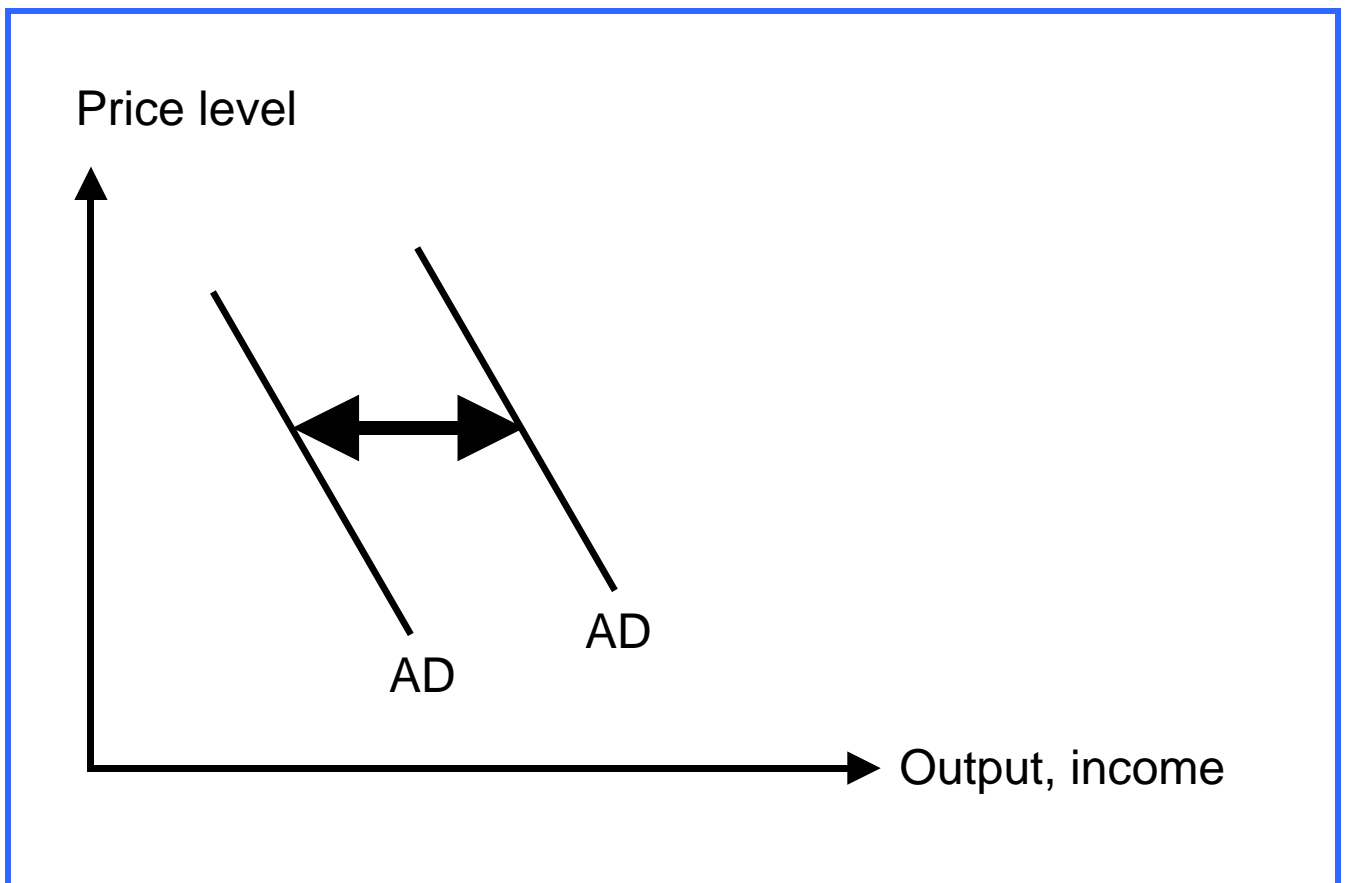


# Aggregate demand - shifts



AD = Aggregate demand

## Possible reasons for shifts

### Change in the following items:

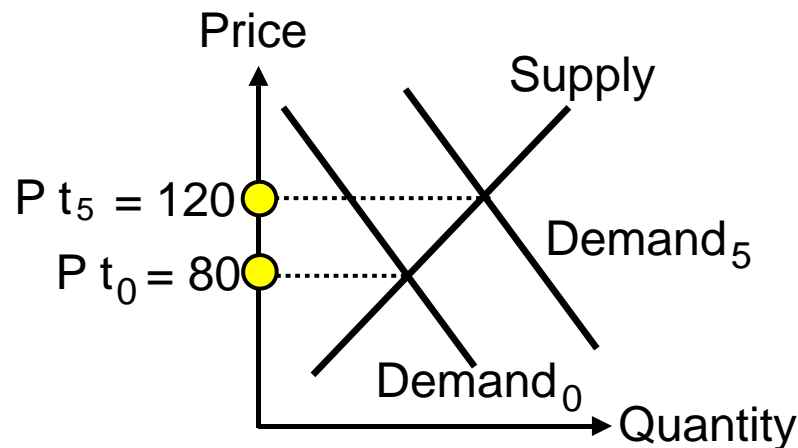
- Consumption
- Investment
- Government spending
- Net exports

# Analysis of markets - comparative static and dynamic

## Comparative static analysis of markets

→ Different equilibrium positions are displayed without taking notice of the adjustment process.

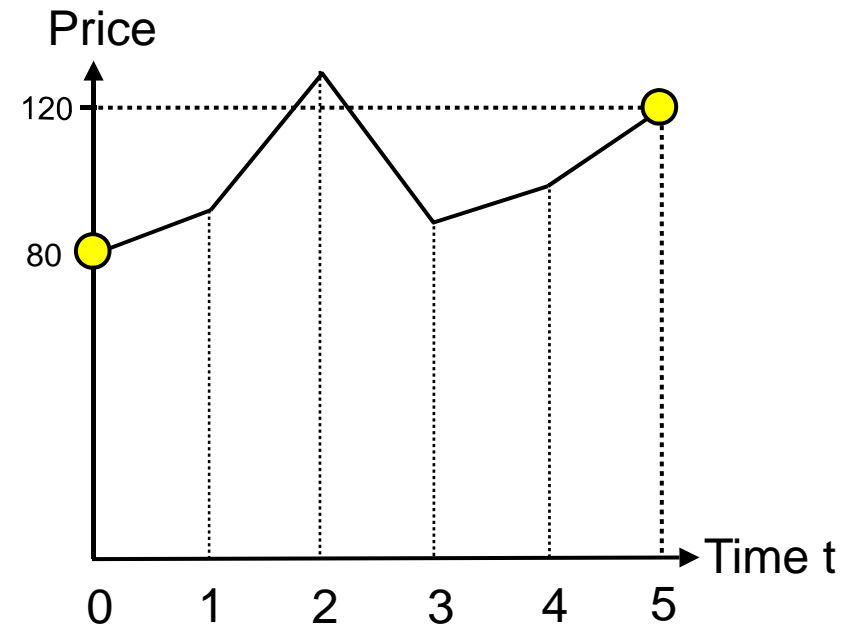
Ex.: Market for oil at time  $t_0$  and  $t_5$ ; the change is due to an increase in demand



## Dynamic analysis of markets

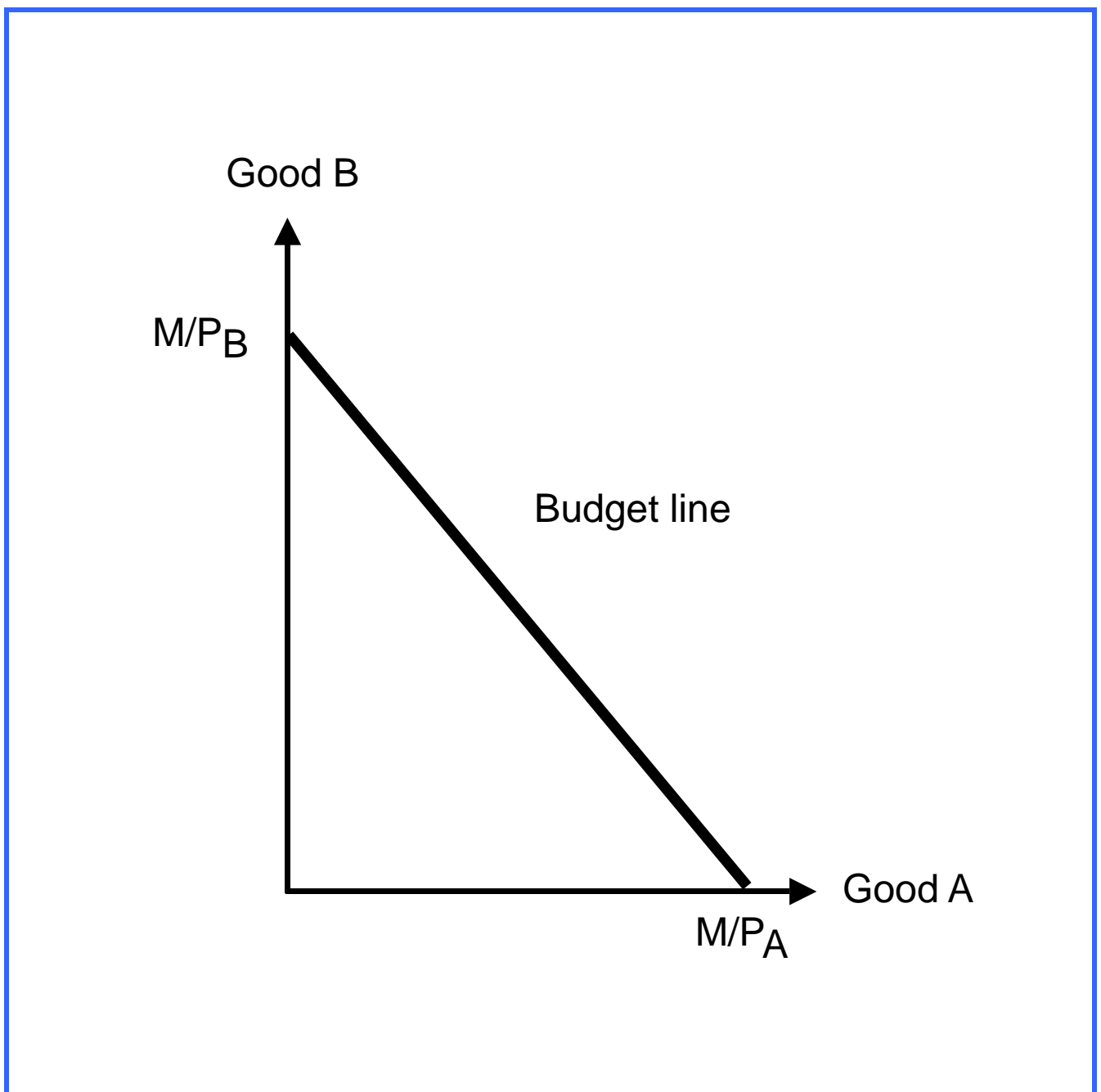
→ Analysis of a market during a period of time

Ex.: Price trend of oil from  $t_0$  to  $t_5$

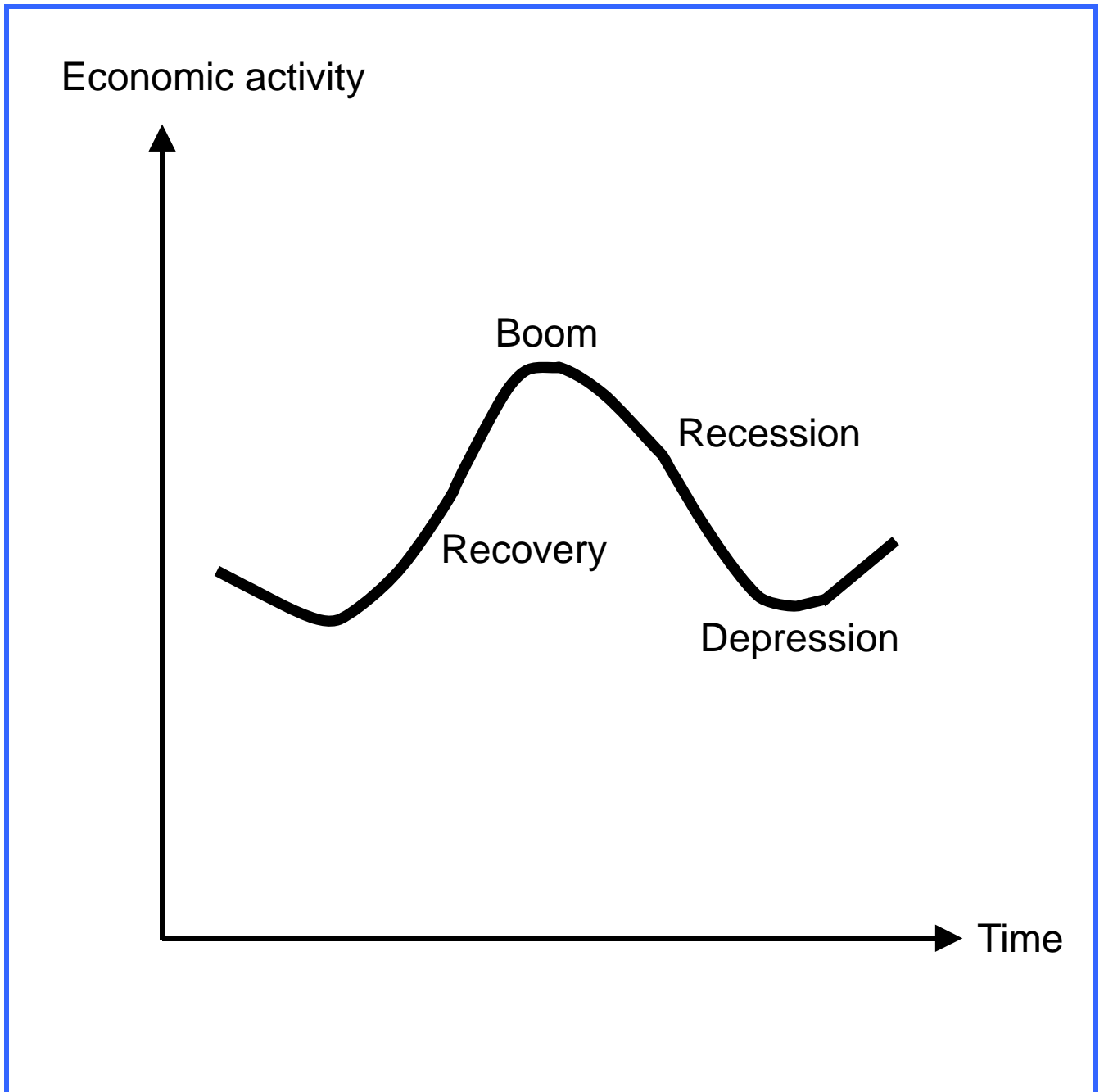


# Budget line

A consumer with an income of  $M$  can choose between two goods, A and B, at the prices of  $P_A$  and  $P_B$ . The budget line shows the possible combinations with regard to the 2 divisible goods A and B.



# Business cycle



# Choice

Many wants

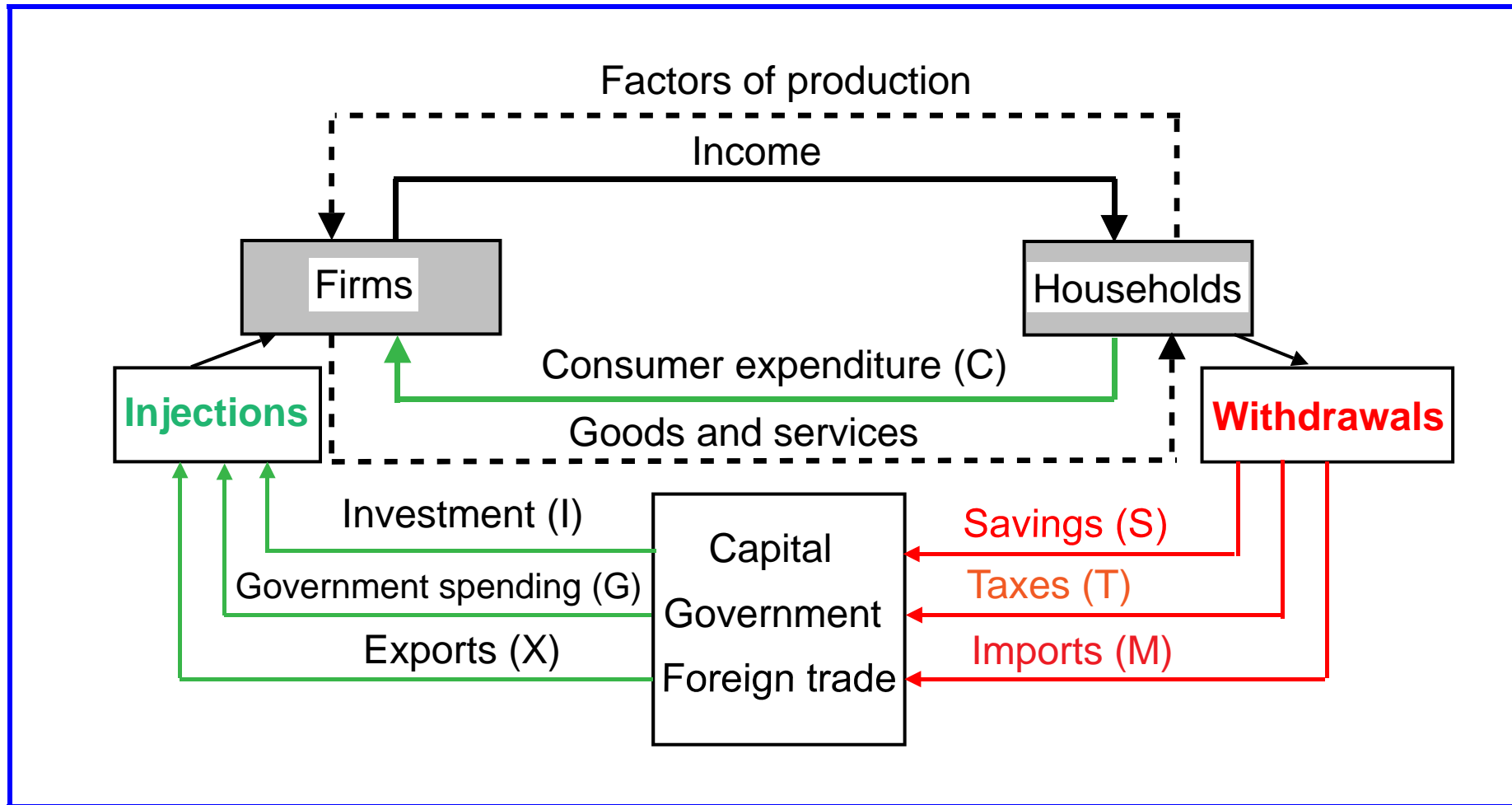
Choice is necessary.

Scarce  
resources

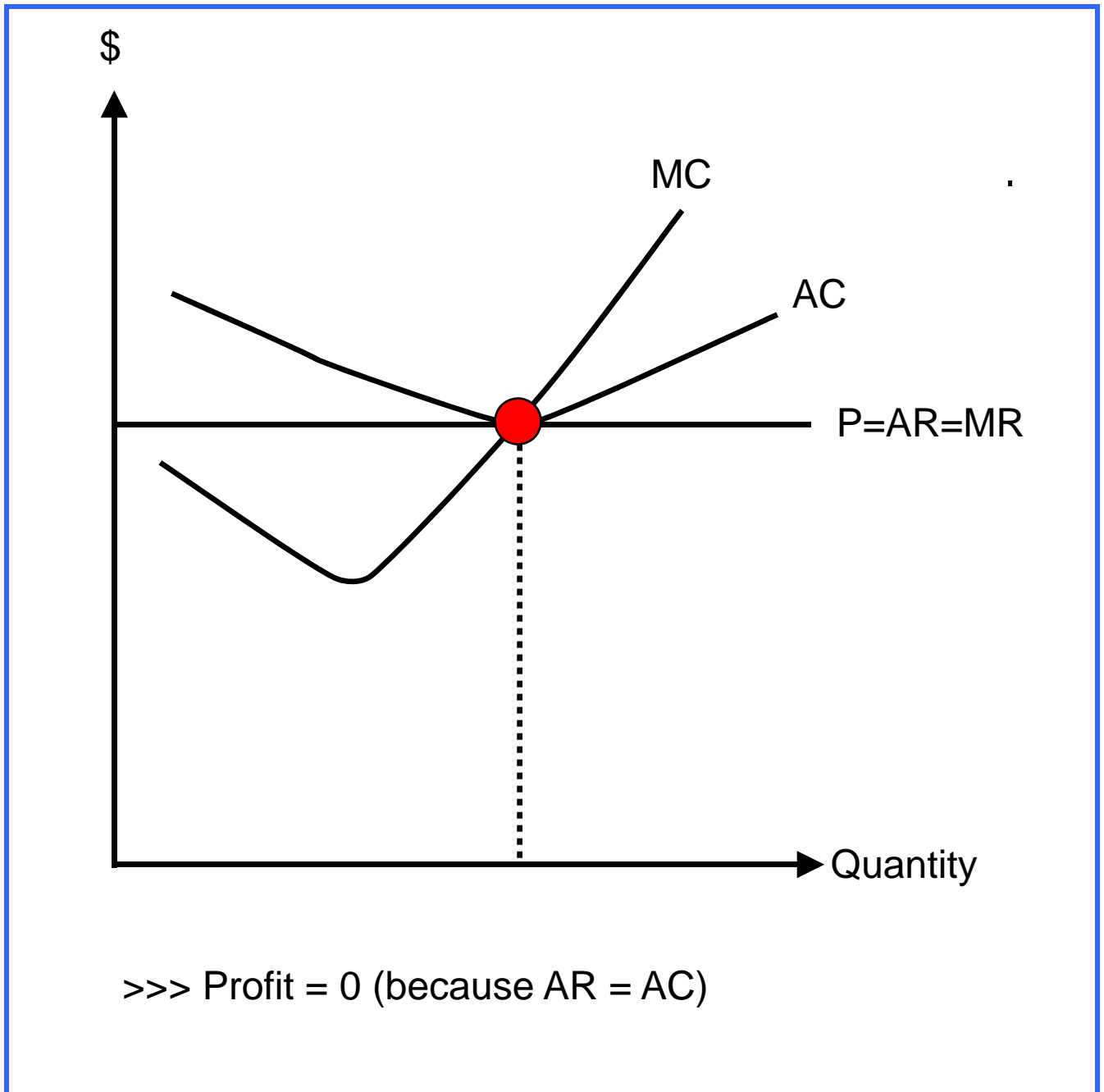
Behaviour to optimize such  
a choice:

- Rational behaviour
- Taking into consideration  
opportunity costs
- Decisions at the margin

