

Micro for small displays

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Abbreviations

AC	Average cost
AR	Average revenue
AT	Average tax
ATC	Average total cost
AVC	Average variable cost
C	Capital
Ce	Cross-price elasticity of D
D	Demand
e	Price elasticity of demand
le	Income elasticity of D
L	Labour
LR	Long run
MC	Marginal cost
MR	Marginal revenue
MT	Marginal tax
MU	Marginal utility
P	Price

PPF	Production possibility fr.
Q	Quantity
qd	Quantity demanded
S	Supply
Se	Price elasticity of supply
SR	Short run
TC	Total cost
TR	Total revenue
TU	Total utility

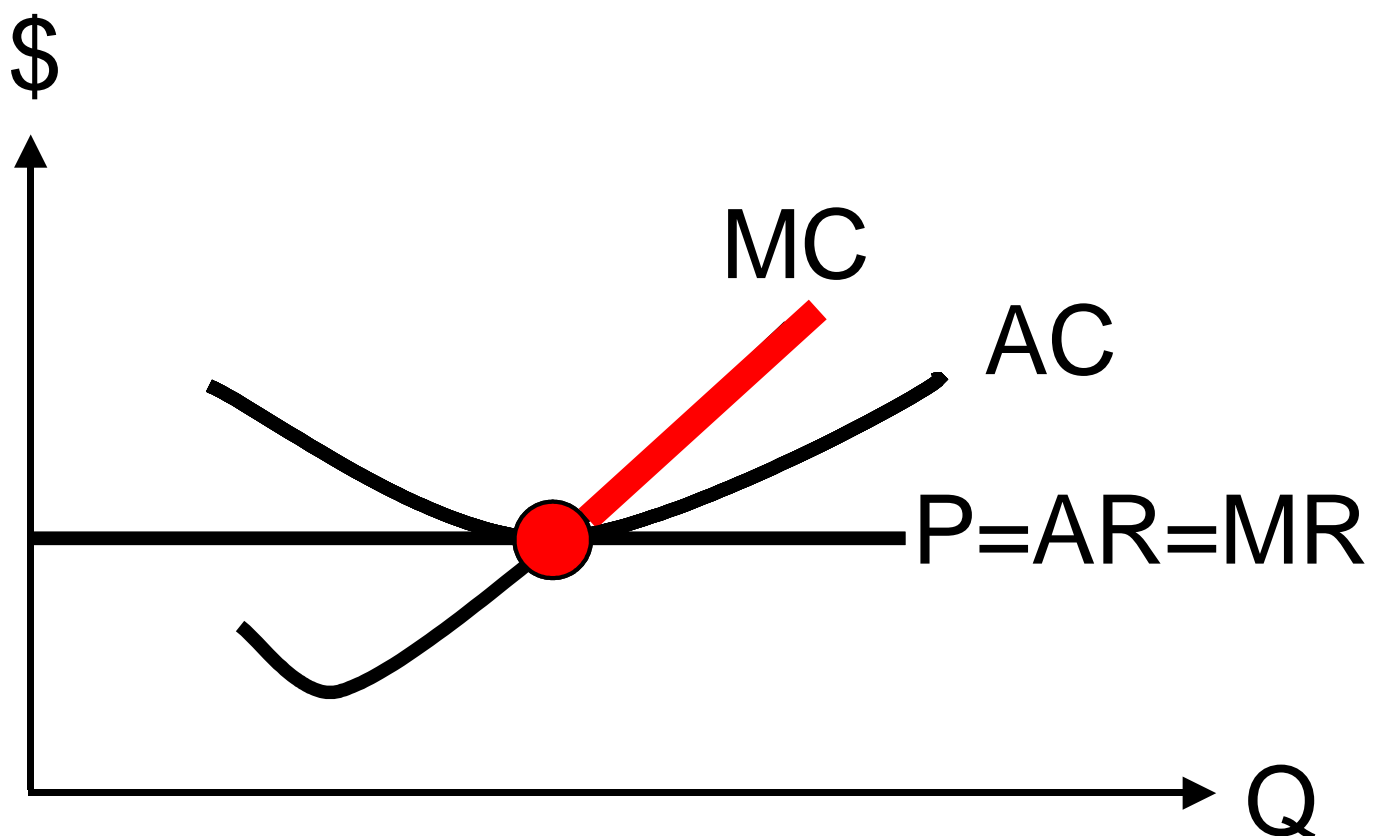
2012-10-15

Ceteris paribus

- Ceteris paribus means '**other things being equal**' (constant).
- By this assumption, **causal relationships** are possible: If A occurs, then B follows.
- Example: If the price rises, quantity demanded falls.
Other things being equal: Income, prices of other goods, tastes, number of buyers.
If other things change, the demand curve **shifts**. If 'only' price changes, we **move along the demand curve**.

Competitive firm (long-run)

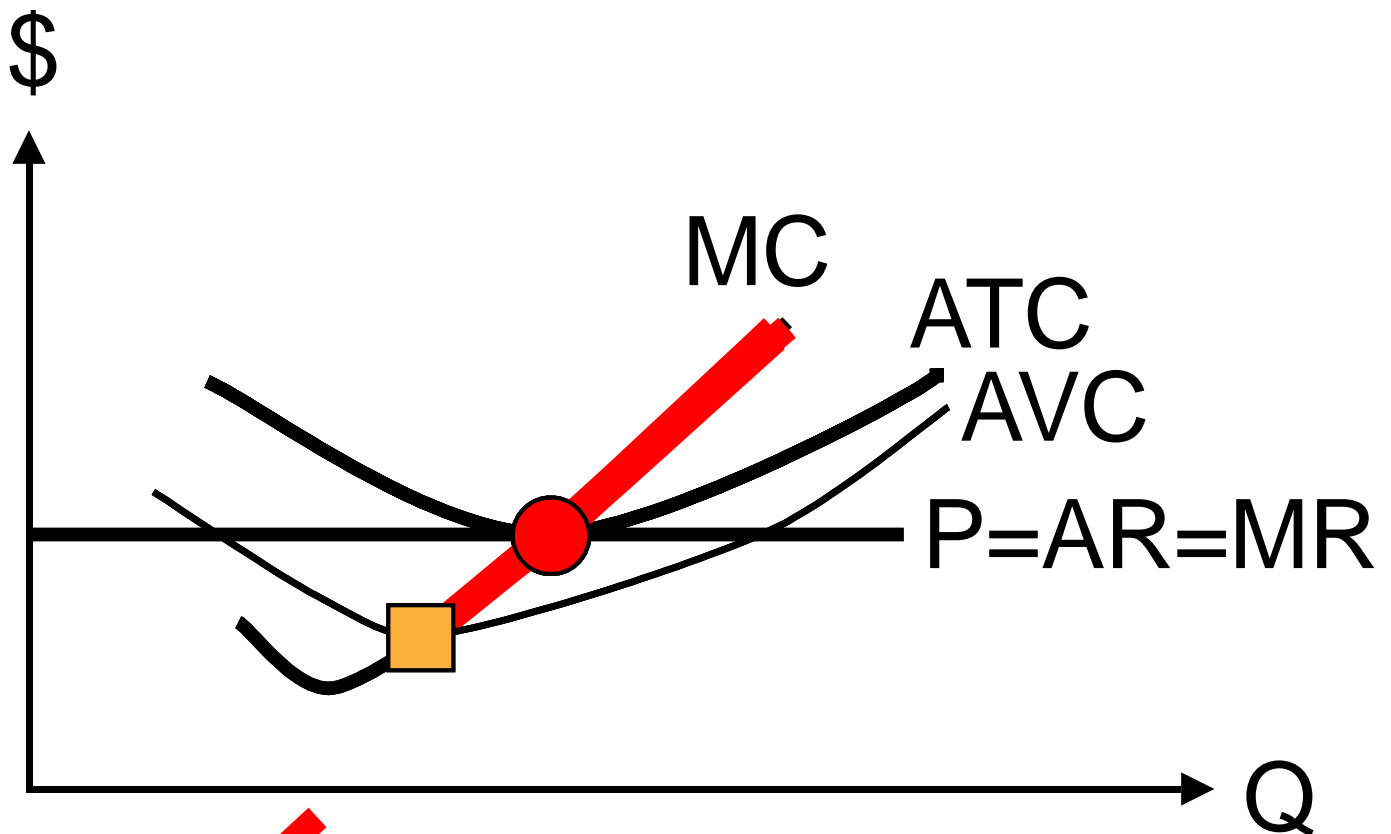
- The competitive firm is a price-taker: Price is given.
- All costs are variable.
- $P = AC$; if not, exit or entry.
A normal profit is part of AC.
- **Long-run equilibrium**



Long-run supply curve

Competitive firm (short-run)

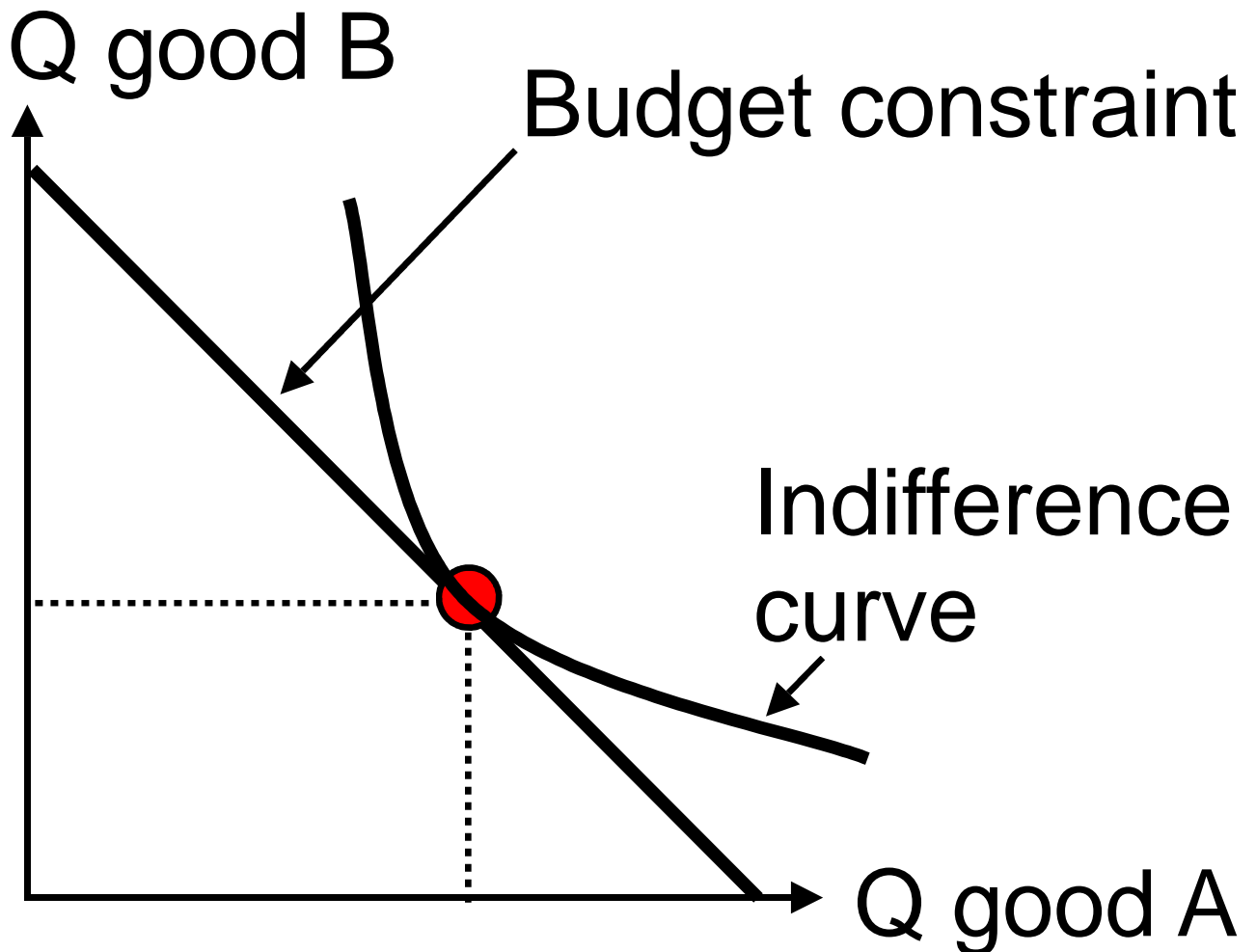
- The competitive firm is a price-taker: Price is given.
- There are fixed and variable costs.
- **Short-run equilibrium**



Short-run supply curve

Shut-down | Break-even

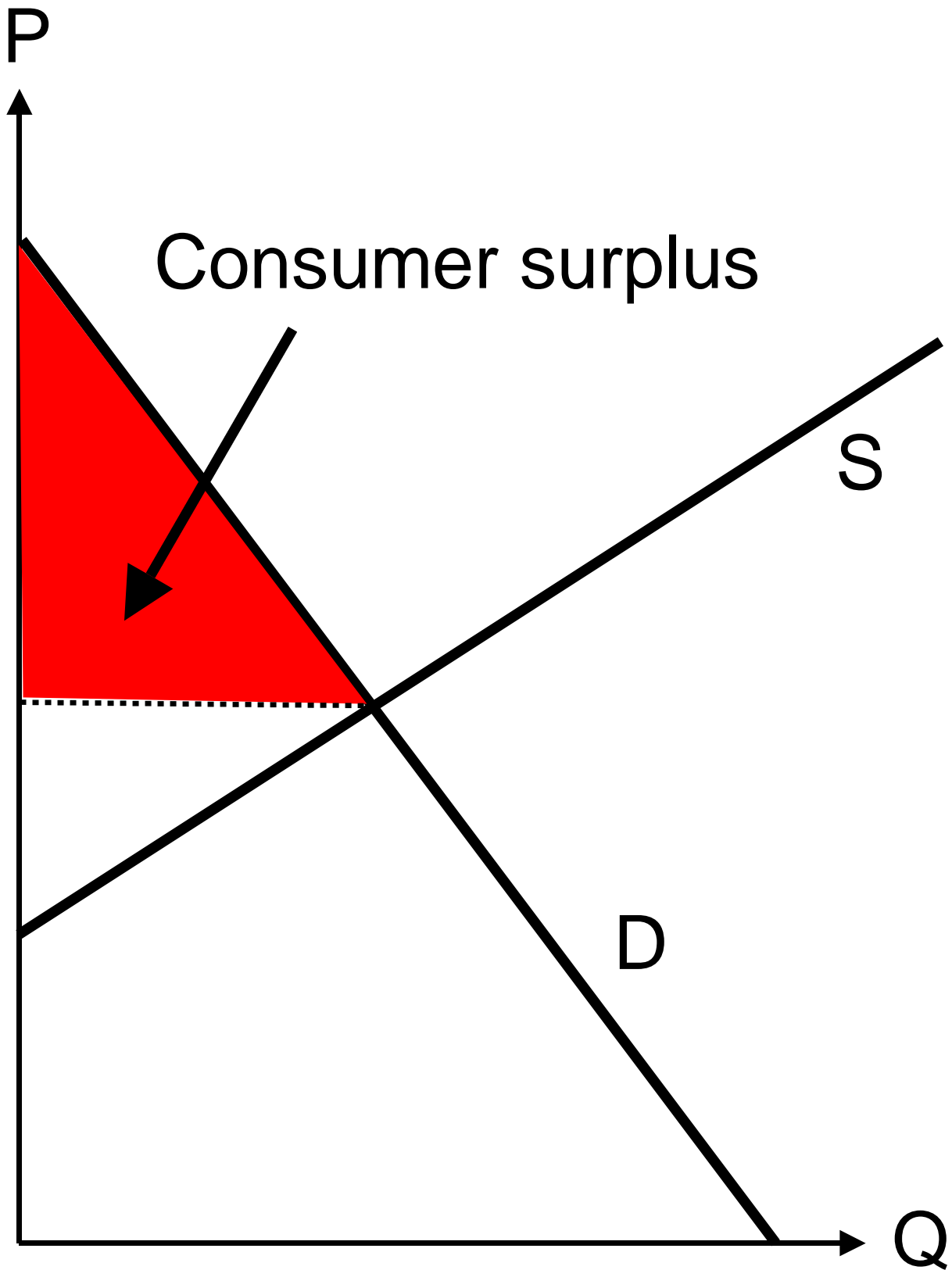
Consumer optimum



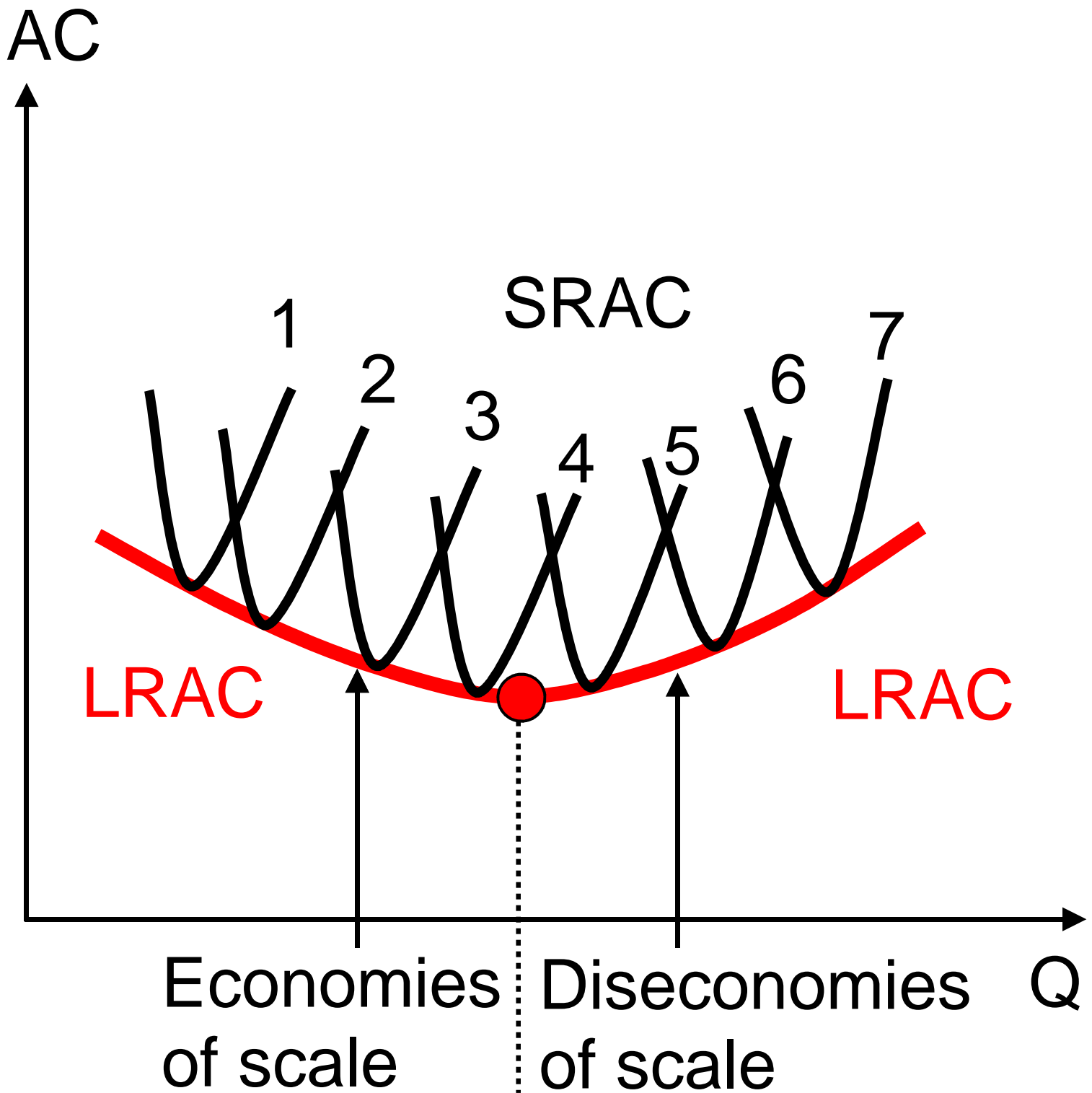
Characteristics of the optimum:

- Budget constraint touches highest indifference curve.
- Hence, slope indifference curve is equal to slope budget constraint.

