

5. Perfect competition analysis

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Characteristics of perfect competition environment...

- many buyers and many sellers on each market
- no one is strong enough to influence the price or industry output
- all goods are homogenous
- no barriers to enter or leave the industry
- all producers and consumers are perfectly informed of price and quantity on each market
- firms endeavour to maximize their profits, consumers endeavour to maximize their total utilities

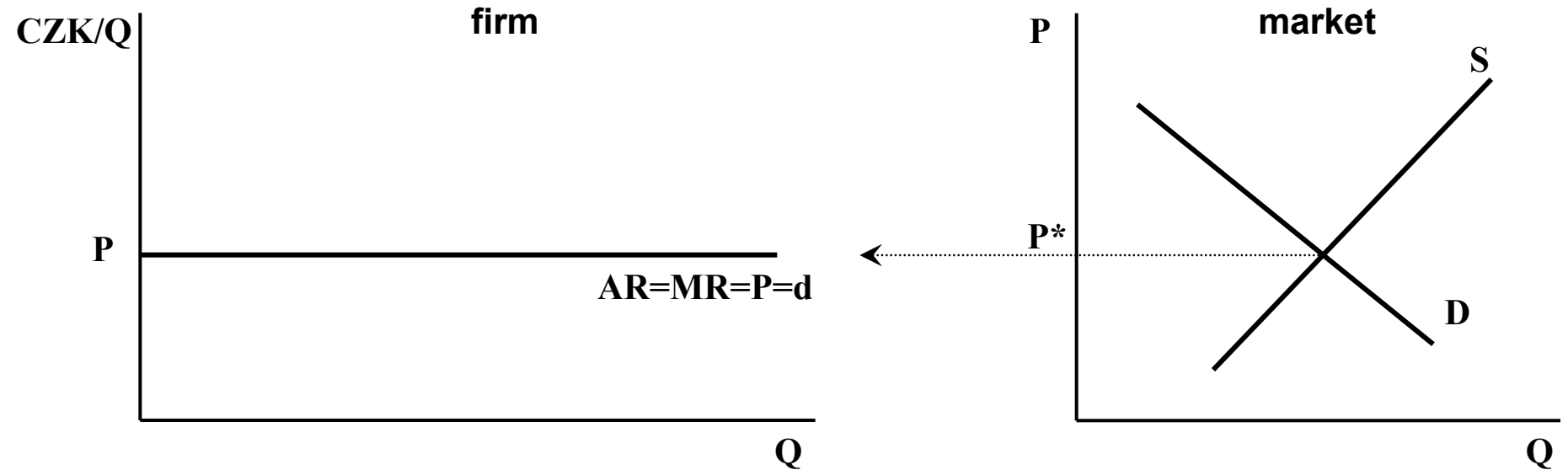


...and facts implying

- firm is a price taker – equilibrium price is set by the market equilibrium
- each firm has a neglectable market share
- firm's individual demand is horizontal at the level of equilibrium price
- marginal and average revenue functions equal to the individual demand function



Firm's individual demand function



If $P > P^*$, then firm sells nothing – consumers have no reason to pay higher than market equilibrium price

If $P < P^*$, then all consumers want to buy production of the specific firm – which is not able to satisfy the entire market demand



Firm has to accept (respect) the market equilibrium price

Firm's short run equilibrium output

Firm's output equals to the economic profit maximizing output:

1. *Q for maximal difference between TR and TC, or::*
2. *Q if MR equals to SMC*



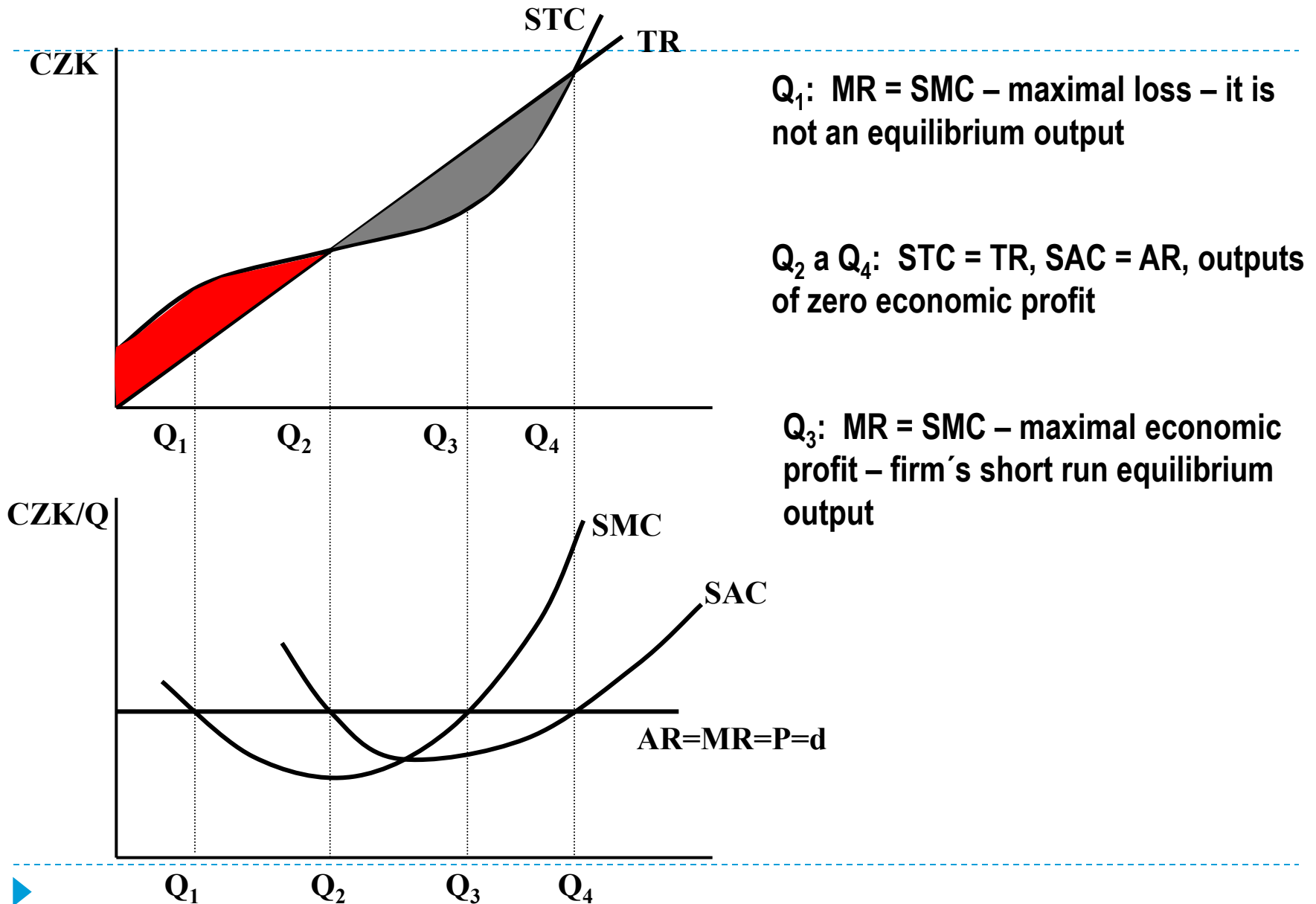
„golden rule“ of profit maximizing:

$$\mathbf{MR = SMC}$$

„golden“ because it rules for whatever type of final market competition



Firm's short run equilibrium output



Derivation of firm's optimal output

- golden rule is a **necessary** but not a sufficient condition:

$$MR = SMC$$

if we maximize the profit function: $TR - STC = \pi$ max. \rightarrow
 $\partial TR/\partial Q - \partial STC/\partial Q = 0$, we look for the maximal difference
between TR and TC, and we acquire:

$MR - SMC = 0$, but: we do not know if we acquire profit or loss
 \rightarrow

- **sufficient condition:**

2nd derivation of profit function must be negative: $\partial^2 \pi / \partial Q^2 < 0$
 \rightarrow or $\partial MR / \partial Q < \partial MC / \partial Q$ we look for Q where MC crosses
MR from below (otherwise the firm maximizes its loss)



Firm's short run supply curve

- individual supply curve equals to the positive sloped part of SMC function limited with the minimum of AVC... why?
- positive sloped part of SMC represents a set of firm's equilibria upon different levels of market equilibrium price
- the firm does not have to cover short total costs, but:
- to cover its variable costs is enough, and it makes sense to cover partially its fixed costs



$P \leq AVC$ – shut down point – the firm minimizes its loss if it shuts down



Firm's short run supply curve

Example:

Firm buys buildings for (head quarters+factory) for 5 mio. EUR (its fixed costs). Costs on wages, energy, materials equal to 2 mio. EUR (its variable costs). Firm sells its output for 3 mio. EUR (its TR)

FC	VC	STC	TR	economic profit
5	2	7	3	-4

The firm continues its existence, because its TR cover the entire VC (2 mio. EUR) + partially cover its FC (1 mio. EUR). The firm gets back its entire fixed costs within 5 years (1 mio. EUR each year).



Firm's short run supply curve

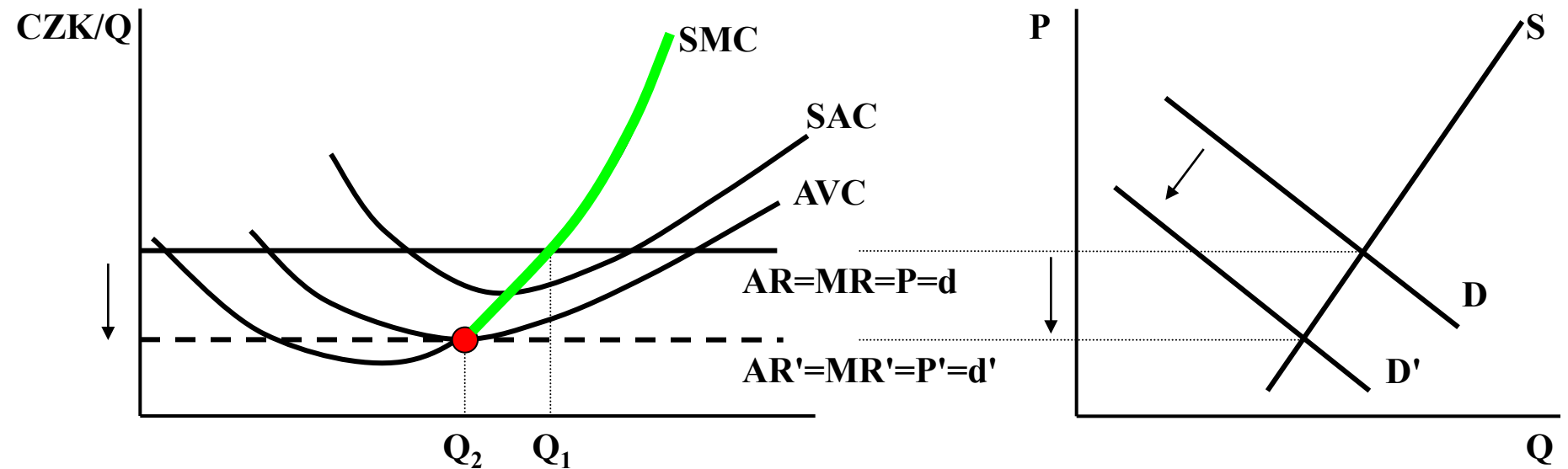
But if total revenues decrease to 2 mio. EUR:

FC	VC	STC	TR	economic profit
5	2	7	2	-5

... then it is better to shut the firm down. Firm's loss is as deep as absolute value of fixed costs.



Firm's short run supply curve



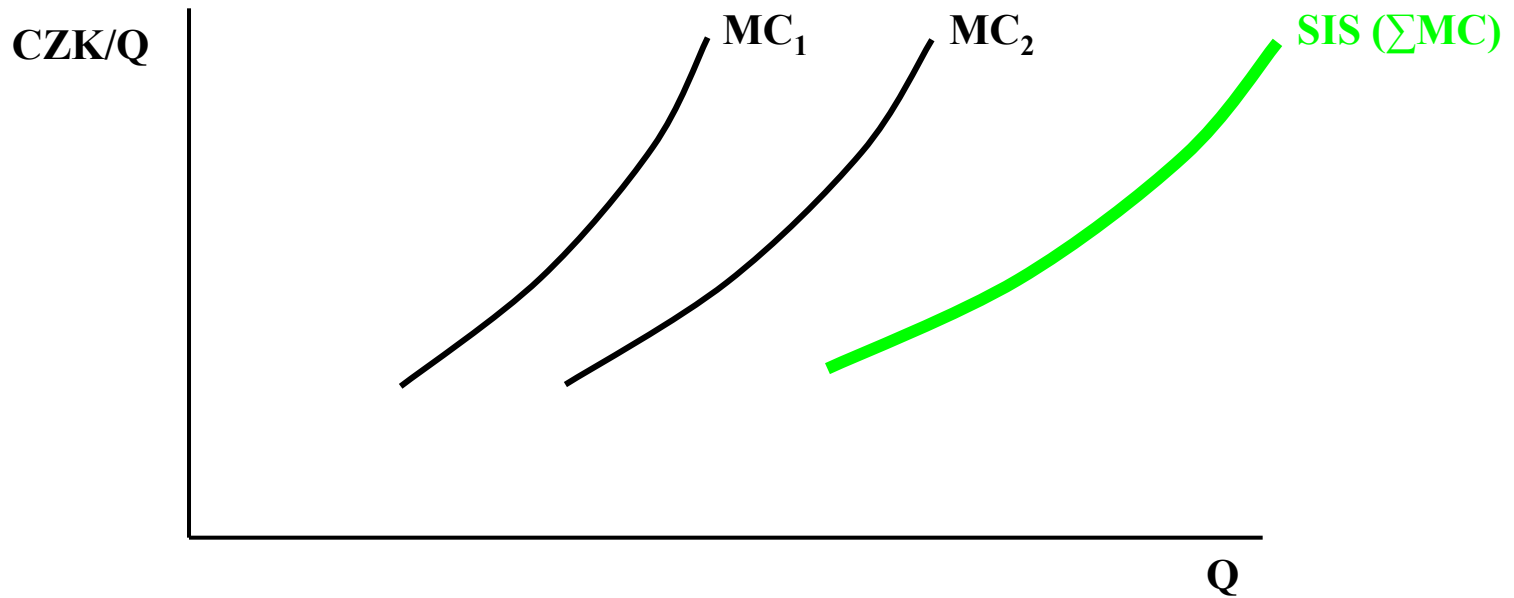
Q_1 – optimal output upon price „P“, the firm maximizes its economic profit