# Circular flow



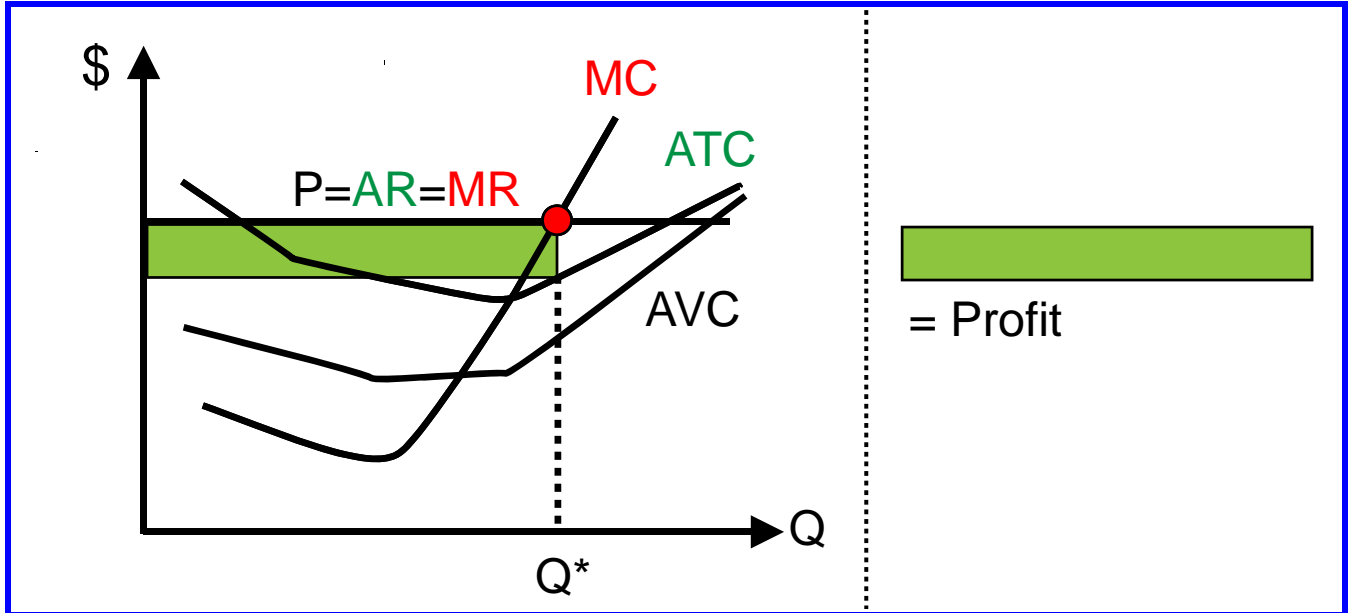
# Competitive firm - long run



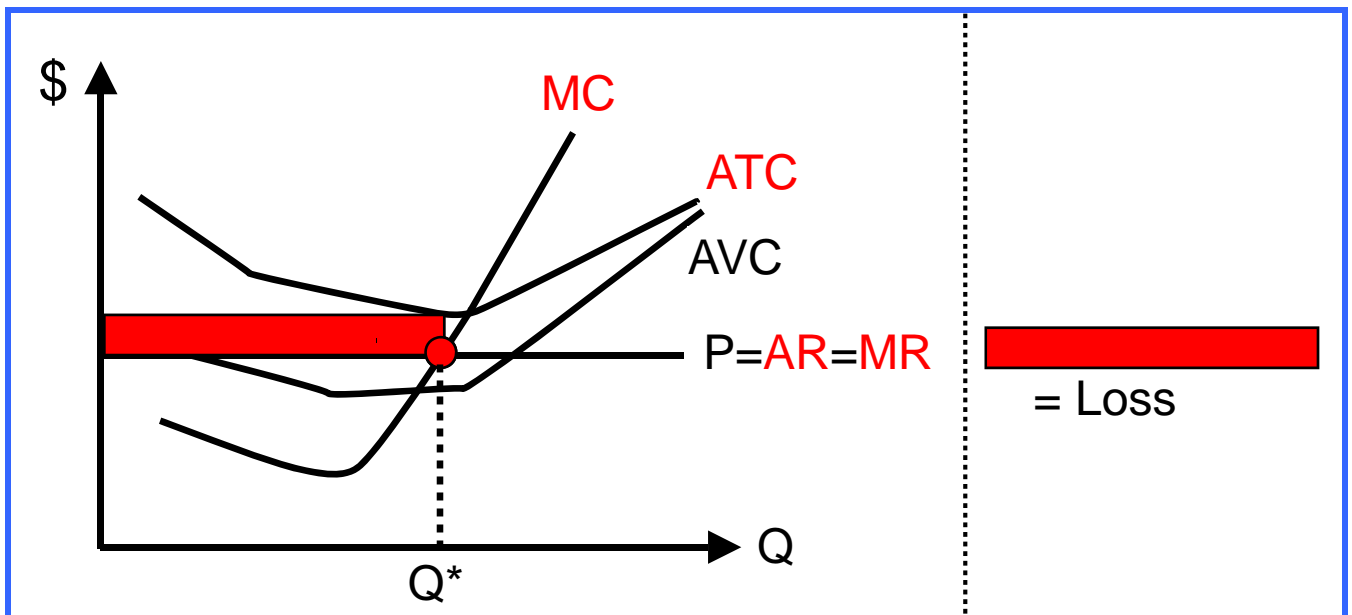
|                    |                       |
|--------------------|-----------------------|
| P = Price          |                       |
| AC = Average cost  | AR = Average revenue  |
| MC = Marginal cost | MR = Marginal revenue |

# Competitive firm - short run

## ① Situation of a profit



## ② Situation of a loss



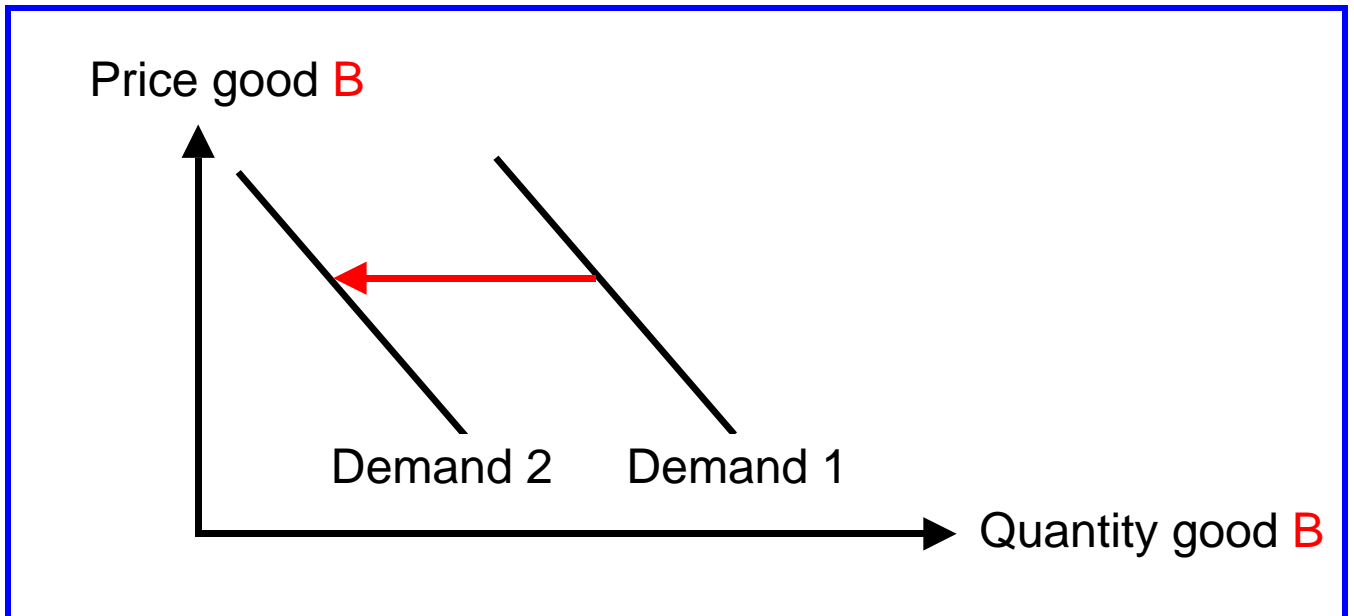
|                             |                       |
|-----------------------------|-----------------------|
| P = Price                   | Q = Quantity          |
| ATC = Average total cost    | AR = Average revenue  |
| AVC = Average variable cost | MR = Marginal revenue |
| MC = Marginal cost          |                       |



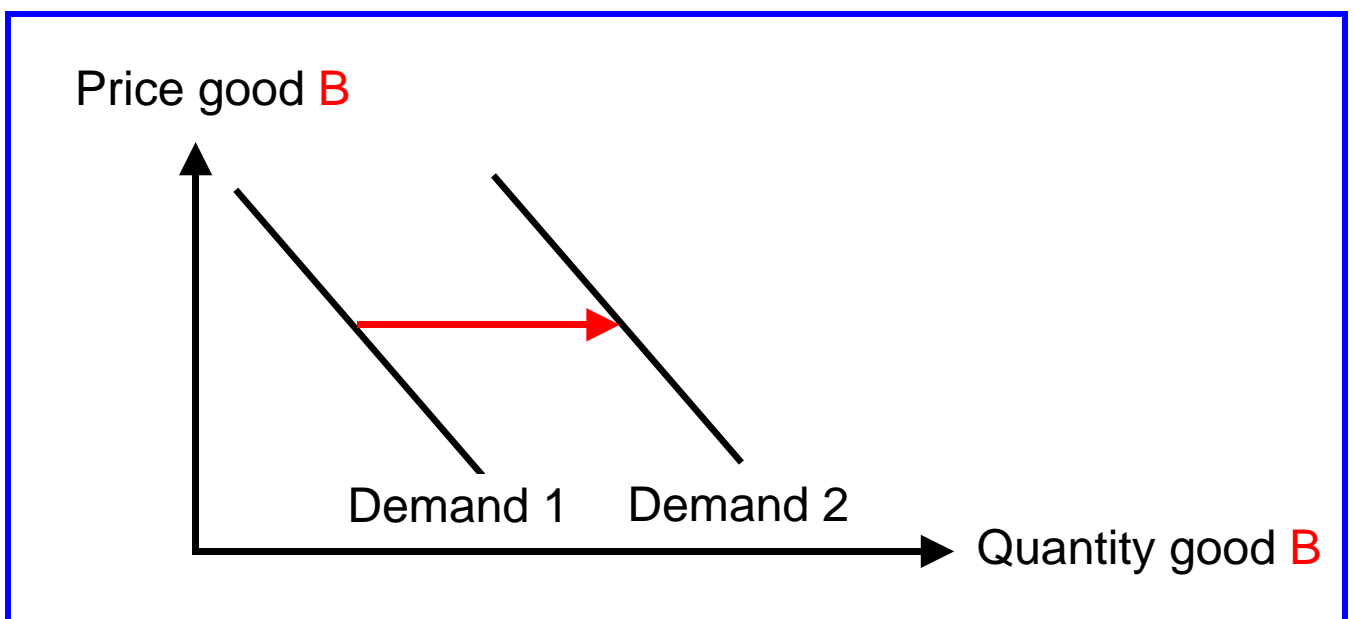
# Complements

The goods A and B are complements.

① **The price of good A rises.**



② **The price of good A falls.**

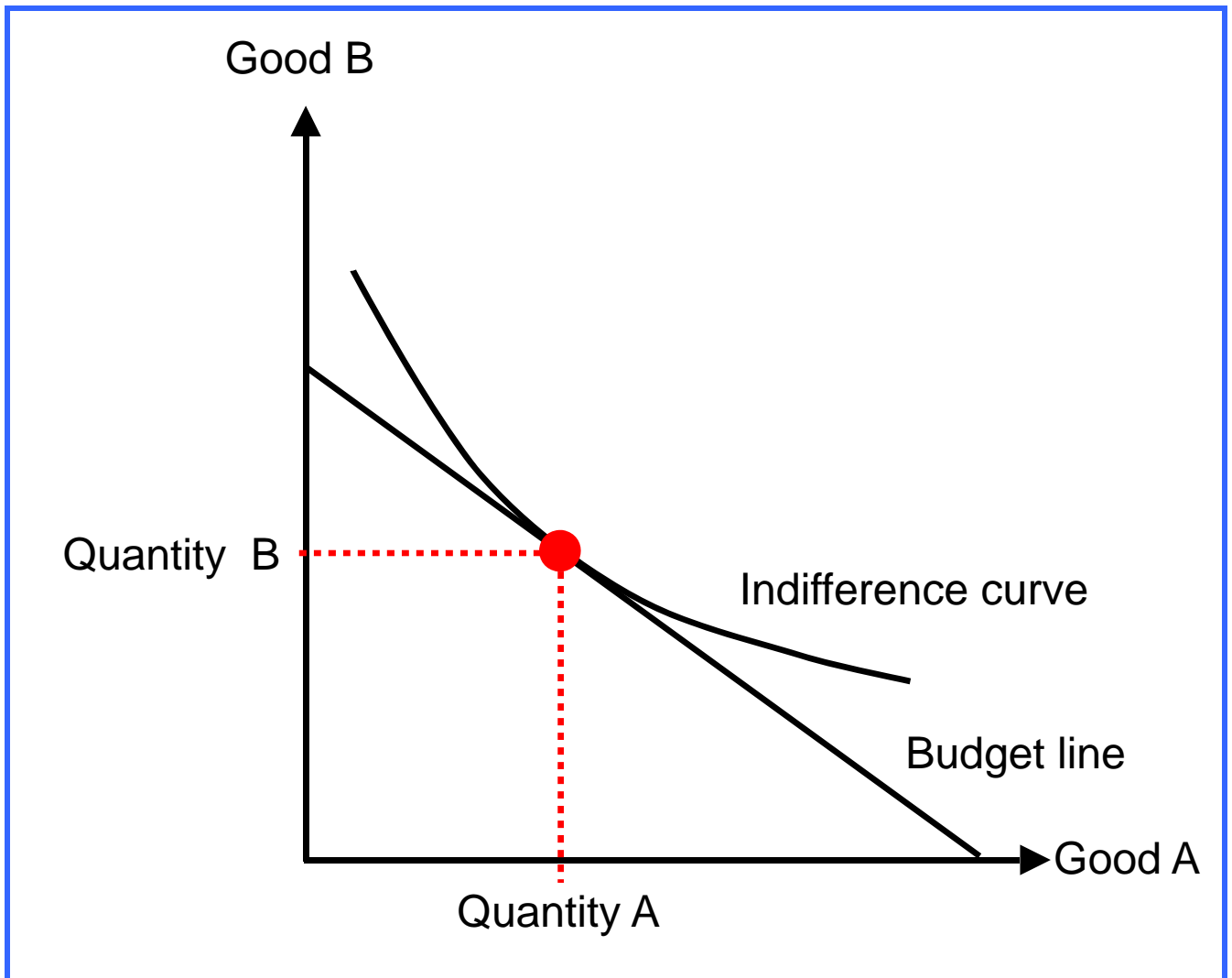


# Consumer choice

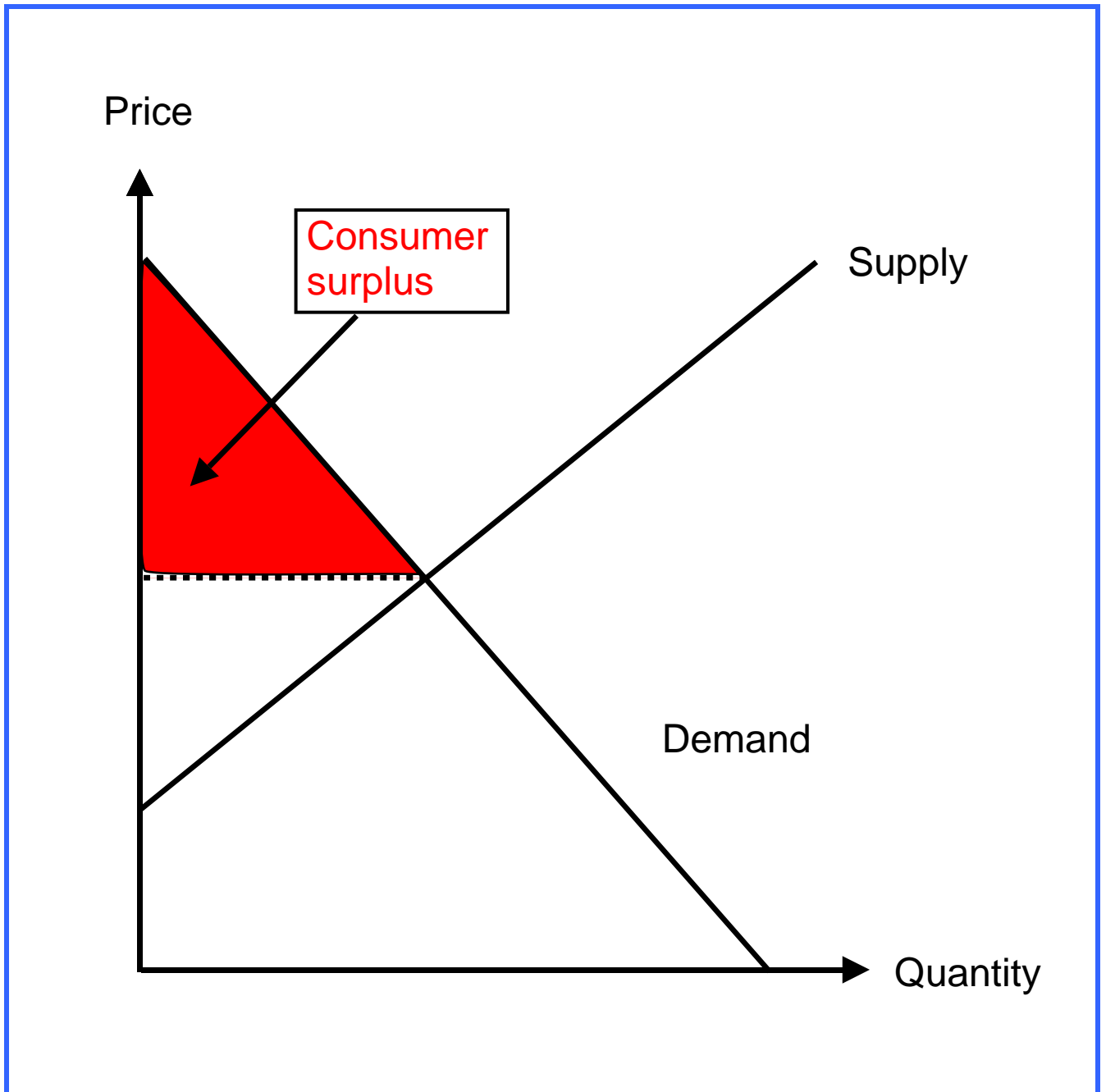
The consumer chooses the highest possible indifference curve. This is the case where the budget line touches this indifference curve.

Information about

- the budget line. [Click here!](#)
- the indifference curve. [Click here!](#)



