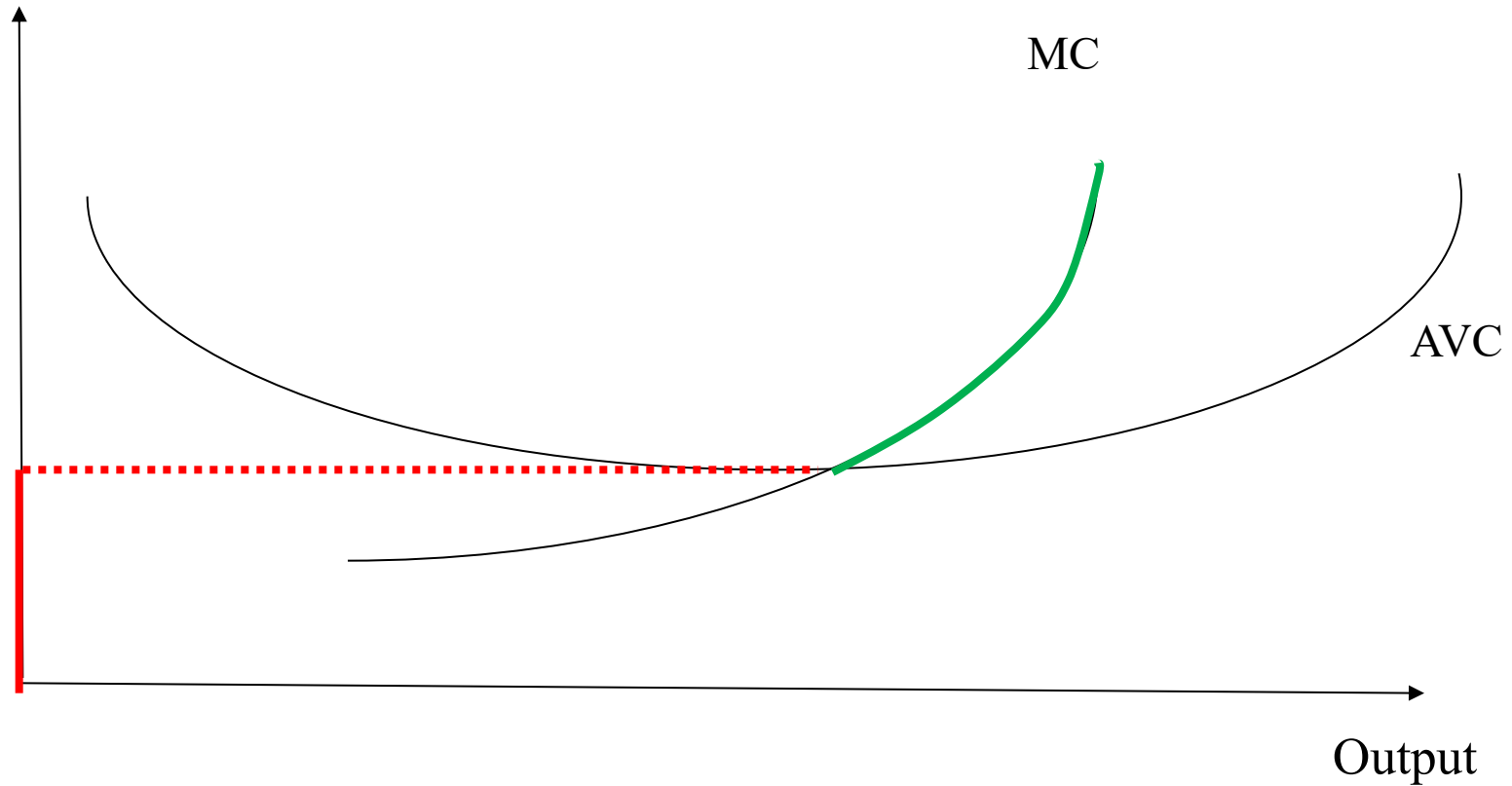


# Supply of a competitive firm in the short run



# Supply of a competitive firm in the short run

Price, Cost  
(£/unit)