Q_2 – market equilibrium price decreases to P' , firm's equilibrium shifts downwards alongside the SMC curve. Firm shuts down, because it covers only its variable costs

firm's individual supply curve = positive sloped SMC curve limited with minimum of AVC



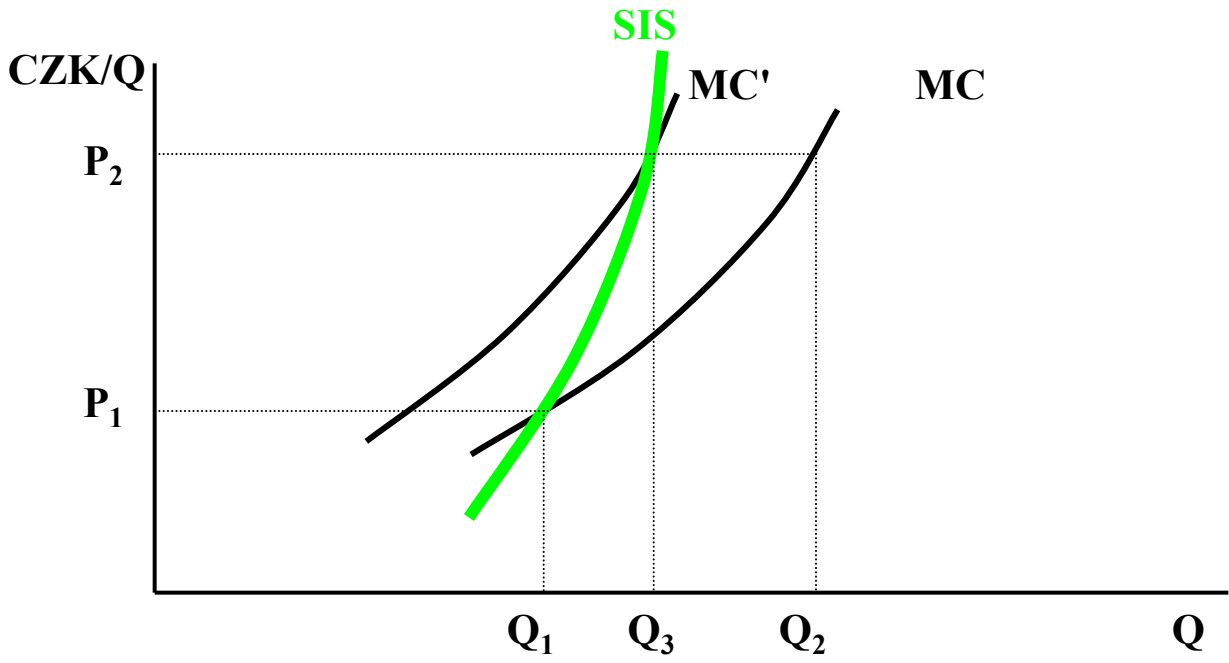
Short industry supply curve – constant prices of inputs



Short industry supply curve (SIS) – as a horizontal sum of individual supply curves $\rightarrow SIS = \Sigma MC$



Short industry supply curve – increasing prices of inputs



Upon price P_1 firms supply output Q_1

Market demand increases which leads to the increase of price to P_2 - firms are willing to supply output Q_2

It also means that the market demand for labour increases → wage rate increases → firms' costs increase → MC curve of each firm shifts leftwards → supplied output increases only to Q_3

Short industry supply curve is steeper than upon constant prices of inputs



Firm's long run equilibrium output

- firm's long run equilibrium output, if: $P = MR = LMC$
- firm's long run equilibrium determined with existence of no barriers to enter or leave the industry
- firm reaches the long run equilibrium upon **zero economic profit**