# Consumer surplus



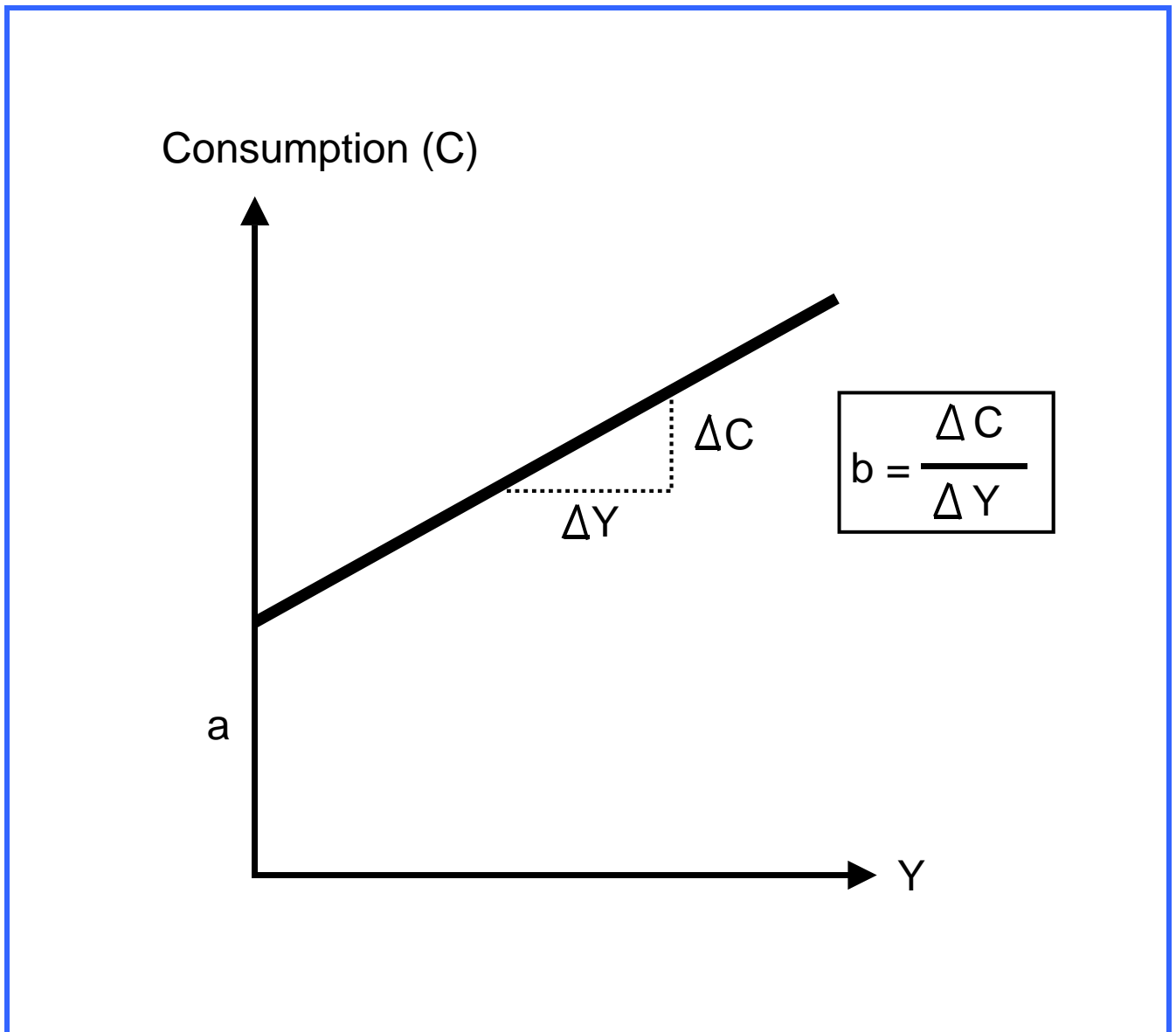
# Consumption function

Consumption function:  $C = a + bY$

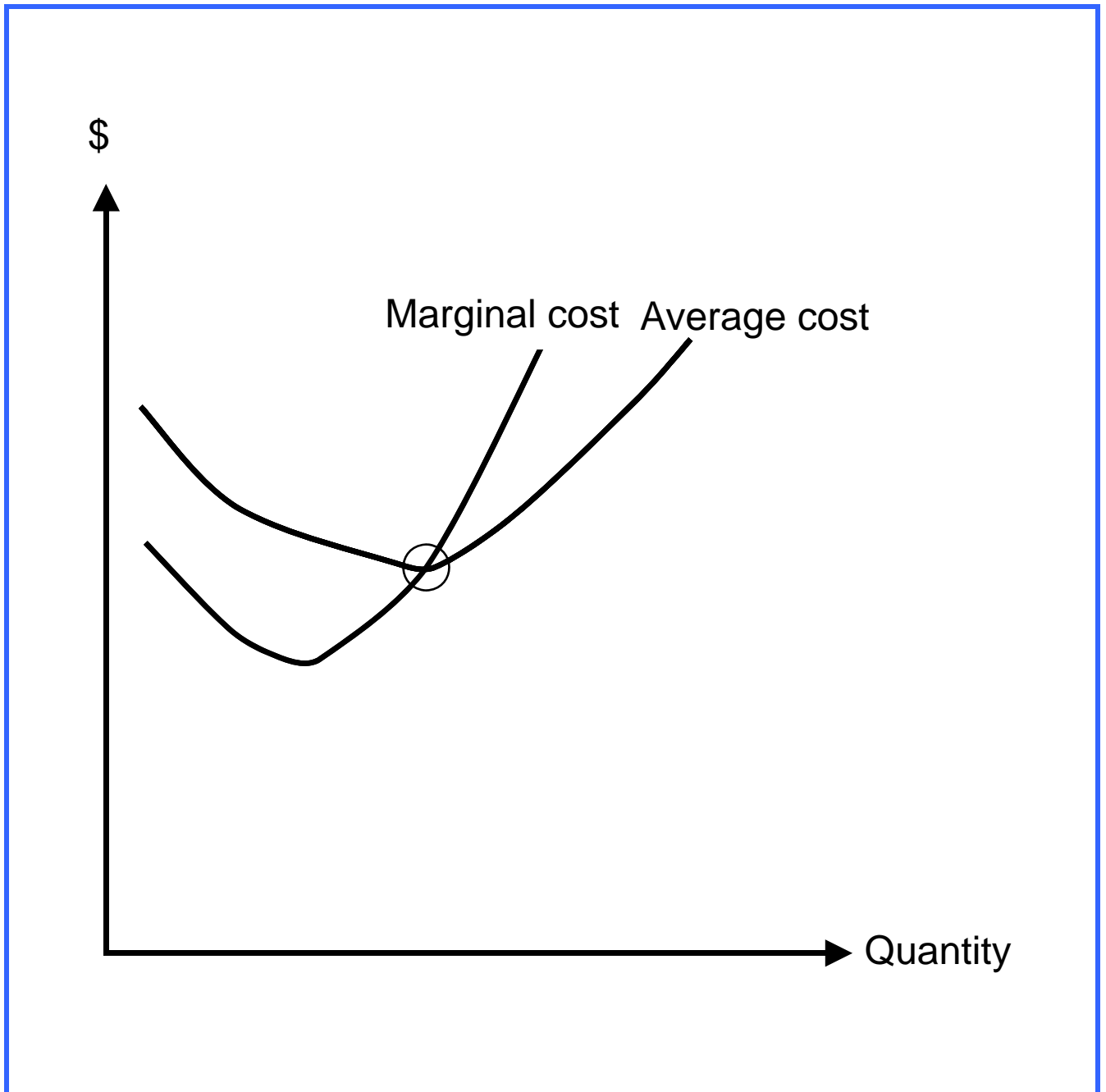
$a$  = Autonomous consumption (C if  $Y = 0$ )

$b$  = Marginal propensity to consume

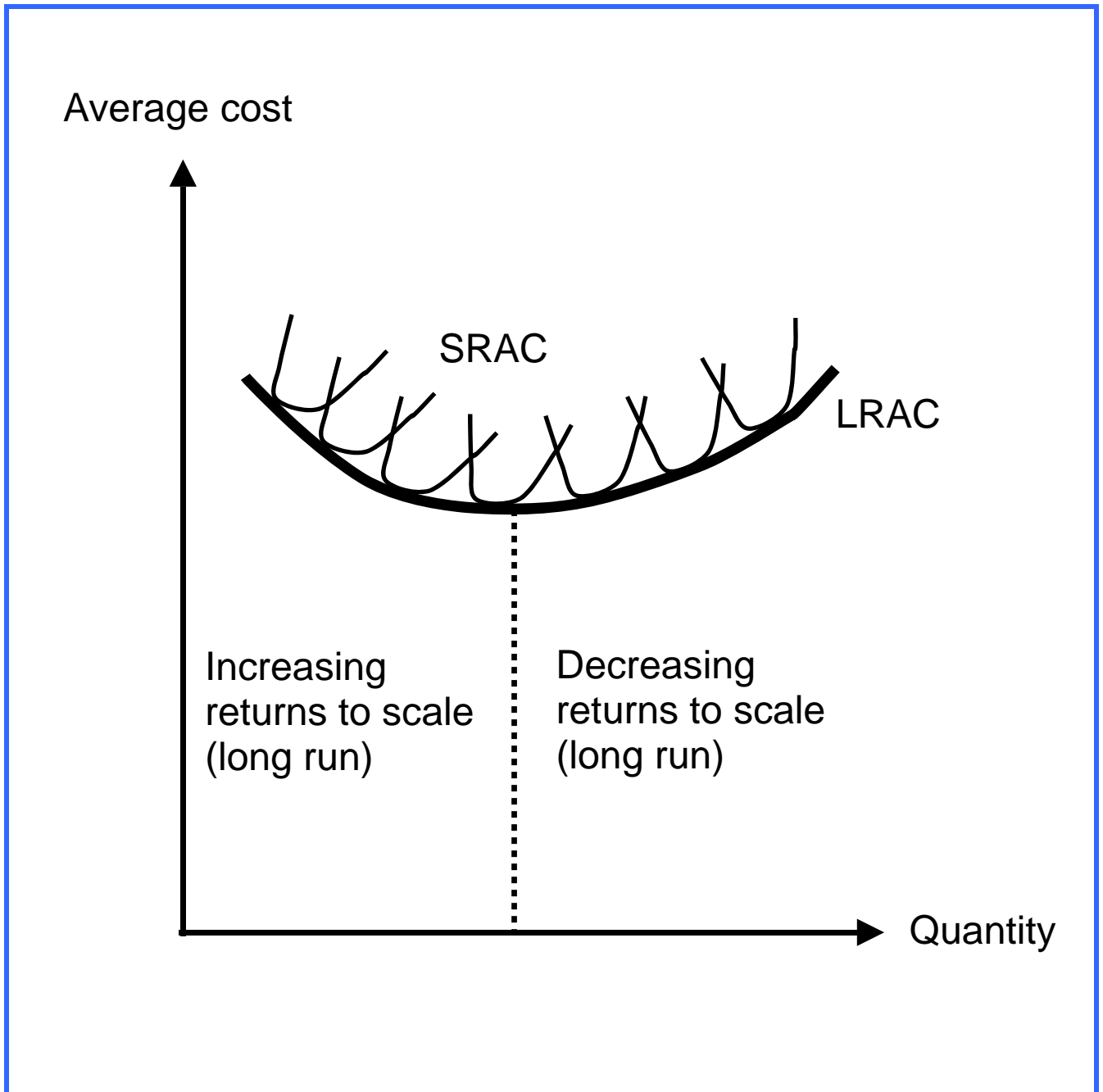
$Y$  = Output, income



# Cost - average and marginal

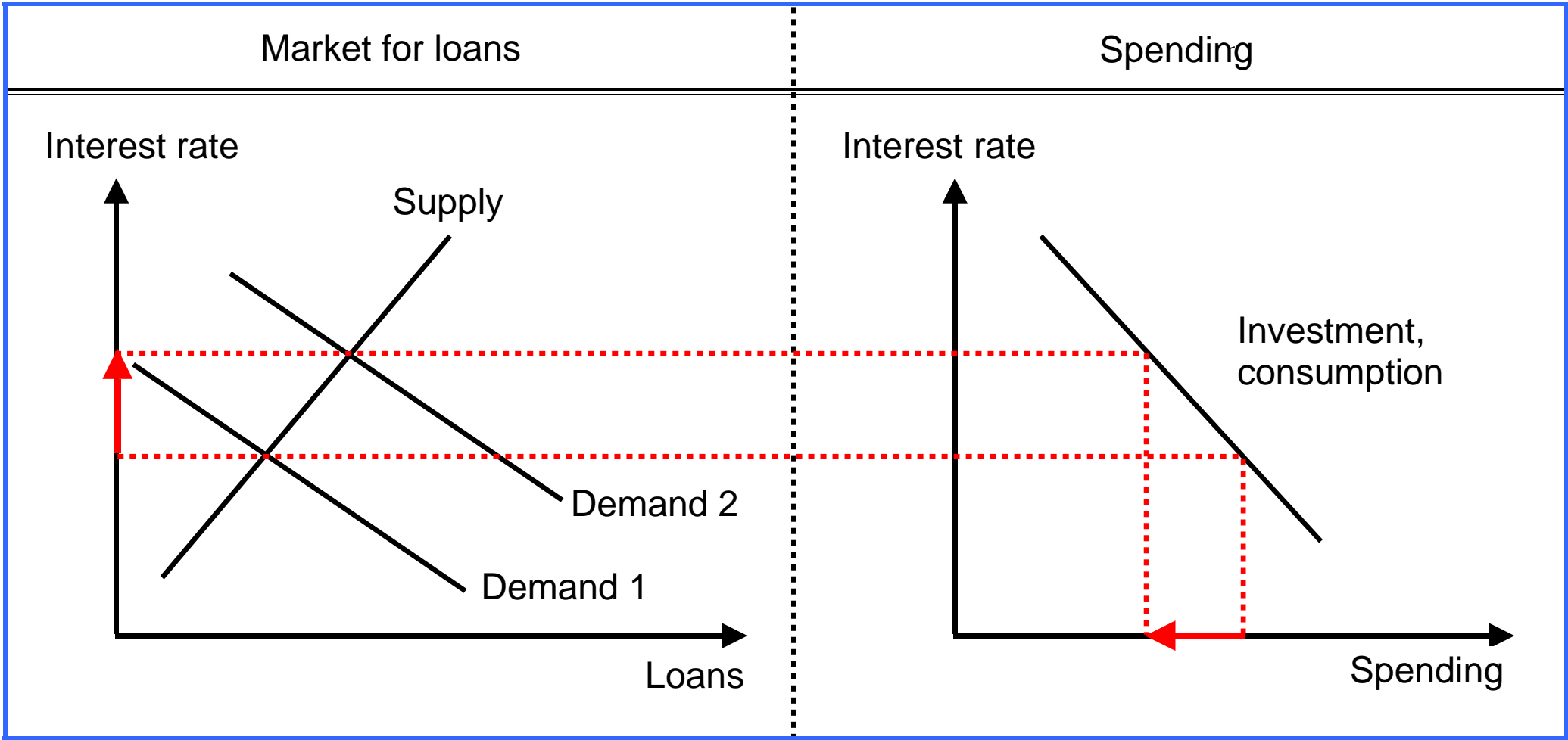


# Cost curves - short run and long run

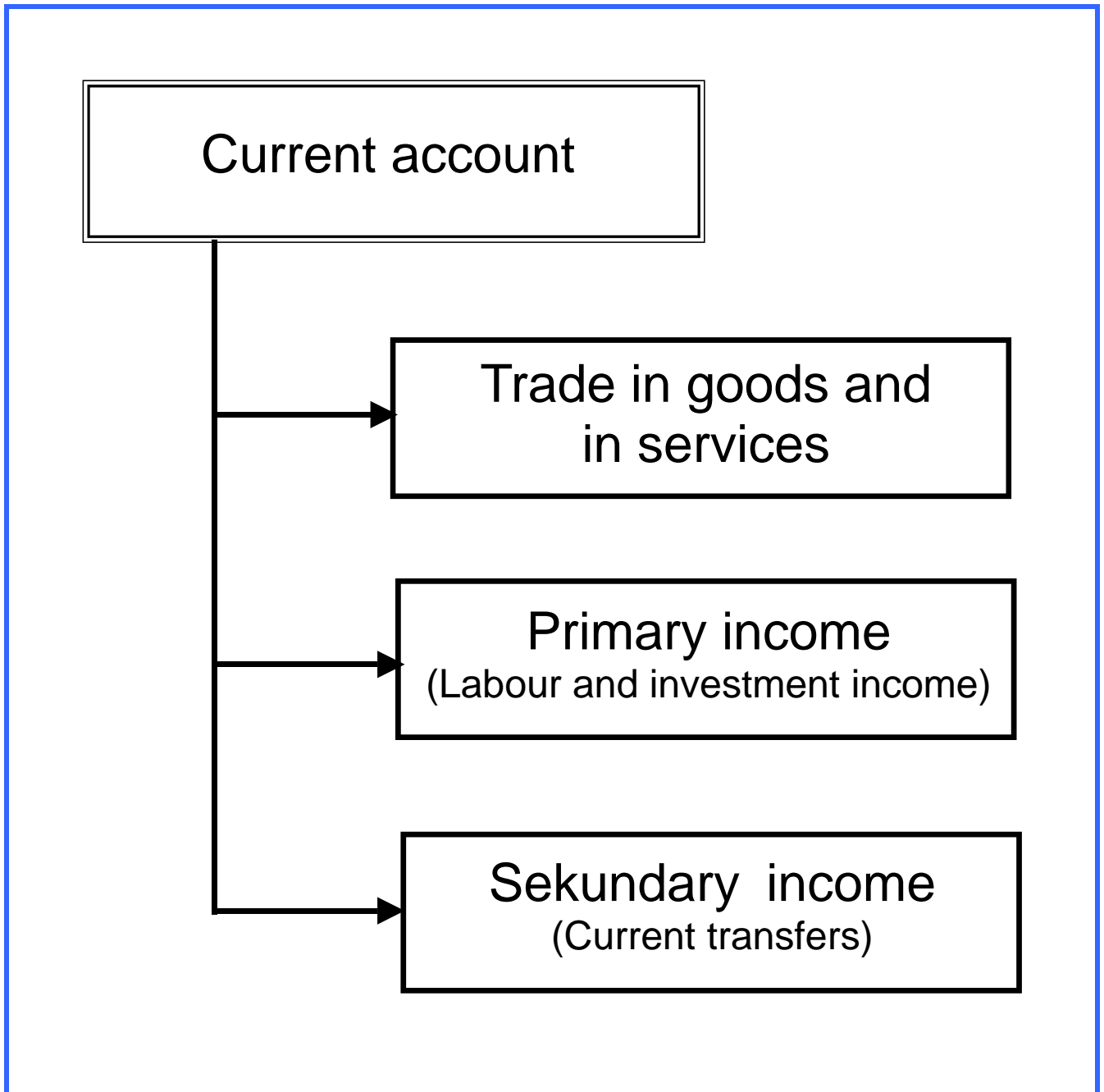


SRAC = Short run average cost  
LRAC = Long run average cost

# Crowding-out effect



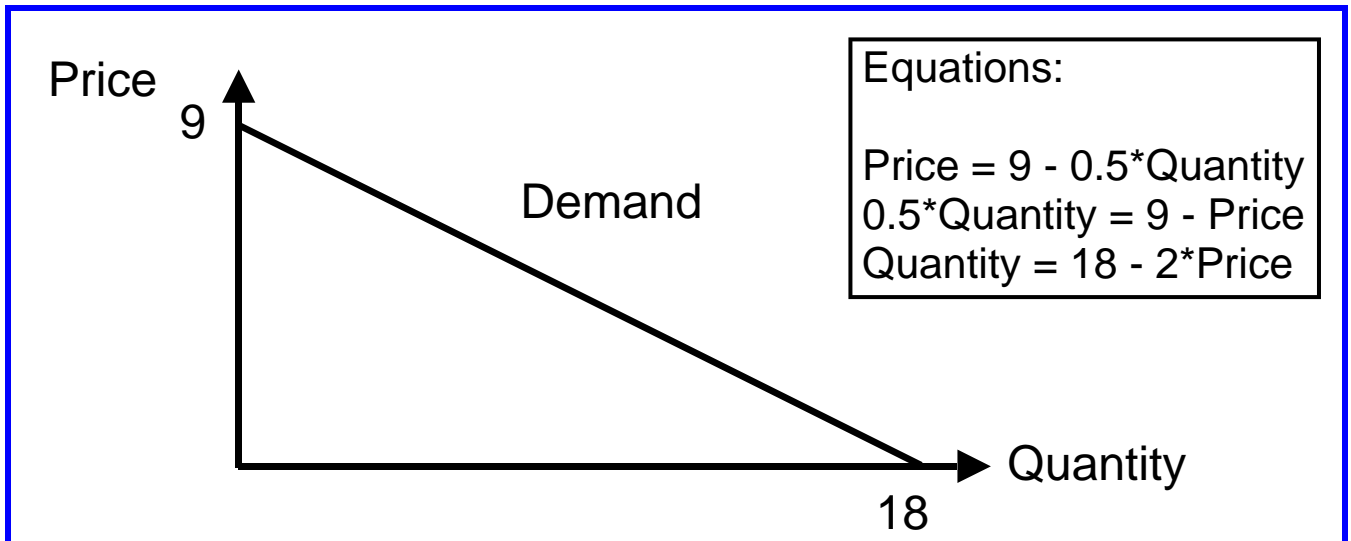
# Current account



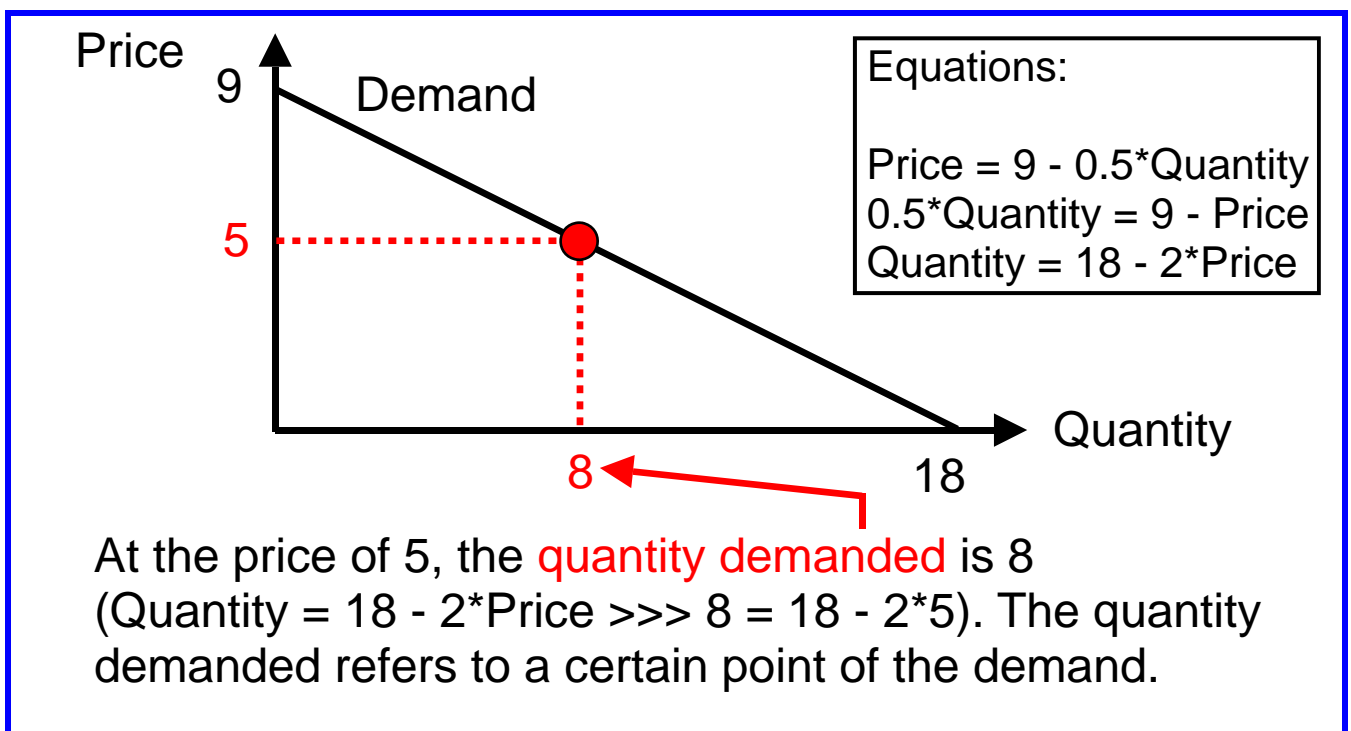


# Demand and quantity demanded

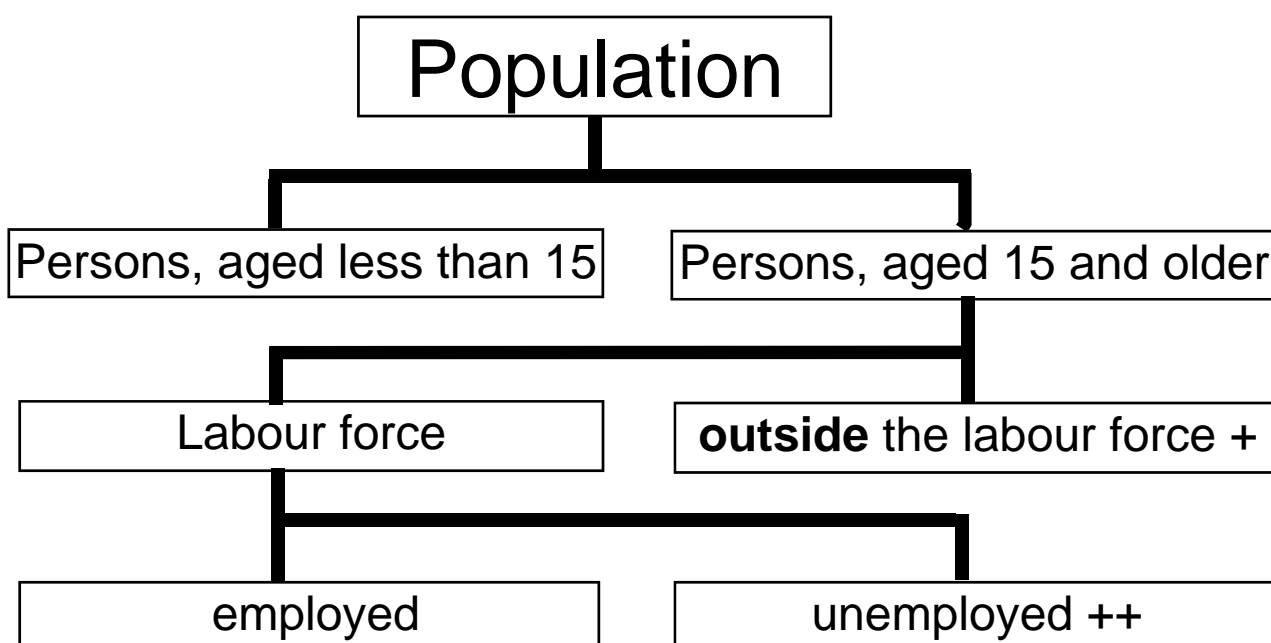
## ① Demand



## ② Quantity demanded



# Employment and unemployment (ILO)



$$\text{Labour force participation rate (\%)} = \frac{\text{Employed and unemployed}}{\text{Working-age population}} * 100$$