Consumer surplus

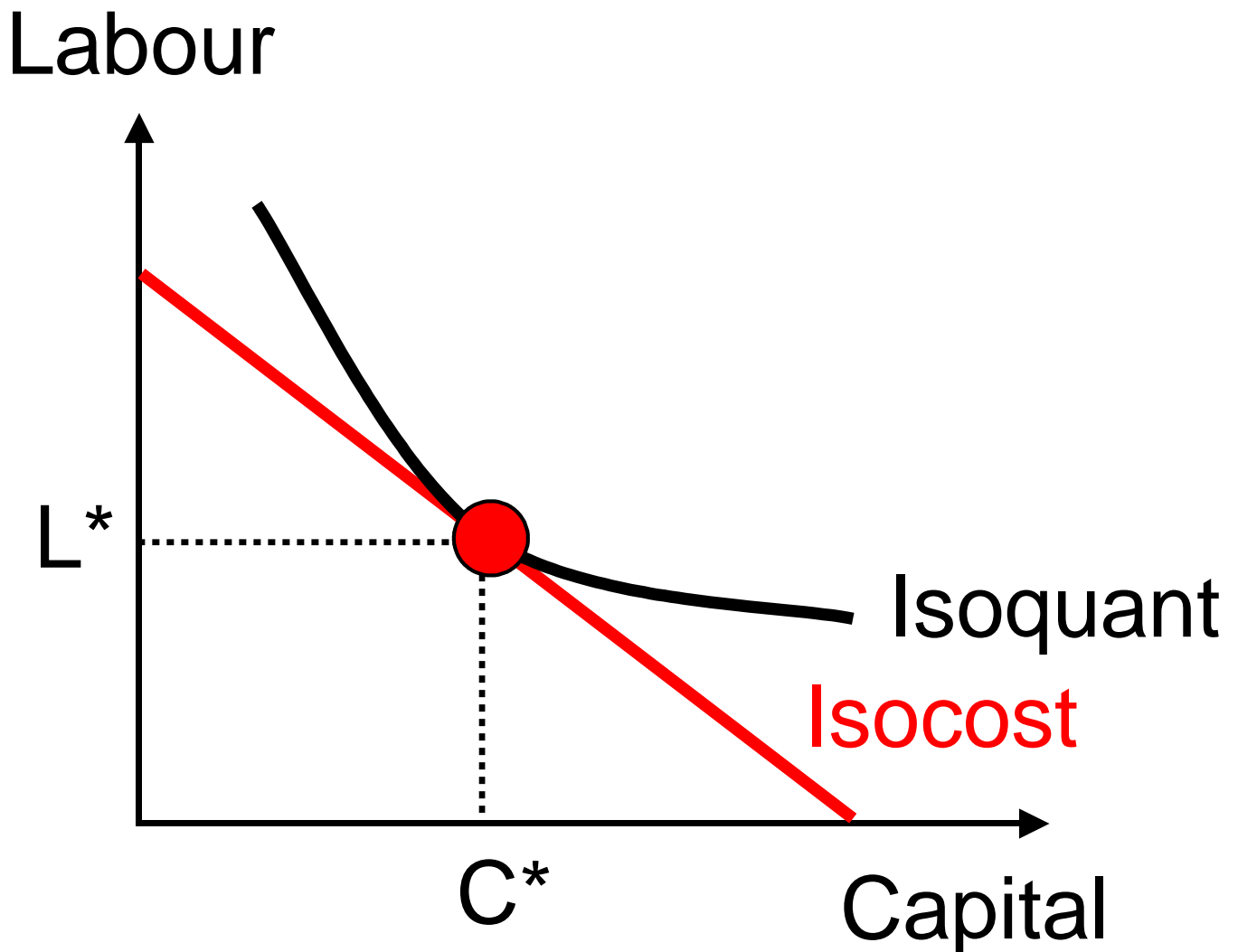


Cost curves (SR and LR)



SRAC = Short-run average cost
LRAC = Long-run average cost

Cost minimization



Isoquant curve:

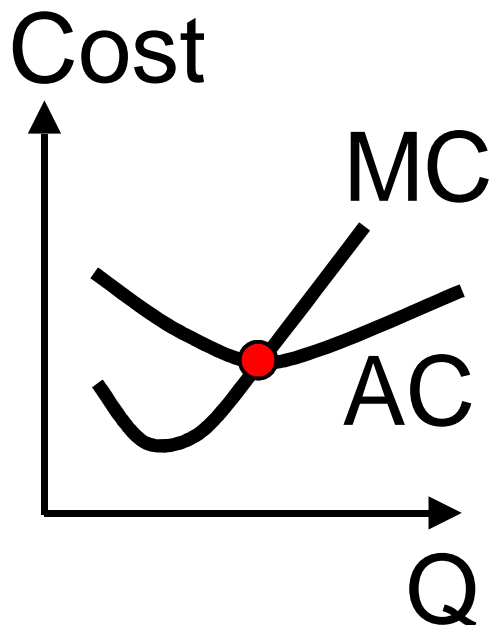
different factor combinations to produce given output

Isocost line:

different factor combinations with equal TC

Costs

- Total cost = Fixed + variable cost
 - Fixed cost: Independent of Q
 - Variable cost: Dependent on Q
- Average Cost = $\frac{TC}{Q}$
- Marginal Cost = $\frac{\text{Change in TC}}{\text{Change in Q}}$
or $MC = (TC)'$
- Relation between AC and MC



Cross-price elasticity of demand

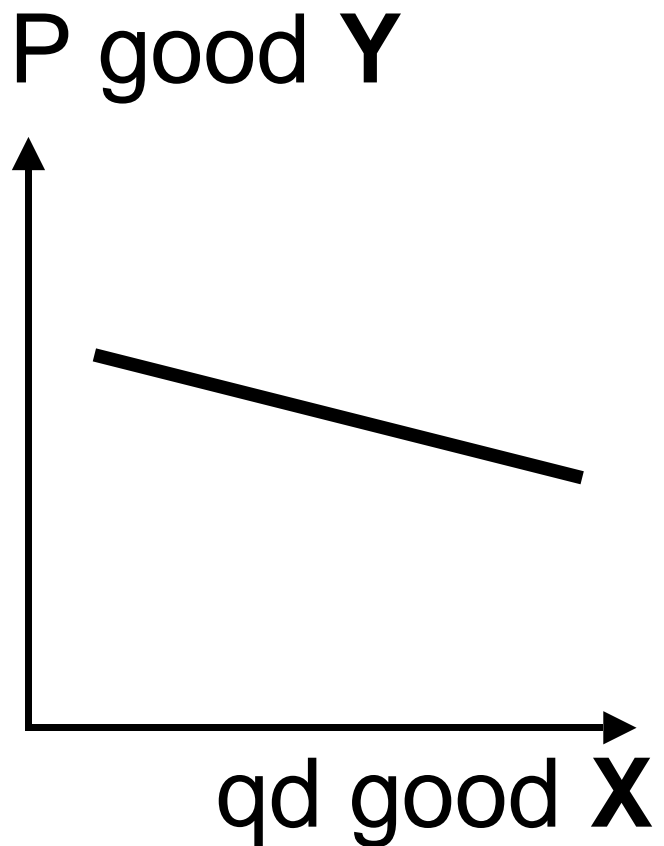
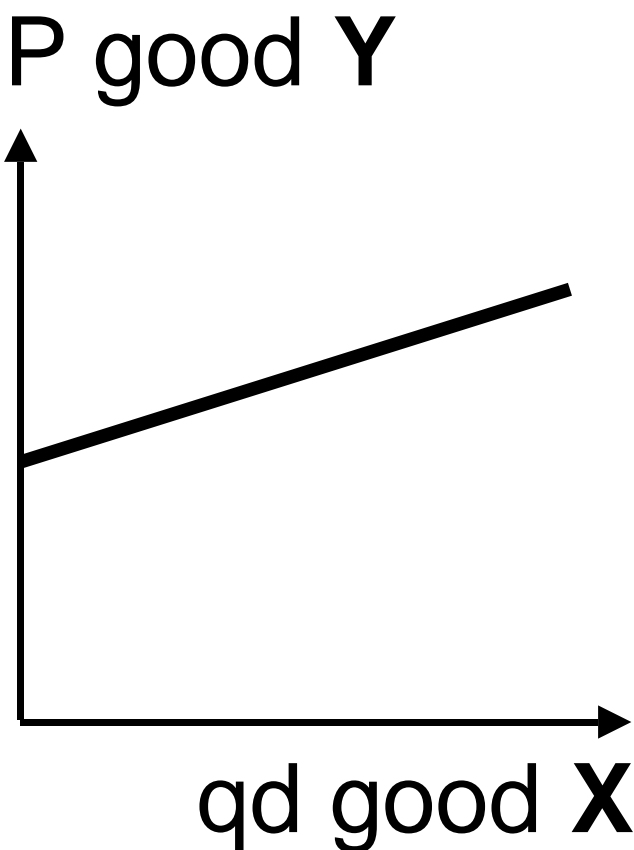
$$= \frac{\% \text{ change in qd of good X}}{\% \text{ change in the P of good Y}}$$

$$Ce > 0$$

→ **Substitutes**

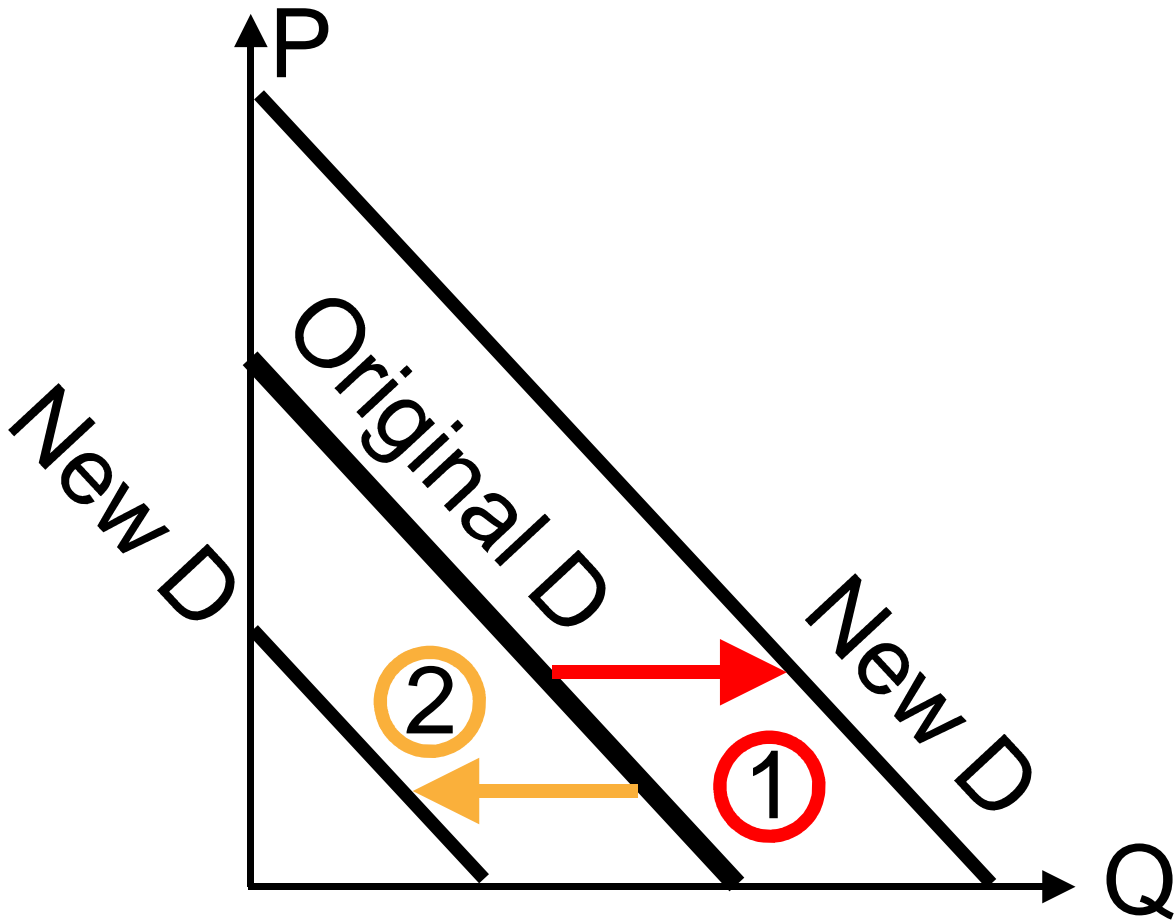
$$Ce < 0$$

→ **Complements**



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Demand (shifts)

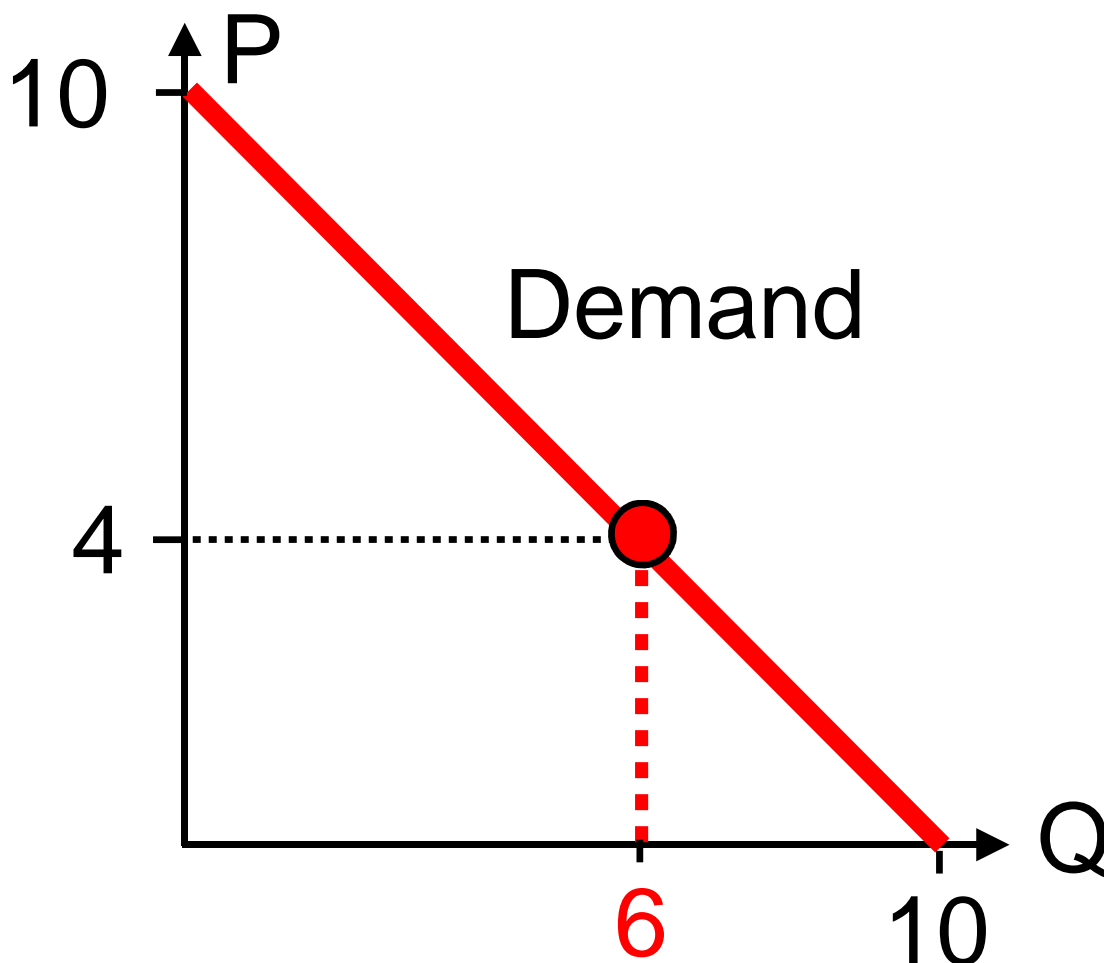


- ① Increase in D (outward shift)
- ② Decrease in D (inward shift)

Possible reasons: Changes in

- income
- the prices of **other** goods
- tastes
- the number of consumers

Demand and quantity demanded



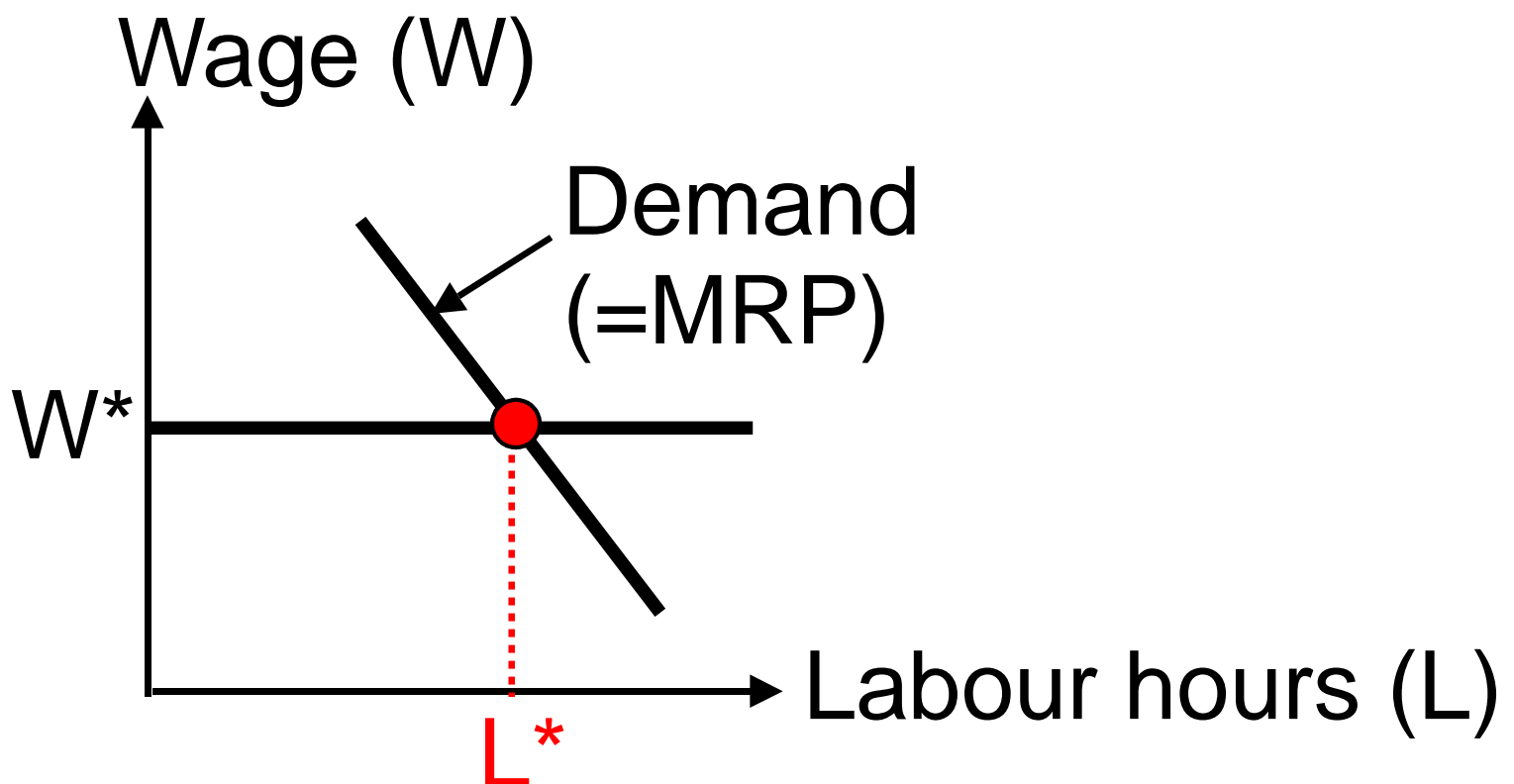
- **Demand** refers to the curve and displays the relationship between prices and quantities demanded.
- **Quantity demanded** refers to a point on the curve.
Example: If $P = 4$, then $Q = 6$; 6 is the quantity demanded.