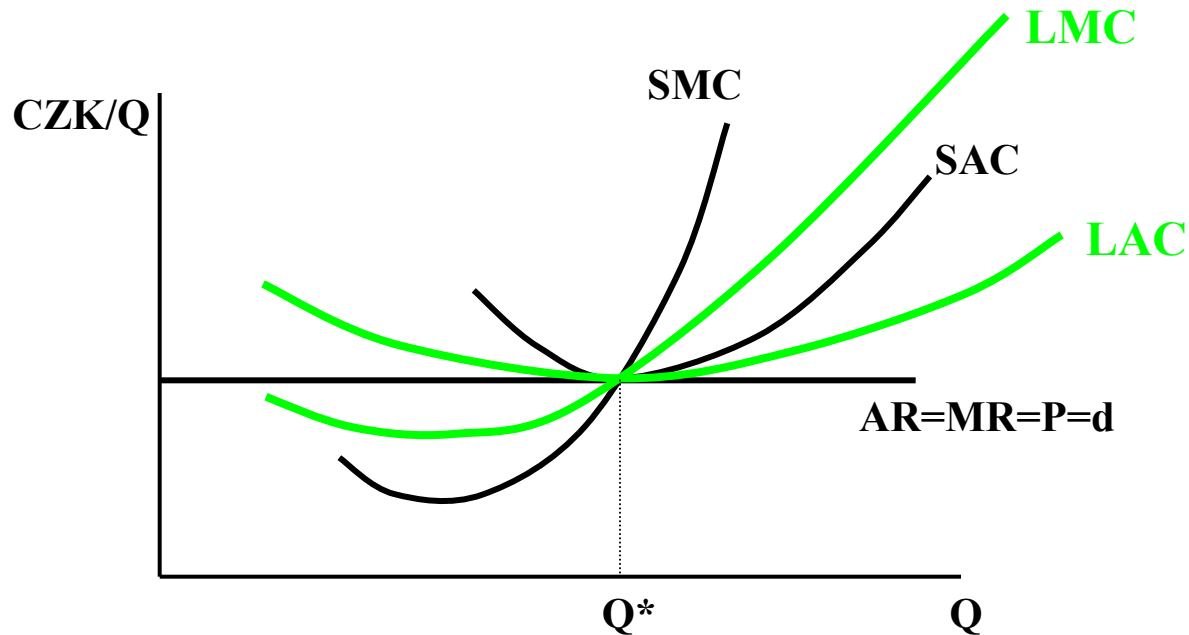


$$P = MR = SMC = LMC = SAC = LAC$$



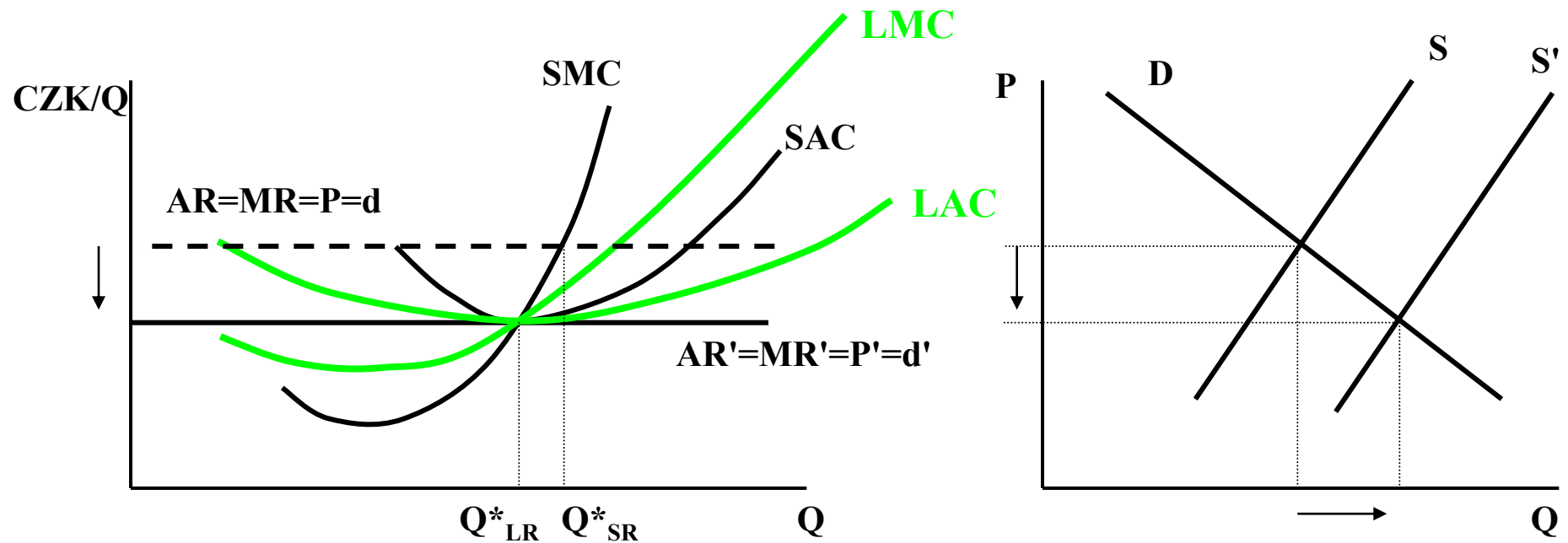
Firm's long run equilibrium

Firm reaches LR equilibrium if there is no reason to enter or leave the industry



Firm's long run equilibrium

If market equilibrium price lies above the LAC level, then firm reaches a positive economic profit – only short run equilibrium

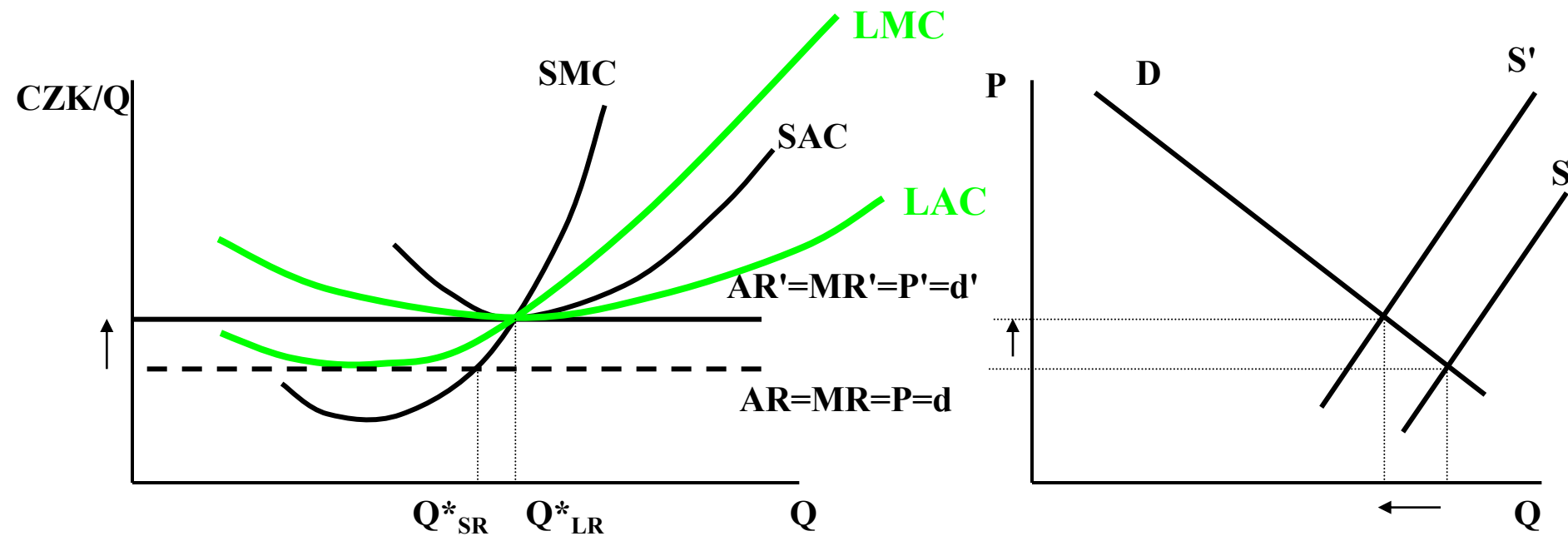


Profitable industry attracts other firms – S shifts to S', market equilibrium price decreases – firm's LR equilibrium, if: $P=MR=SMC=LMC=SAC=LAC$