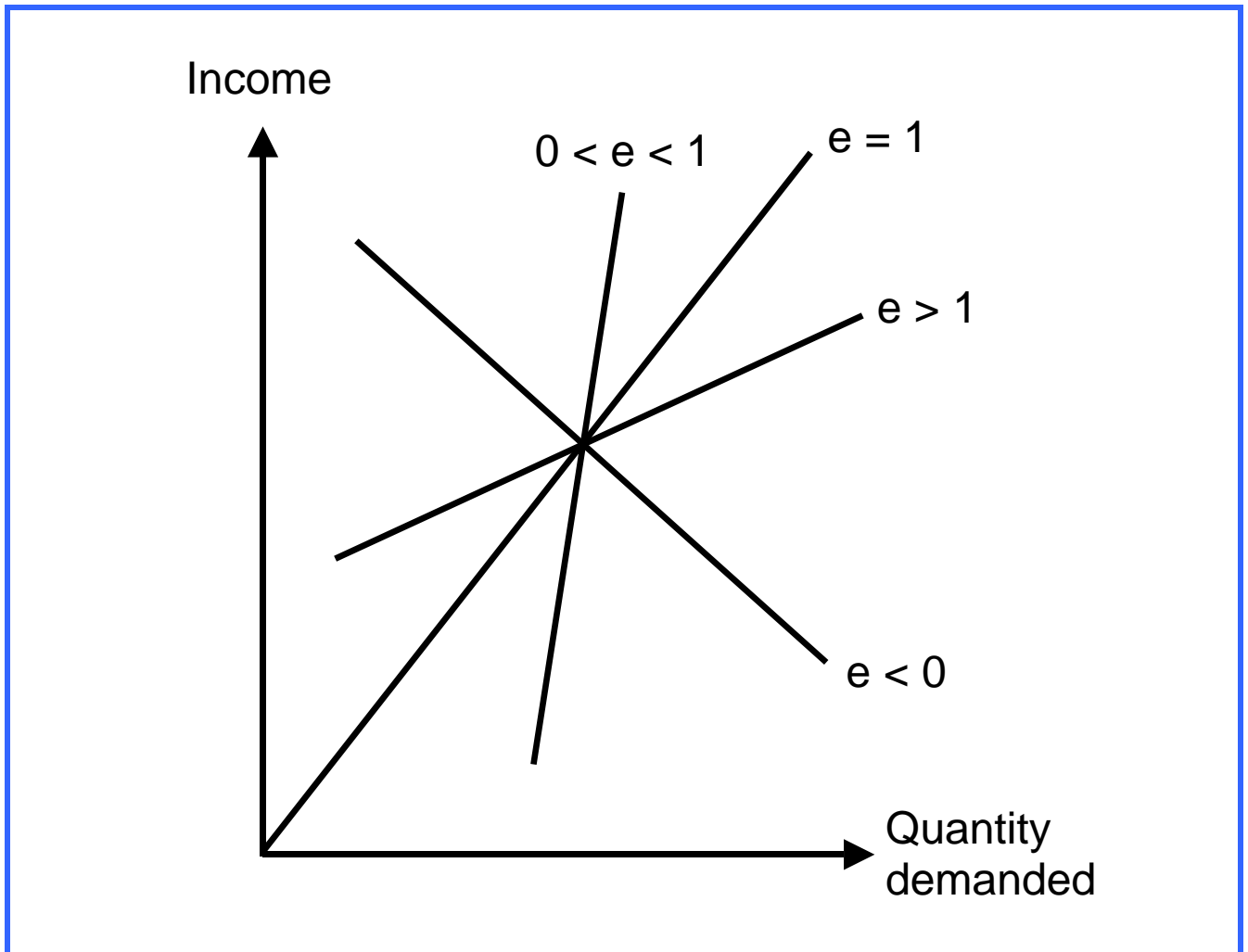
$$\text{Unemployment rate (\%)} = \frac{\text{Unemployed}}{\text{Labour force}} * 100$$

- + - students
- retired persons
- sick persons
- persons without a job, not looking any more for one

++ persons without a job, but actively looking for one

There are countries using upper age limits.

# Engel curves



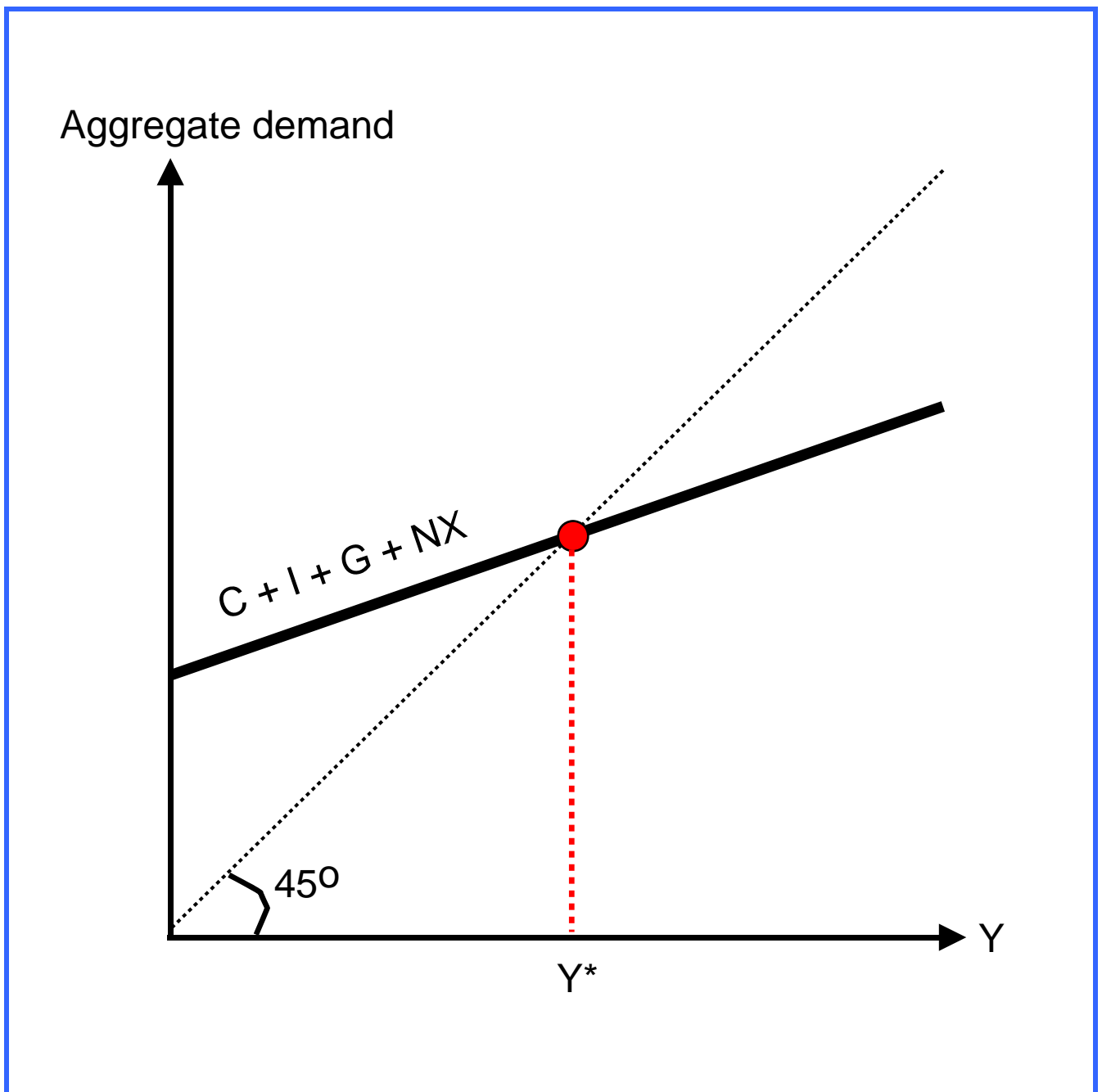
e = Income elasticity of demand

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

Types of goods:

- Luxuries:  $e > 1$
- Necessities:  $0 < e < 1$
- Inferior goods:  $e < 0$

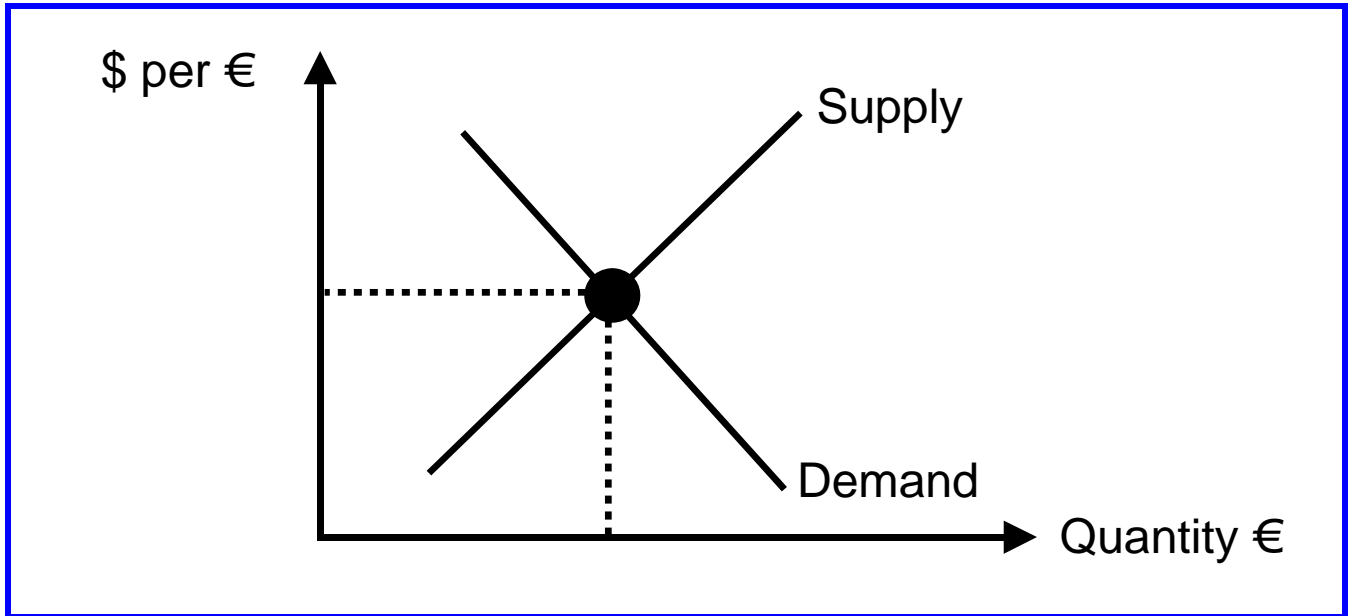
# Equilibrium - Keynes



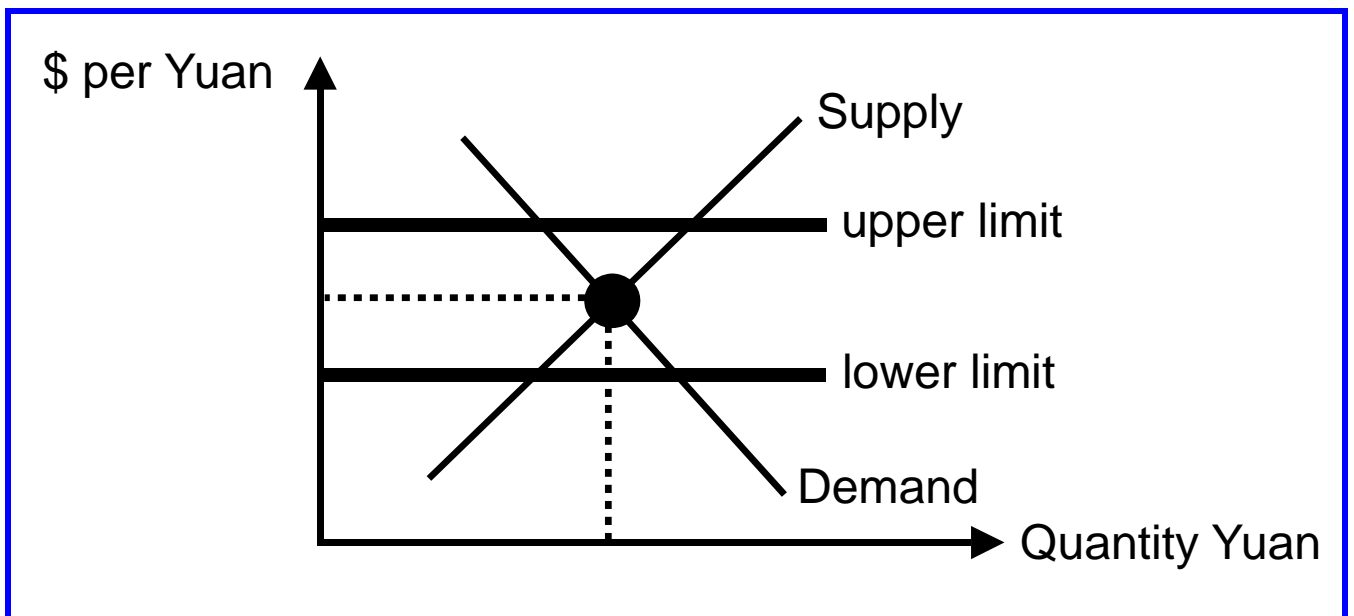
|                            |                           |
|----------------------------|---------------------------|
| $Y$ = Output, income       | $I$ = Investment          |
| $Y^*$ = Equilibrium of $Y$ | $G$ = Government spending |
| $C$ = Consumption          | $NX$ = Net exports        |

# Exchange rate

## ① **Flexible** exchange rate

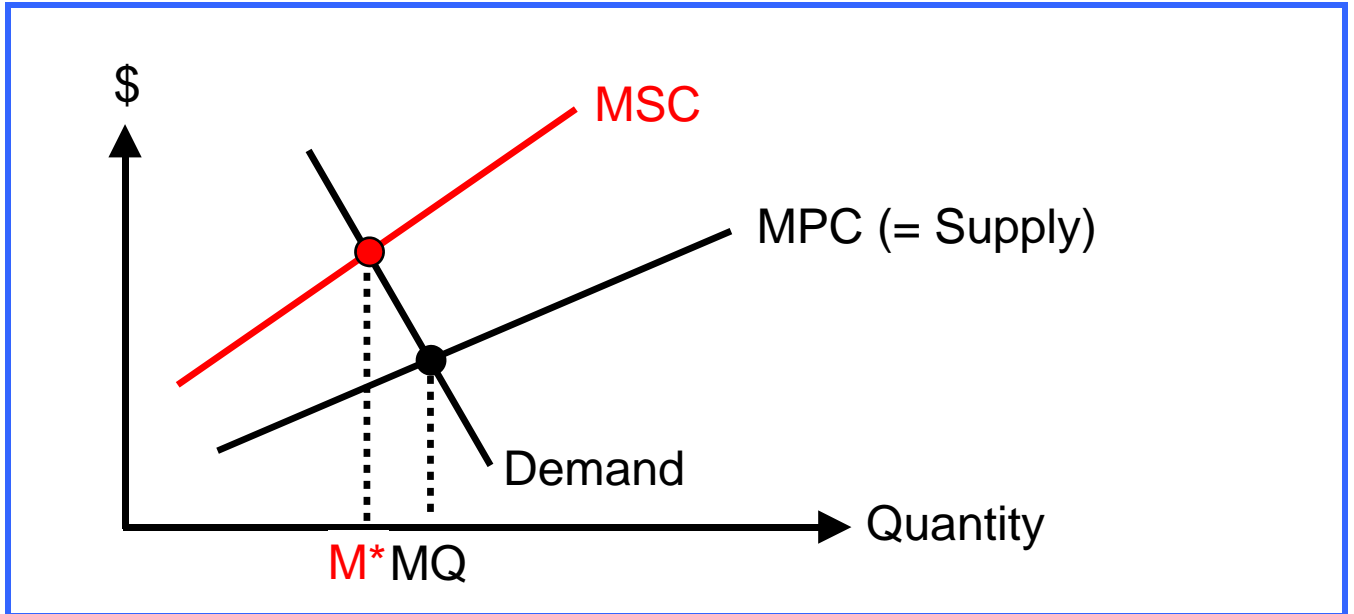


## ② **Fixed** exchange rate

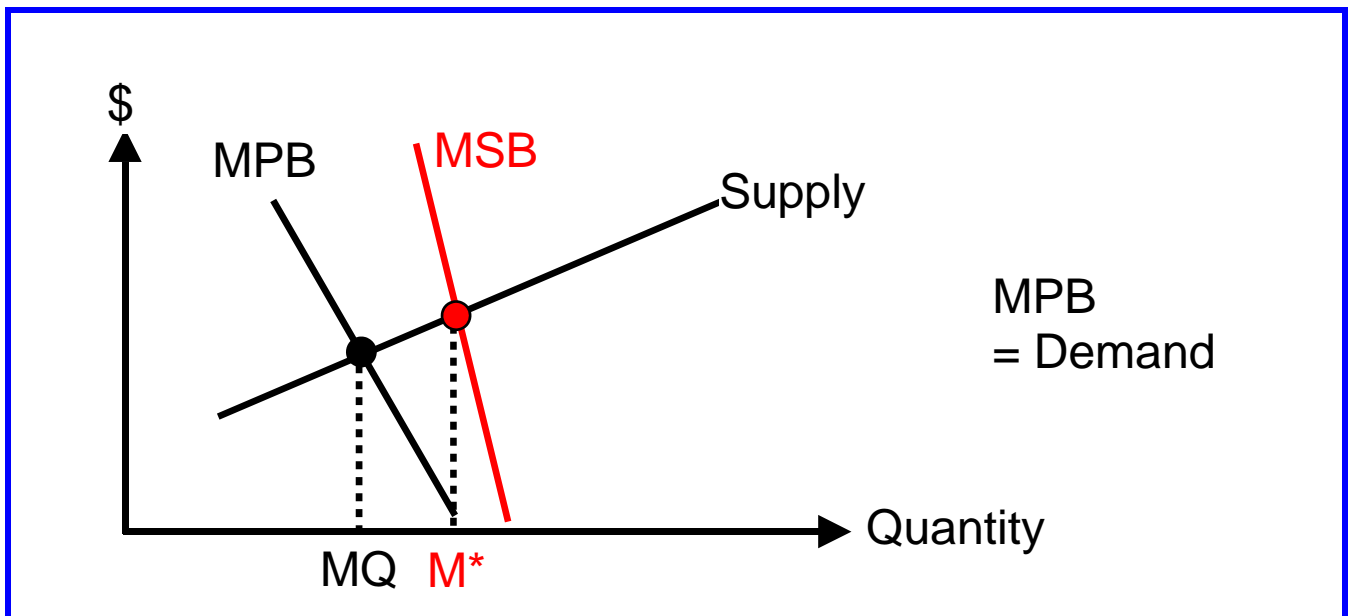


# Externality

## ① Negative externality (with external costs)



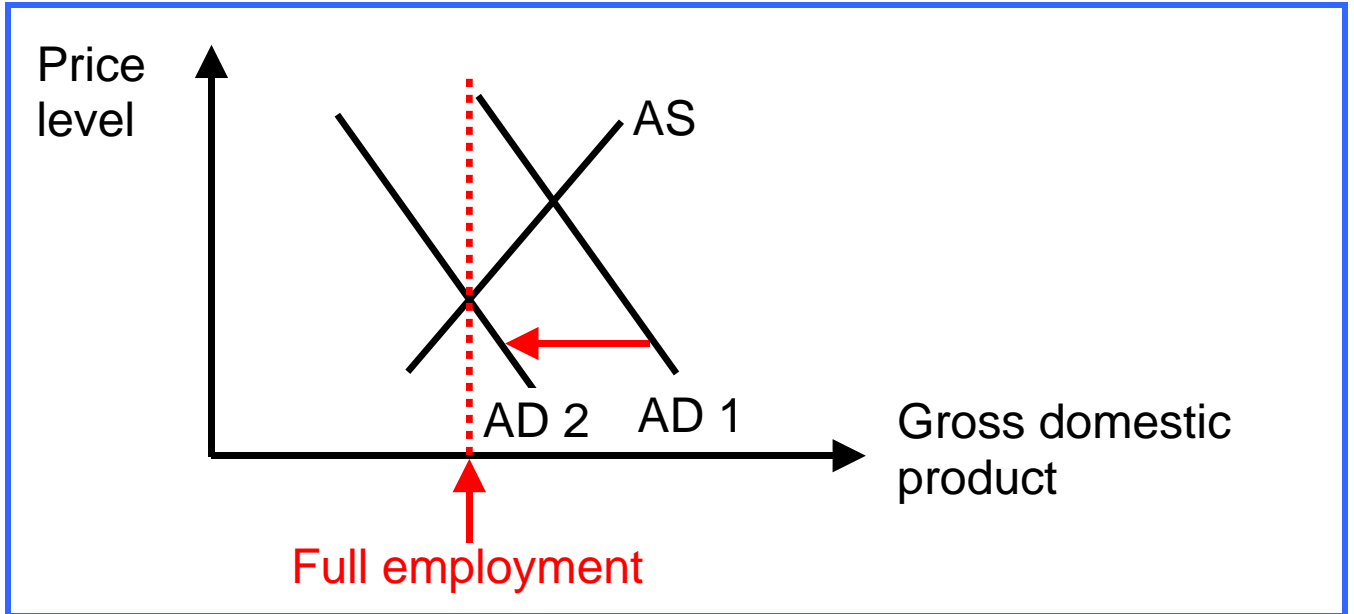
## ② Positive externality (with external benefits)



