Relationship between ST and LT cost functions

Today
FC (K) = 10.000 € for Q = 10 BIKES
Tomorrow?

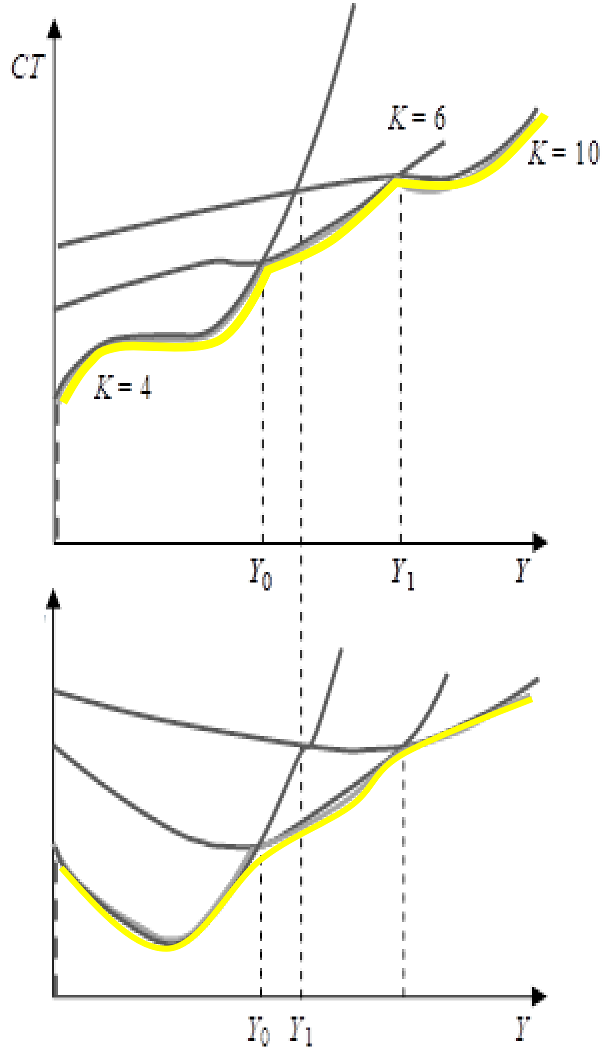
FC (K) = 1.000.000 € ? For Q = 10 BIKES?

FC (K) = 1.000.000 € ? ~~Q = 10 BIKES~~

K = 4
K= 6
K = 10

ST: Fixed costs?
ST: Variable costs?
LT: ?