Demand for labour

- The firm is a price-taker.
- The demand for labour depends on the output produced multiplied by the marginal revenue of the output:

Marginal revenue product =
Marginal product * Marginal
revenue (>>> $MRP = MP * MR$)

- Demand for labour



Economic problem

Many wants
of goods and
services

Scarce
resources to
produce goods
and services

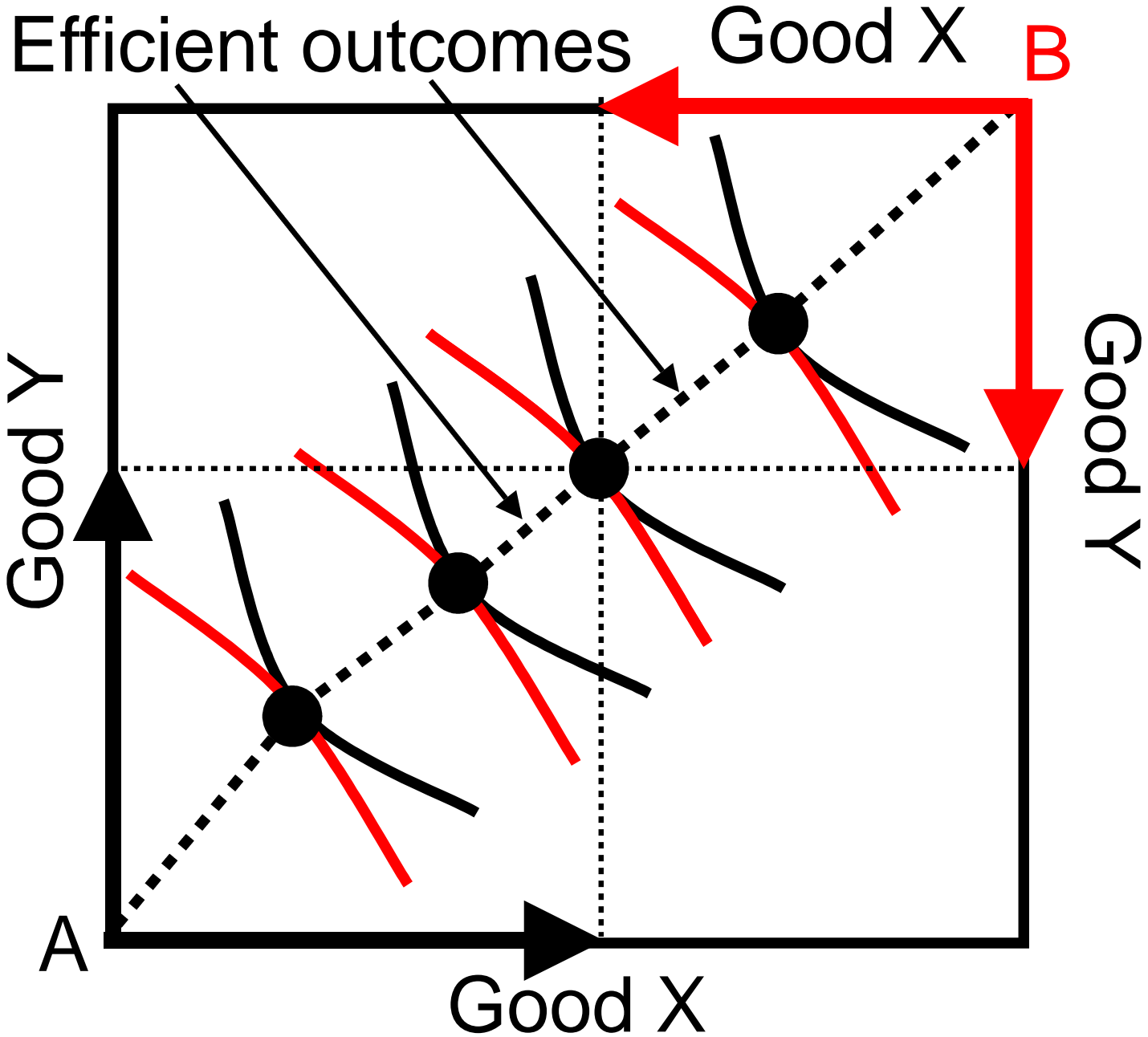
Choices

Edgeworth box

- 2 consumers, A and B
- 2 goods, X and Y
- Combination of 2 indifference curve maps of A and B

Contract curve:

Efficient outcomes



Elasticities

Price elasticity
of demand

$$= \frac{\% \text{ change in } qd}{\% \text{ change in price}}$$

(result in absolute values)

Cross-price elas-
ticity of demand

$$= \frac{\% \text{ change in } qd \text{ of good X}}{\% \text{ change in price of good Y}}$$

Income elasticity
of demand

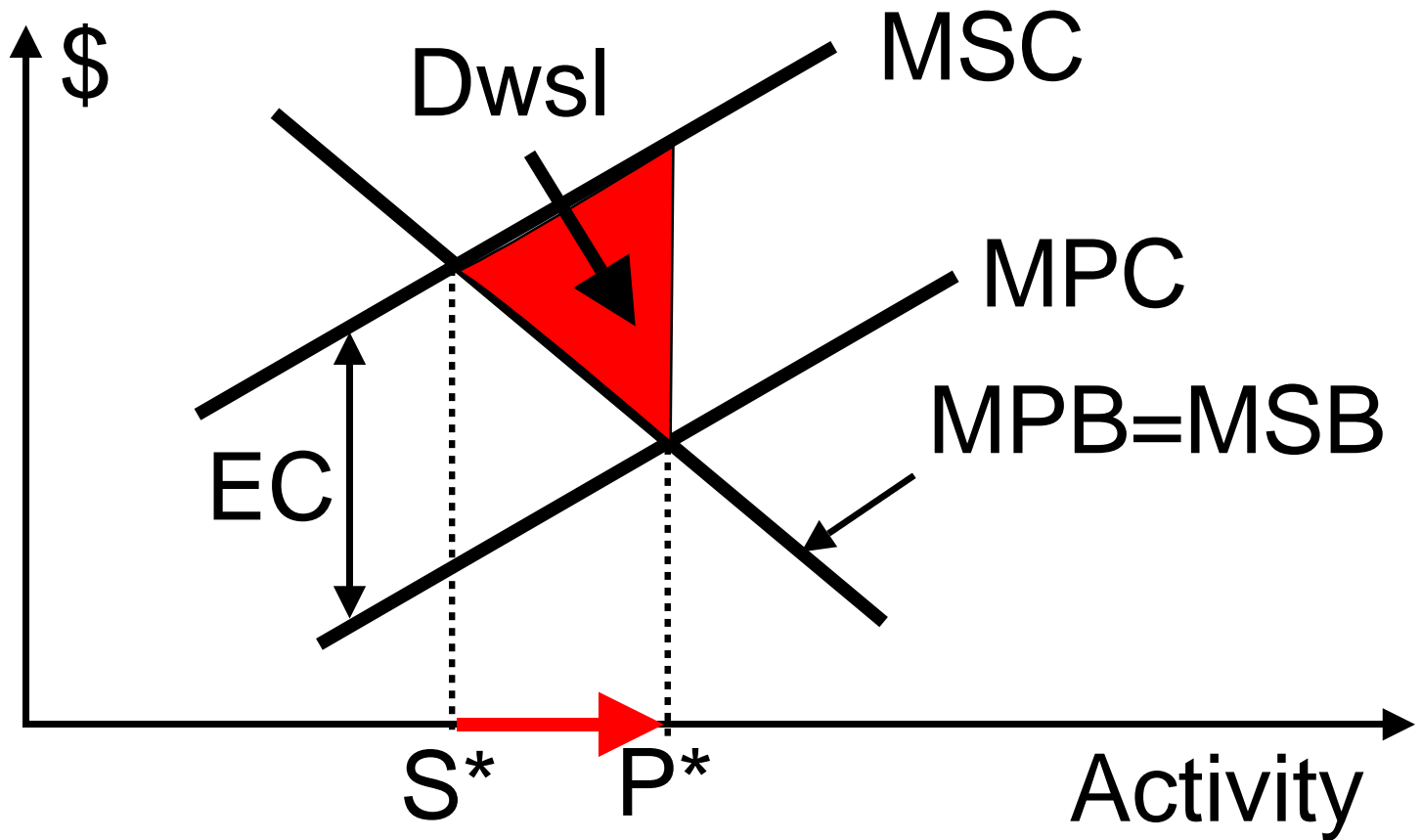
$$= \frac{\% \text{ change in } qd}{\% \text{ change in income}}$$

Price elasticity
of supply

$$= \frac{\% \text{ change in quantity supplied}}{\% \text{ change in price}}$$

Externality (negative)

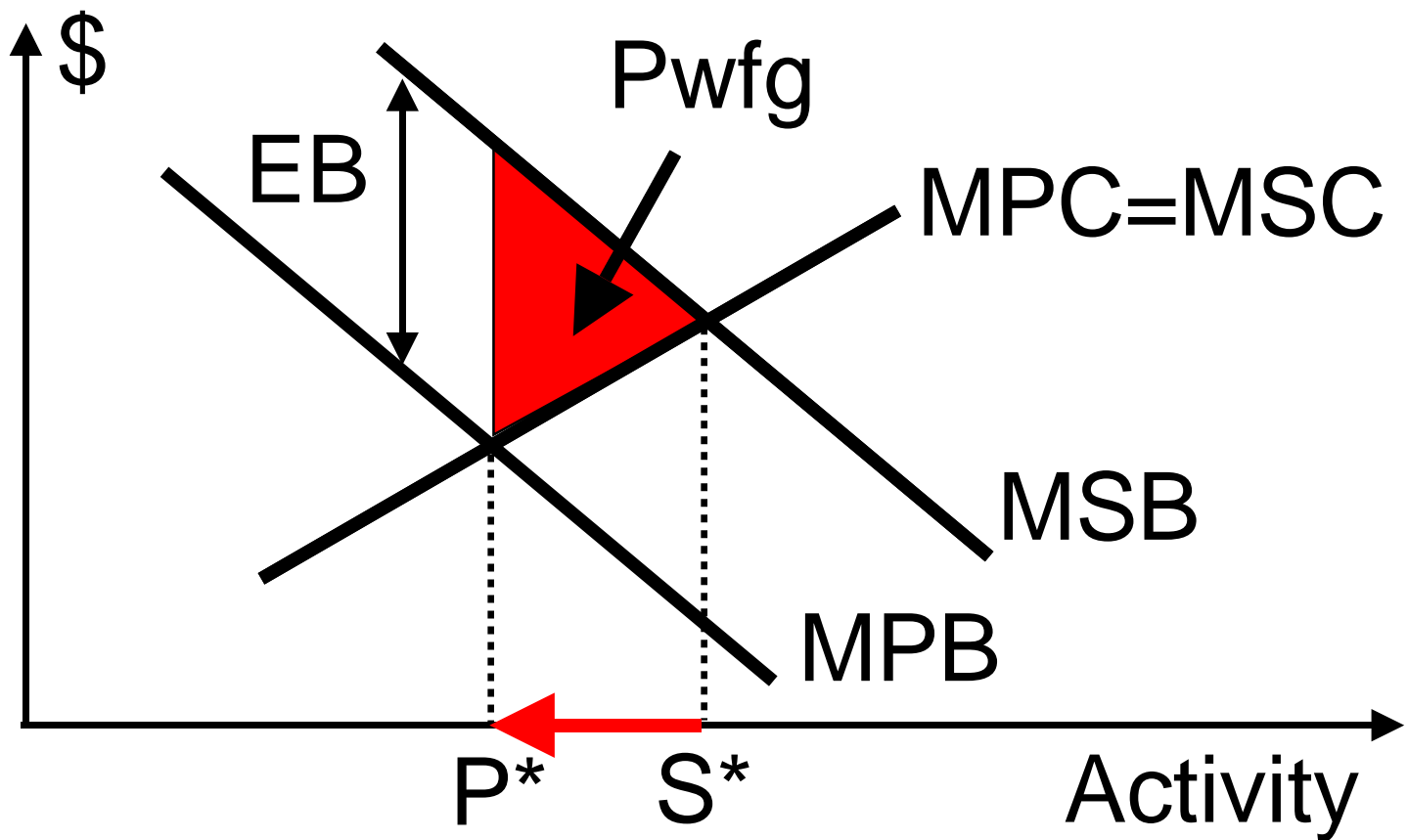
by production, example.: Pollution



- MPC: Marginal private costs
- MSC: Marginal social costs
- MPB: Marginal private benefits
- MSB: Marginal social benefits
- EC: External costs
- S^*/P^* : Social/private optimum
- Dwsl: Deadweight social loss

Externality (positive)

by consumption, ex.: Vaccinations



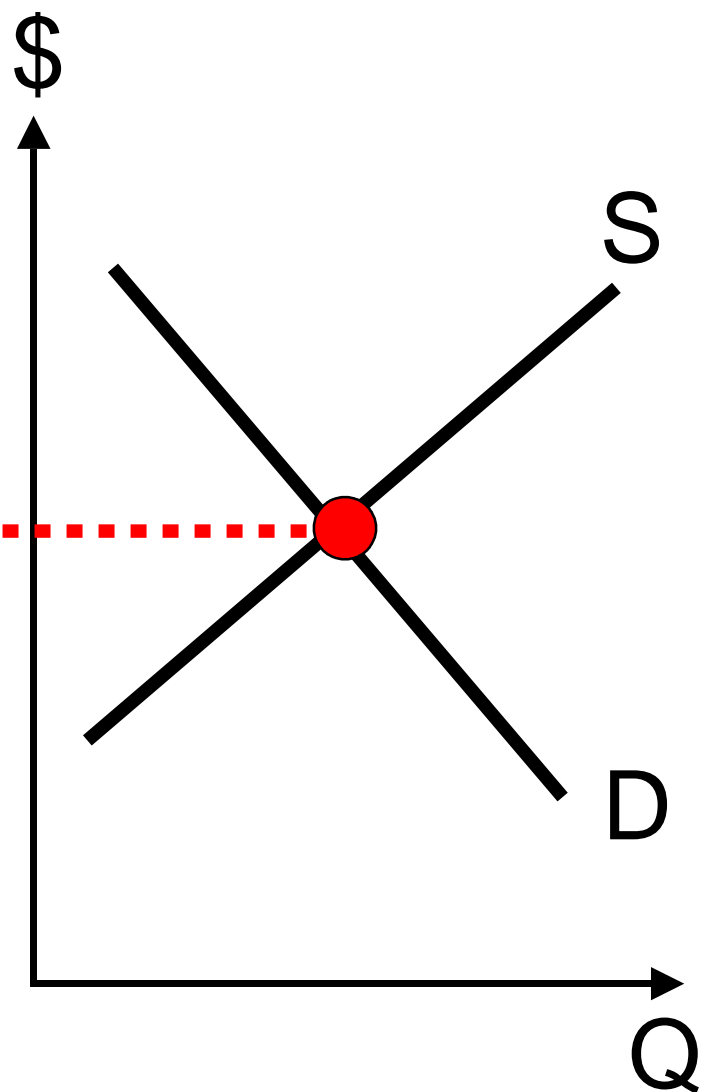
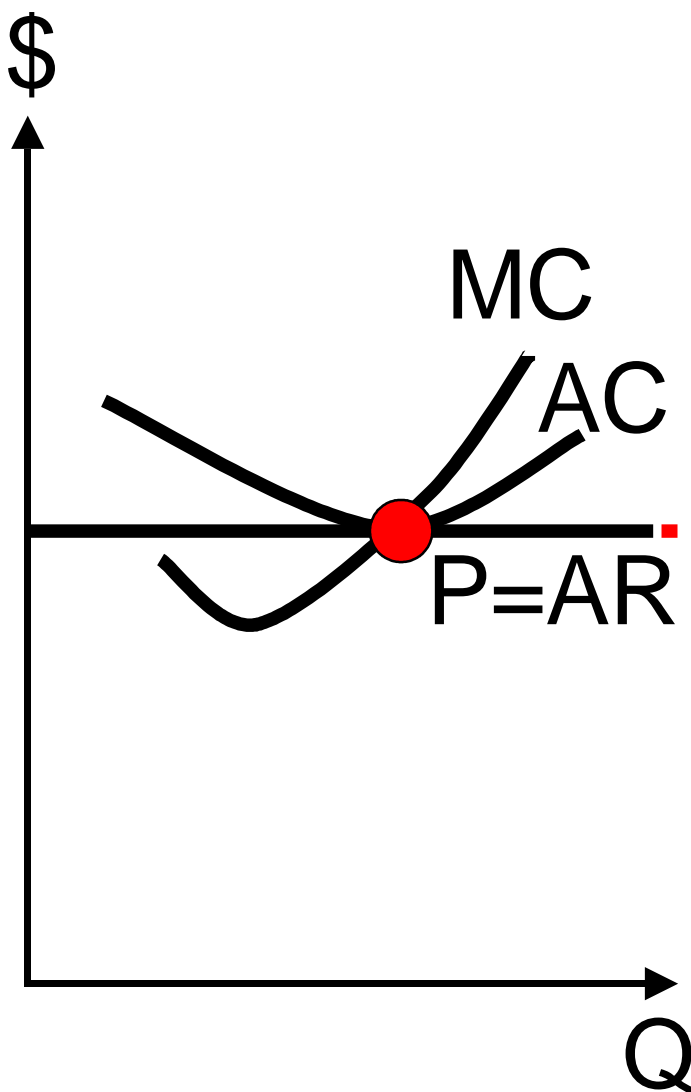
- MPC: Marginal private costs
- MSC: Marginal social costs
- MPB: Marginal private benefits
- MSB: Marginal social benefits
- EB: External benefits
- S^*/P^* : Social/private optimum
- Pwfg: Potential welfare gain

Firm and market

A competitive firm is a price-taker. It chooses Q to maximize profit or minimize loss. Normal profits are part of AC. Long-run equilibrium?