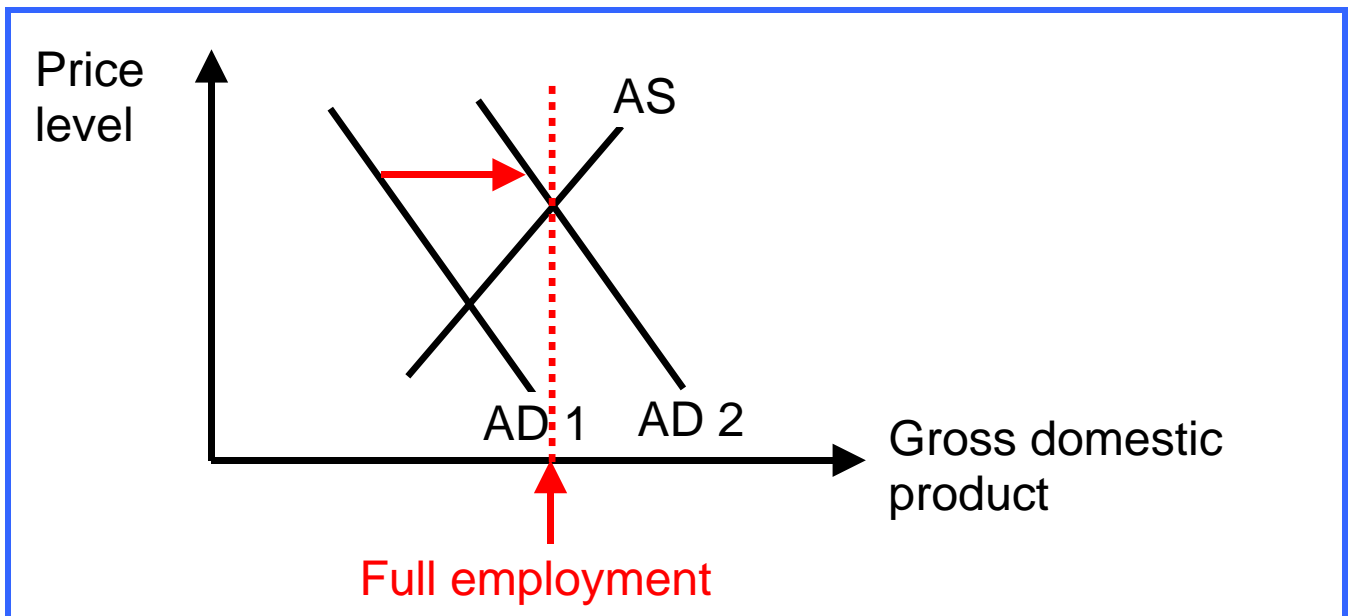
|                                 |                                |
|---------------------------------|--------------------------------|
| MPC = Marginal private costs    | MSB = Marginal social benefits |
| MPB = Marginal private benefits | MQ = Market quantity           |
| MSC = Marginal social costs     | M* = Optimal quantity          |

# Fiscal policy

## ① Situation of **overheating**



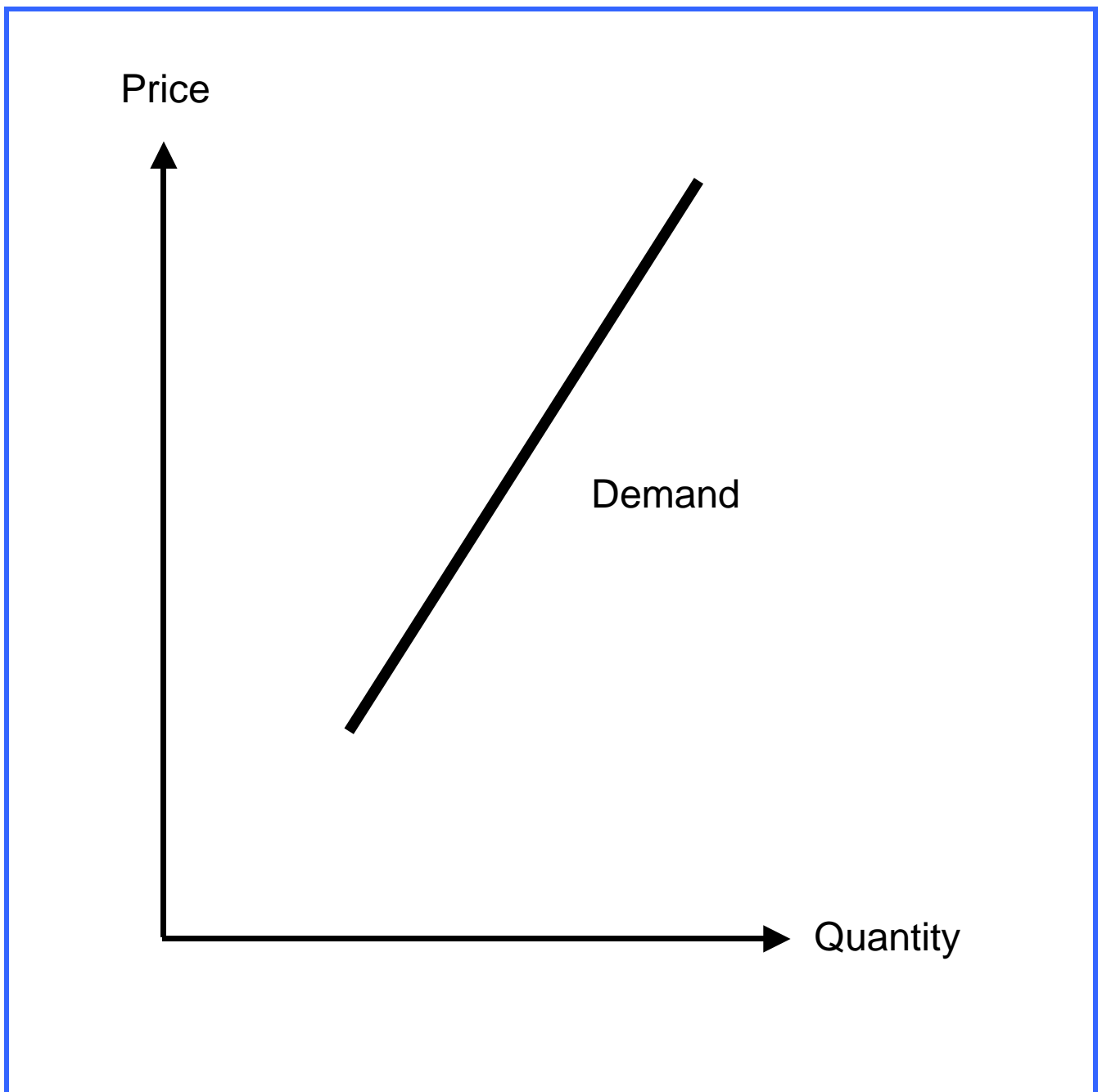
## ② Situation of **underemployment**



AD = Aggregate demand (Consumption, investment, government spending, etc.)

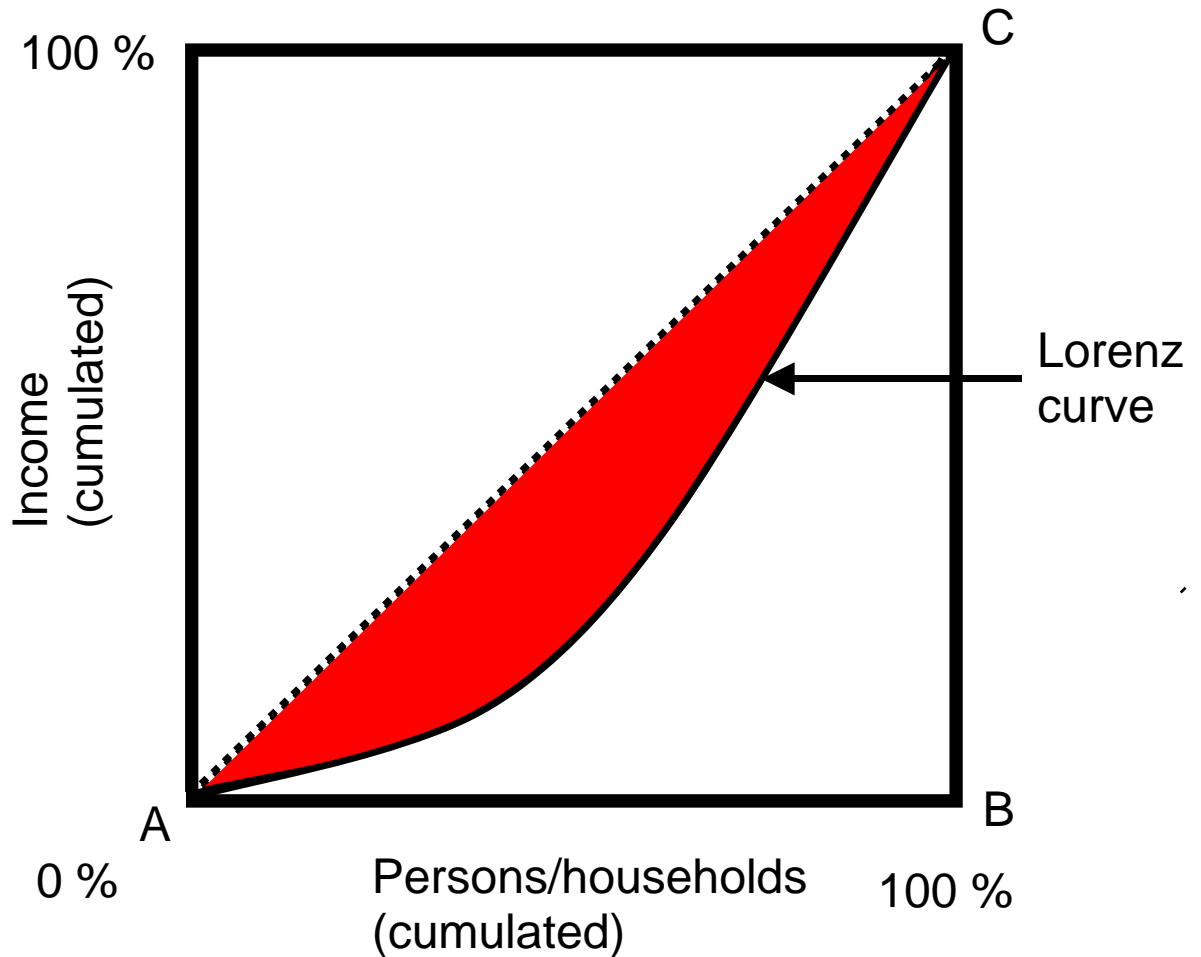
AS = Aggregate supply

# Giffen good





# Gini coefficient



**Gini coefficient =**

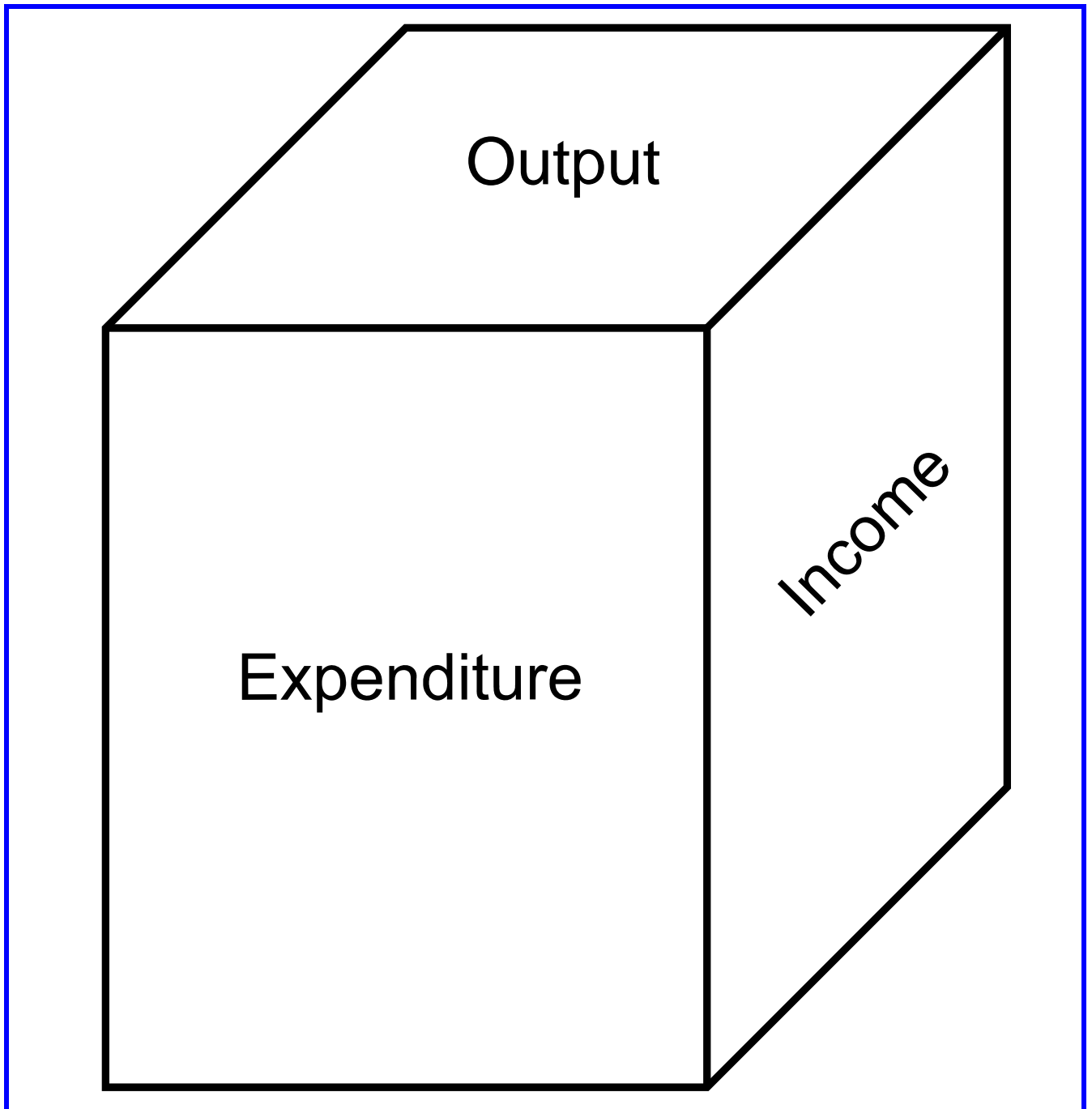
$$\frac{\text{Red area}^*}{\text{Triangle ABC}}$$

\* Red area = Area between the Lorenz curve and the 45<sup>0</sup>-diagonal line

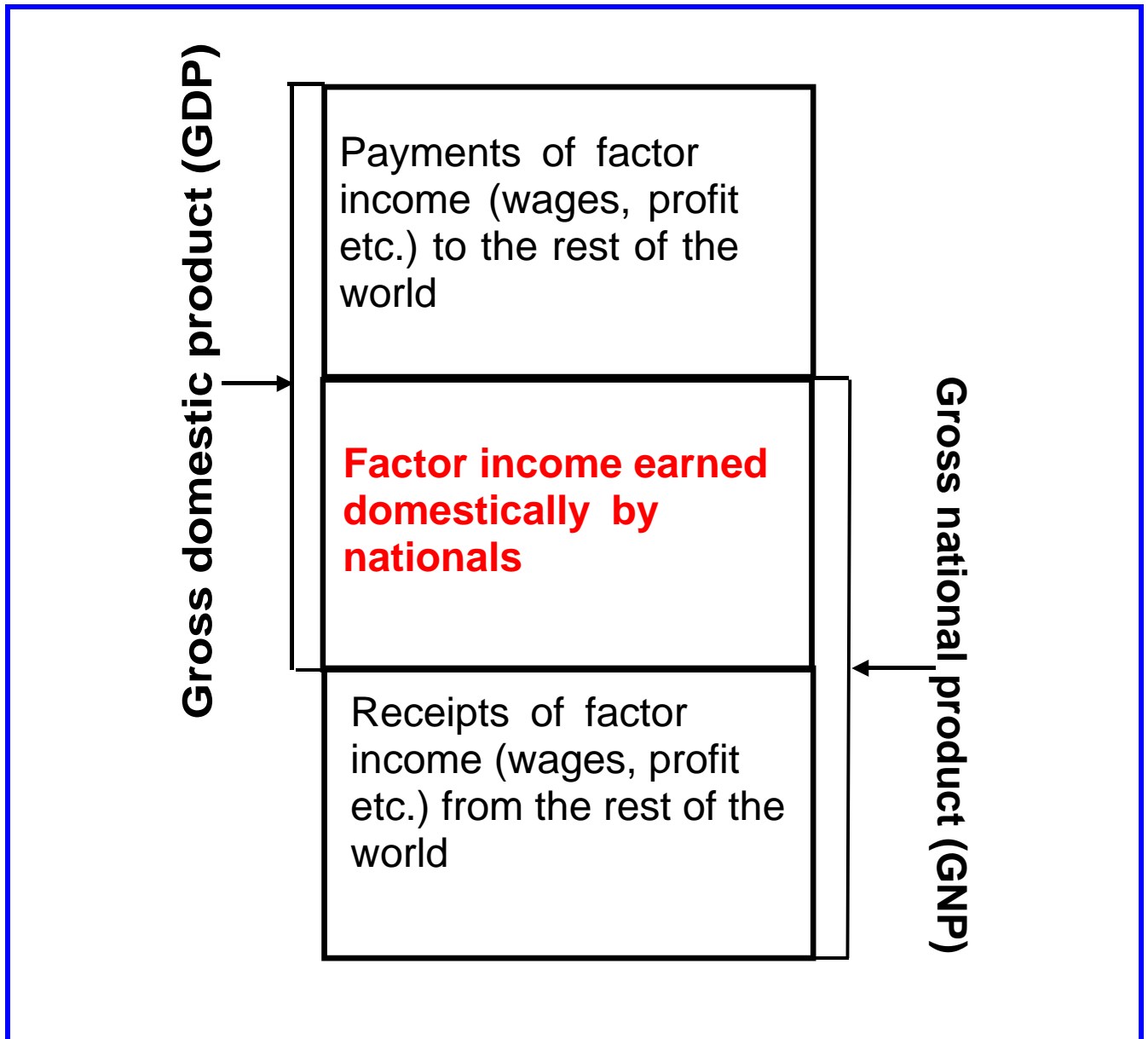
# Goods - private and public

|             |     | Rival?        |                             |
|-------------|-----|---------------|-----------------------------|
|             |     | yes           | no                          |
| Excludable? | yes | Private goods | Goods by natural monopolies |
|             | no  | Common goods  | Public goods                |

# Gross domestic product - methods of calculating



# Gross domestic product and gross national product

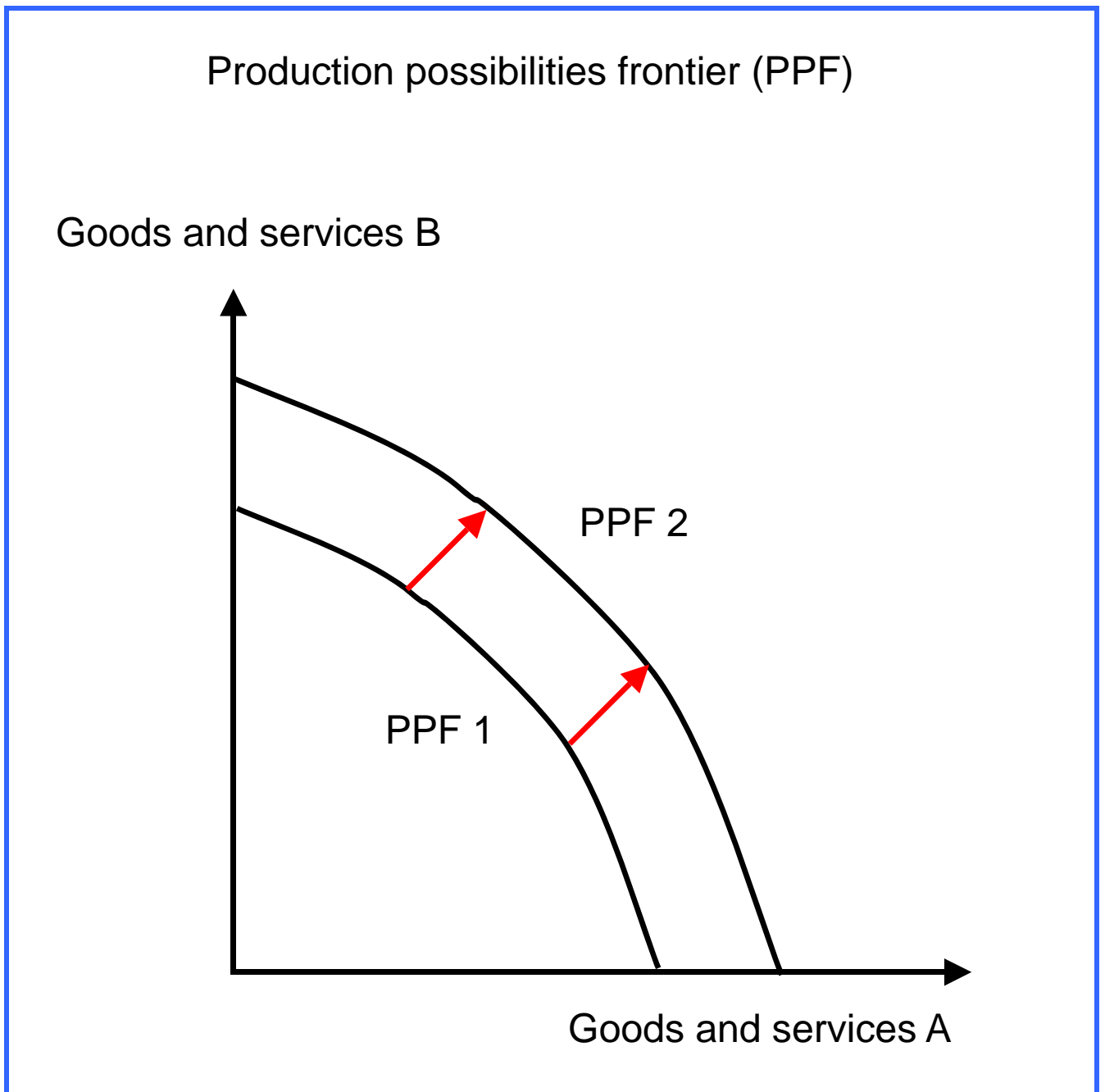


GDP → total income **produced domestically**

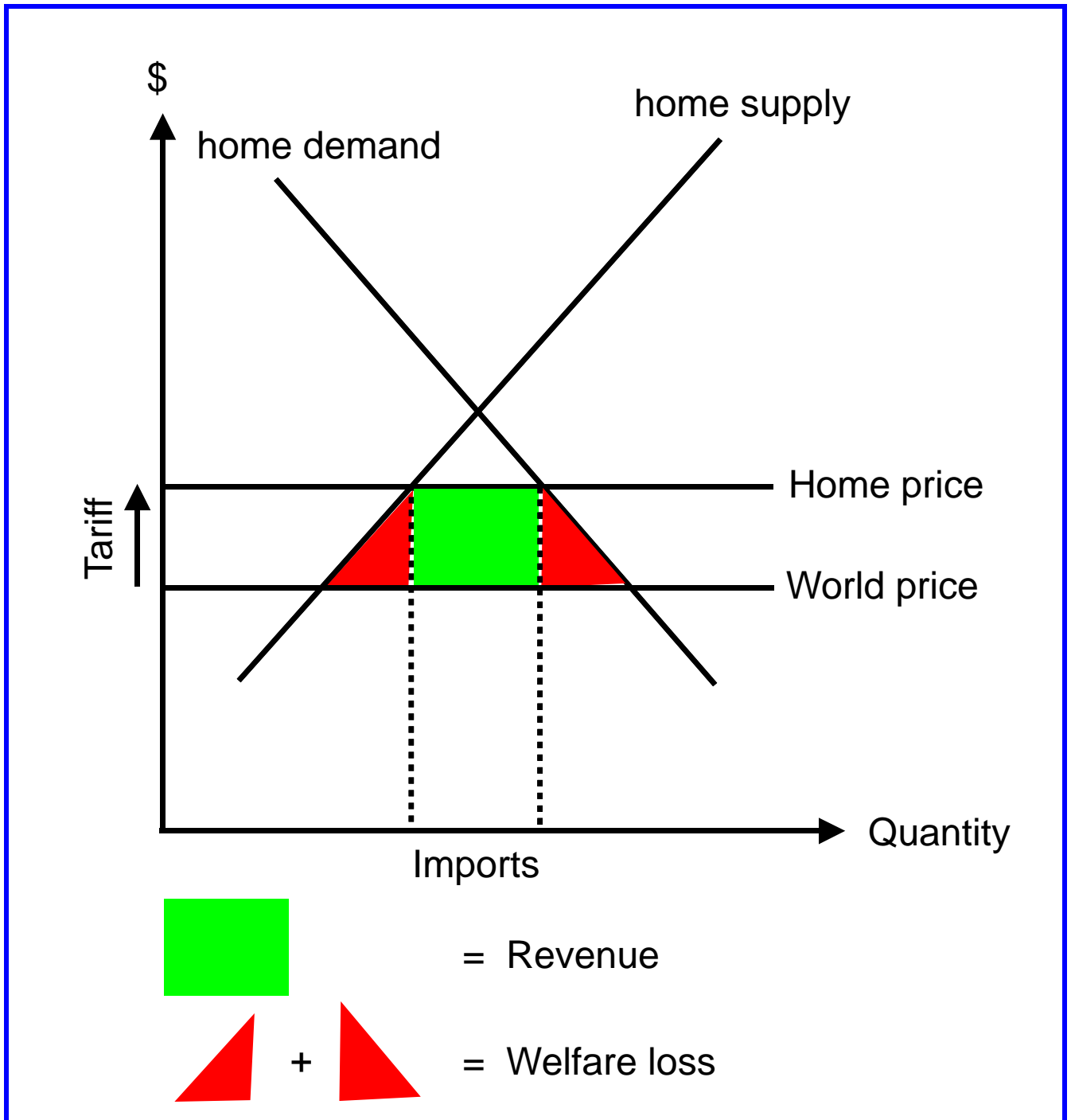
GNP → total income **earned by nationals**

# Growth

When there is economic growth, then the production possibilities frontier shifts outward.