Firm's long run equilibrium

If $P < LAC$, firm reaches loss – only short run equilibrium



Lossy industry is left by lossy firms (shut down spot firms) – S shifts to S', market equilibrium price increases – equilibrium if: $P=MR=SMC=LMC=SAC=LAC$



Firm's long run supply curve

Is this right?:

„Firm's long run supply curve equals to the positive sloped part of LMC curve limited with the minimum LAC.“



Long industry supply curve

Industry supply = set of long run firms' equilibria = set of intersections of shifting demand curve and short industry supply curves

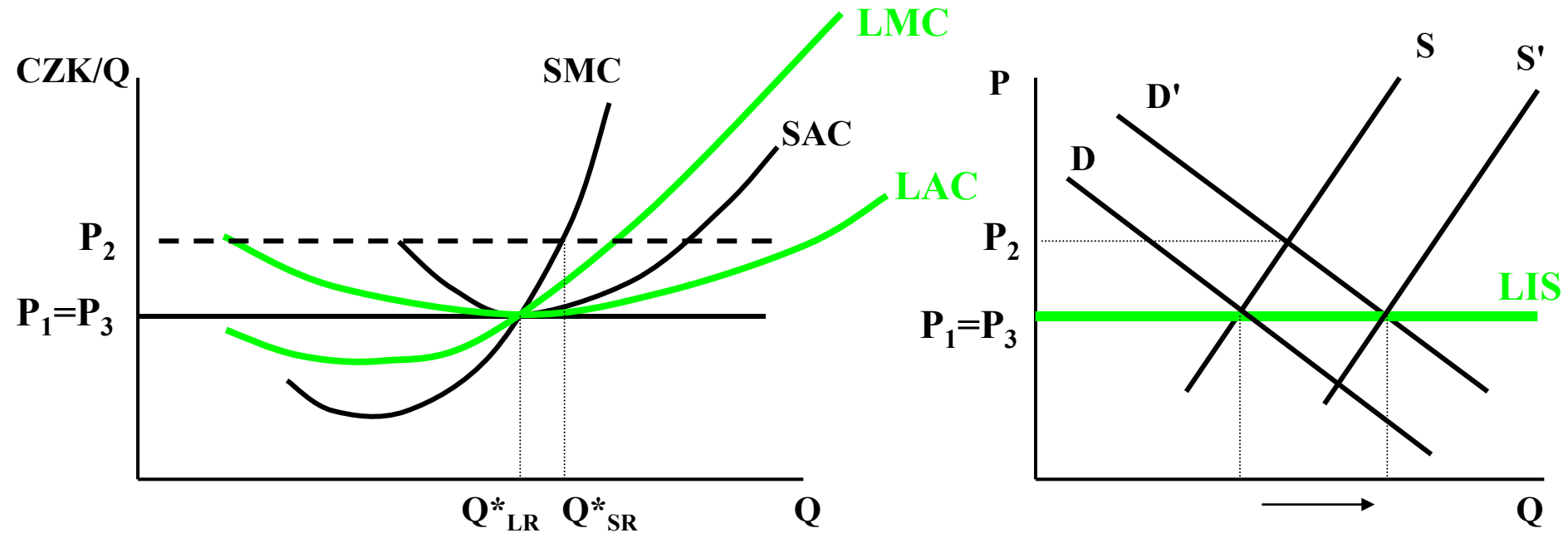


LIS curve (Long Industry Supply)



LIS curve upon constant input prices

LIS development depends on the development of prices of inputs

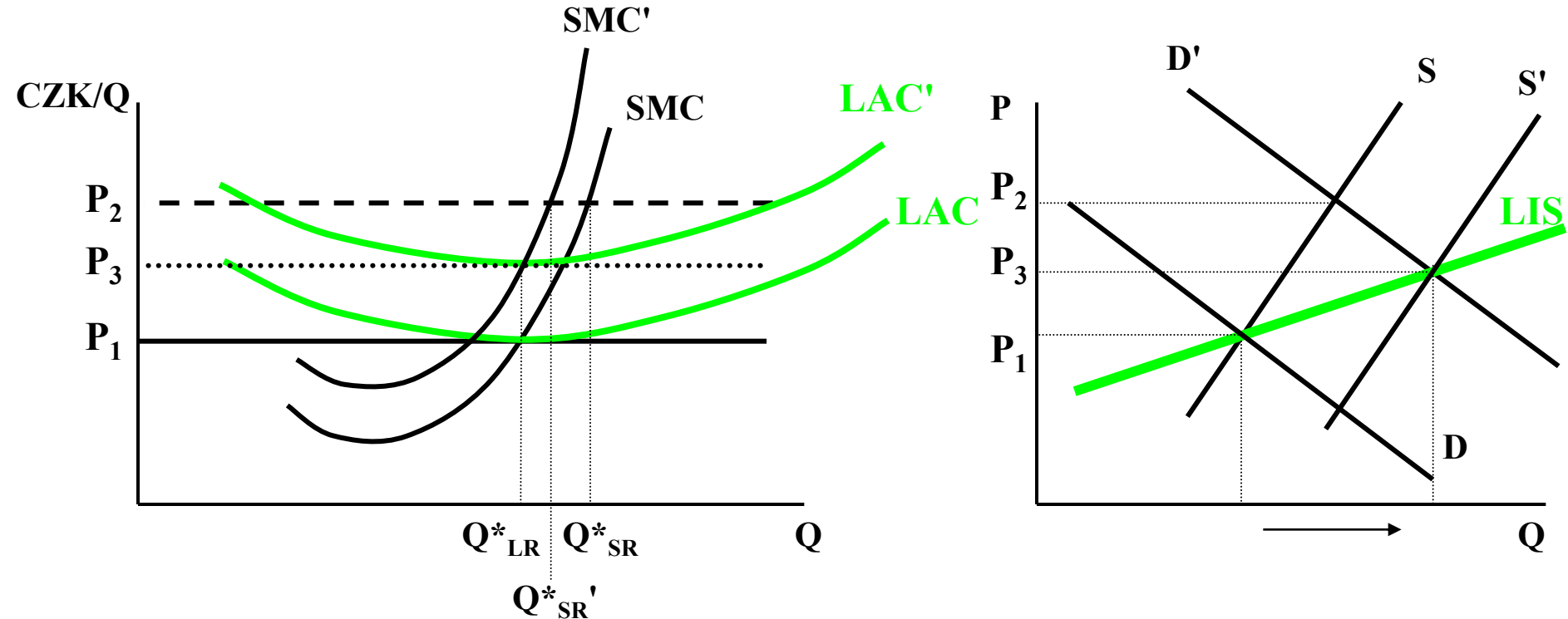


Market demand increase imply the increase of equilibrium price – profitable industry – each firm supplies output Q^*_{SR} for price P_2