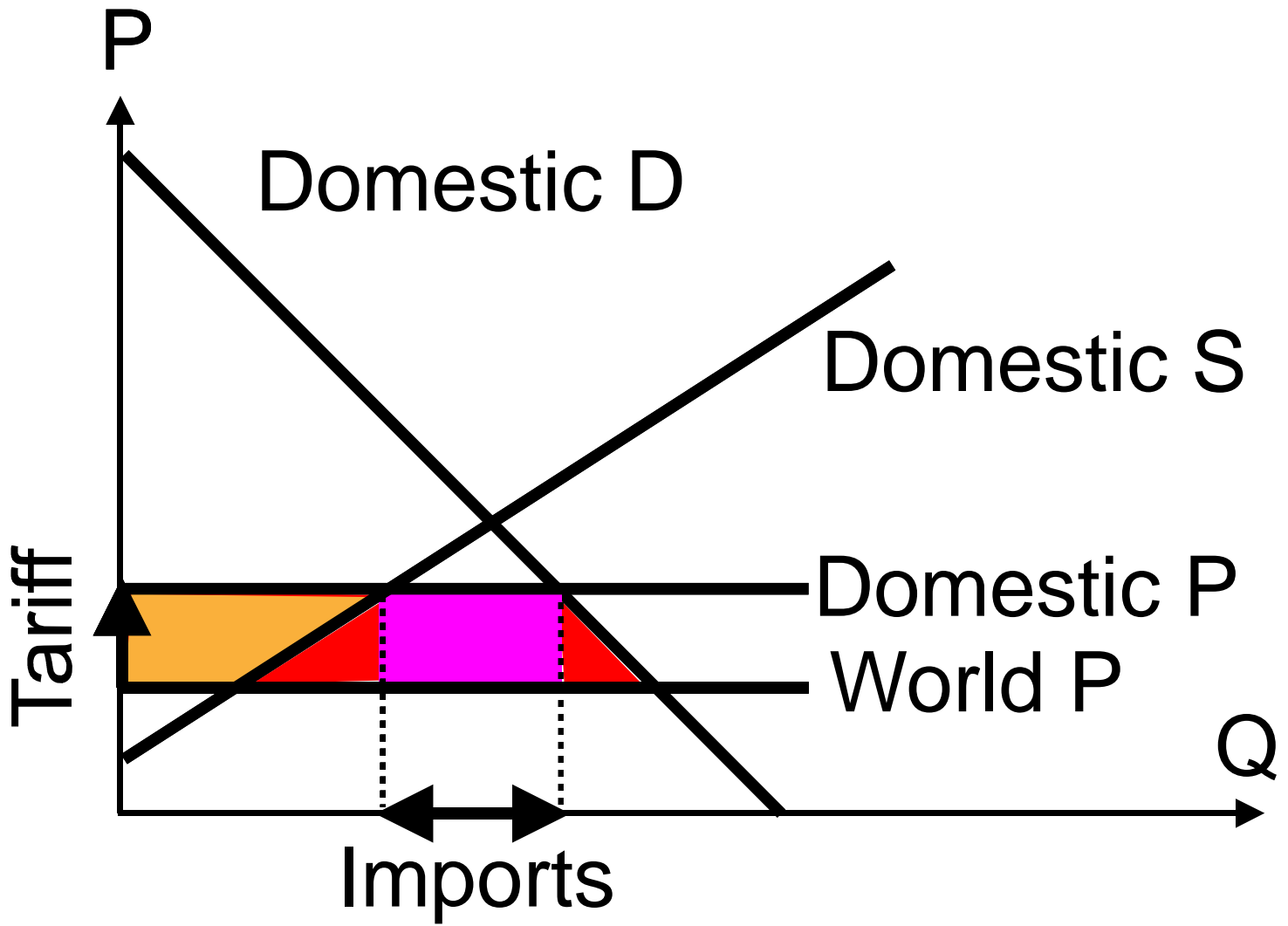
Competitive firm

Market

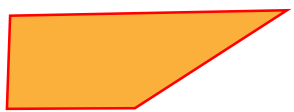


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Import tariff (effects)



Effects of an import tariff:



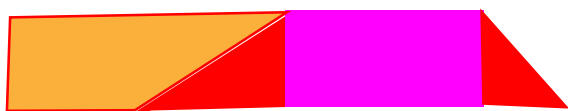
Producer surplus



Tariff revenues



Welfare losses



Consumer surplus

Income elasticity of demand

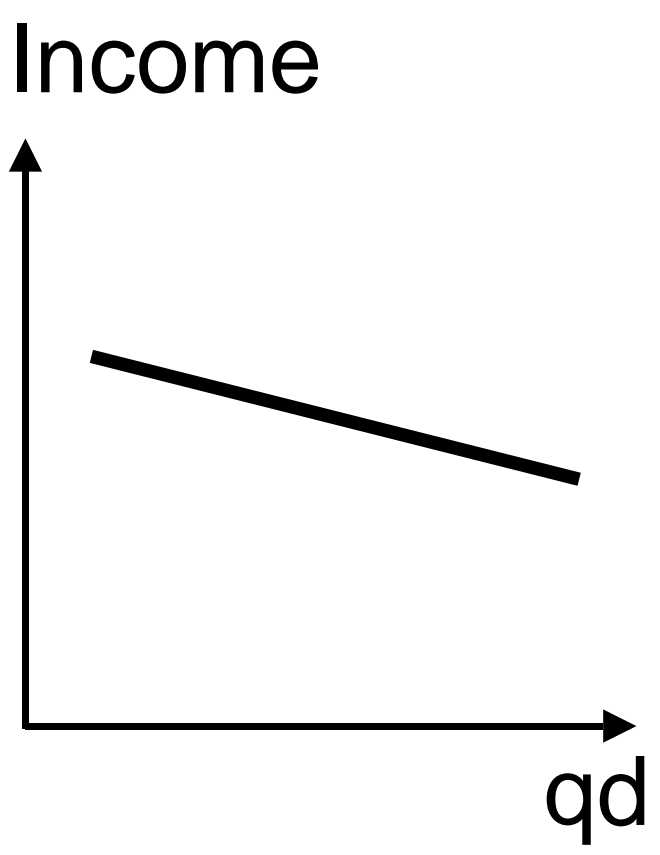
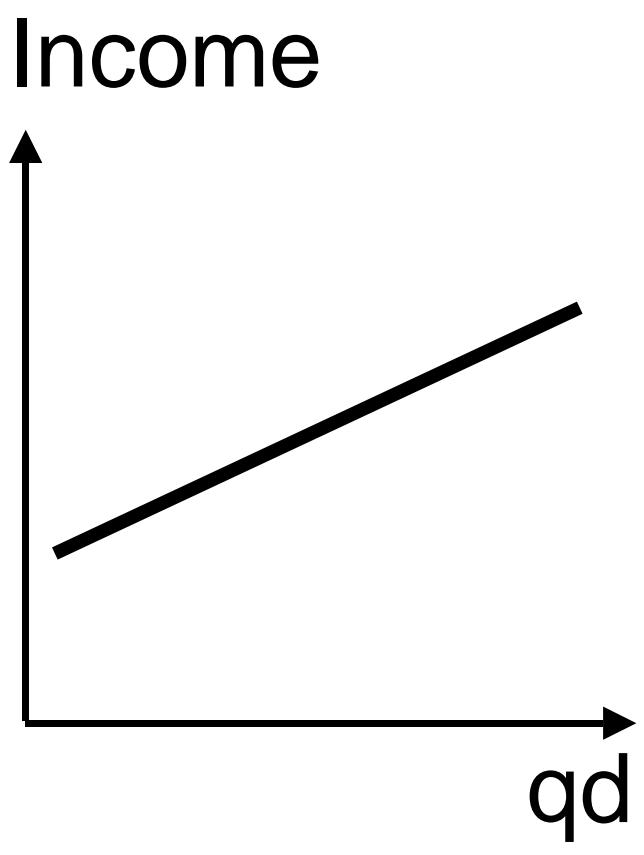
$$= \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}}$$

$le > 0$

$le < 0$

→ Normal good

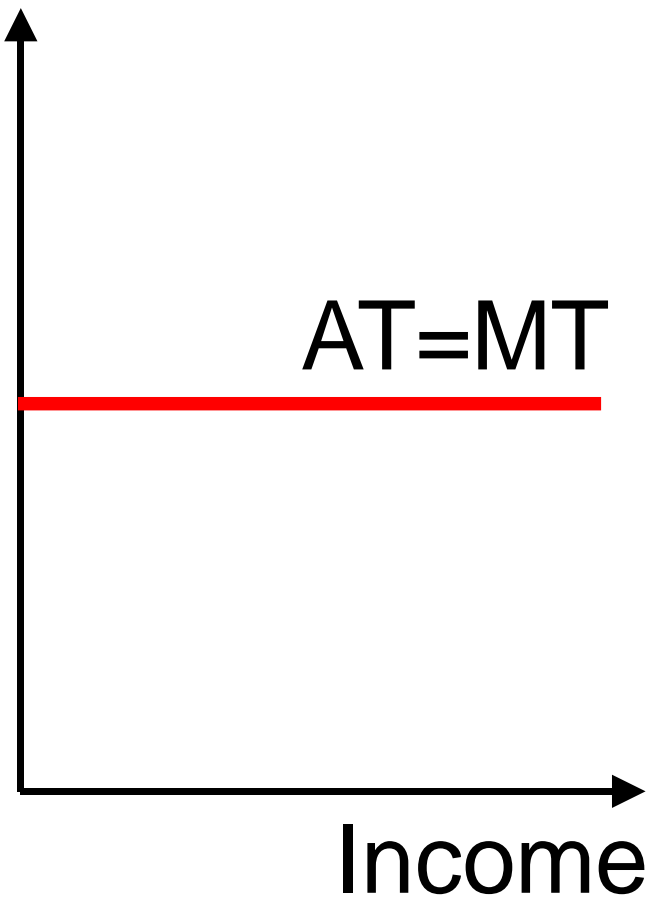
→ Inferior good



Income tax

Proportional tax

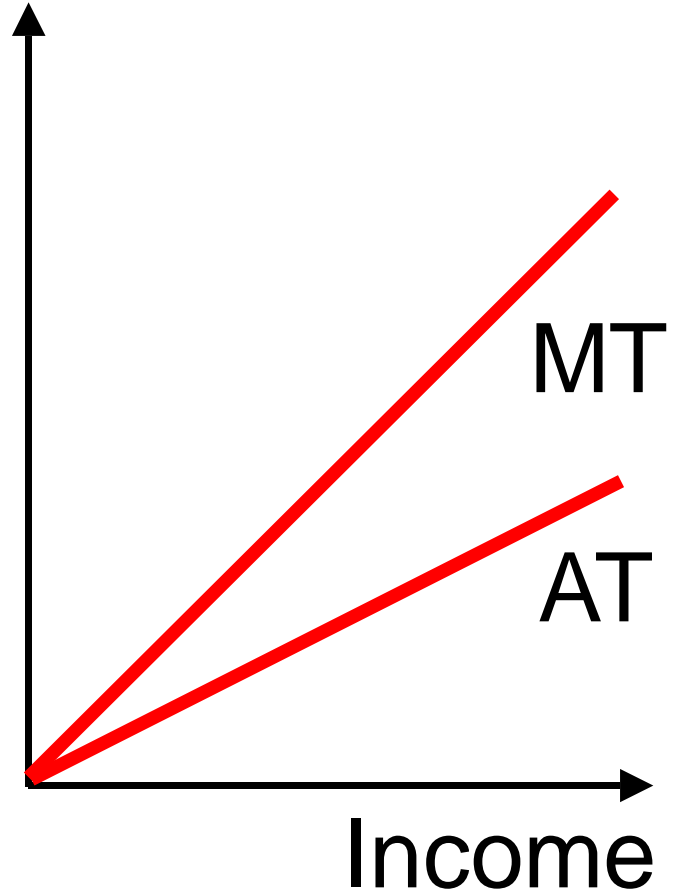
Tax rate



Total tax rises in proportion to income.

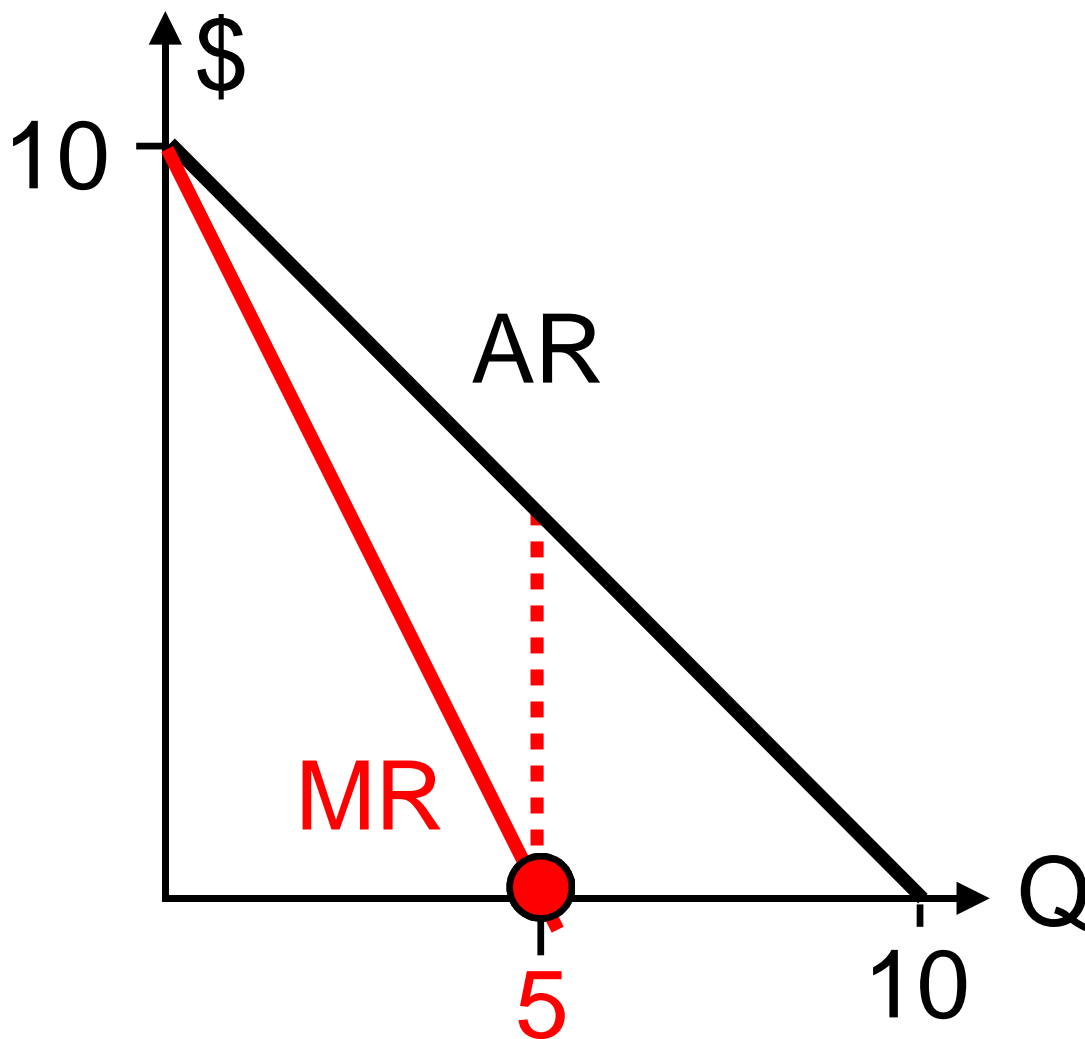
Progressive tax

Tax rate



Total tax rises more than proportional to income.

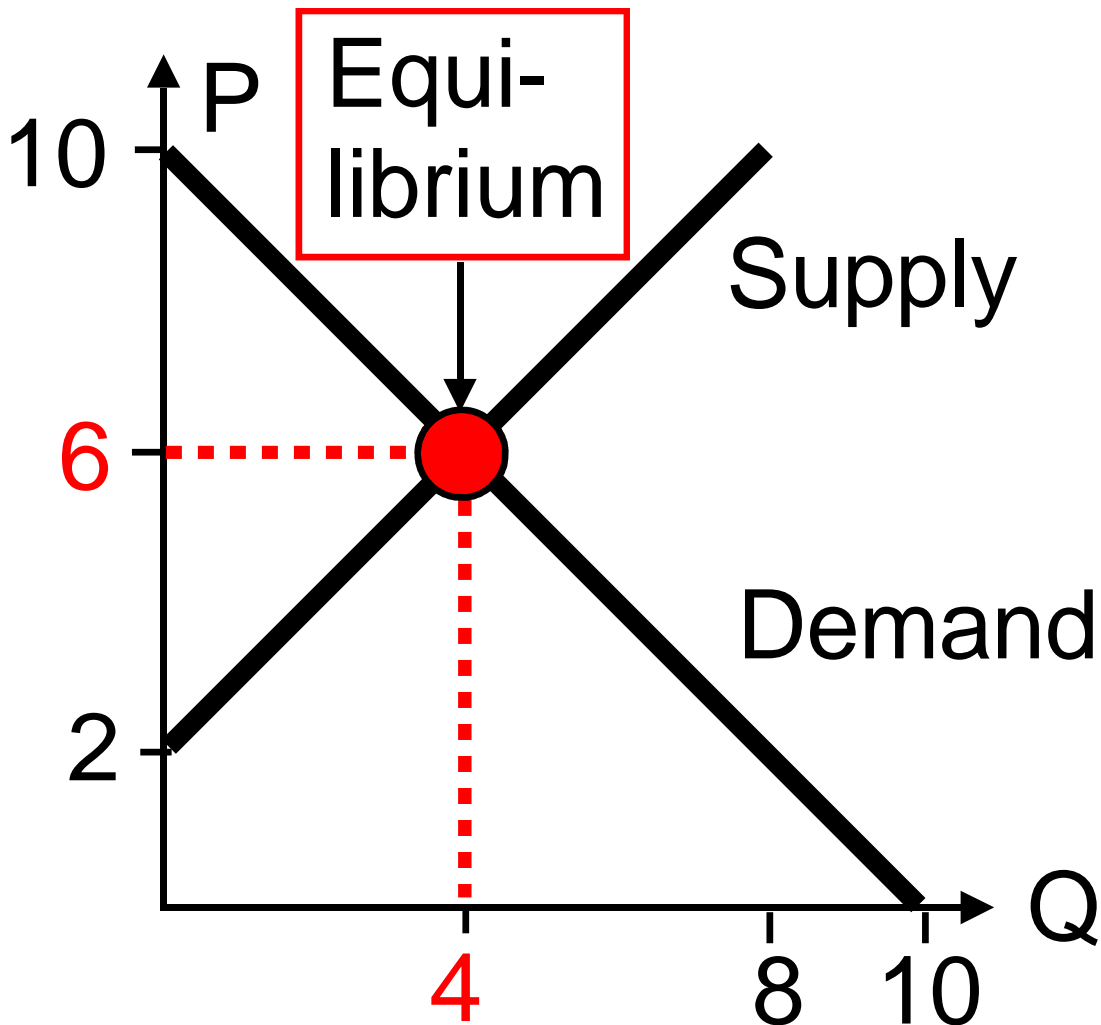
Marginal and average revenue



From average to marginal revenue:

- $AR = 10 - Q$
- **MR** relates to **changes in TR**, therefore, a bit of calculus:
 - $TR = AR * Q = 10Q - Q^2$
 - $MR = (TR)' = 10 - 2Q$

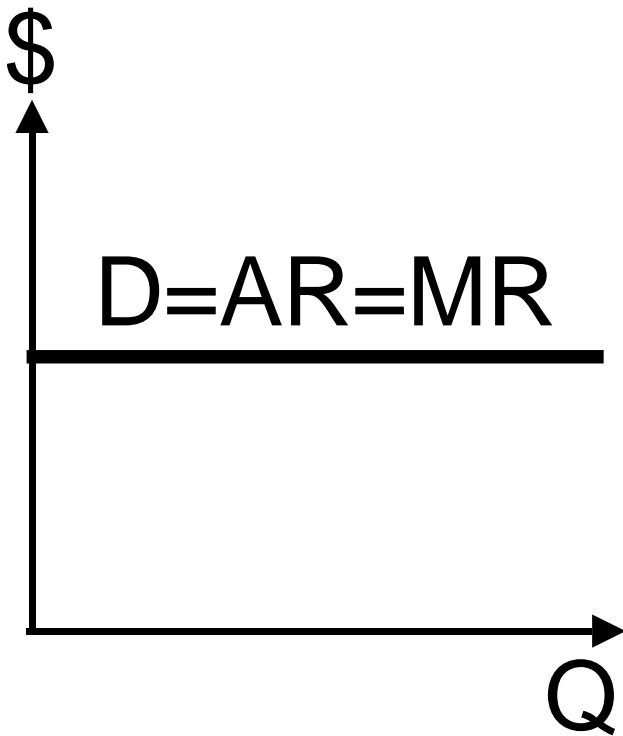
Market equilibrium



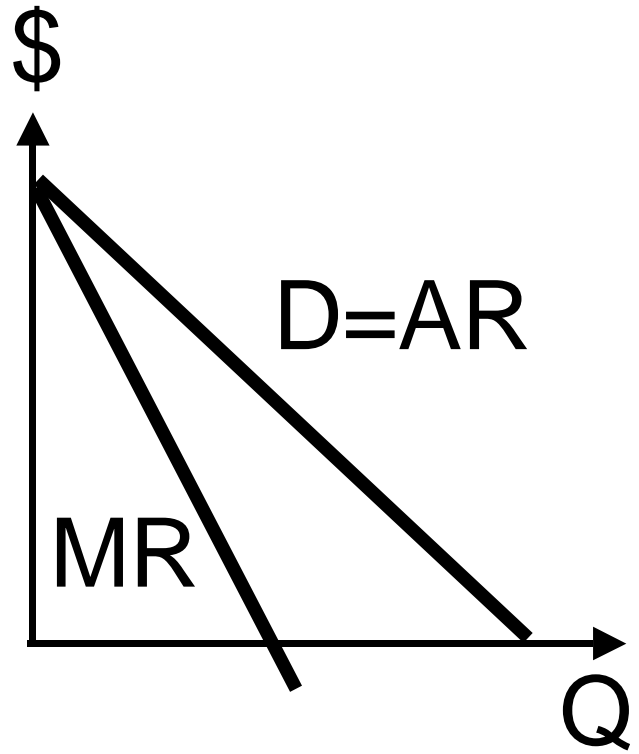
- **Demand (Q) = 10 - P**
- **Supply (Q) = P - 2**
- **At equilibrium:**
Demand = Supply; therefore:
 $10 - P = P - 2$
 $P = 6$ and $Q = 4$

Market structure (demand)

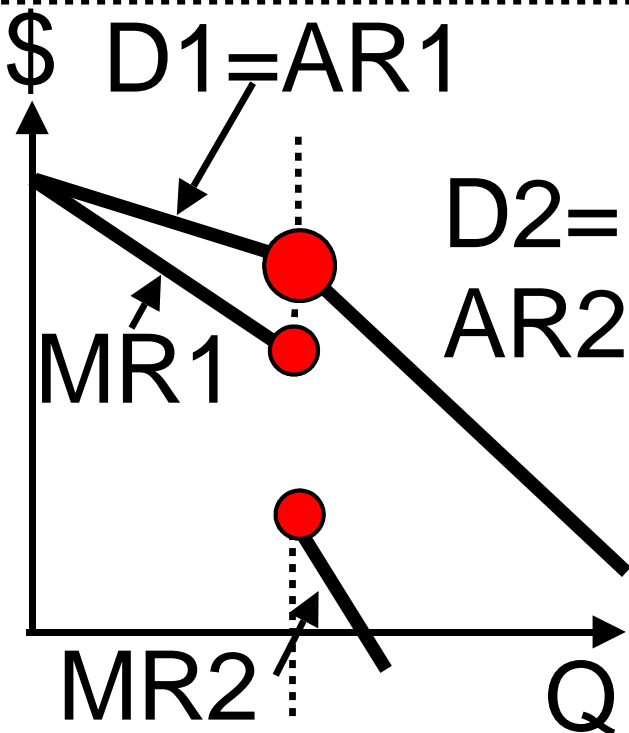
Competition



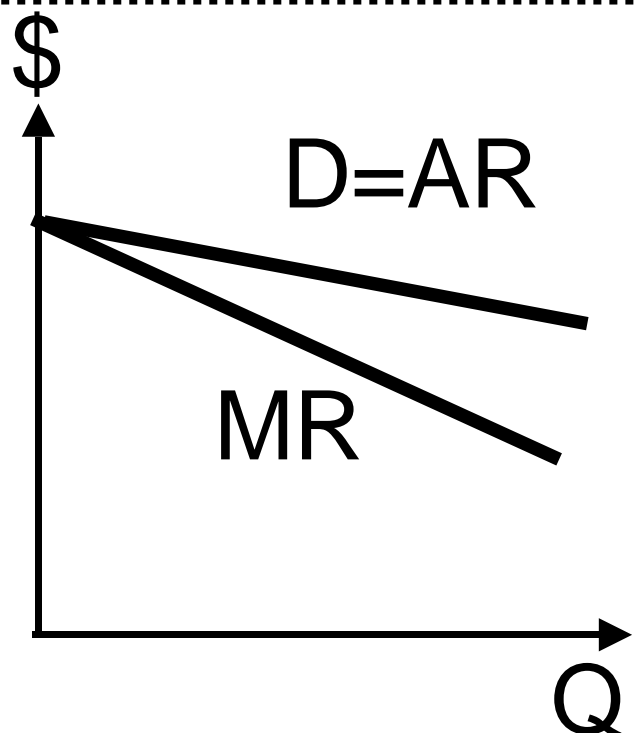
Monopoly



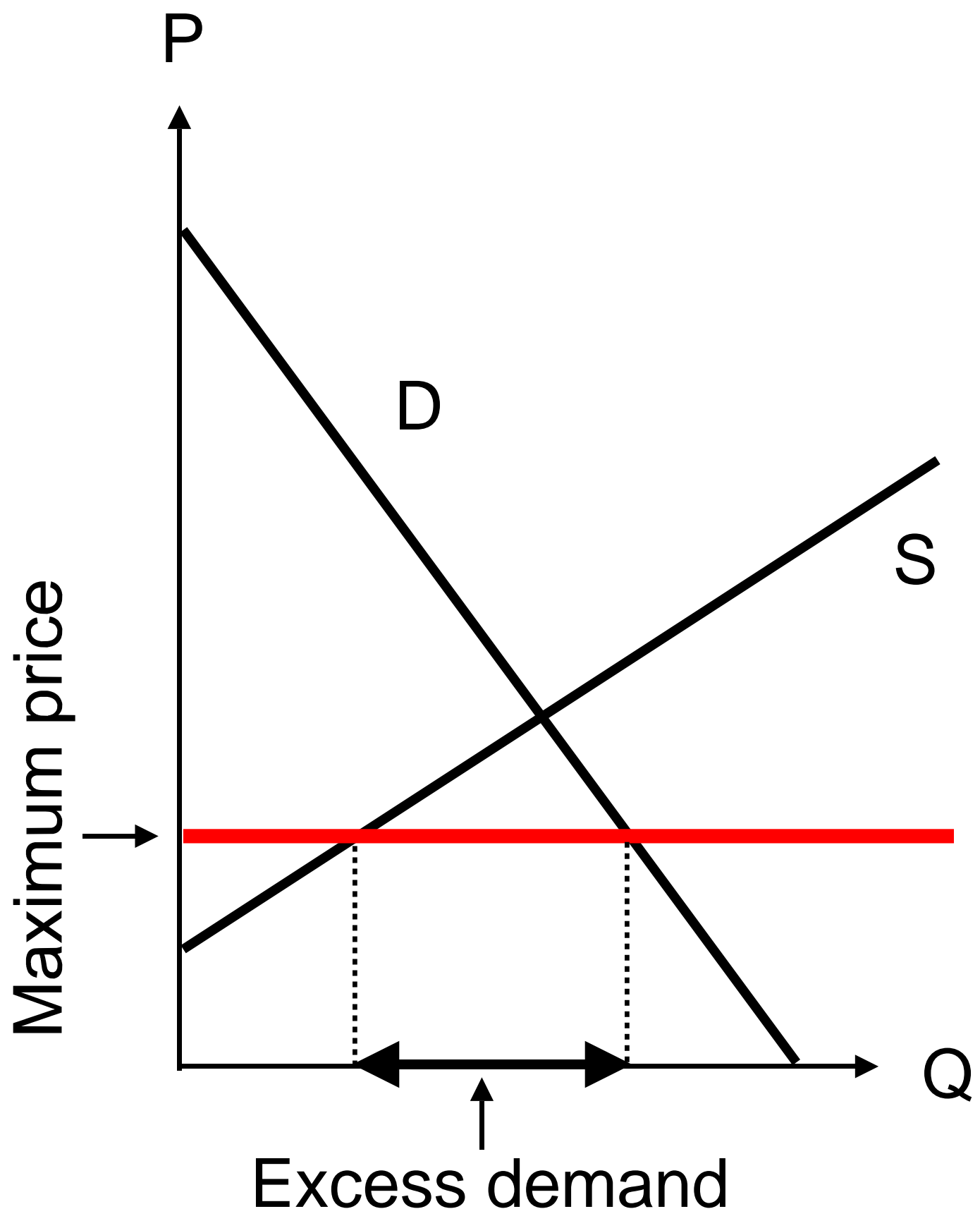
Oligopoly



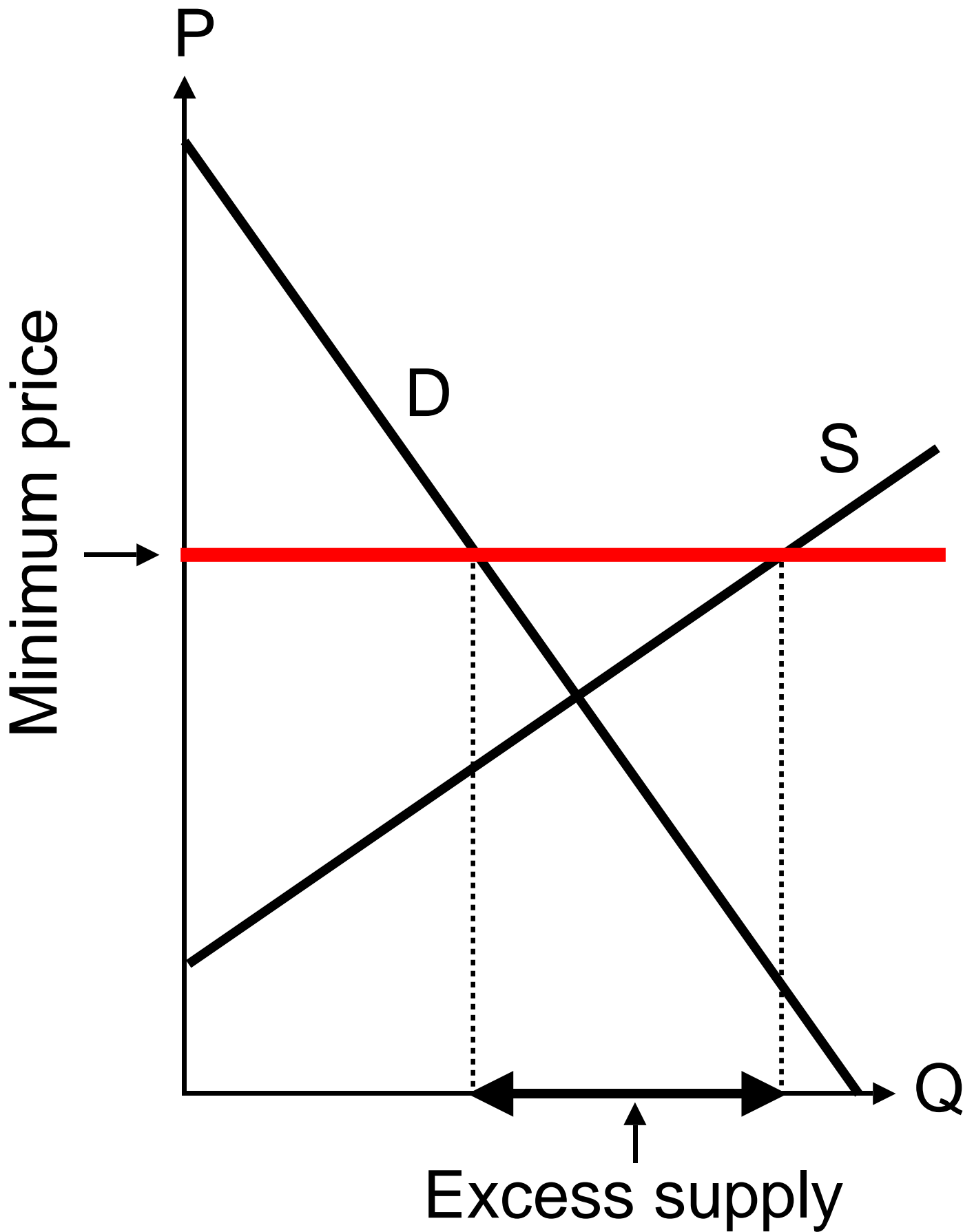
Monopolistic competition



Maximum price (ceiling)

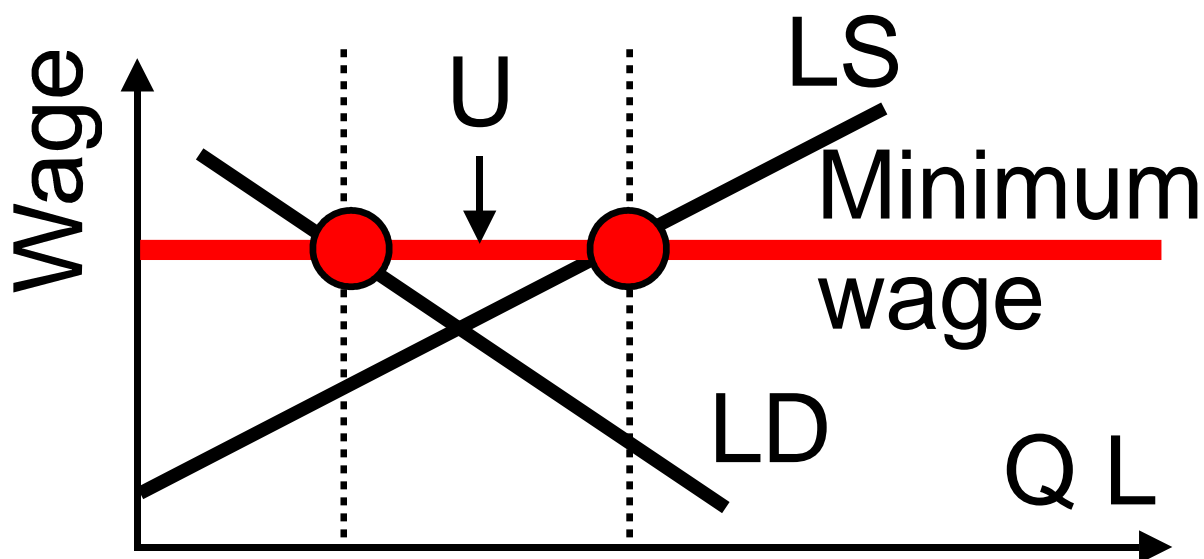


Minimum price (floor)

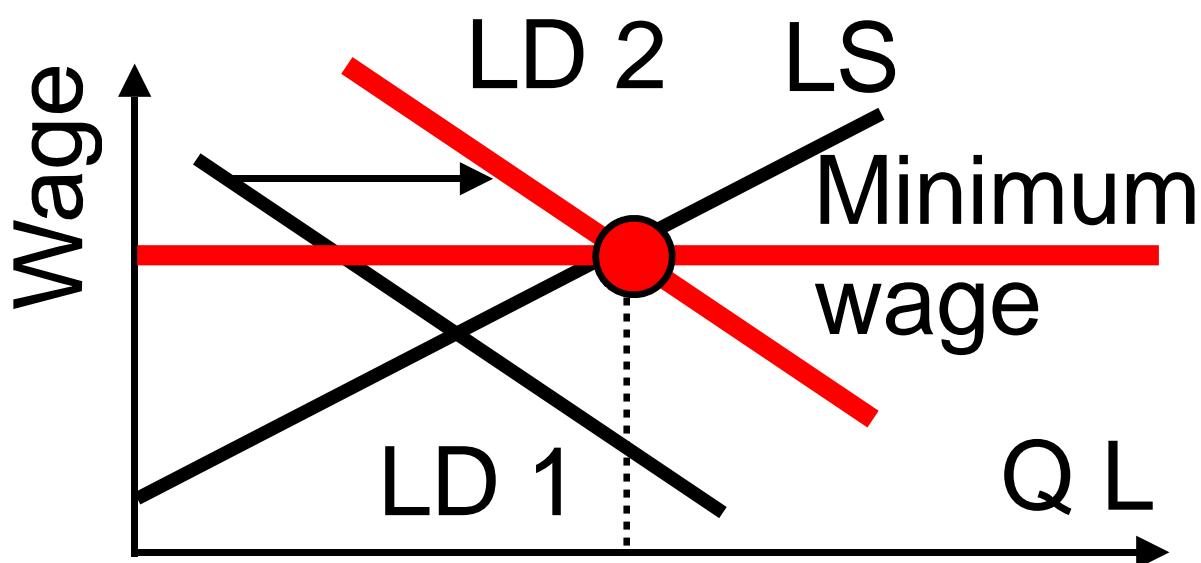


Minimum wage

- 1) A minimum wage causes unemployment (U),...