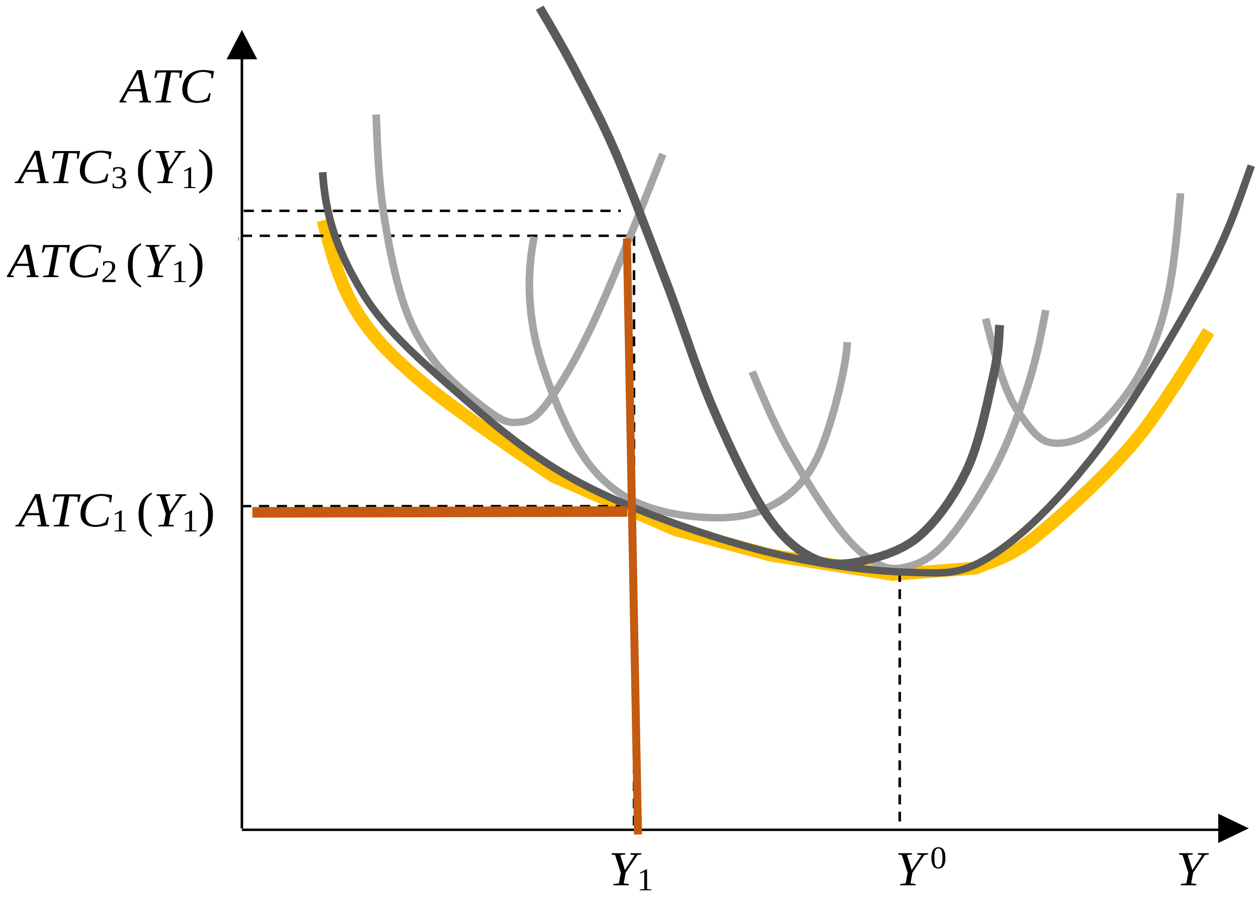
ATC



Relationship between ST and LT cost functions

Y° : minimum efficient scale of the firm, minimum of minima, best of the best

$TC^{LT}(Y) = \min TC^{ST}(Y)$



Which Isoquant? Short-Term

$$\max_{Q} \Pi^i(Q) = TR^i(Q) - TC^i(Q) = PQ - TC^i(Q)$$

s.t. $P = P^d(Q)$ → P = P° (PRICE-TAKER, perfect competition)

s.t. $Q = f^i(K, L)$

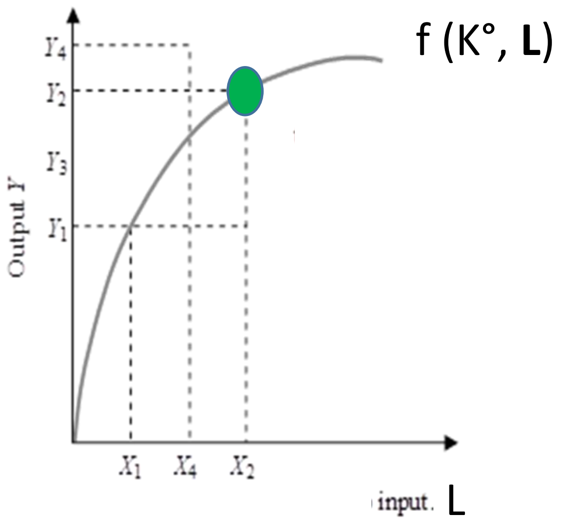
s.t. K = K° (or better K≤K°?) **SHORT TERM PERIOD!**

s.t. TC^i (Q, w°, r°) = w° L (Q, K) + r° K NOT ANY L!

PS: which profits?

Maximization of profit, ST

K=K°



Q* such that:
Max Π (Q) = P° **Q** – TC (**Q**)
Or L* such that:
Max Π (L)= P° f (K°, **L**) – w° **L** – r° K°

$$P_0 \frac{\delta f(K_0 L)}{\delta L} - w_0 = 0$$

P° MPL (K°, L*) = w°

$$MPL(K_0 L^*) = \frac{w_0}{P_0}$$

PS: r°K°?

Isoprofits and Maximization of profits, ST

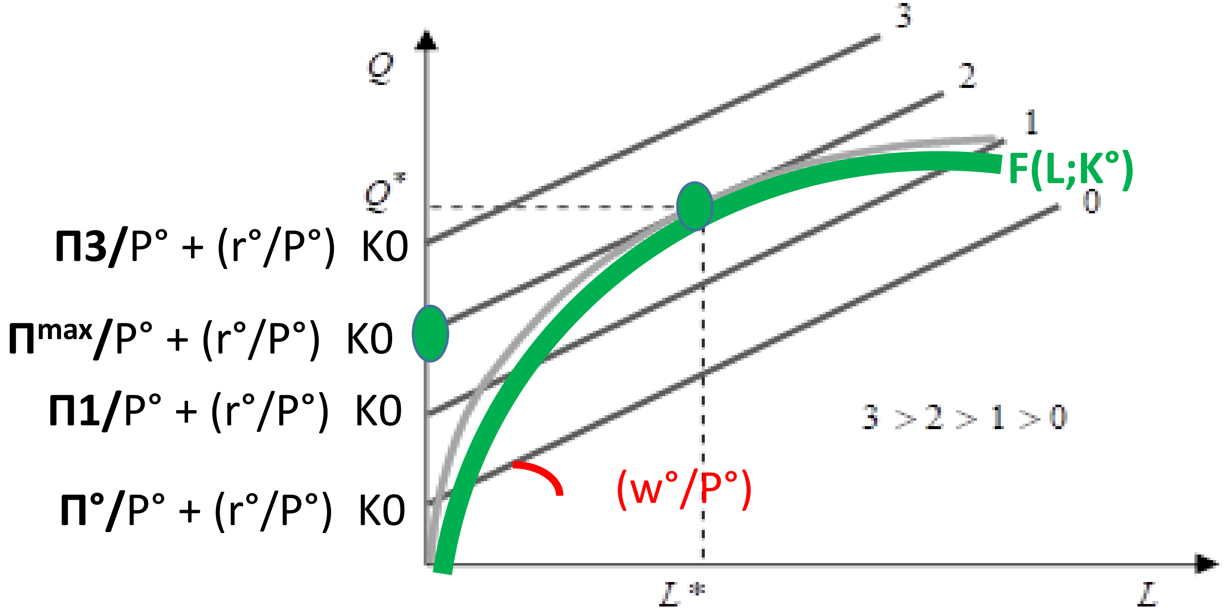
$$\Pi° = P° \, Q - w° \, L - r° \; K°$$

What is the optimal condition for Q* and L*?