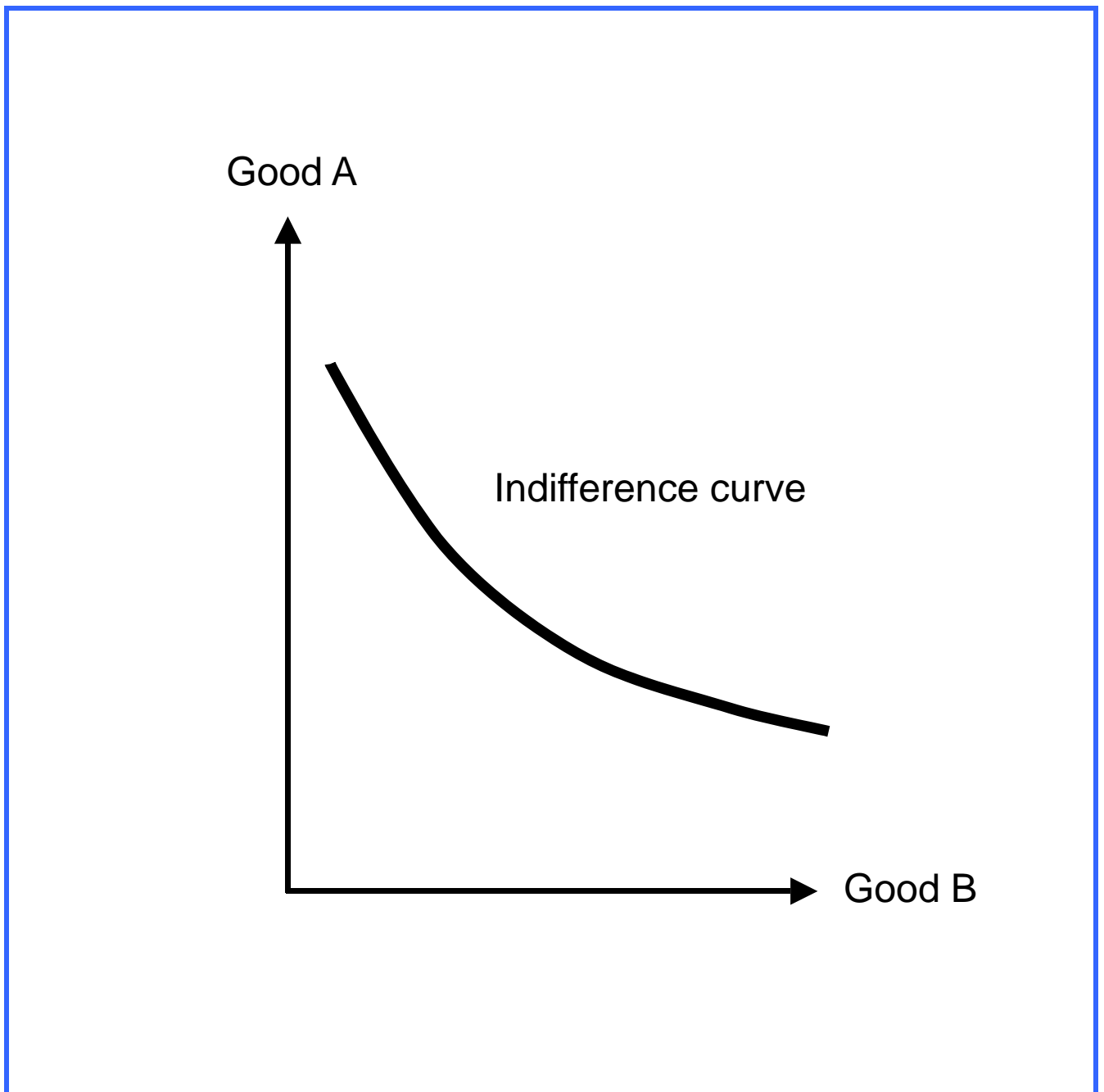


# Import tariff - revenue and welfare loss



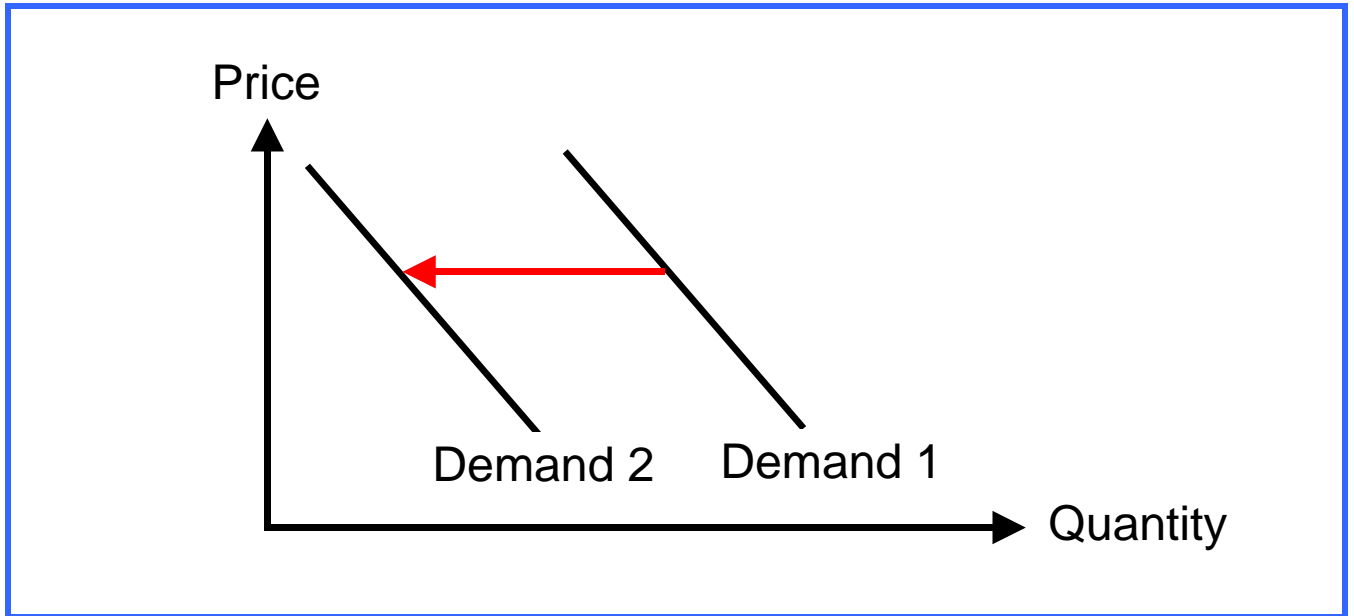
# Indifference curve

An indifference curve shows the combinations of 2 divisible goods, A and B, which result in the same utility for the consumer. Along an indifference curve **total utility** is thus **constant**.

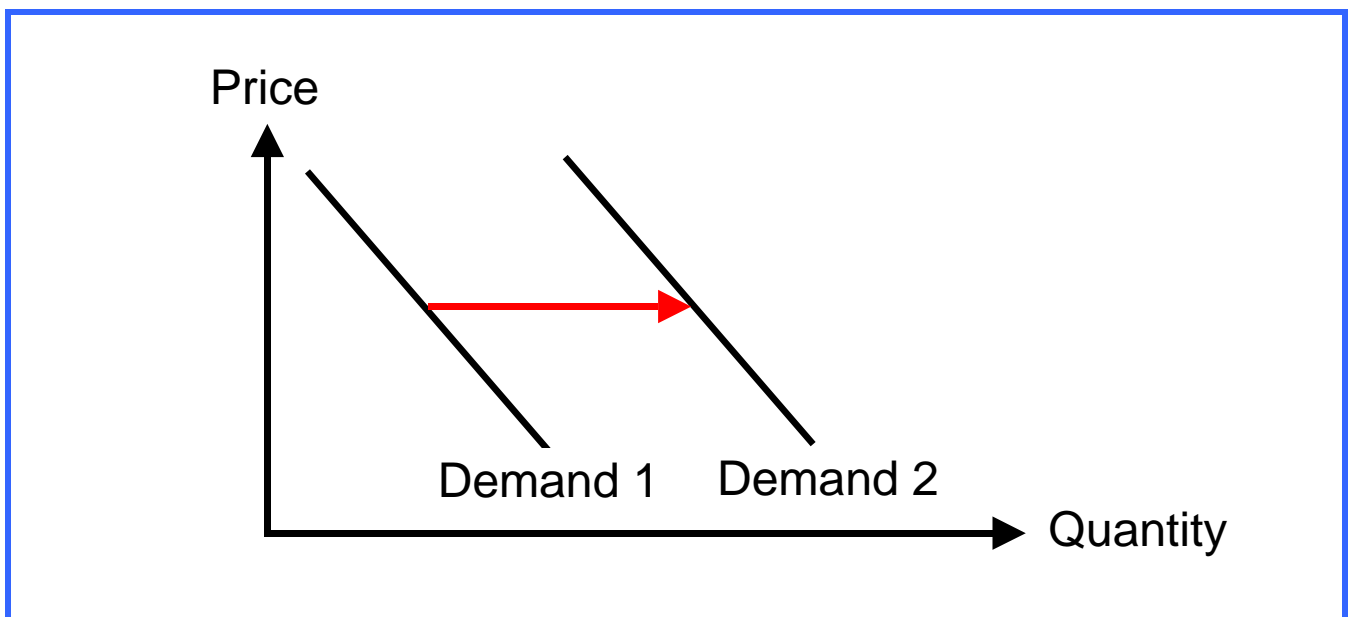


# Inferior good

- ① **Income rises.** What happens to an inferior good?

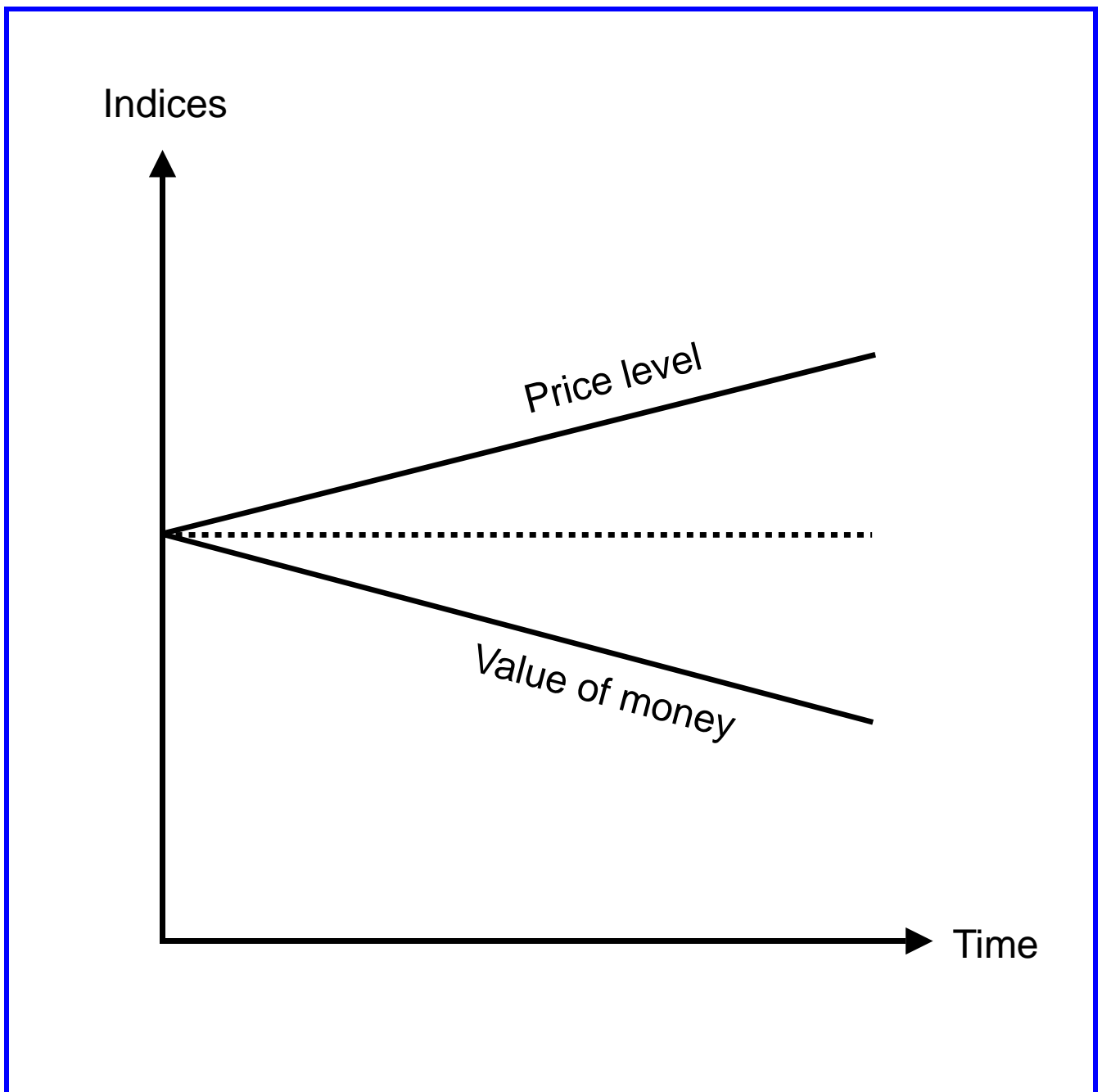


- ② **Income falls.** What happens to an inferior good?