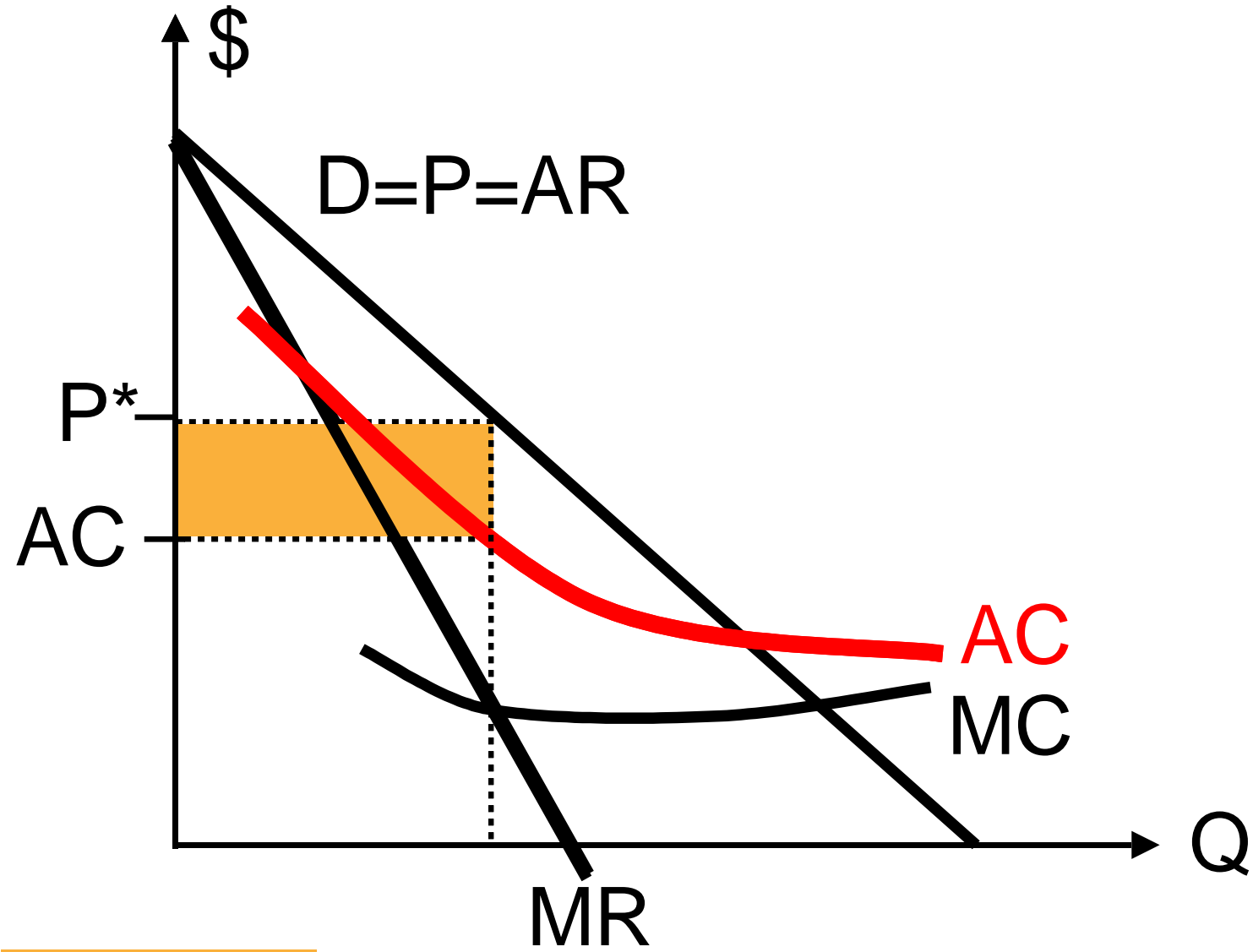


- 2) ... except when labour demand increases.



Natural monopoly

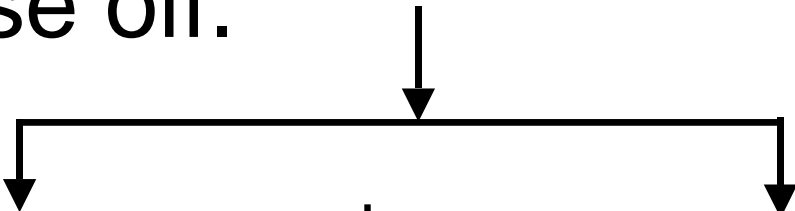
Due to cost advantages (falling AC/economies of scale) **natural monopolies** have a strong market position. Example: A firm investing in infrastructure (high fixed cost)



Supernormal profit

Pareto efficiency

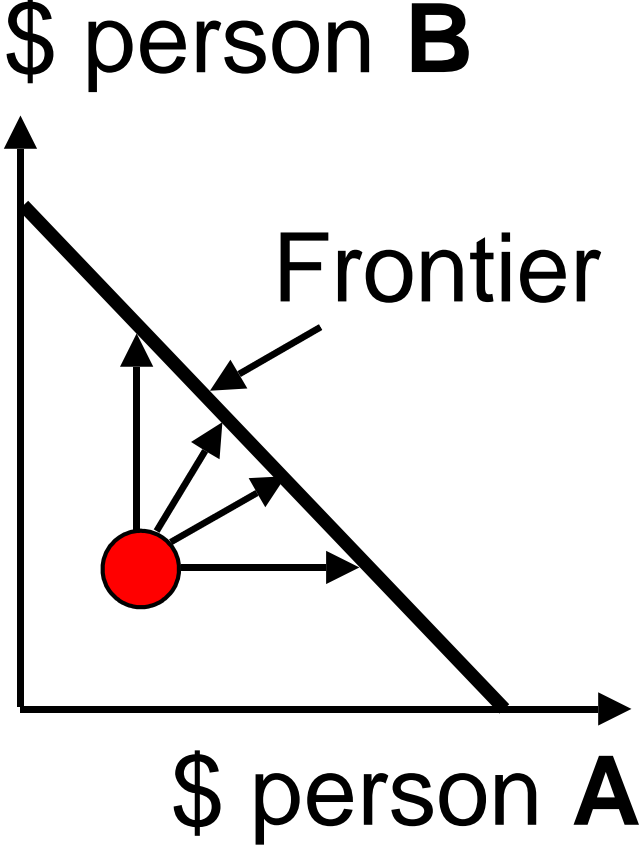
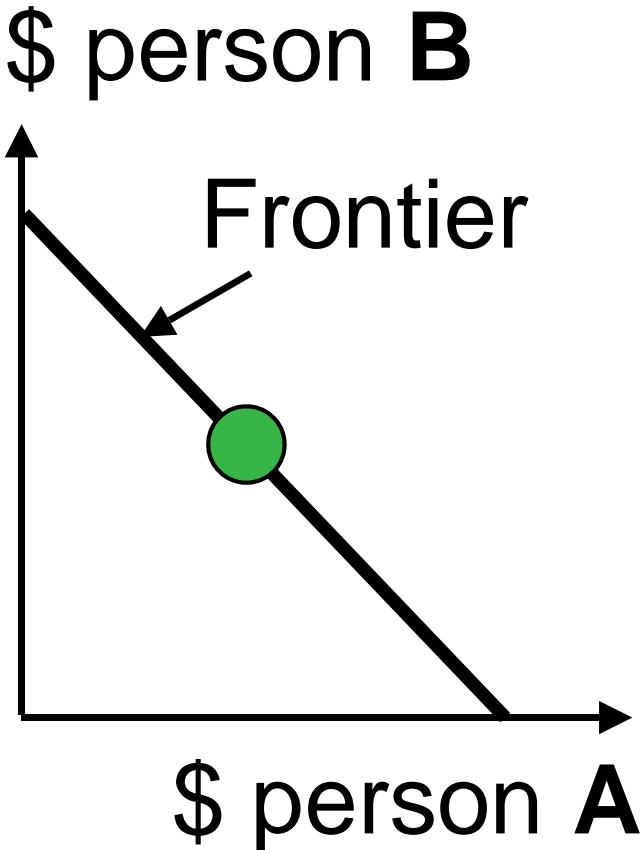
It is impossible to make one person better off without making another one worse off.



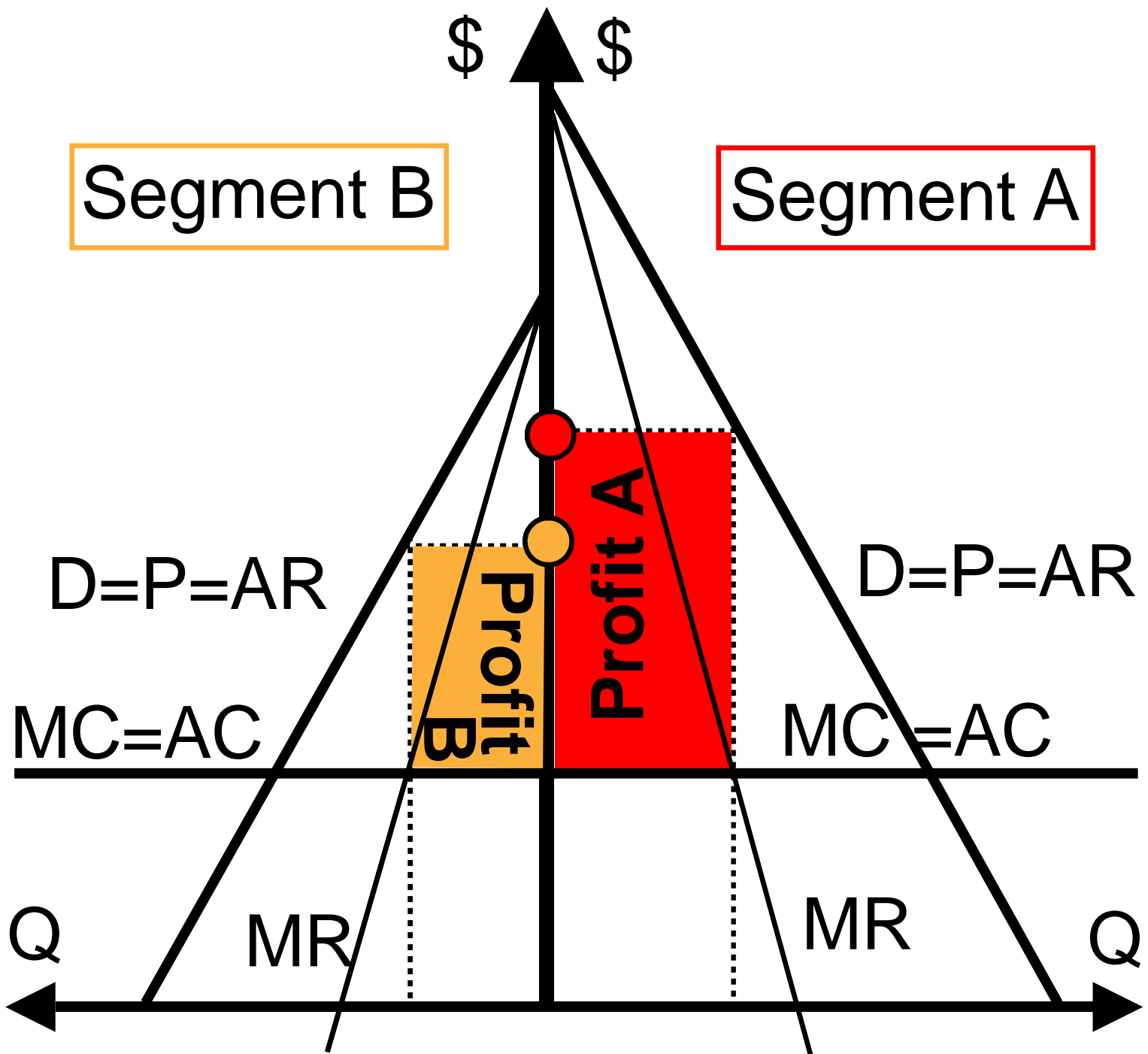
Pareto efficient

inefficient

Example: Distribution of wealth between 2 persons



Price discrimination



● Price in segment A

● Price in segment B

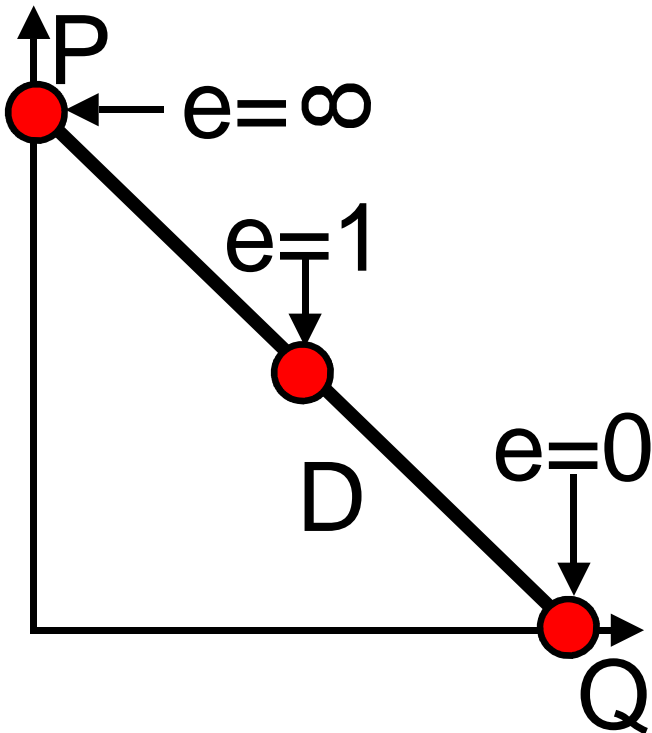
Price elasticity of demand and total revenue

	Price elasticity of demand		
	$e > 1$	$e = 1$	$e < 1$
Price rises	TR falls	TR unchanged	TR rises
Price falls	TR rises	TR unchanged	TR falls

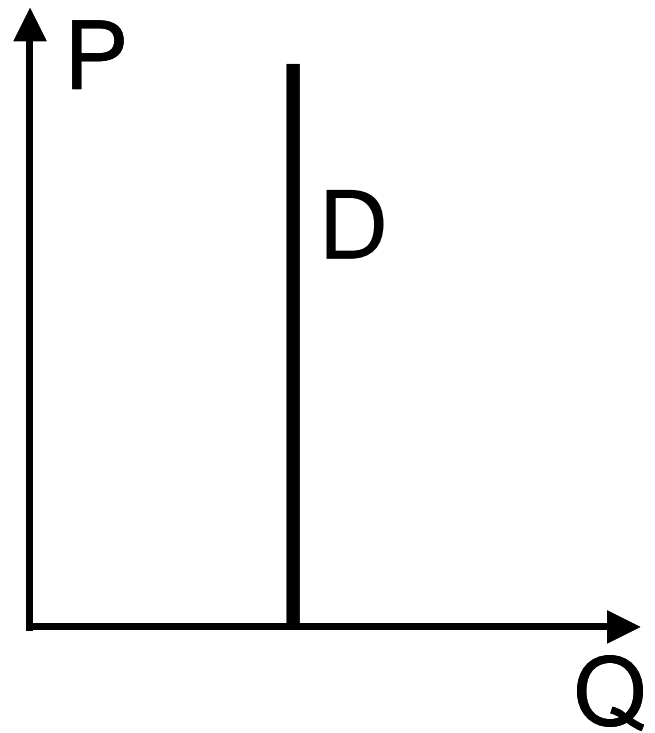
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Price elasticity of demand