$$Q = \frac{\Pi_0}{P_0} + \frac{r_0}{P_0} K_0 + \frac{w_0 L}{P_0}$$

Π1 ? Π°

Π1 > Π°



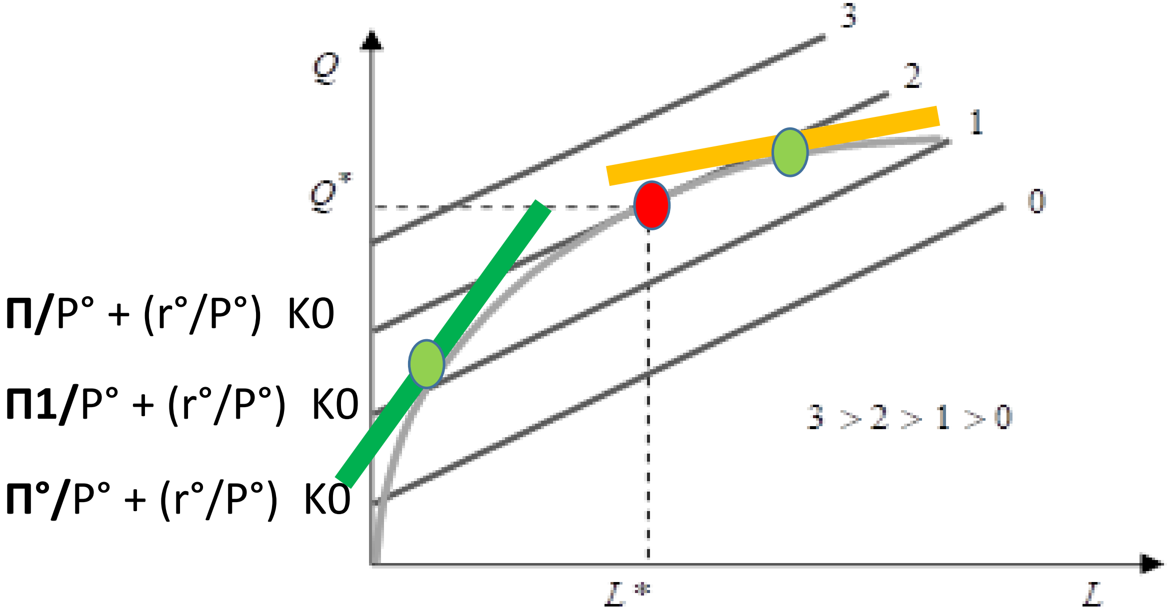
Isoprofits and Maximization of profits, ST

Π° = P° Q – w° L – r° K0

Do you spot the supply curve?

Do you spot the labor demand curve?

$$Q = \frac{\Pi_0}{P_0} + \frac{r_0}{P_0} K_0 + \frac{w_0 L}{P_0}$$



What if P declines? (a lot?)

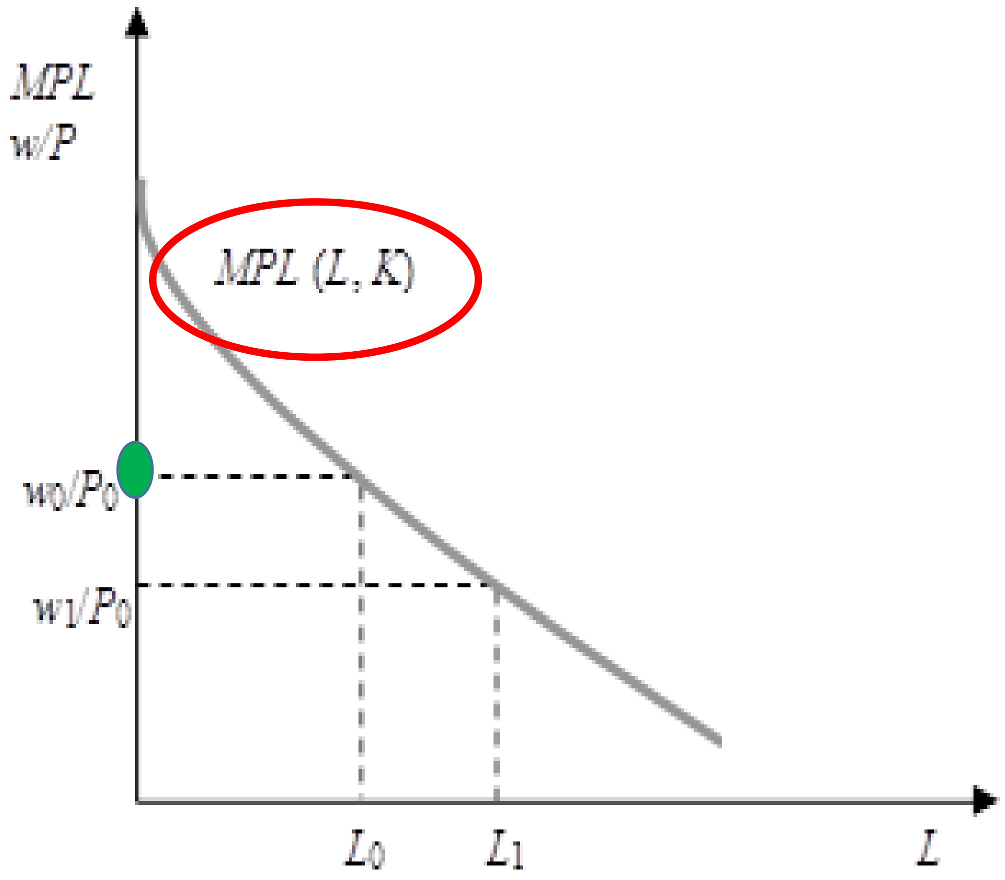
What if w declines?

