Basic Microeconomics

Topics: page titles

Consumer's choice

Max U(x,y)

s.t. m=xp$_x$+yp$_y$

graph

$$\frac{MU_x}{MU_y} = \frac{p_x}{p_y}$$

$$MRS = -\frac{MU_x}{MU_y}$$

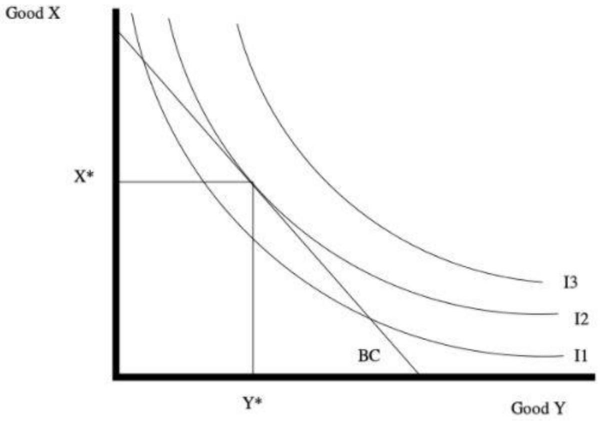
$$x^d(p_x, p_y, m)$$

→

$$X^d(p_x)$$
$$Y^d(p_y)$$

For a generic good demand function ***q(p)***

Consumer's choice



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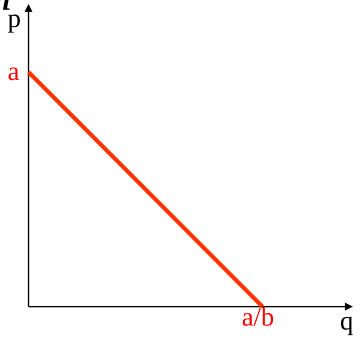
Linear demand

$$q = \alpha - \beta p$$

$$p = \frac{\alpha}{\beta} - \frac{1}{\beta} q = a - bq$$



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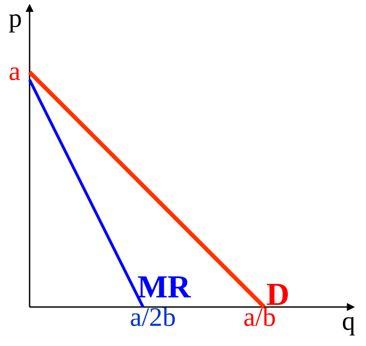
Linear demand and marginal Revenue (MR)

$$\varepsilon = -\frac{dq}{dp}\frac{p}{q} = \beta\frac{p}{q} = \frac{\alpha - q}{q}$$

$$R = pq = (a - bq)q =$$
$$= aq - bq^2$$

$$MR = a - 2bq$$



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Demand elasticity

$$\varepsilon = -\frac{dq}{dp}\frac{p}{q} \cong -\frac{\Delta q / q}{\Delta p / p}$$

measures the responsiveness of demand to a change in the price

$$\frac{-\Delta\ \%\ \text{quantity}}{\Delta\ \%\ \text{price}}$$

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Firms maximise profits

$$\Pi = R - TC$$

- **Revenue**: *R=pq*
- Demand function *q=D(p)*
  Inverse demand function p=P(q)
- Technology, i.e. costs
  - *Cost minimization*

Cost minimization

- Costs depend on technology used in the production process, i.e. on the production function
- The *production function* gives the maximum output thta can be produced using a given combination of the inputs:

$$q = f\left(x_1, x_2, \ldots x_n\right)$$

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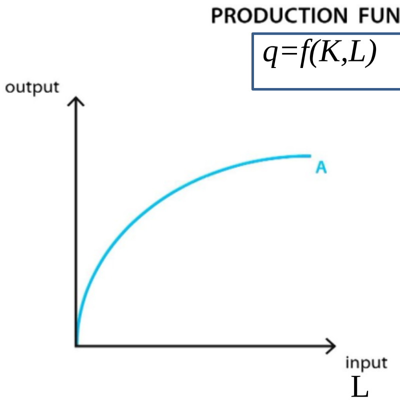
Production funtion. Inputs: labour and capital



- Given the level of input K, the graph shows the output as a function of input L