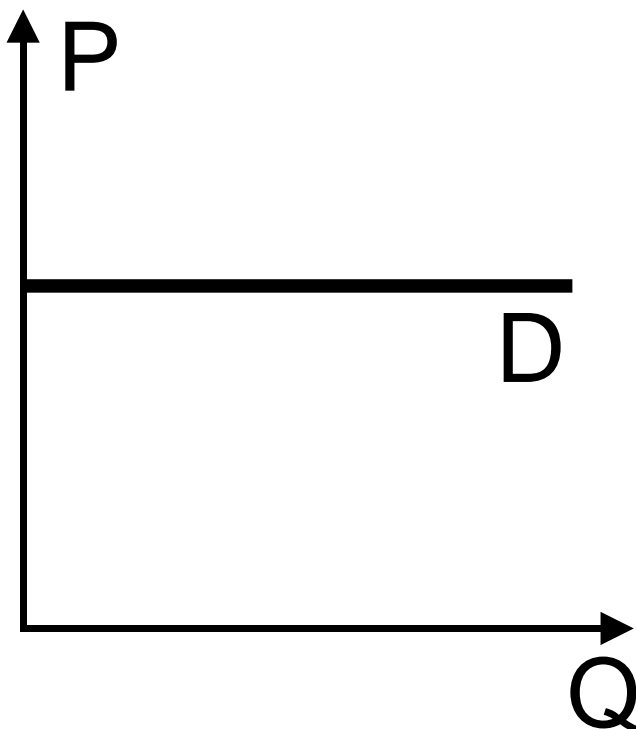
1) e and D curve



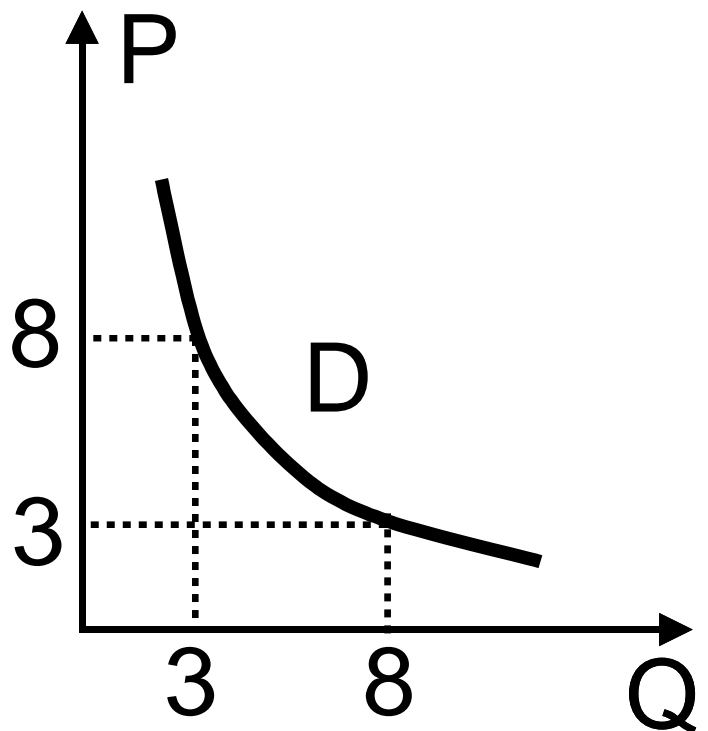
2) $e = 0$



3) $e = \infty$

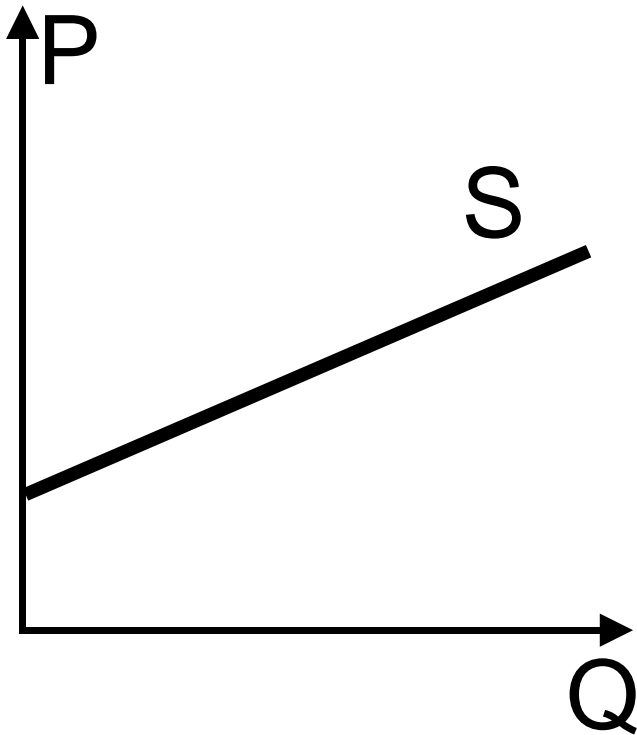


4) $e = 1$

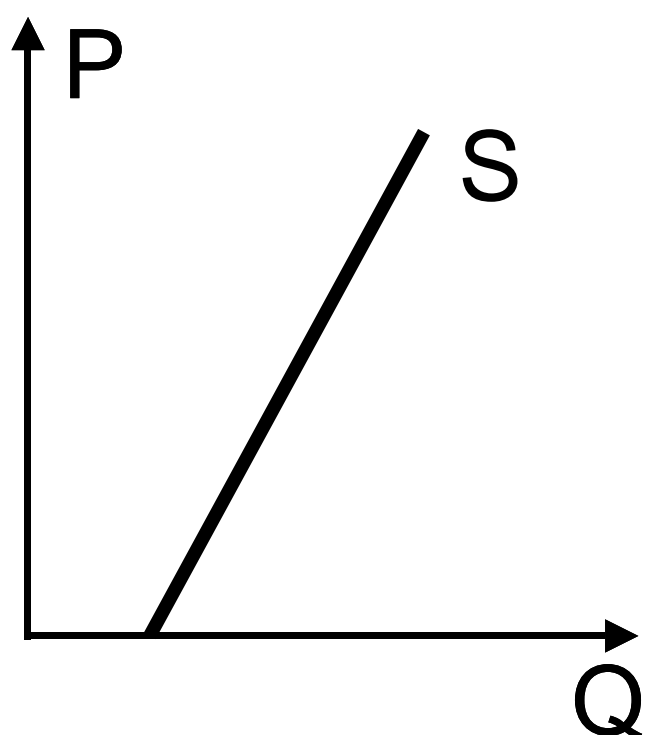


Price elasticity of supply

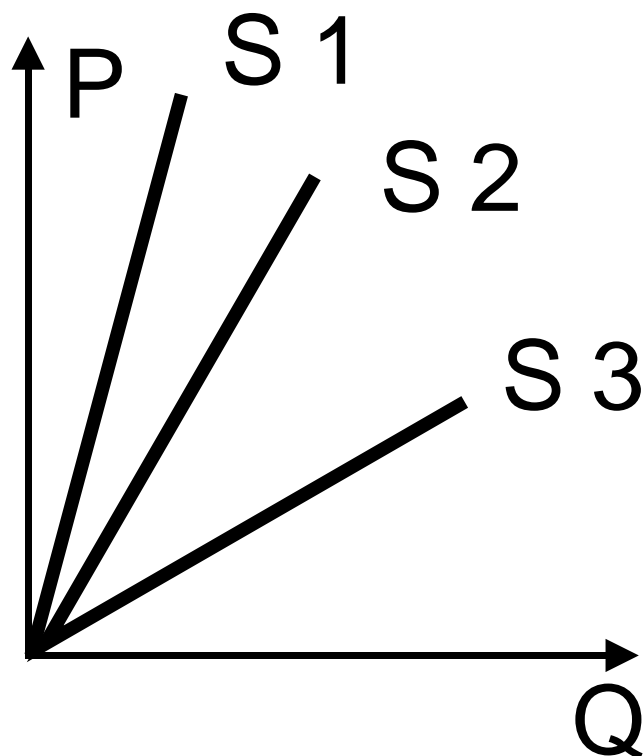
1) $Se > 1$



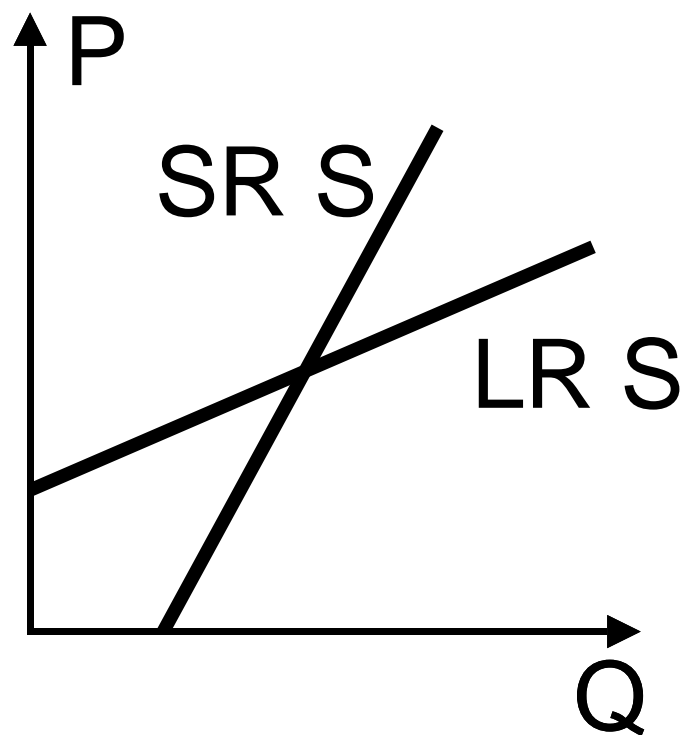
2) $Se < 1$



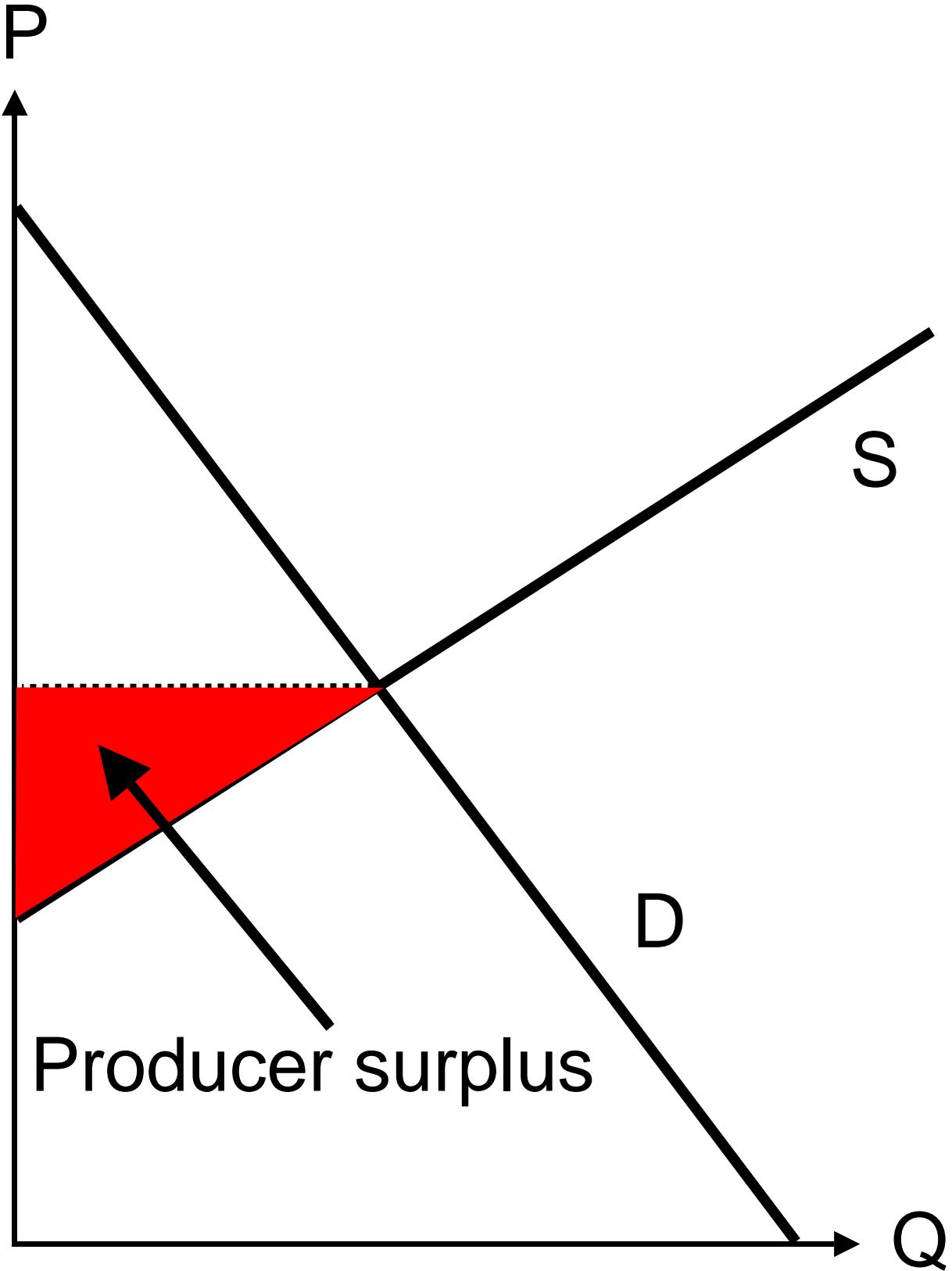
3) $Se = 1$



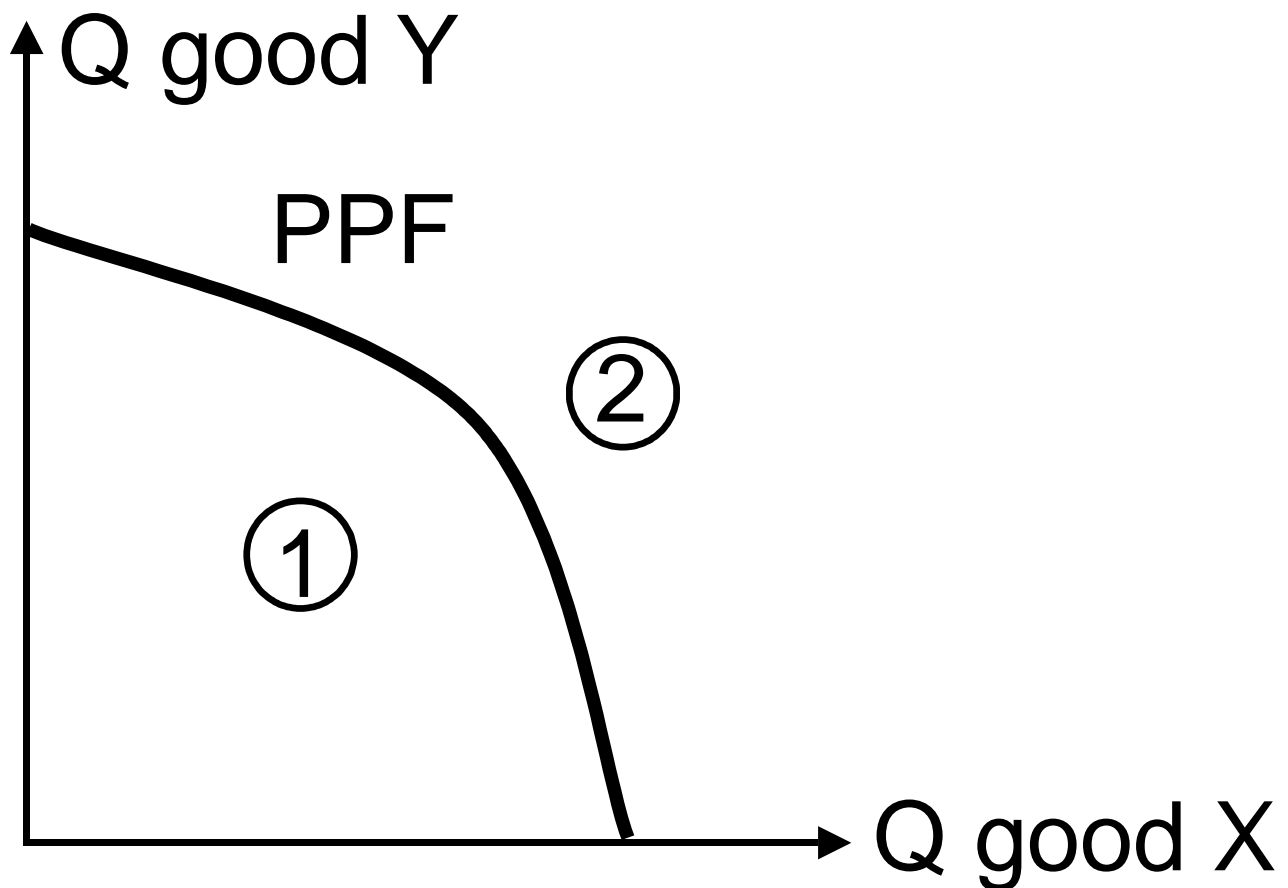
4) SR/LR S



Producer surplus



Production possibility frontier



Characteristics:

- **Concave** shape of PPF:
Opportunity costs are rising when substituting more and more X for Y.

- Points on the PPF are **efficient**.

Other points:

① inefficient

② unattainable

Profit and loss (rules)

① **Marginal condition:**

$$MC = MR$$

+

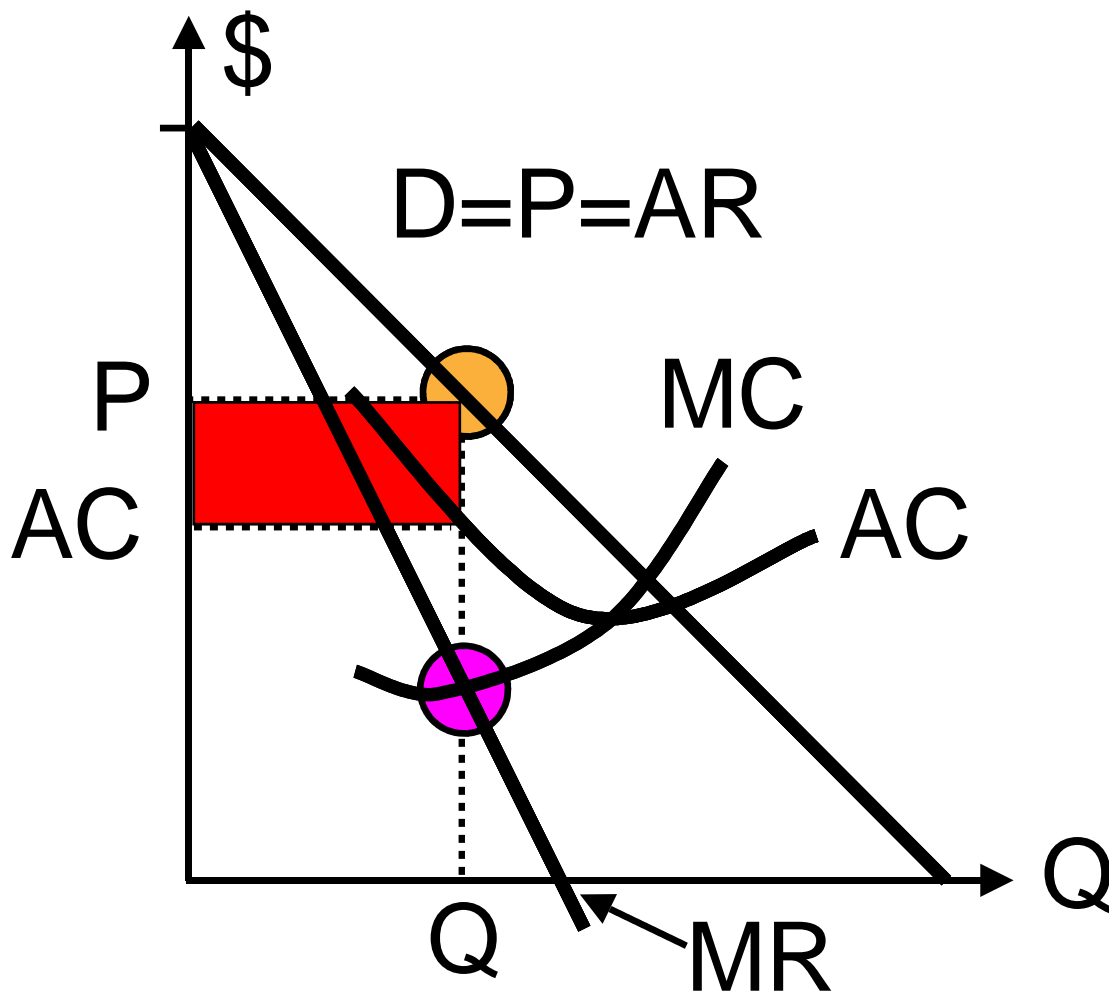
② **Average condition:**

• **Maximum profit:** $AC < AR$

• **Minimum loss:** $AC > AR$

• **Normal profit:** $AC = AR$

Profit maximization by a monopolist



Profit maximization by a monopolist in 3 steps:

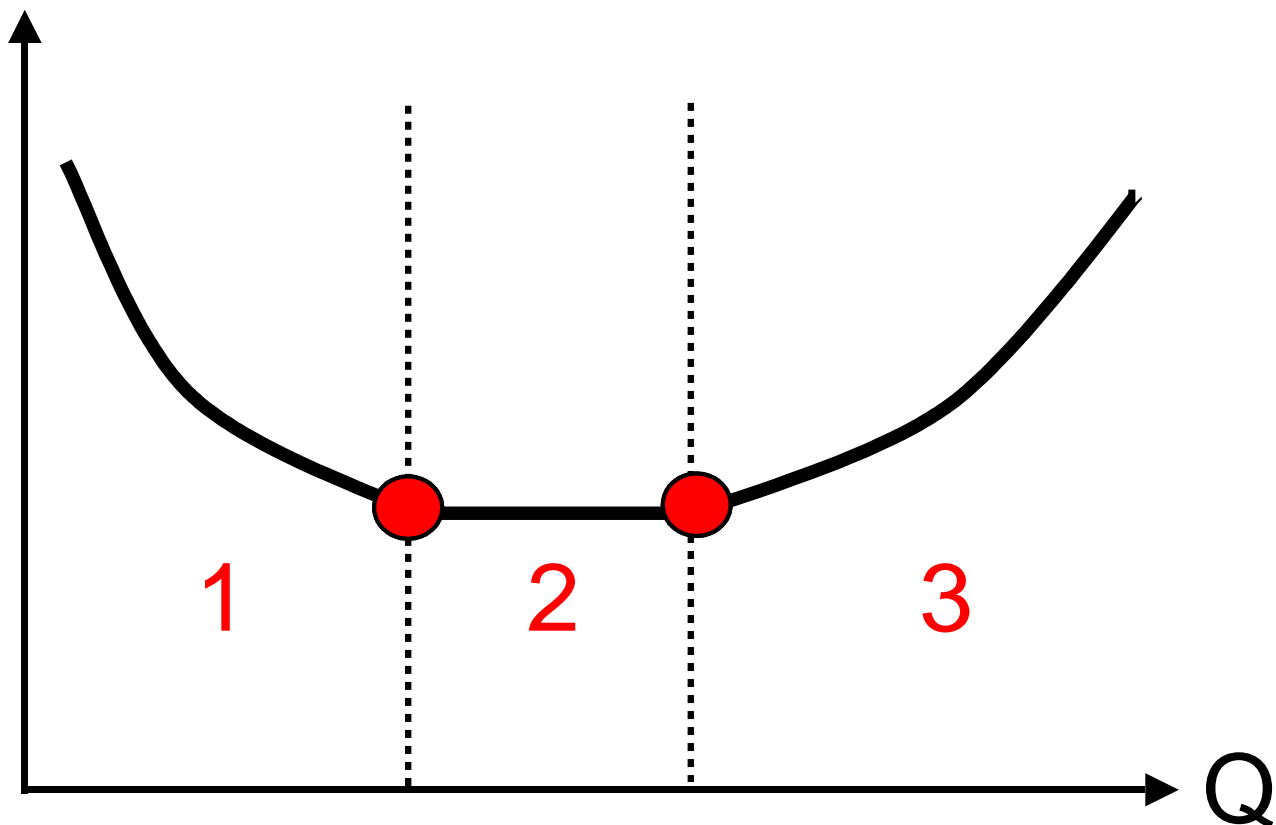
- Find point $MC = MR$
- Set price $> MC = MR$