New firms enter the industry – industry supply increases, equilibrium price decreases to the original level: $P_1 = P_3$ – if we join the LR equilibria, we acquire the LIS curve



LIS upon increasing input prices

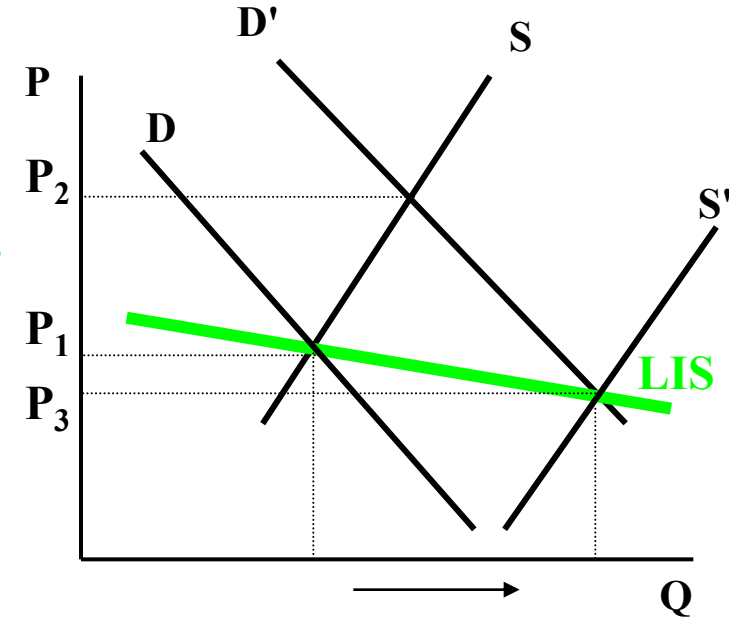
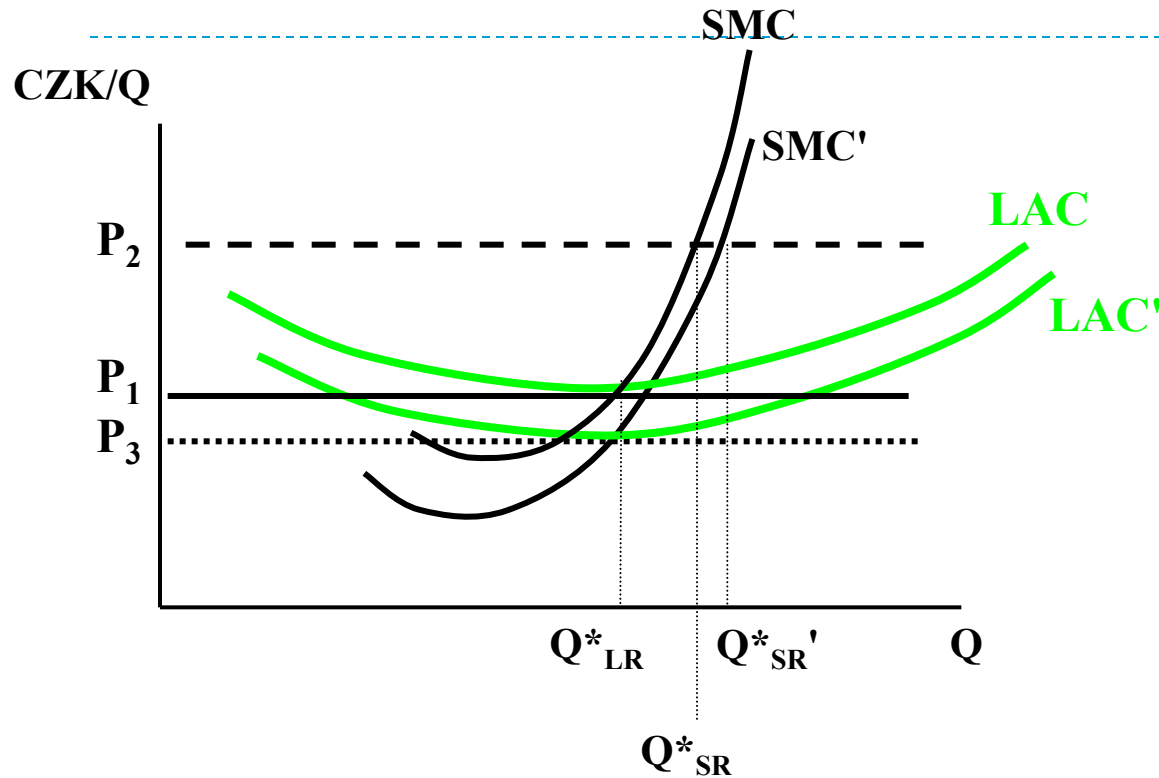


Market demand increase imply the increase of equilibrium price – profitable industry – each firm supplies output Q^*_{SR} for price P_2

New firms' inflow induces the increase of demand for inputs and increase of their prices – cost functions shift upwards

New firms' inflow leads to the increase of industry supply and equilibrium price decreases – but only to the level P_3 – LIS curve has a positive slope

LIS upon decreasing input prices



Market demand increase imply the increase of equilibrium price – profitable industry – each firm supplies output $Q^*_{SR'}$ for price P_2

New firms' inflow induces the decrease of input prices (i.e. new firms bring new technology) – cost functions shift downwards

Cost decrease lead to the relative higher increase of industry supply – equilibrium price decrease to P_3 – LIS has a negative slope

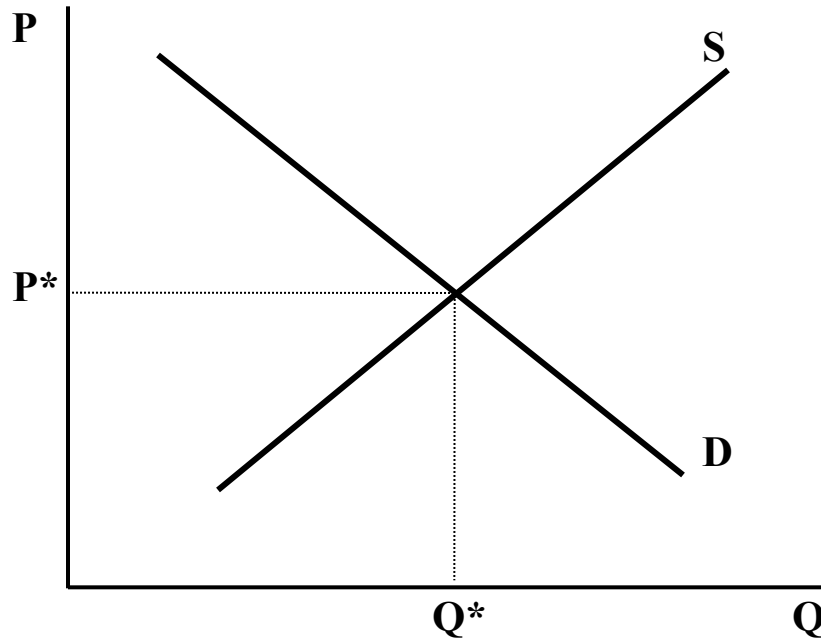
Perfect competition efficiency

Productive and allocative efficiency:

- **Productive efficiency:** firm produces its equilibrium output with minimal AC – in short run firm may/may not fulfill the productive efficiency (if the firm reaches profit or loss)
- **Allocative efficiency:** it is produced an output for that stands: $P=MU=MC$... or there is no other better solution – reallocation does not lead to bigger total surplus (consumer's + producer's)... or there is zero dead weight loss - **firm and industry both *always* fulfill the allocative efficiency**



Allocative efficiency

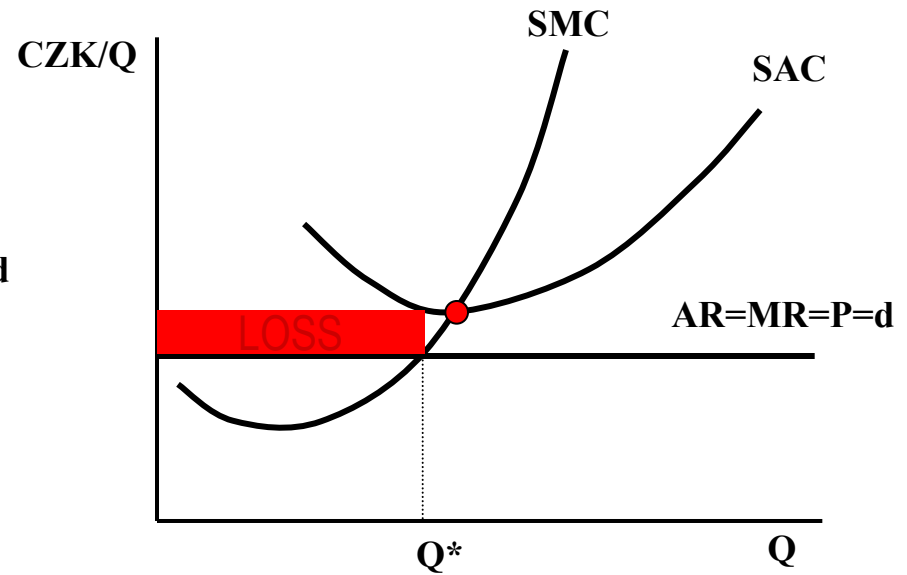
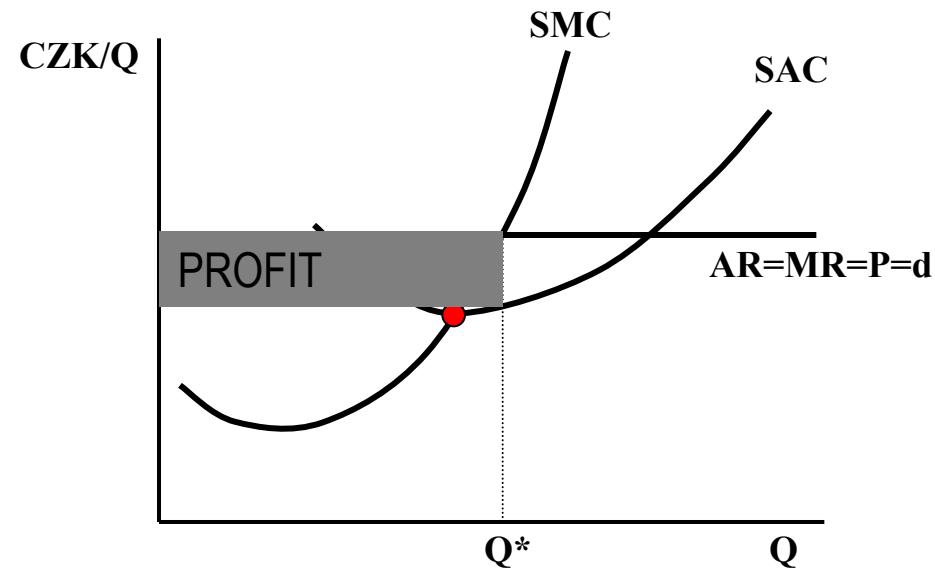


There is no other solution that would lead to the better position of consumers and producers together.

Consumers can get better but producers get worse and vice versa



Productive efficiency

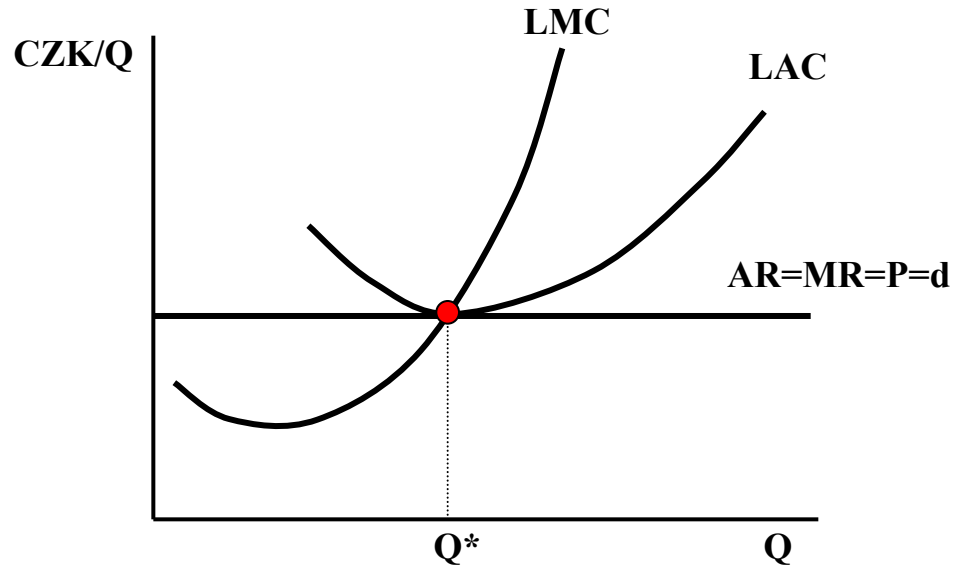


If a firm gains profit or loss, then it does not fulfill the productive efficiency – equilibrium output is not produced with minimal AC