If  $P \geq AVC$  produce at  $Q$  such that  $MC(Q)=P$

# Supply of a competitive firm in the short run

- ❖ In the short run fixed cost do not matter. The firm maximizes:

$$PQ - VC(Q)$$

- ❖ Marginal analysis. The firm chooses quantity  $Q$  such that:

$$P = MC(Q)$$

- ❖ But a firm should at least make 0+ profit:

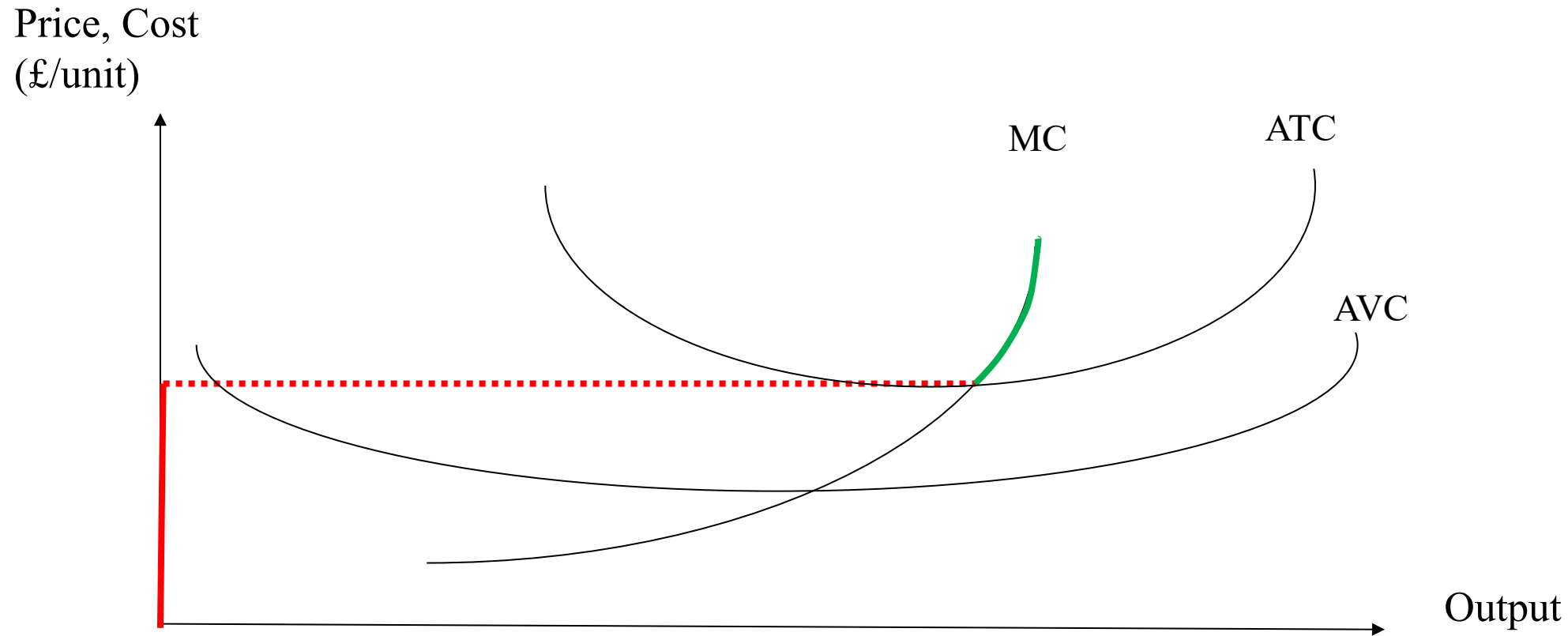
$$PQ - VC(Q) \geq 0$$

This means  $P \geq AVC(Q)$

# Takeaway - Supply in the short run

- ❖ Firms should sometimes produce even if the price they obtain is lower than their average total cost
- ❖ They lose money overall but start reimbursing their fixed cost.

# Supply of a competitive firm in the long run



❖ In the long run, fixed costs matter

Choose quantity such that  $P = M(C)$  as long as  $P > ATC$

Profit must be positive or nul  $\pi = PQ - TC(Q) \geq 0$

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*Conférence de méthode*  
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