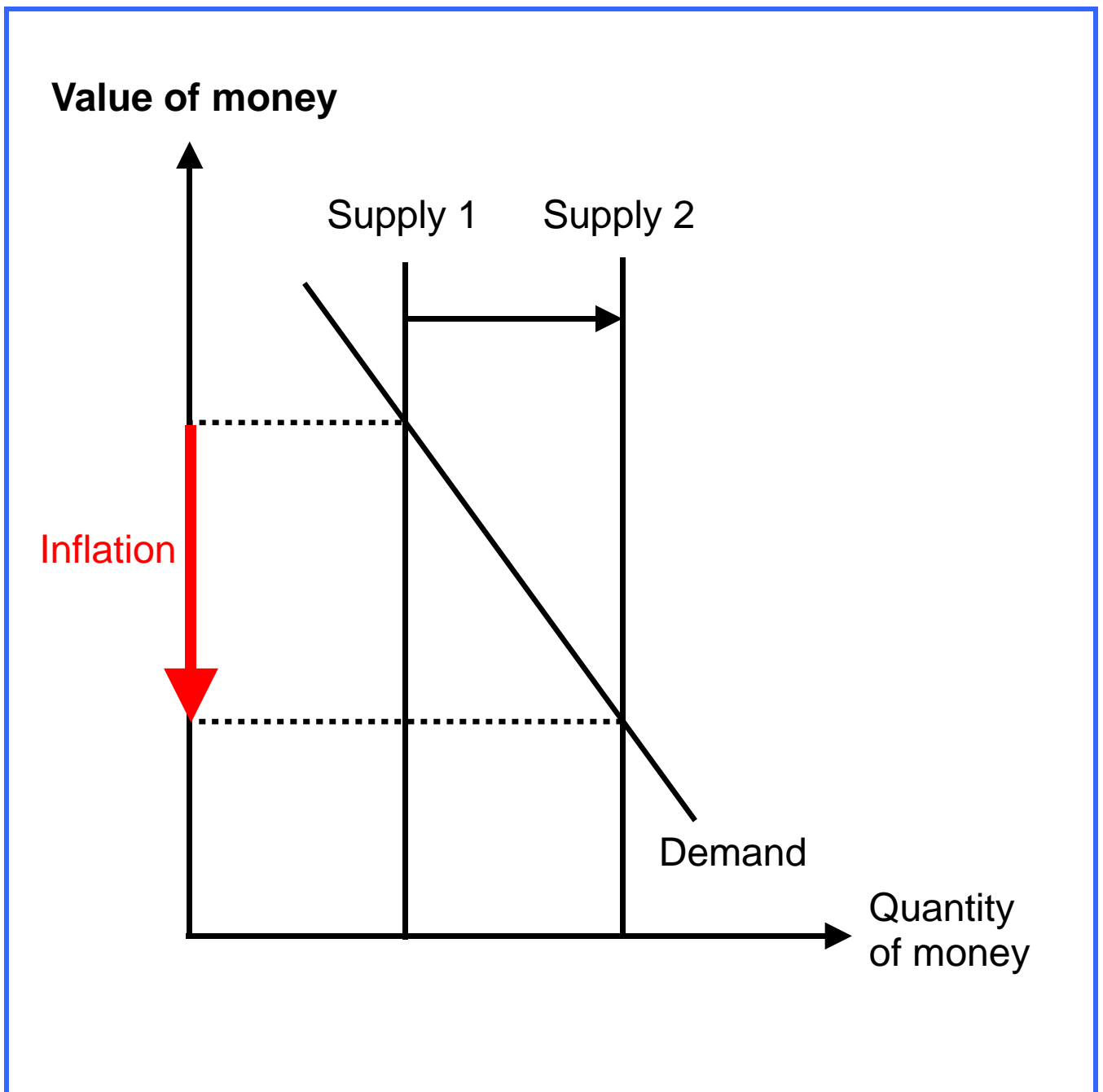




# Inflation 1 - characteristics

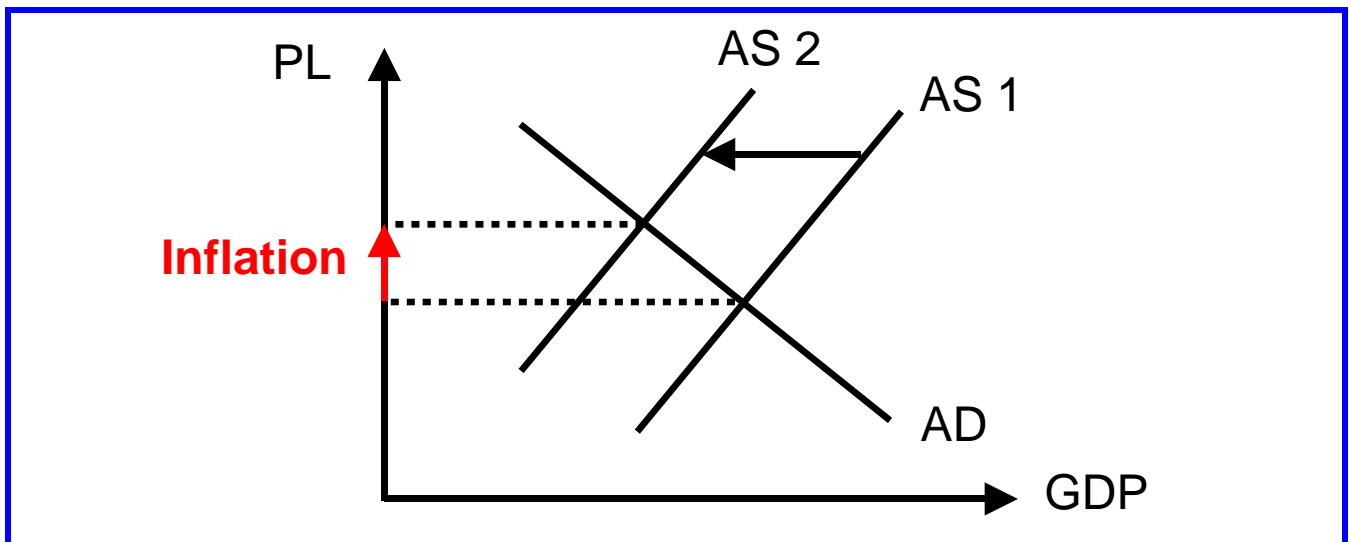


# Inflation 2 - monetary inflation

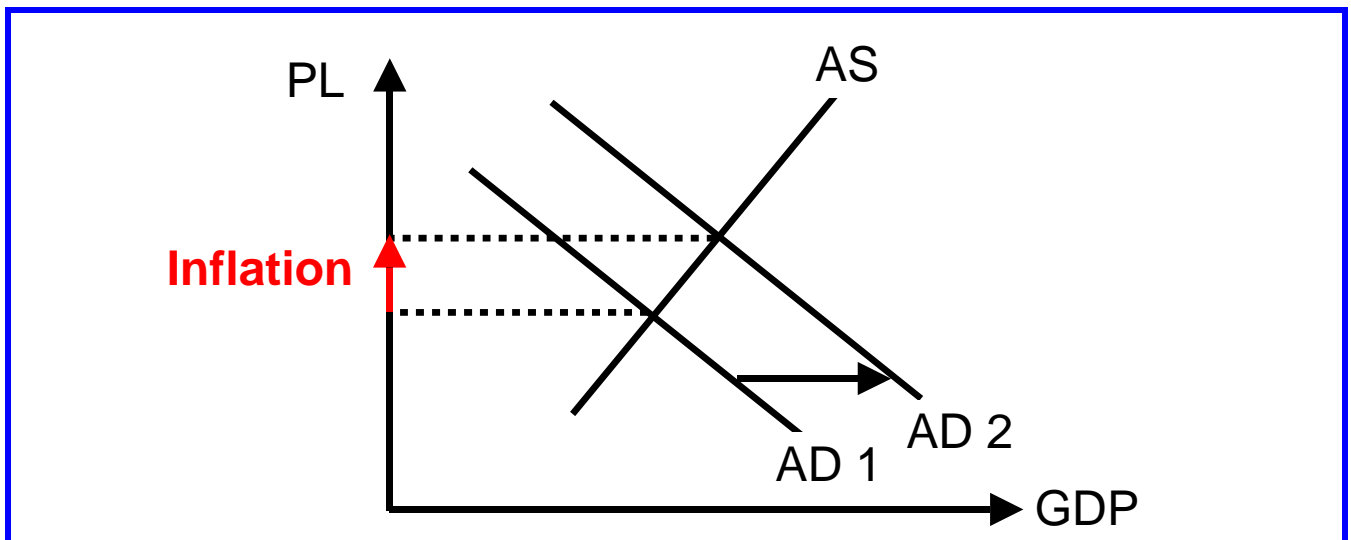


# Inflation 3 - cost-push inflation and demand-pull inflation

## ① Cost-push inflation

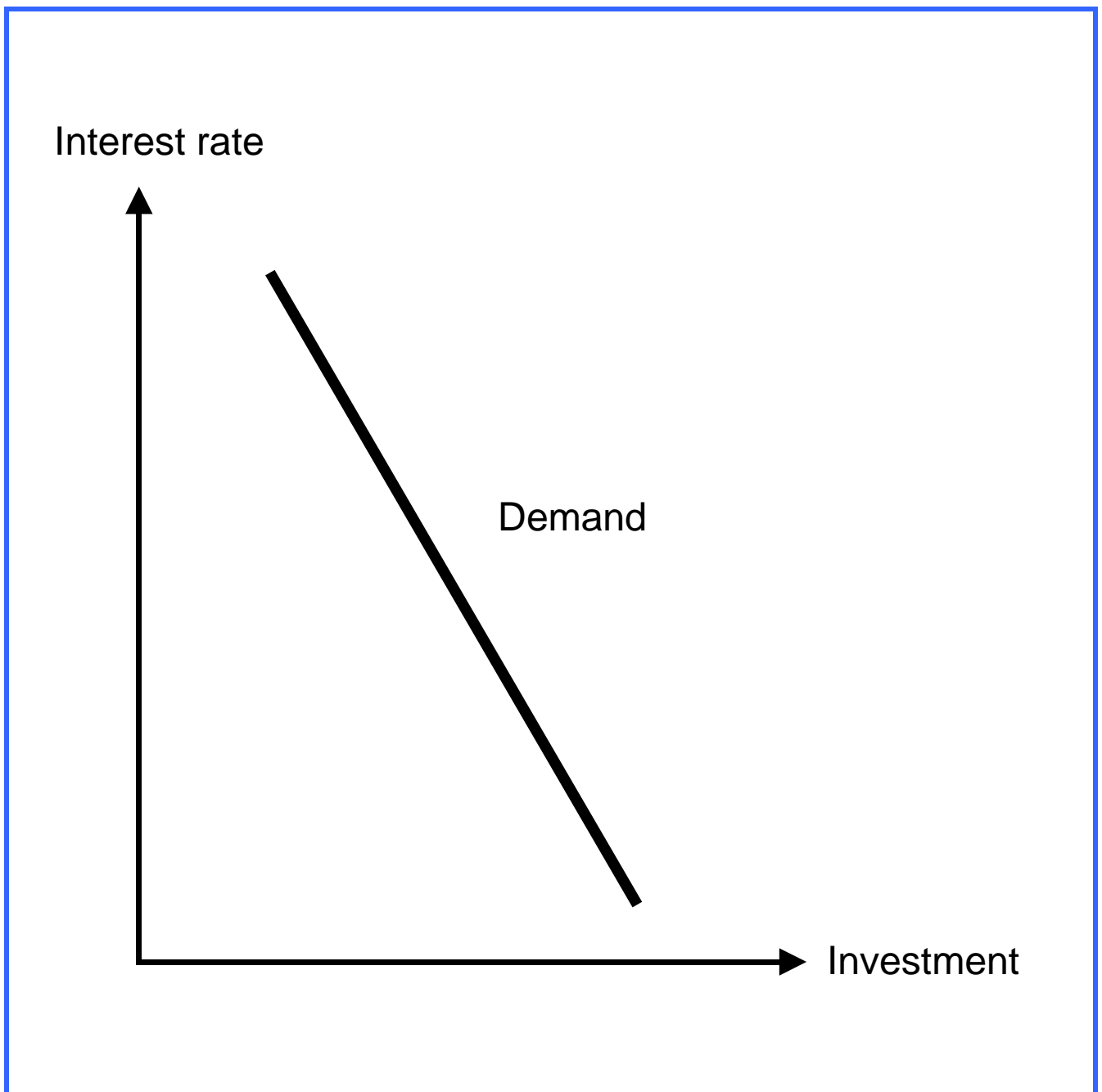


## ② Demand-pull inflation



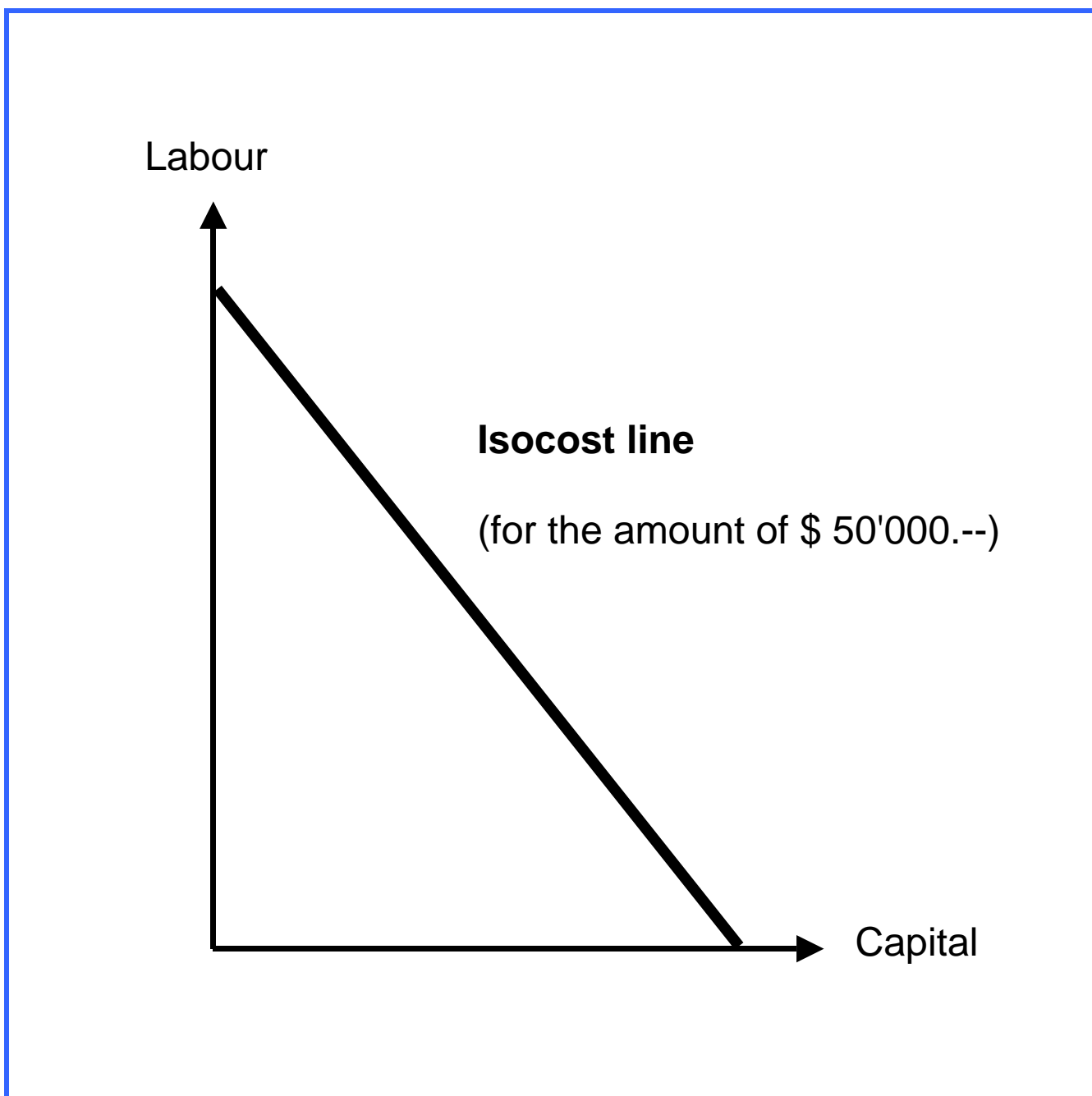
|                       |                              |
|-----------------------|------------------------------|
| AS = Aggregate supply | PL = Price level             |
| AD = Aggregate demand | GDP = Gross domestic product |

# Investment demand



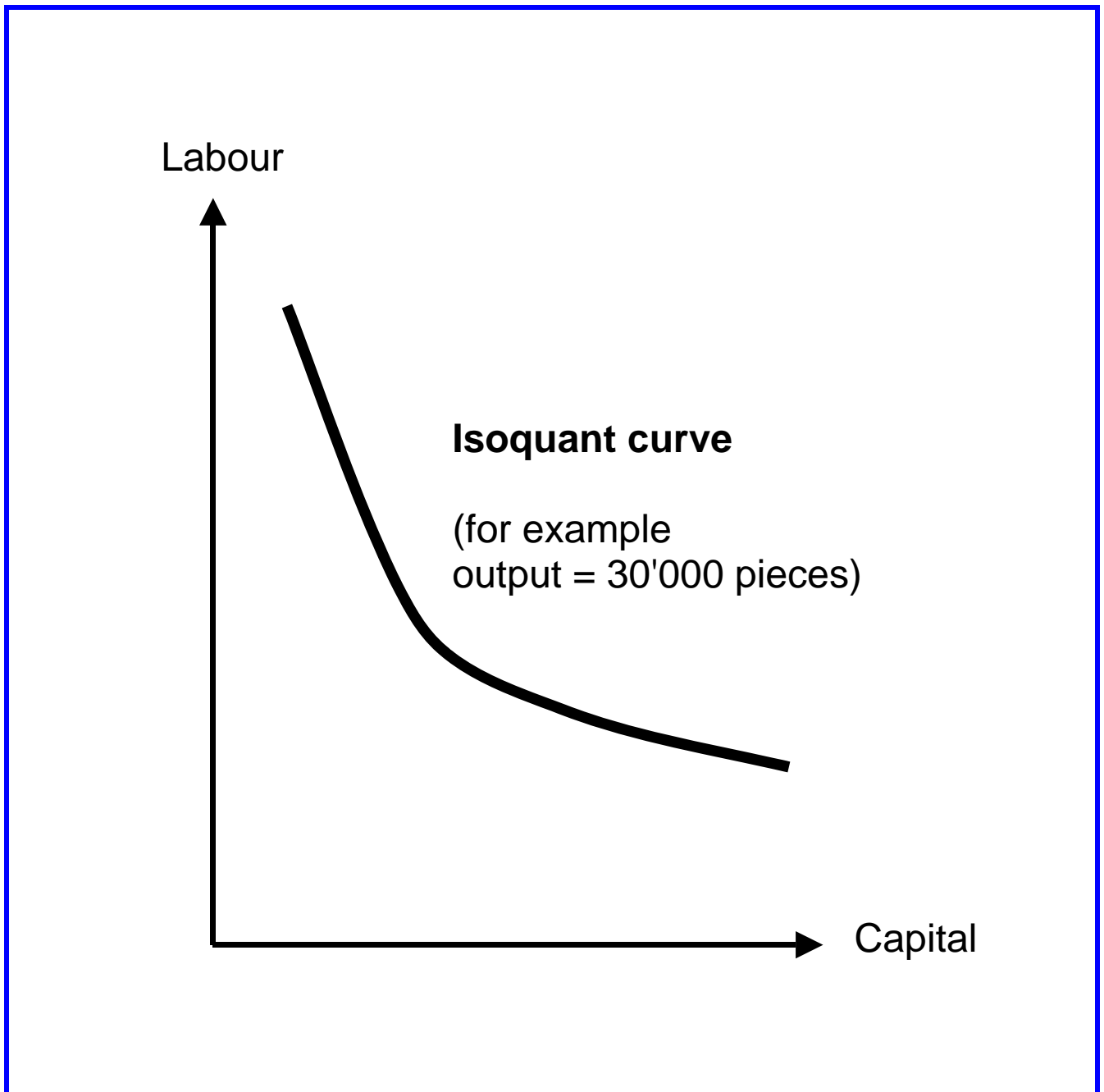
# Isocost

An isocost line shows the combinations of divisible factors of production (labour, capital) that a firm can choose for a given amount of money.

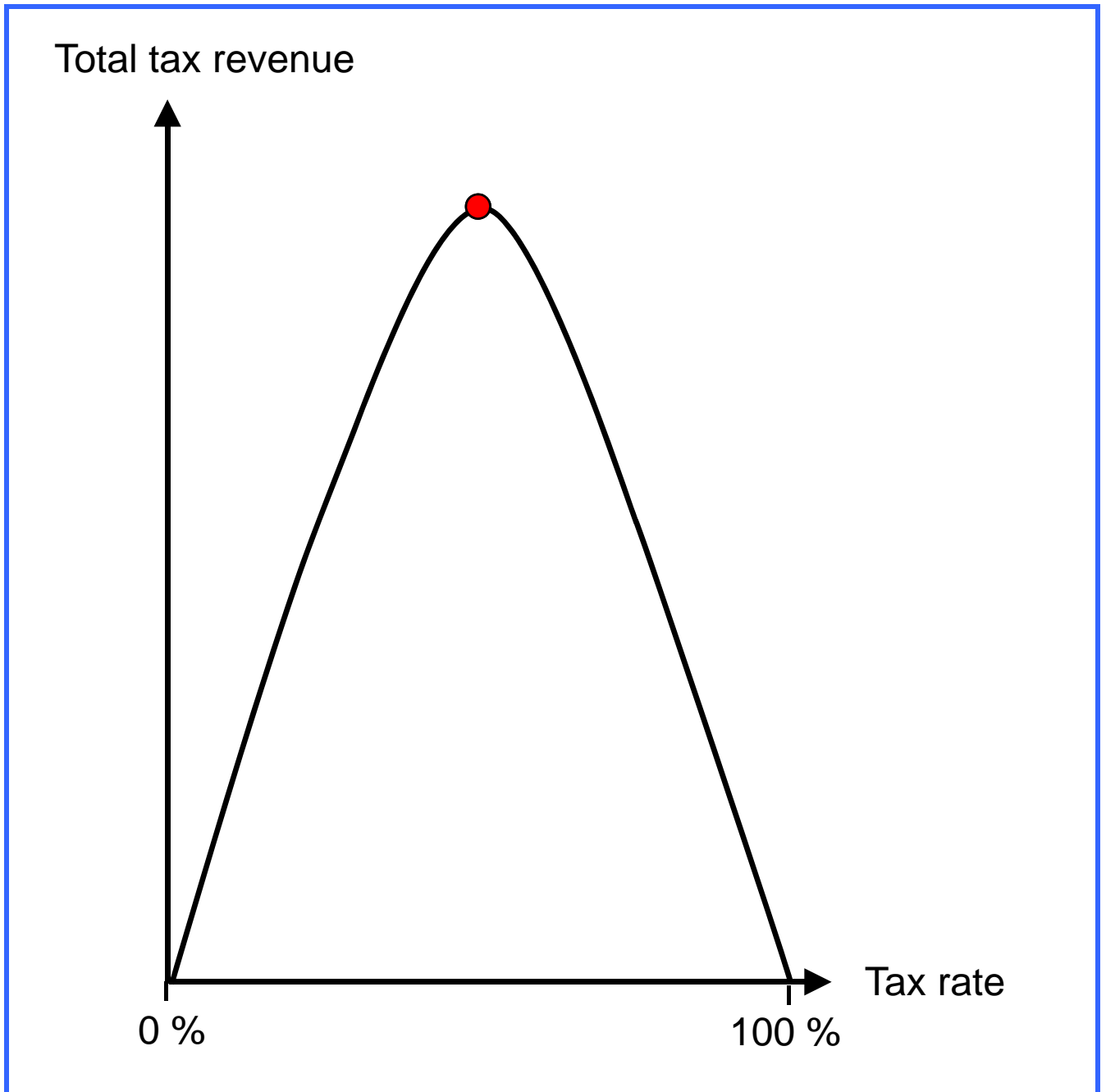


# Isoquant

An isoquant curve shows the combinations of divisible factors of production (labour, capital) which are necessary for the production of a given output.

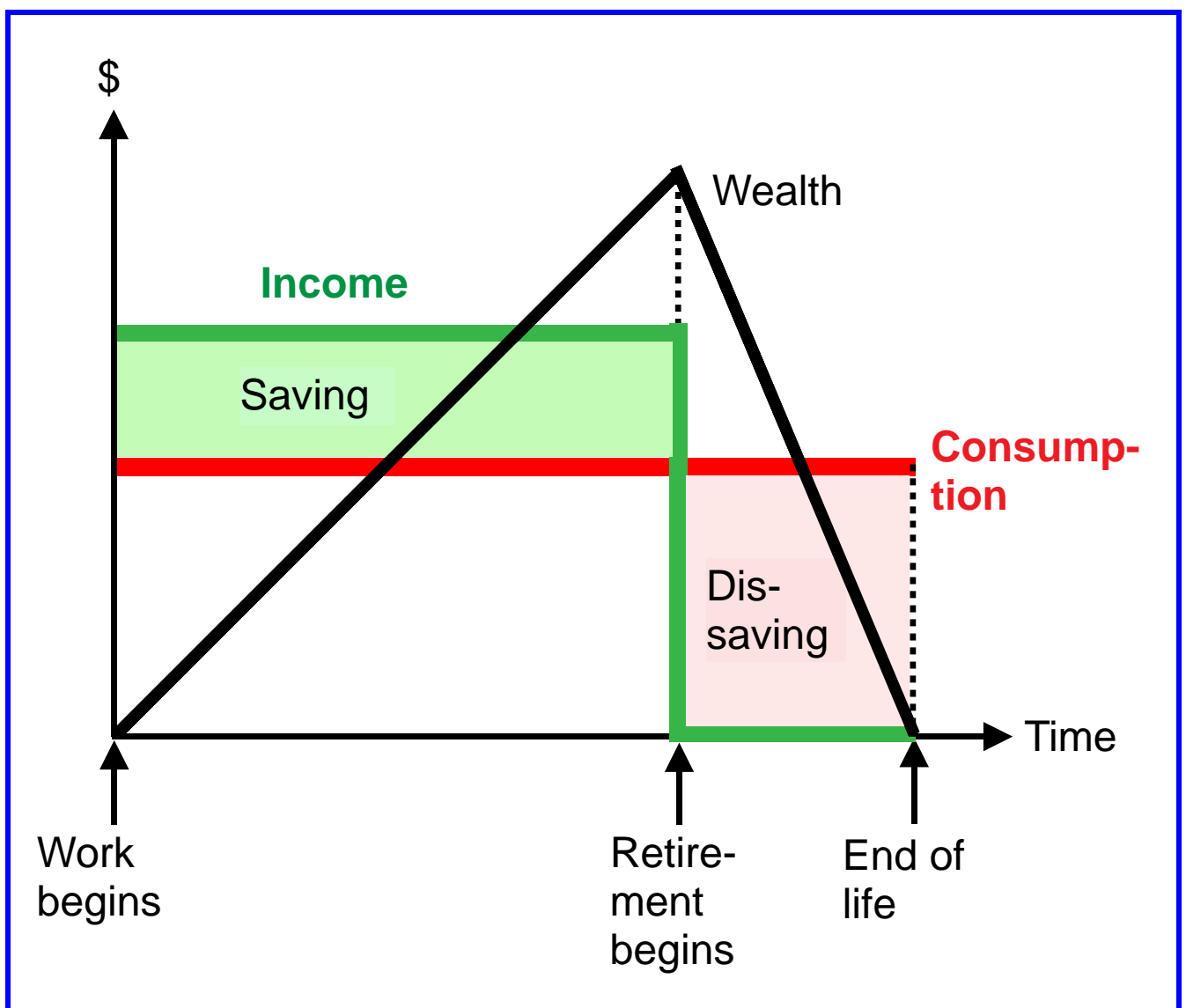


# Laffer curve



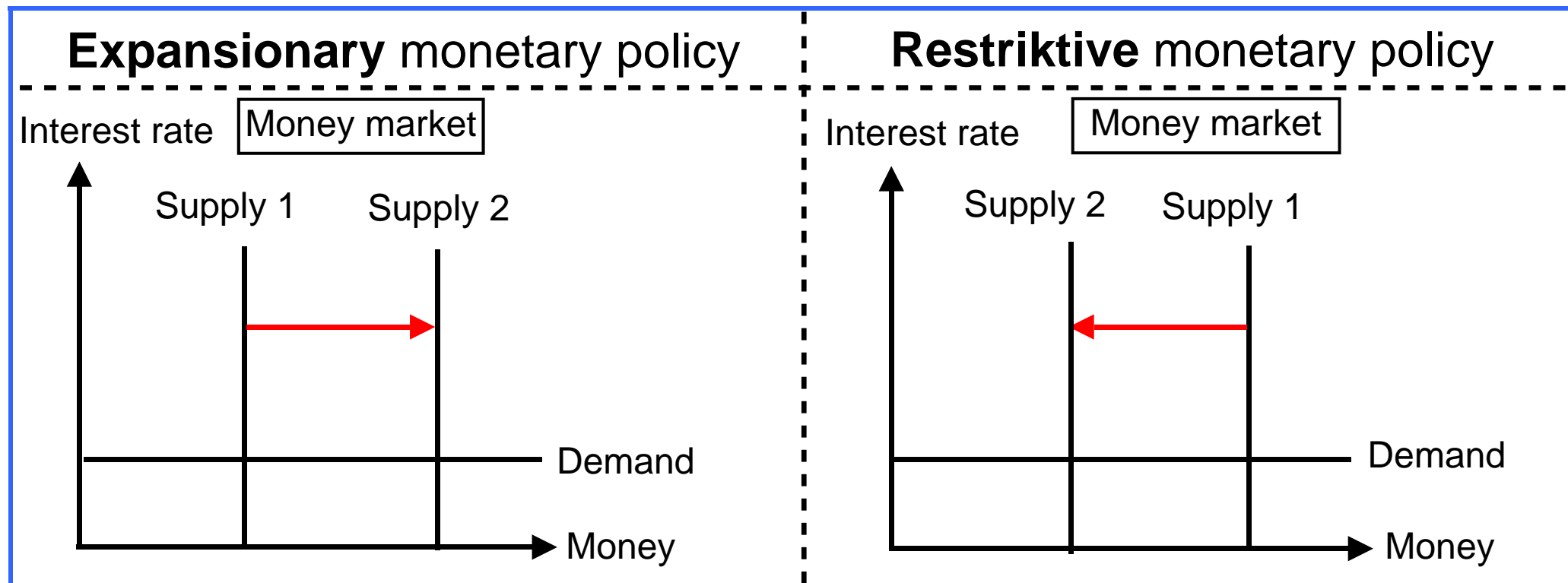
# Life-cycle hypothesis

According to the life-cycle hypothesis, consumption does not depend on current income, but on **lifetime income**. Wealth is built up by saving out of income to enable consumption during retirement.