What iF r°K° grows?

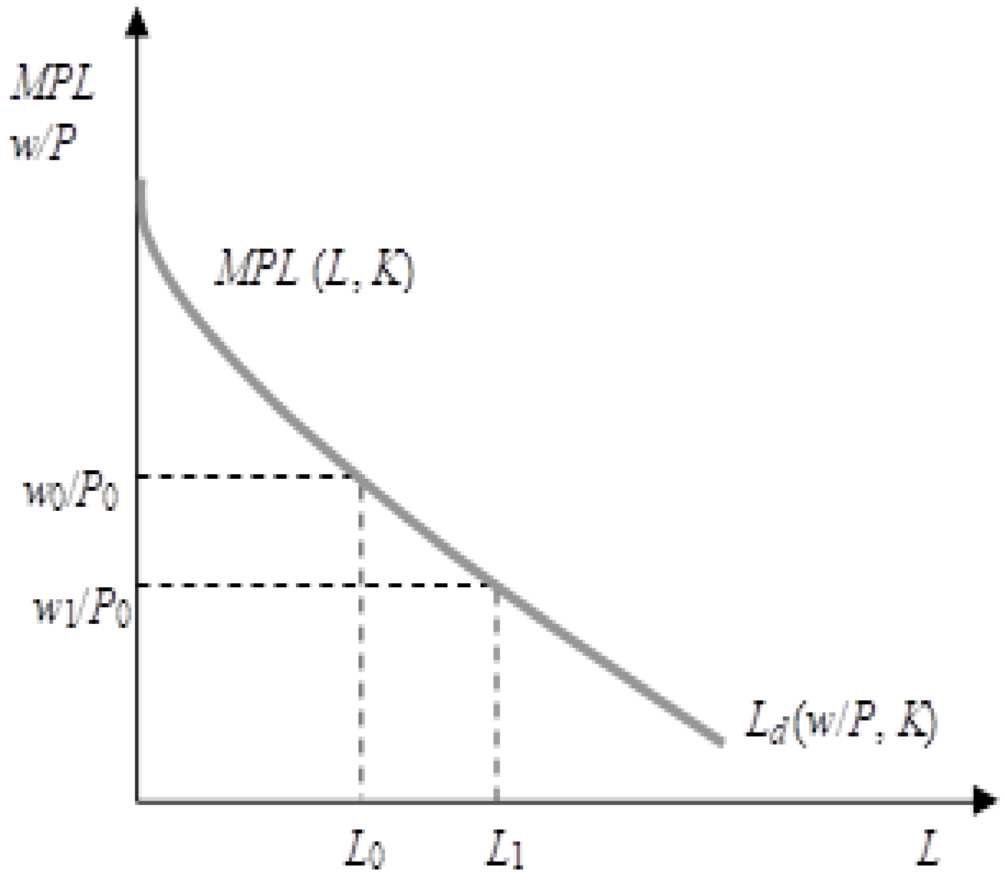
The labor demand curve of the firm?

At the real wage w°/P°,
How many workers will the firm demand/desire?

And at the wage w1/P°?