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Cost minimization

- Suppose only two inputs. Costi minimizarion requires :

$$\min \quad w_1 x_1 + w_2 x_2$$
$$t.c. \quad q = f(x_1, x_2)$$

- Optimal combination of inputs requires

$$-\frac{MP_1}{MP_2} = TRS = -\frac{w_1}{w_2}$$

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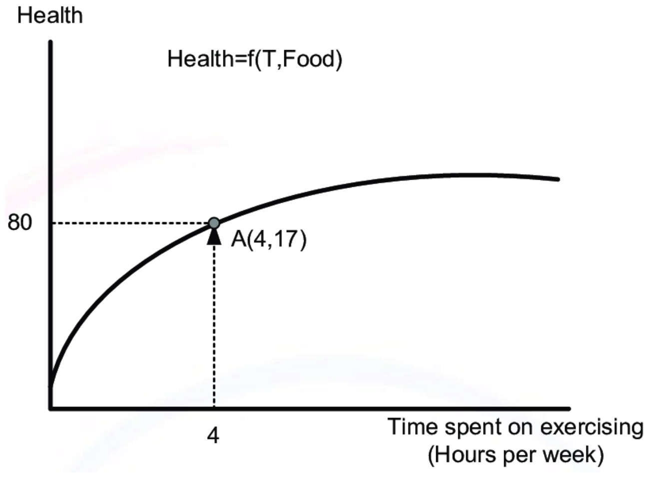
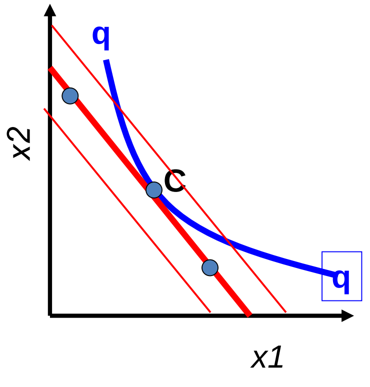
Health production function



Cost minimization



- The optimal combination of inputs to produce quantity **q** is at the tangency point between cost curve and isoquant of production.
- By repeating for each quantity → Total cost of production: **TC(q)**

Cost Relationships

- total cost of producing output Q
  TC(Q)=VC(Q) +F
- average cost: AC(Q) =TC(Q)/Q
- marginal cost: cost of one more unit
  - formally: MC(Q) = dC(Q)/d(Q)

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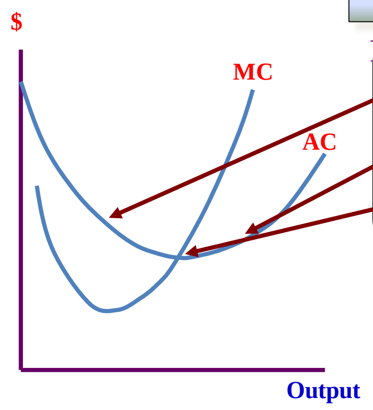
Cost curves: an illustration

Typical average and marginal cost curves



Relationship between AC and MC

If MC < AC then AC is falling

If MC > AC then AC is rising

MC = AC at the minimum of the AC curve

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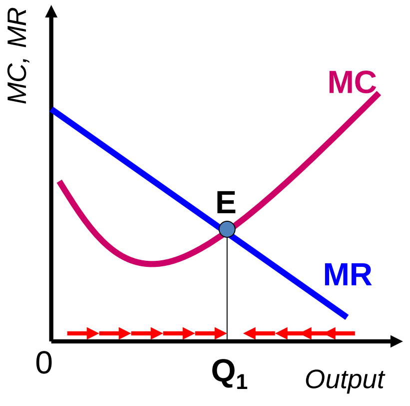
Profit maximization

MONOPOLY							
Q	F	MC	VC	TC	P=10-Q	Revenues	Profits
1	10	2	2	12	9	9	-3
2	10	2	4	14	8	16	2
3	10	2	6	16	7	21	5
4	10	2	8	18	6	24	6
5	10	2	10	20	5	25	5

The First Order Condition: MR = MC

- Profit is $\pi(q) = R(q) - C(q)$
- Profit maximization: $d\pi/dq = 0$
- This implies $dR(q)/dq - dC(q)/dq = 0$
- But $dR(q)/dq$ = marginal revenue
- $dC(q)/dq$ = marginal cost
- So profit maximization implies MR = MC

Profit maximization



If MR > MC, profit can be increased by producing more.

If MR < MC, profit can be increased by reducing output.

Profit are mazimized at Q_1, where MR = MC.