$$\text{Profit} = (P - AC) * Q$$

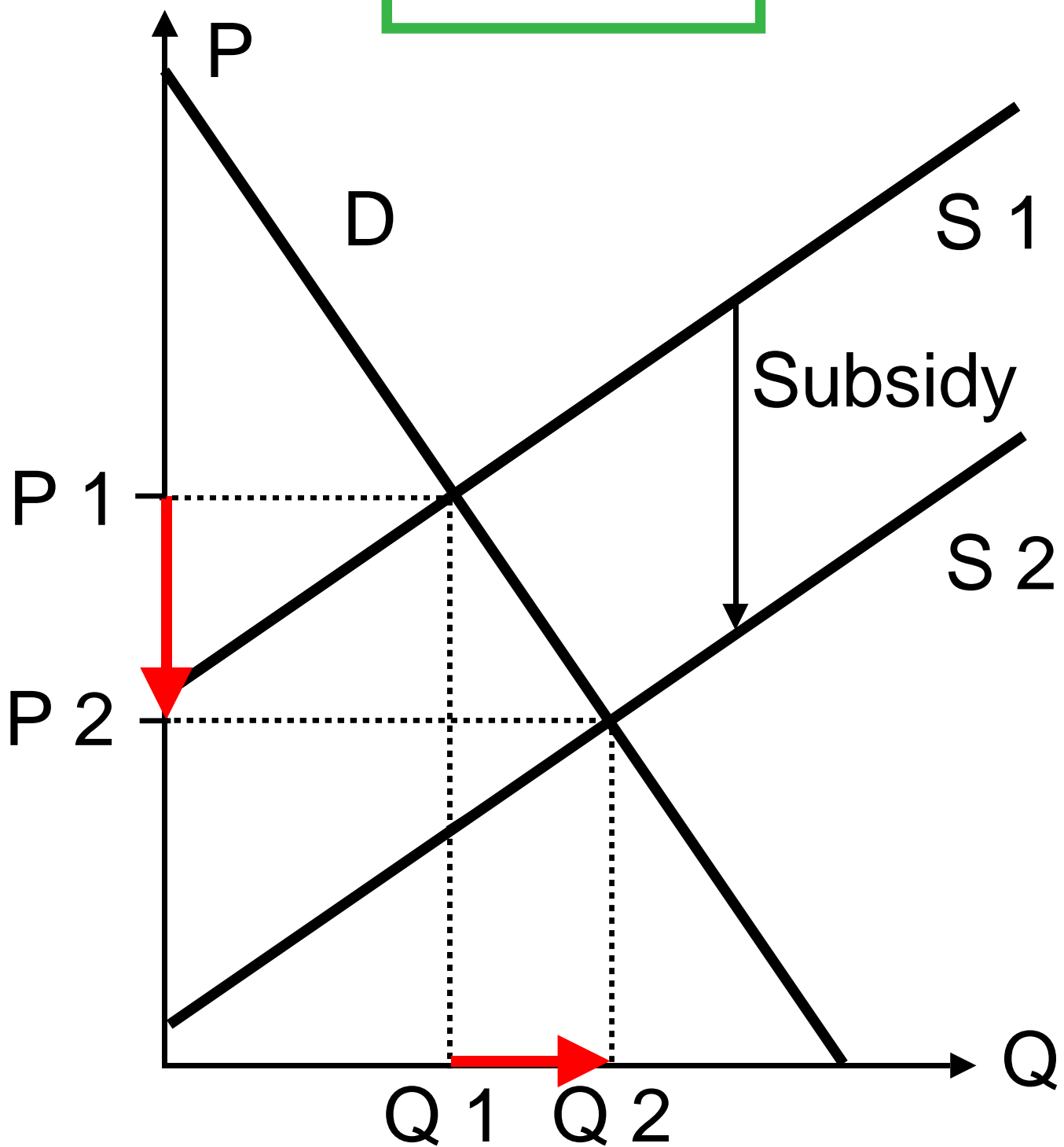
Returns to scale

Long-run average cost



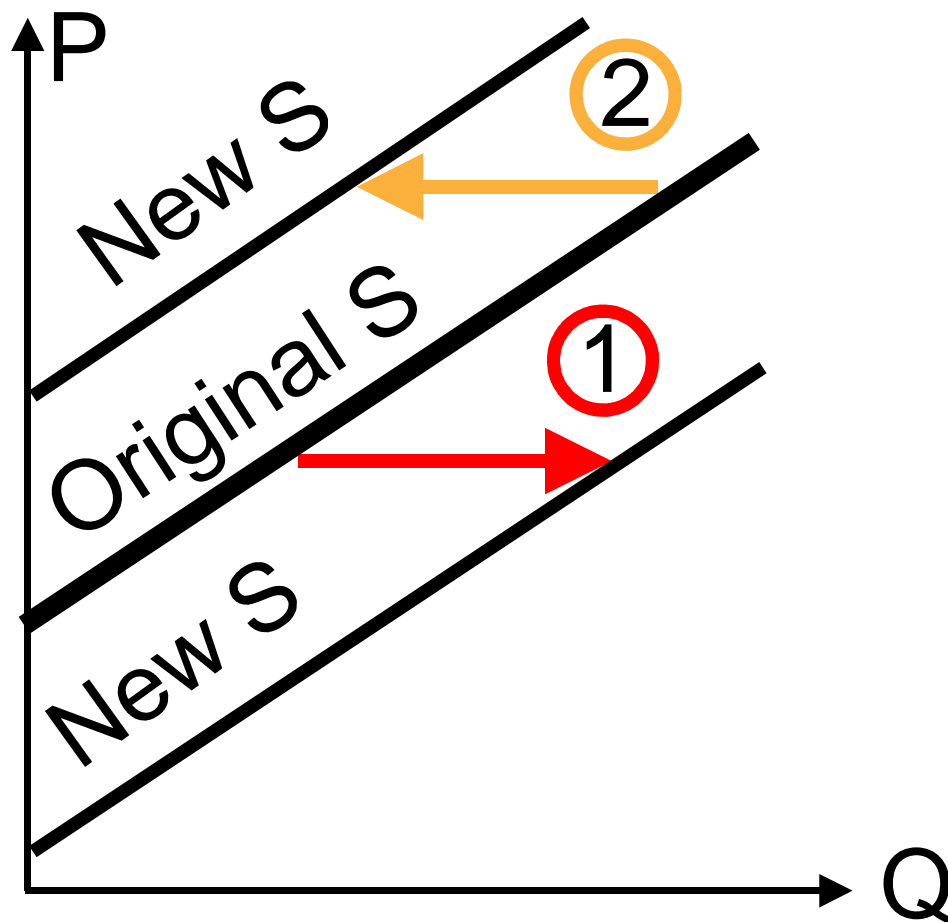
- 1 Increasing** returns to scale
(= economies of scale)
- 2 Constant** returns to scale
- 3 Decreasing** returns to scale
(= diseconomies of scale)

Subsidies



By a per-unit subsidy, price is decreased and quantity is increased. In this case both sellers and buyers profit from subsidies at the cost of taxpayers. 2012-10-15

Supply (shifts)

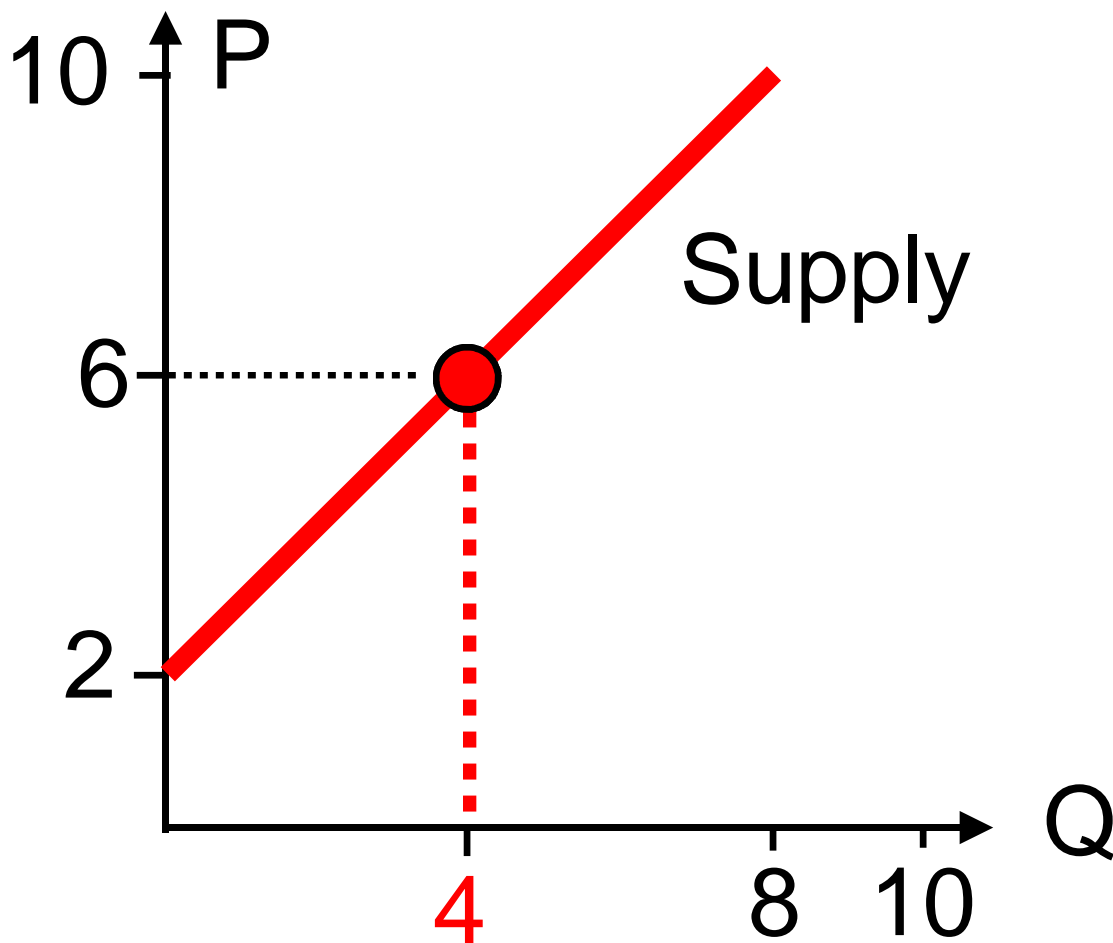


- ① Increase in S (outward shift)
- ② Decrease in S (inward shift)

Possible reasons: Changes in the

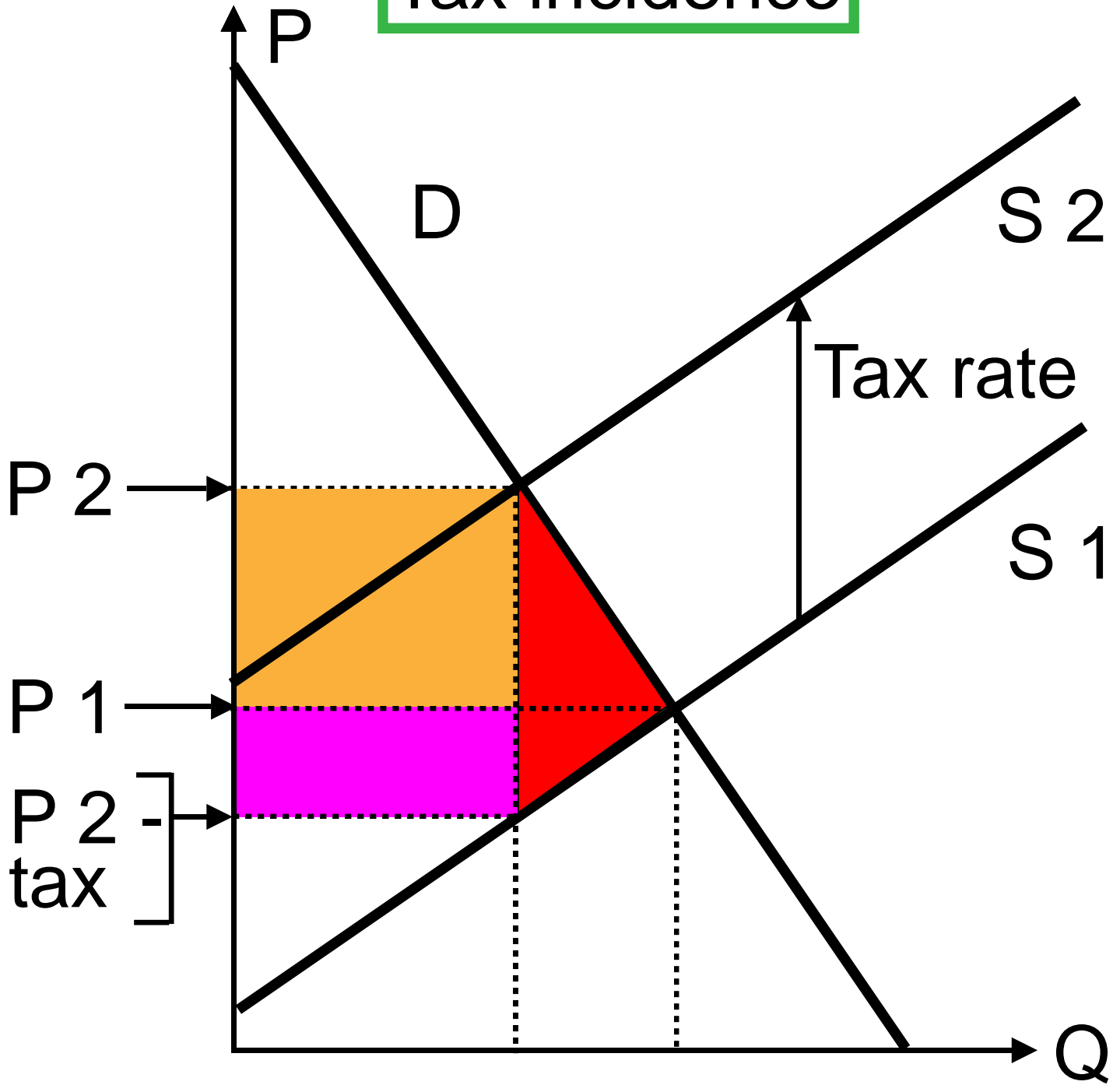
- costs of production
- technology
- regulations by the state (taxes)
- number of suppliers

Supply and quantity supplied



- **Supply** refers to the curve and displays the relationship between prices and quantities supplied.
- **Quantity supplied** refers to a point on the curve.
Example: If $P = 6$, then $Q = 4$; 4 is the quantity supplied.

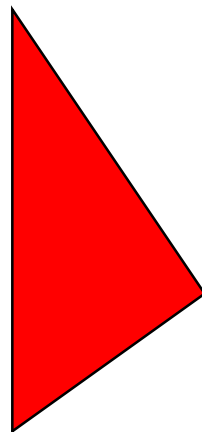
Tax incidence



tax borne by buyers

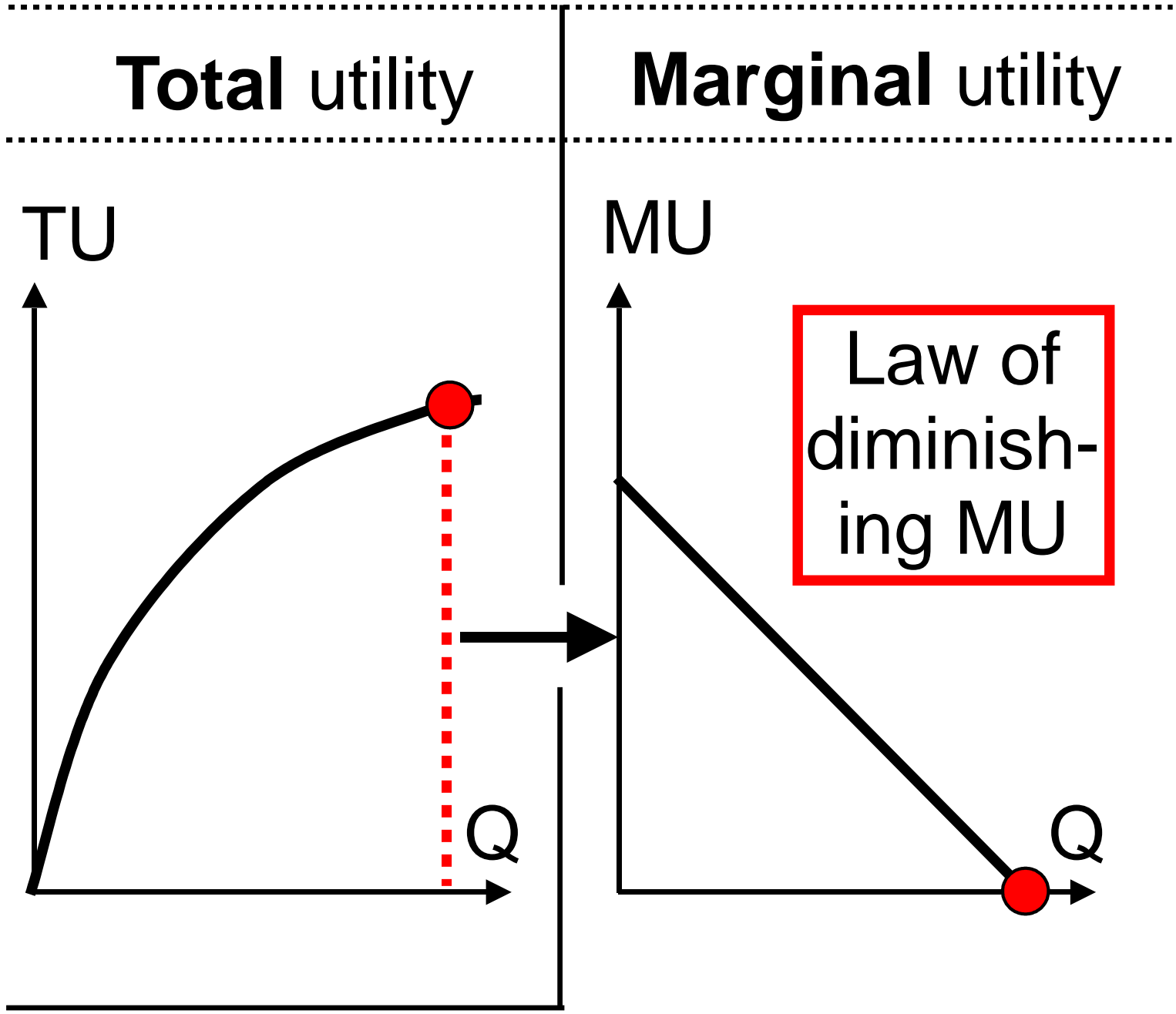


tax borne by sellers



dead-weight loss

Utility



Consumption **equilibrium**:

$$\frac{\text{MU good A}}{\text{P good A}} = \frac{\text{MU good B}}{\text{P good B}}$$