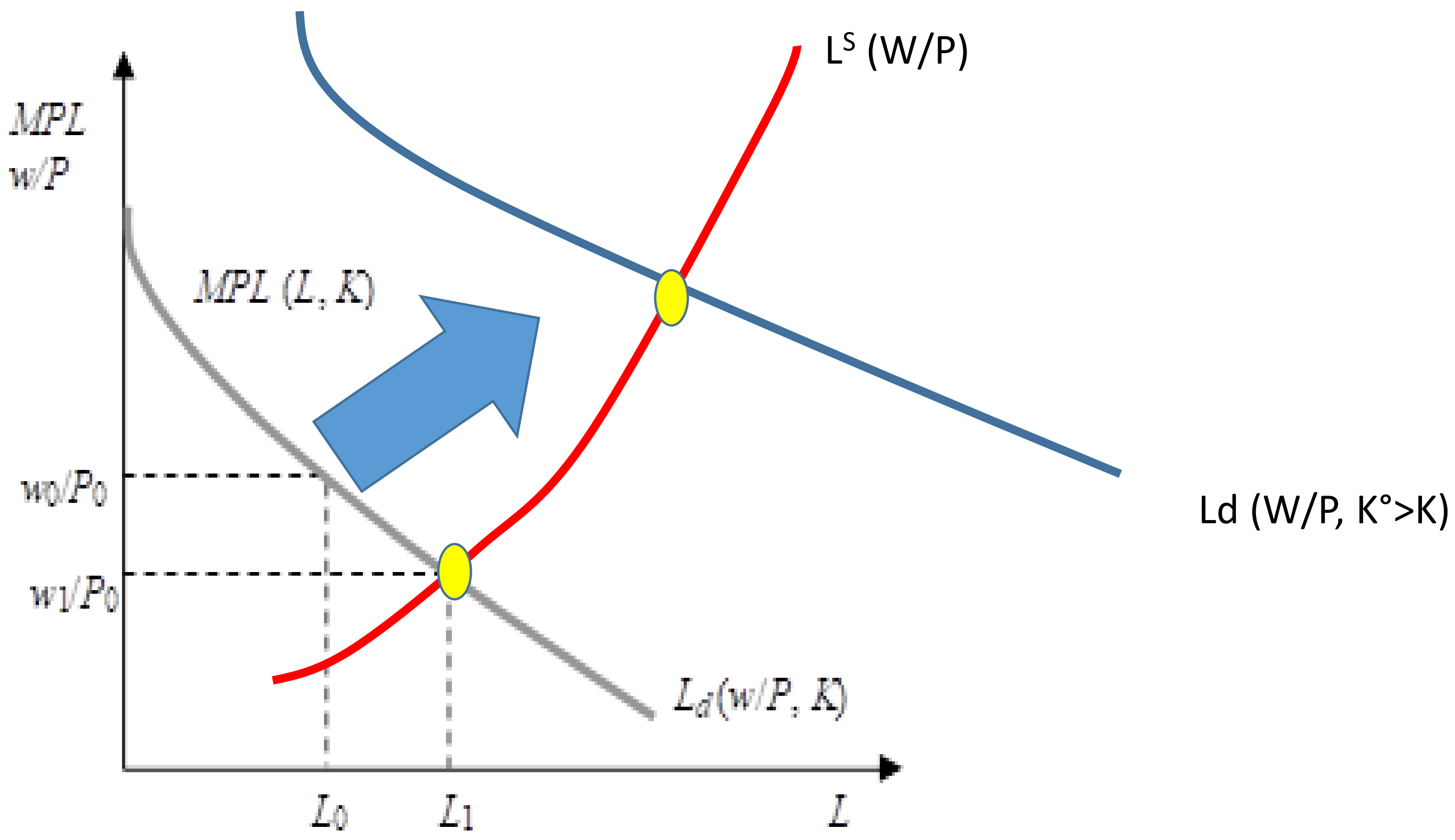
The labor demand curve of the firm!



!!!!!!

The impact of technological progress on labor demand

How can employment and wages simultaneously go up?



Which Isoquant? Maximization of profits, LT

Maximum profit

Economically efficient

Technologically efficient

Output efficient

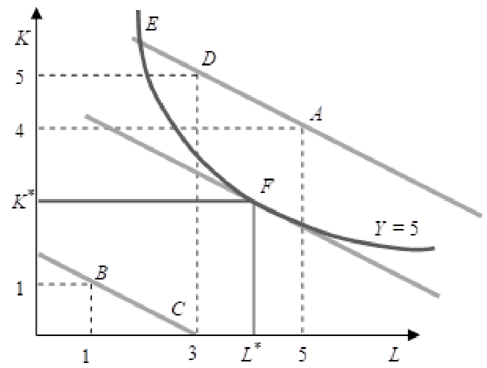
K* and L*

$\Pi (K, L) = P° f(K, L) - w° L - r° K$

$P° MPL(K^*, L^*) = w°$

$P° MPK(K^*, L^*) = r°$

Notice anything?



Maximizing profits requires minimizing costs (not necessarily viceversa)!

$$\frac{MPL(K^*, L^*)}{MPK(L^*, K^*)} = \frac{w_0}{r_0}$$

Chapter 5

The Maths of Profit

Q* such that

$$\underset{Q}{\text{Max}}\,\Pi(Q) = TR(Q) - TC(Q)$$

In any market regime:

$$\frac{\delta TR(Q^*)}{\delta Q} - \frac{\delta TC(Q^*)}{\delta Q} = 0$$

?

$$\frac{\delta TR}{\delta Q}(Q) = P(Q)\left[1 - \left(\frac{1}{\varepsilon(Q)}\right)\right]$$

Elasticity and market regime

The elasticity of demand reminds us of the firm's ability to raise the price without losing consumers.

Always the same? No, it depends on the "market regime" in which the enterprise operates.