In LR each firm fulfills the productive efficiency, because in LR all firms tend to zero economic profit → equilibrium output with minimal AC



Productive efficiency



In LR each firm fulfills the productive efficiency, because in LR all firms tend to zero economic profit → equilibrium output with minimal AC



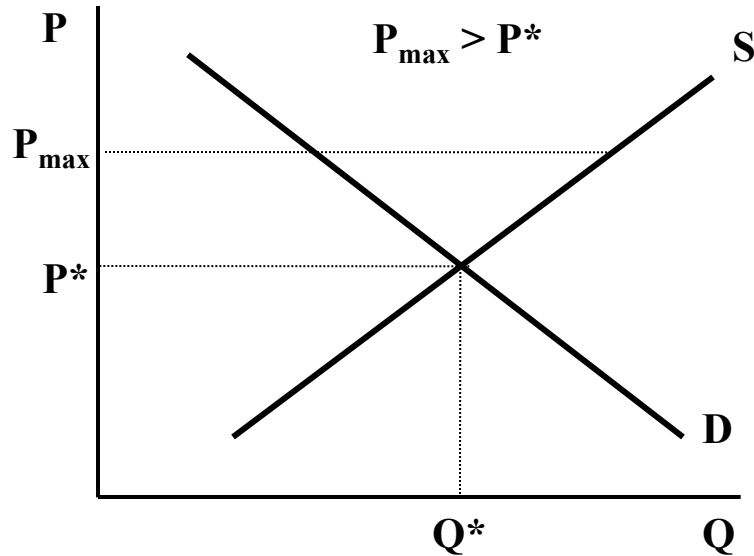
Price regulation

- ▶ price regulation = state interventions into the freely set market equilibrium price
- ▶ 2 basic forms: maximal prices (price cannot increase over...)
minimal prices (price cannot decrease under...)
- ▶ aim of regulation: to assure that the market works as a specific group of people desires
- ▶ impact: market imbalances

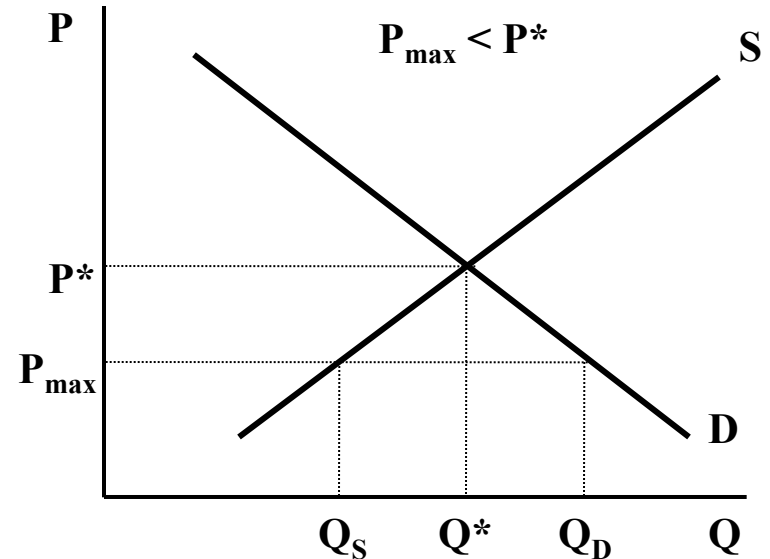


Maximal prices

The price cannot be higher than the regulator has set



If the maximal price lies over the equilibrium price, there is no impact on the market



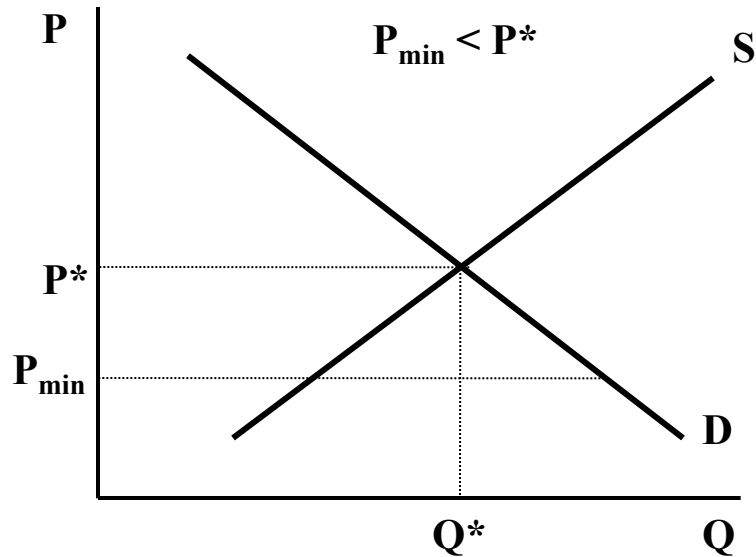
If the maximal price lies under the equilibrium price, there is a demand overhang: black markets, lack of goods, enforced savings

Maximal prices – typical for centrally planned economies

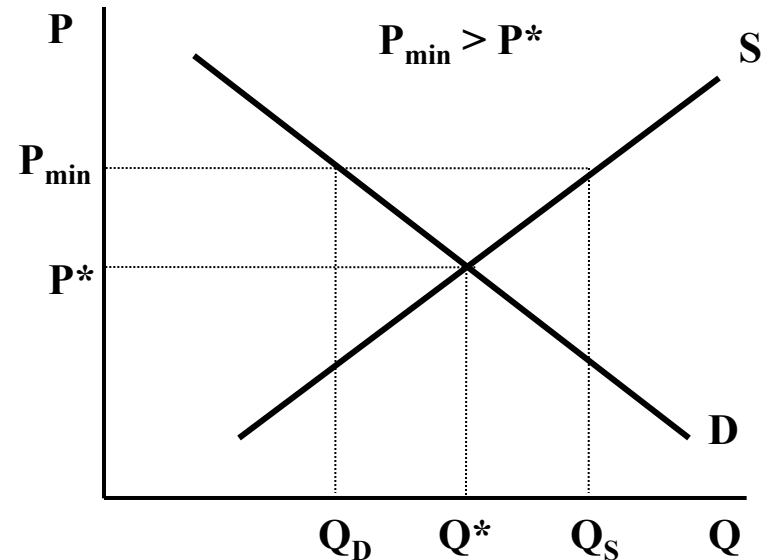


Minimal prices

The price cannot be lower than the regulator has set



If the minimal price lies under the equilibrium price, there is no impact on the market



If the minimal price lies over the equilibrium price, there is a supply overhang

Minimal prices mostly used to regulate the agriculture production market