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Market Performance and Efficiency

- Contrast two polar cases
  - perfect competition
  - monopoly
- (Pareto) E*fficiency*
  - no reallocation of the available resources makes one economic agent better off without making some other economic agent worse off

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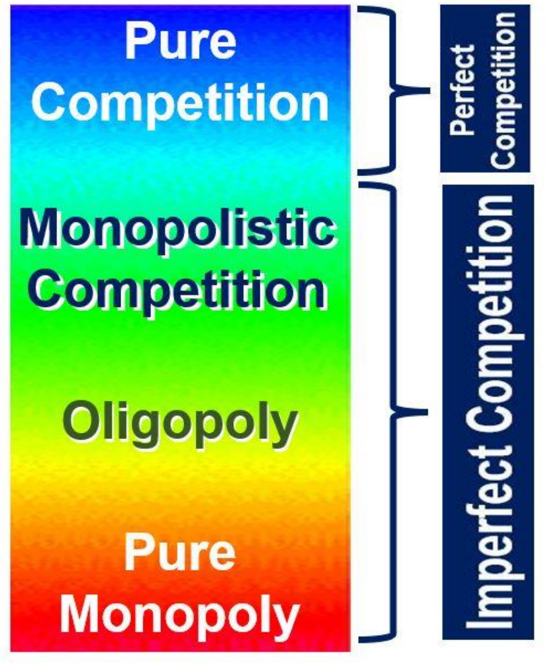
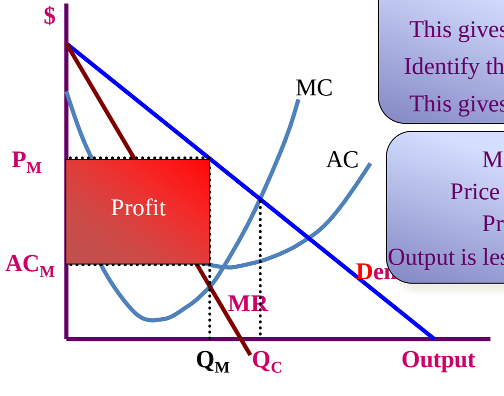


Monopoly MR=MC → P>MC



Choose output where MR = MC
This gives output Q_M
Identify the market clearing price
This gives price P_M

MR is less than price
Price is greater than MC: loss of efficiency
Price is greater than average cost
Output is less than the perfectly competitive outpu

Positive economic profit

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Perfect Competition

- 1. Firms are *price-takers*
  - Firms can sell as much as they like at the ruling market price

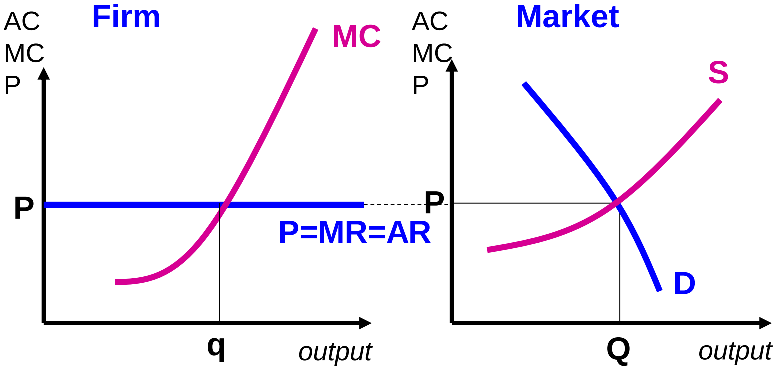
    → **marginal revenue equals price**

- 2. Profit maximization requires to equate marginal revenue with marginal cost

    1+2→

- 3. In a perfectly competitive equilibrium **price equals marginal cost**

Perfect competition

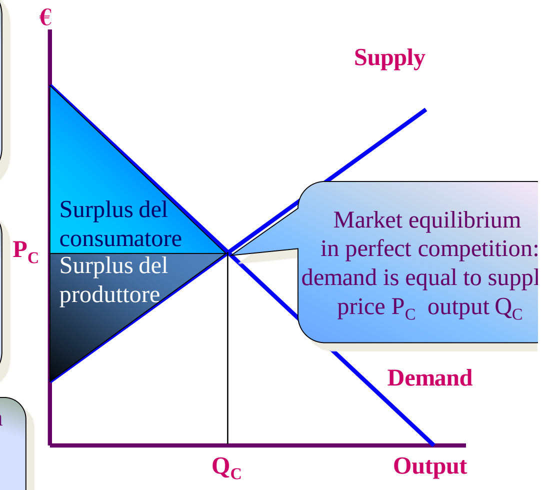


PERFECT COMPETITION AND EFFICIENCY

Consumers' surplus is the difference between willingness to pay and price paid. It is the light blue area

Producer surplus is the difference between price and marginal cost. It is the blue area

Total surplus (social welfare) is the sum of consumers' surplus and producers' surplus



Equilibrium in perfect competition is Pareto-efficient

Deadweight loss of monopoly

Equilibrium in monopoly: MR=MC

Price P_M output Q_M

Consumers' surplus (blue) and producers' surplus (green)

Total surplus is lower than in perfect competition. There are pareto improving exchanges that do not happen (between Q_M and Q_C)