So depending on the market regime we may observe different prices and quantities.

$$\frac{\delta TR}{\delta Q}(Q) = P(Q)\left[1 - \left(\frac{1}{\varepsilon(Q)}\right)\right]$$

$$\frac{\delta TR(Q^*)}{\delta Q} - \frac{\delta TC(Q^*)}{\delta Q} = 0$$

Market Power and Market Regime

Market regime is identified by the market power of the firms populating that market.

Market Power: inversely related to the degree of market loss when a firm raises its price (elasticity). In **perfect competition**, it is minimum, as it would lose **the whole market**.

Perfect Competition

Perfect Competition: **defined** as that market regime in which the firm is a *price-taker* of the market price, i. e. with no market power.

$$\frac{\delta TR}{\delta Q}(Q) = P(Q)\left[1-\left(\frac{1}{\varepsilon(Q)}\right)\right]$$

Firms **can** change the price with respect to the market prevailing price, **but it is not profitable/convenient**: if they raise it, they lose **all clients (elasticity =?)**; they do not lower it as they conjecture being able to sell at that market price any quantity they wish.

Perfect Competition

Perfect Competition: **defined** as that market regime in which the firm is a *price-taker*, i. e. with no market power.

What conjectures on rivals are coherent with this belief of being able to sell whatever quantity at that market price? Would other firms not react?

How can we have Perfect Competition? The role of size

A) Large number of firms

Our impact on price? Our impact on rival's profits? Minimal.

Example: Industry made of 10.000 identical firms, each producing 100 units of the product, for a total quantity produced of 1.000.000 units, sold at a price of 10 euro per unit.

If one firm were to double (!!!) the produced quantity to 200 units?

Total quantity would rise by 0,01%. Assuming a reasonable elasticity of market demand, equal to e.g. 2, price would decline by ?

0,005% to 9,9995 euro!

The elasticity of demand of the firm instead would equal – (100%/-0,005%) or 20.000.

To make the price go down by 1%, the single firm would have to raise production … 200-fold times. Impossible! So … they think they can sell at the market price any quantity they wish.

Perfect Competition

Perfect Competition: **defined** as that market regime in which the firm is a *price-taker*, i. e. with no market power.

Firms are therefore rightly convinced not to be able to influence, with their choice on how much to produce and sell, the choices of the other firms. Therefore they make no conjecture about the other's reactions, **we lack strategic interaction** (=monopoly!).

How can we have PC (a price taker)?

A) Not enough. Even if it was a small firm, it could still have market power (raising price without losing all customers)

Ever taken a cappuccino at a Tor Vergata bar? Which one?

B) **Homogeneous good, perfect substitute, or perceived as such, MRS = 1** among bar customers

How can we have PC?

A) and B) are not enough.

One million consumers, one million firms selling the same identical good. But… I could still not lose all clients if I raise the price! Why?

C) **Perfect** information

How can we have PC?

«If B) or C) do not hold,

why do we lose perfect competition?»

Because they could raise price and …

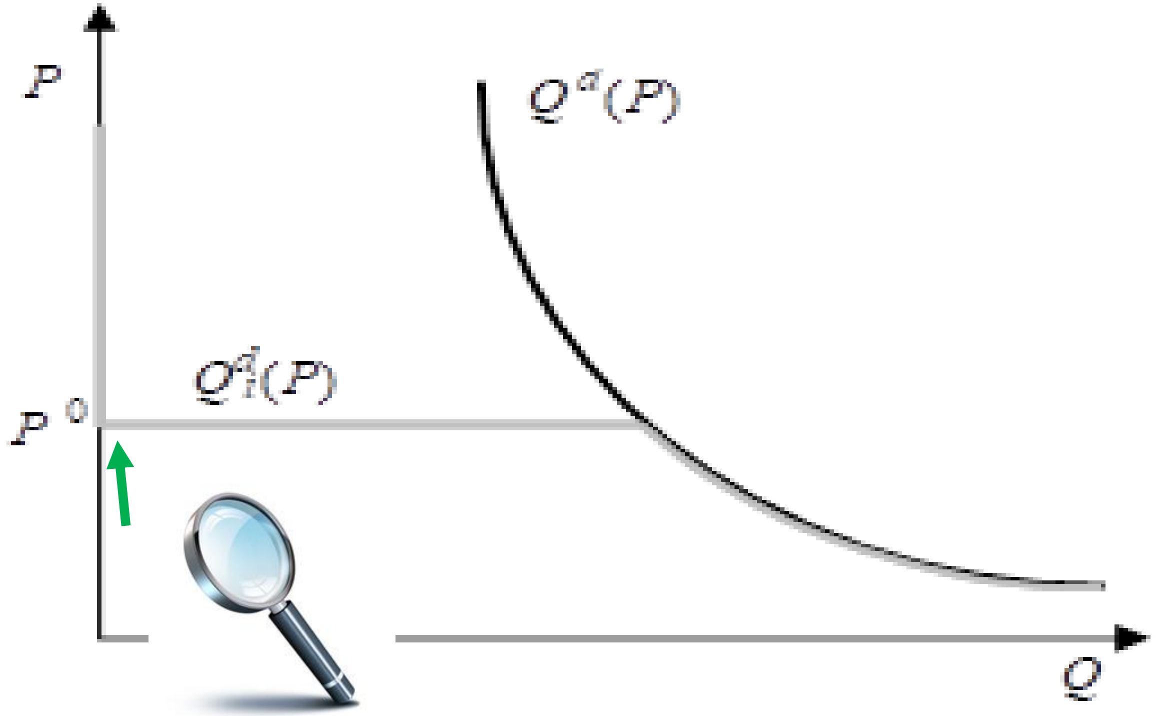
… not lose all the market and therefore… not be price-takers!

How can we have PC, in the LT?

D) Free entry, in the long term

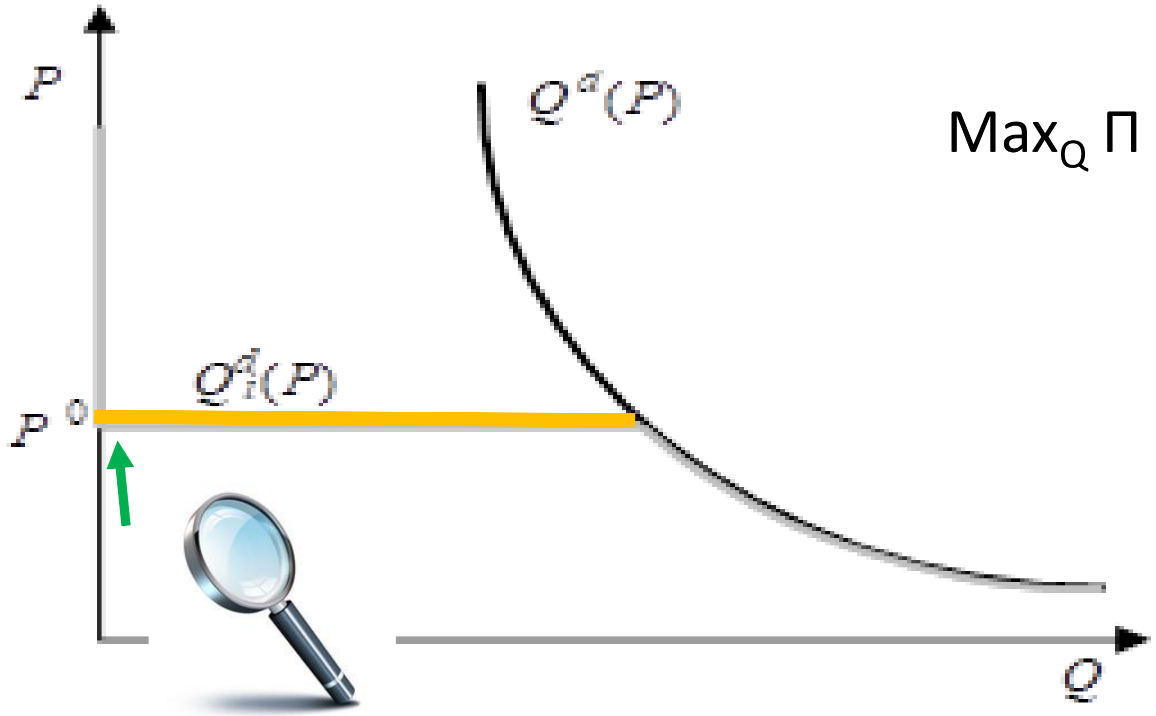
The perceived demand curve of the firm in PC

PS:
Where
does P°
come
from?



The demand curve of the PC single firm

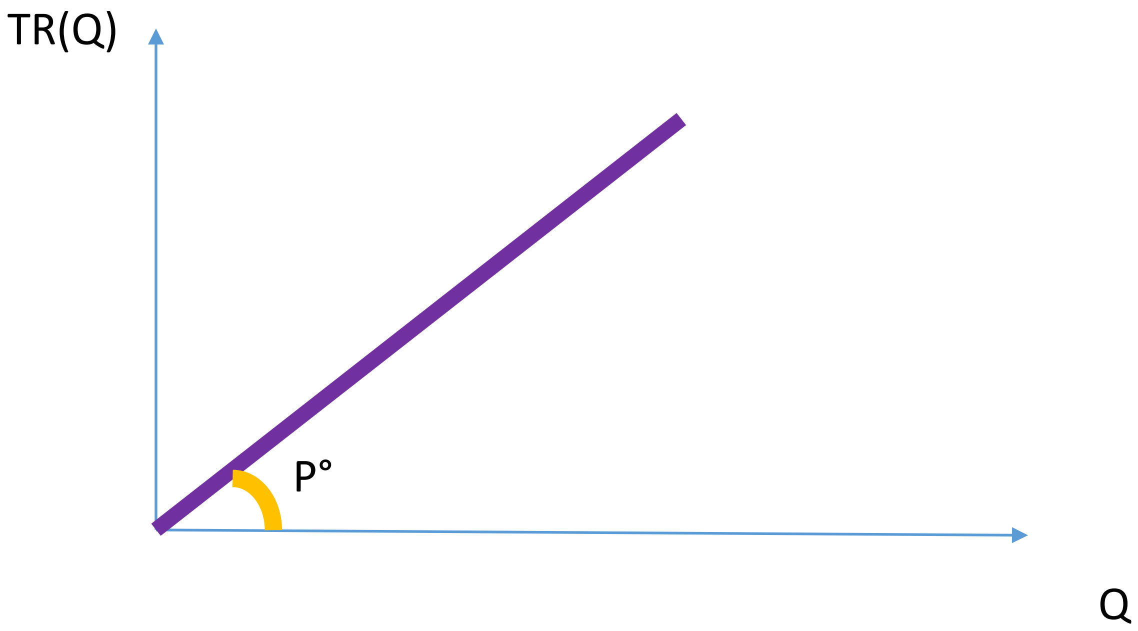
$$\underset{Q}{\text{Max}}\,\Pi\,(Q) = TR(Q) - TC(Q)$$



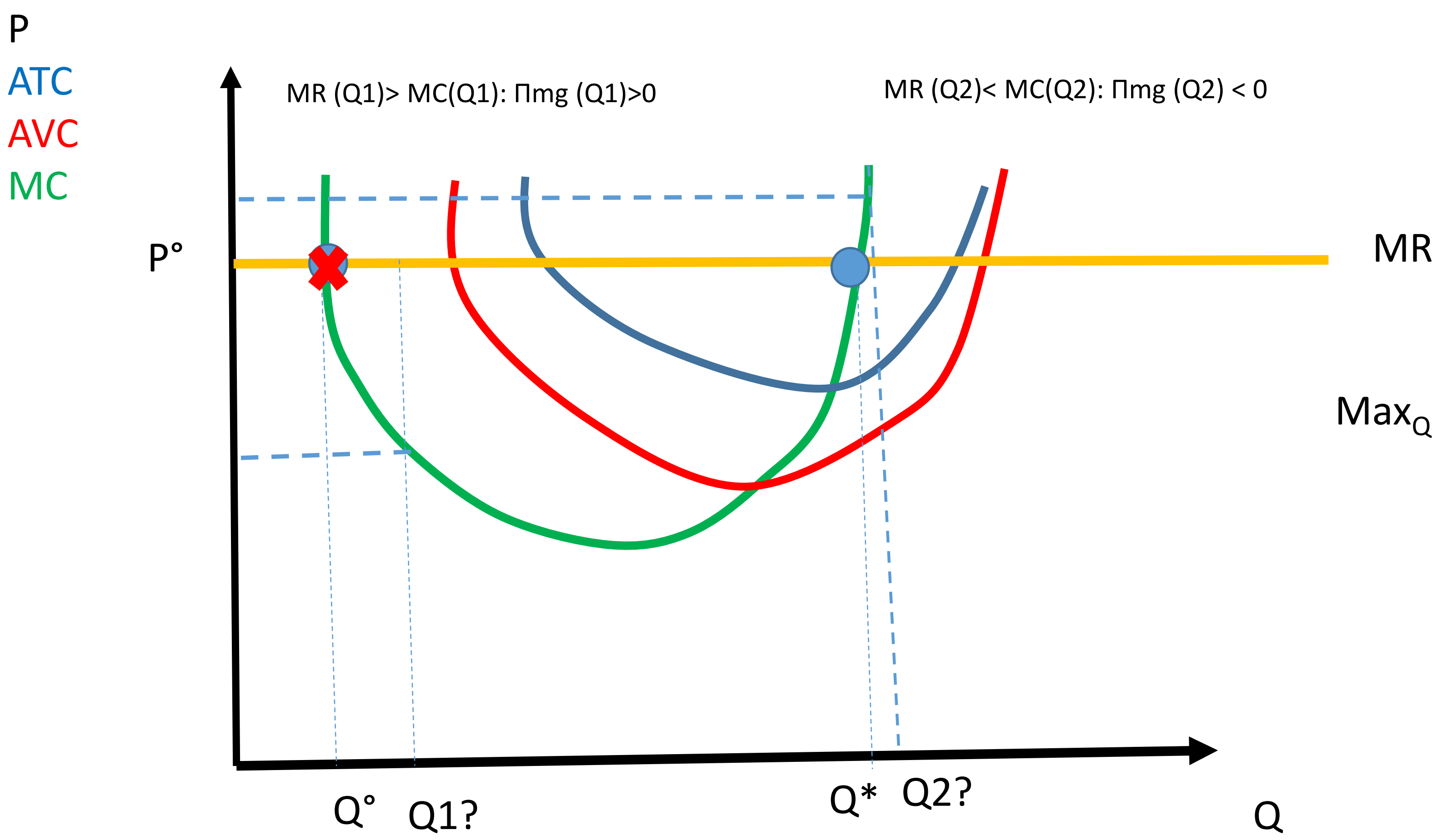
Max$_Q$ Π (Q) = P° **Q** – TC (**Q**)

PS:
Where is the Marginal Revenue function?

MR and TR in PC



P° and the first point on the ST supply curve



$$Max_Q\ \Pi\ (Q) = P°\ \mathbf{Q} - TC\ (\mathbf{Q})$$

$$MC\ (Q^*) = MR(Q^*)$$

$$(\delta TC/\delta Q) = P°$$

Economic and accounting profits: where are they?