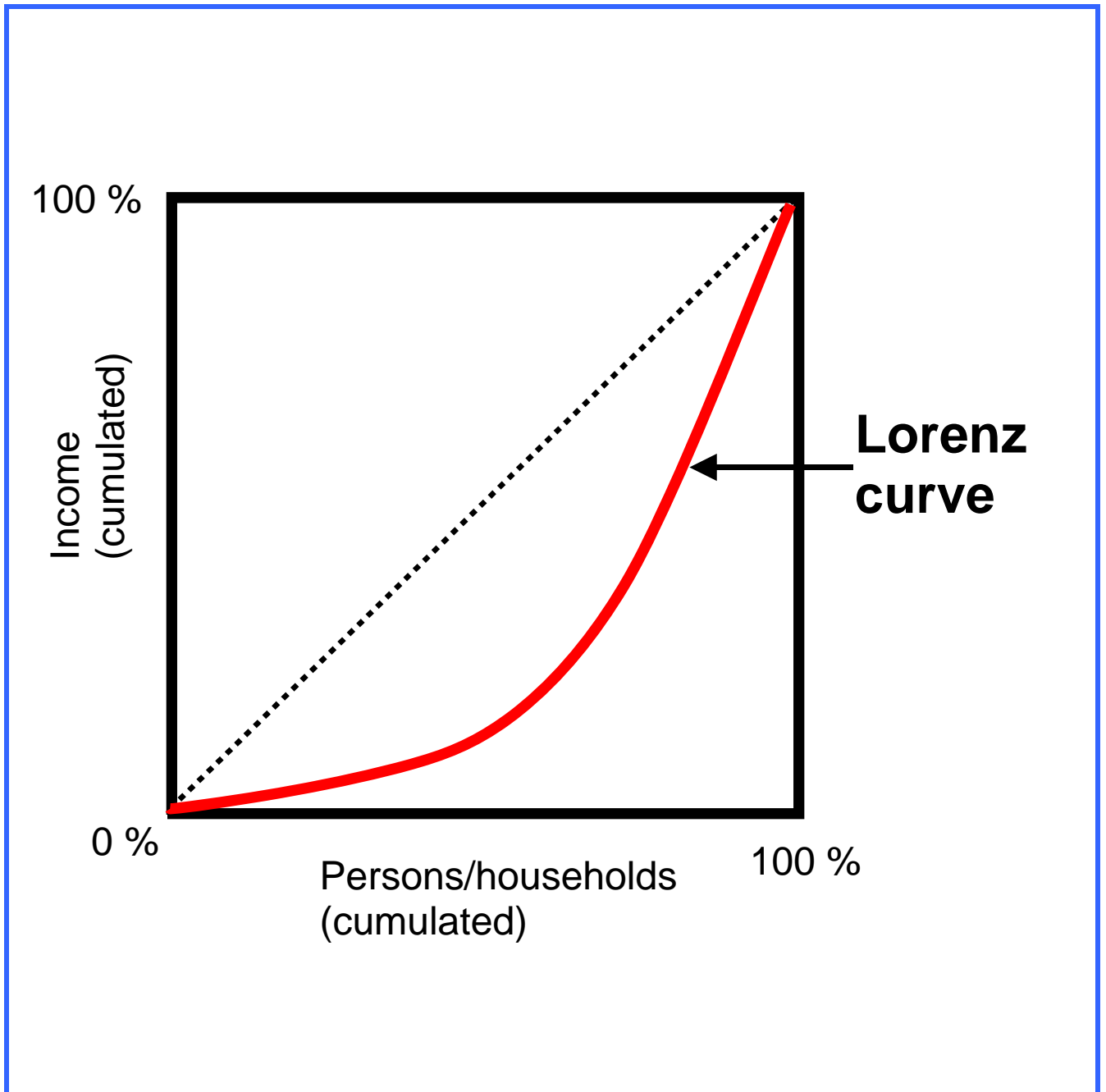


# Liquidity trap

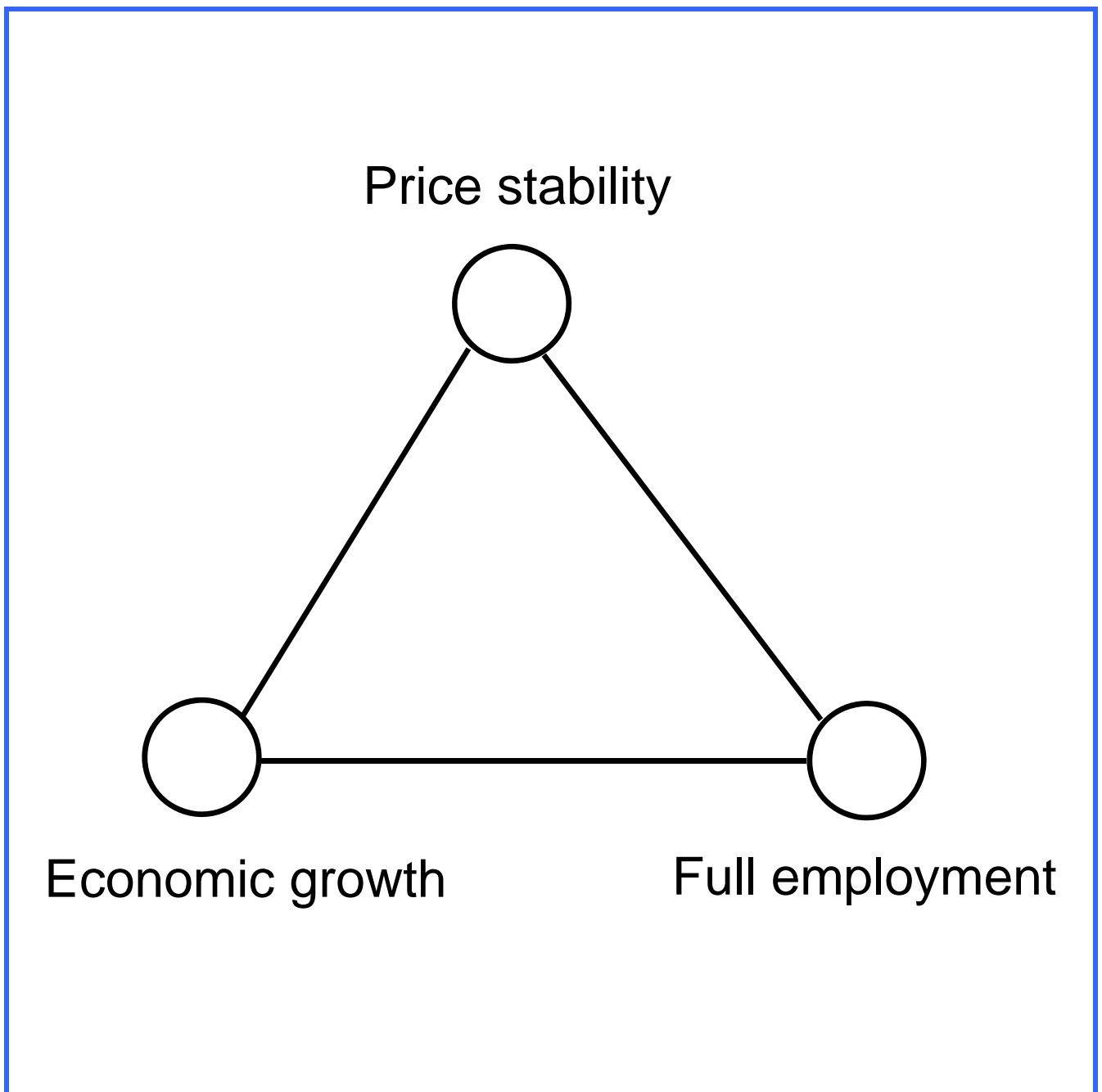


In both situations, neither the interest rates nor the corresponding investments will change.

# Lorenz curve

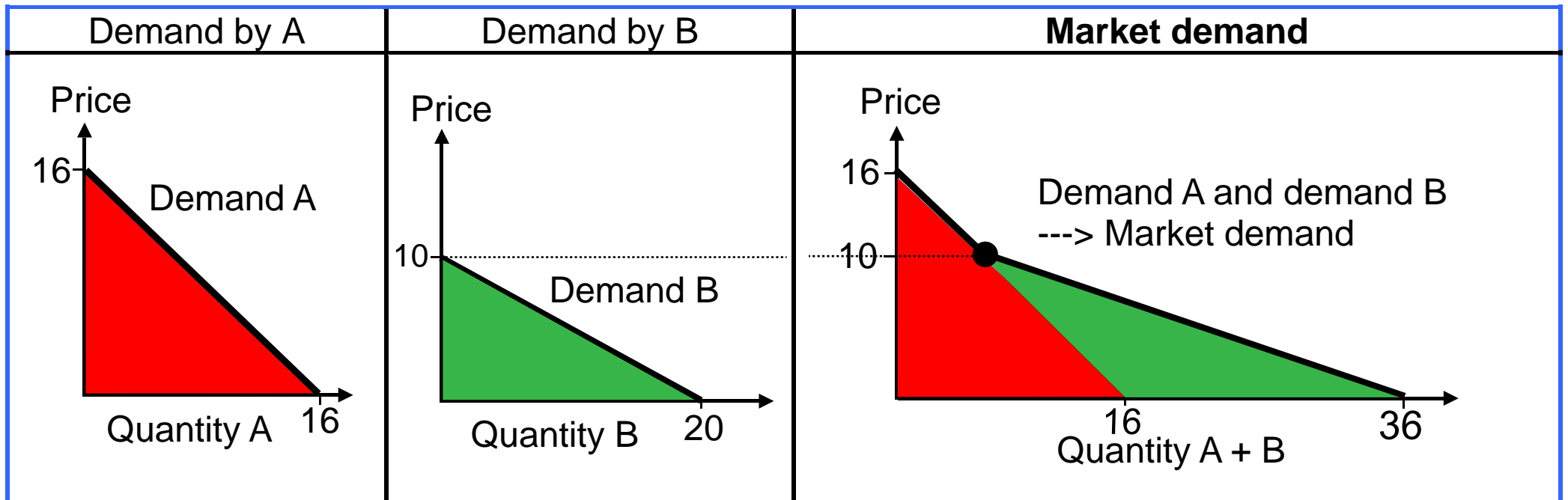


# Macroeconomic objectives



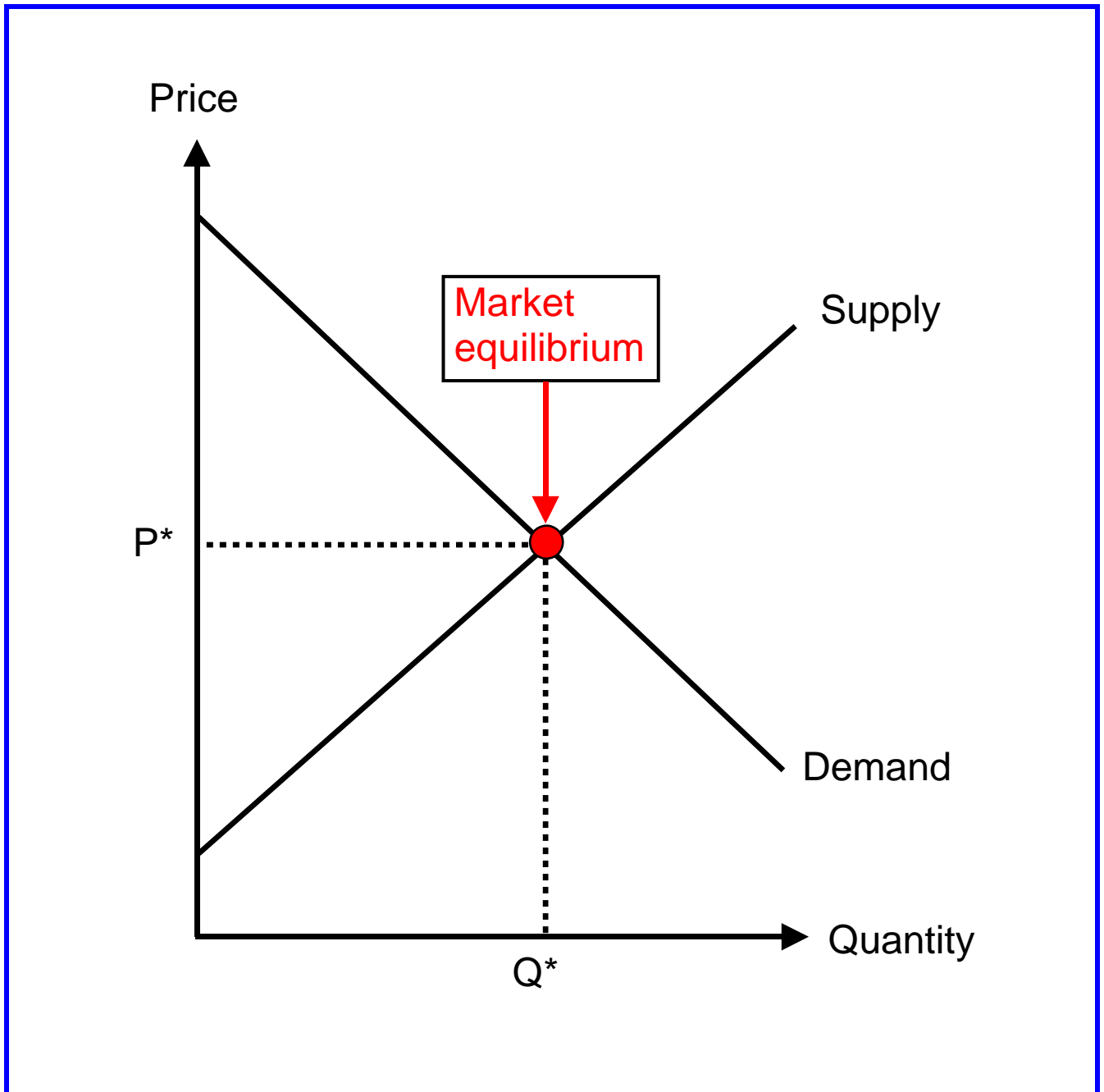
# Market demand (derivation)

A market consists of 2 consumers, A and B. The market demand is derived from the individual demand curves by adding them horizontally.



Similarly, the market supply can be derived.

# Market equilibrium

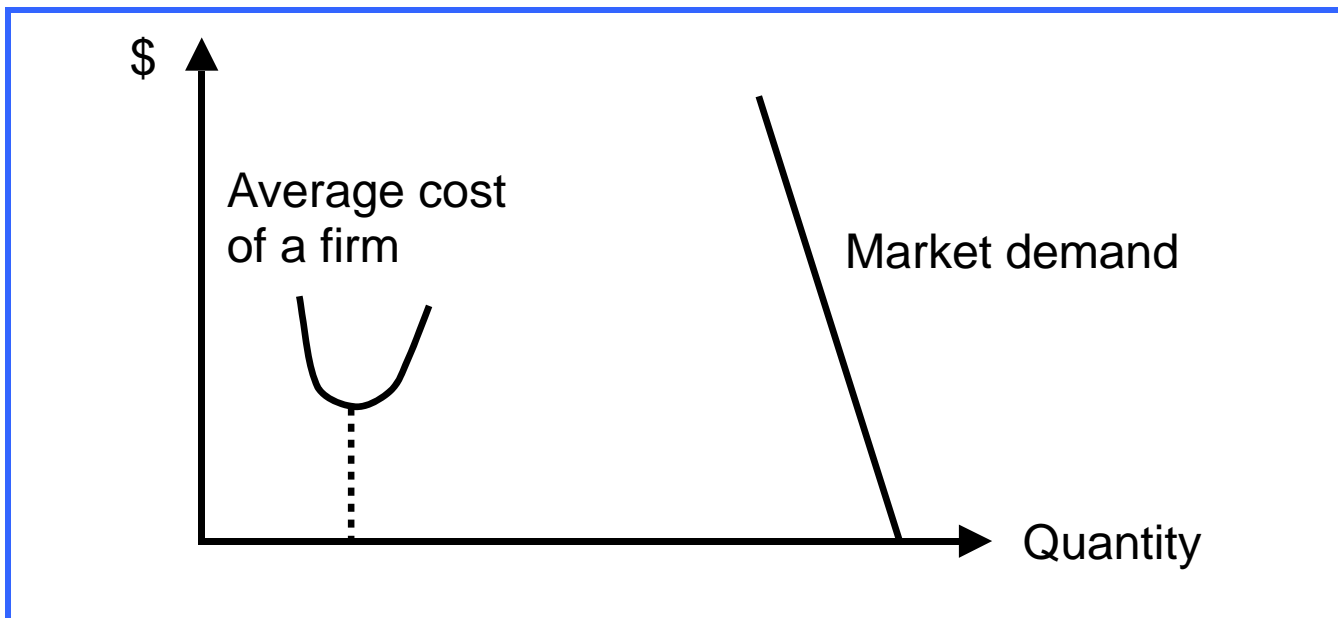


$Q^*$  = Equilibrium quantity

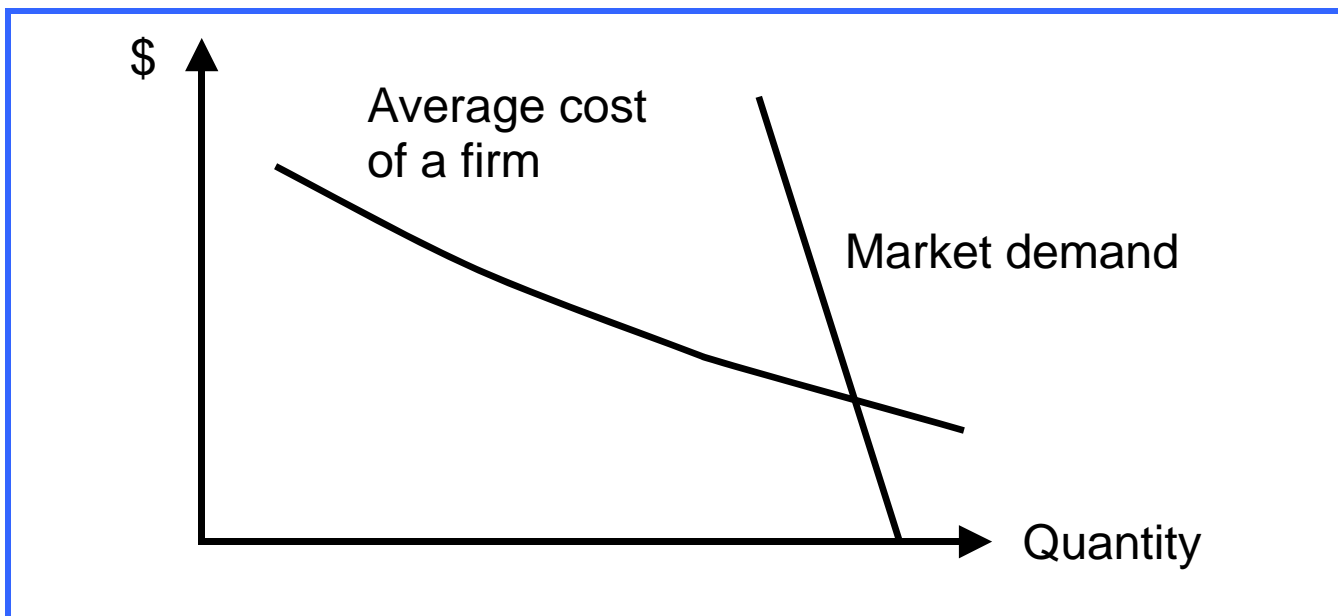
$P^*$  = Equilibrium price

# Market structure and cost

- ① **A few firms** offer the product.

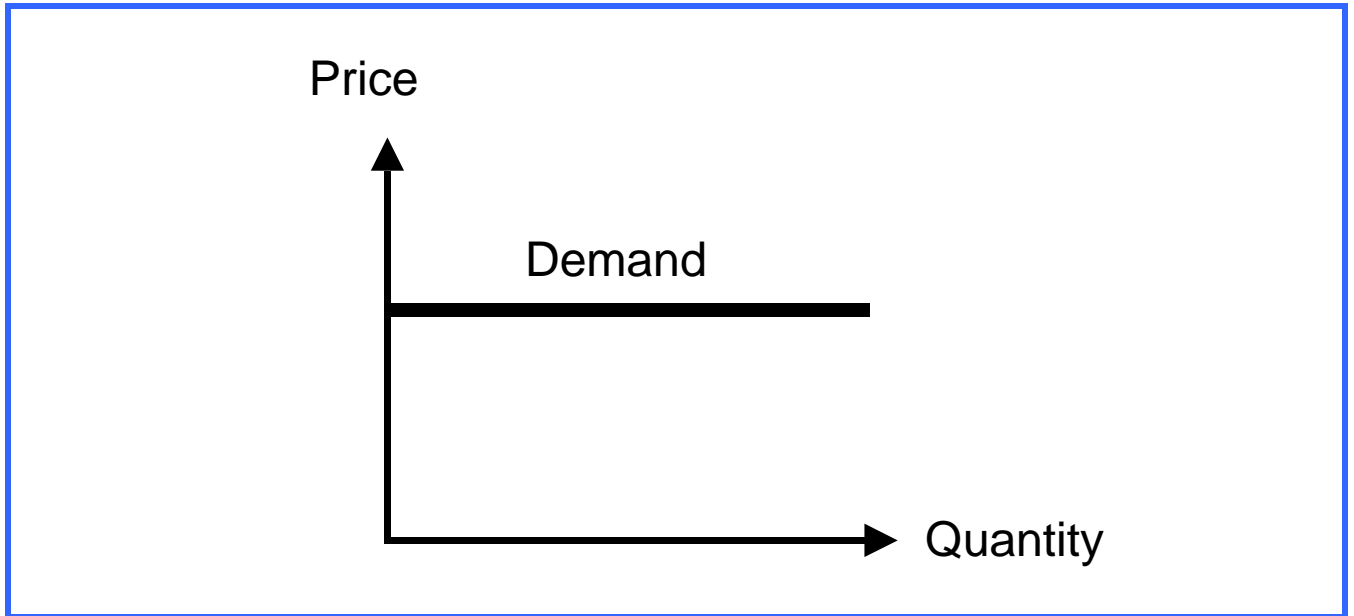


- ② **A monopoly** (as a natural monopoly) is probable.

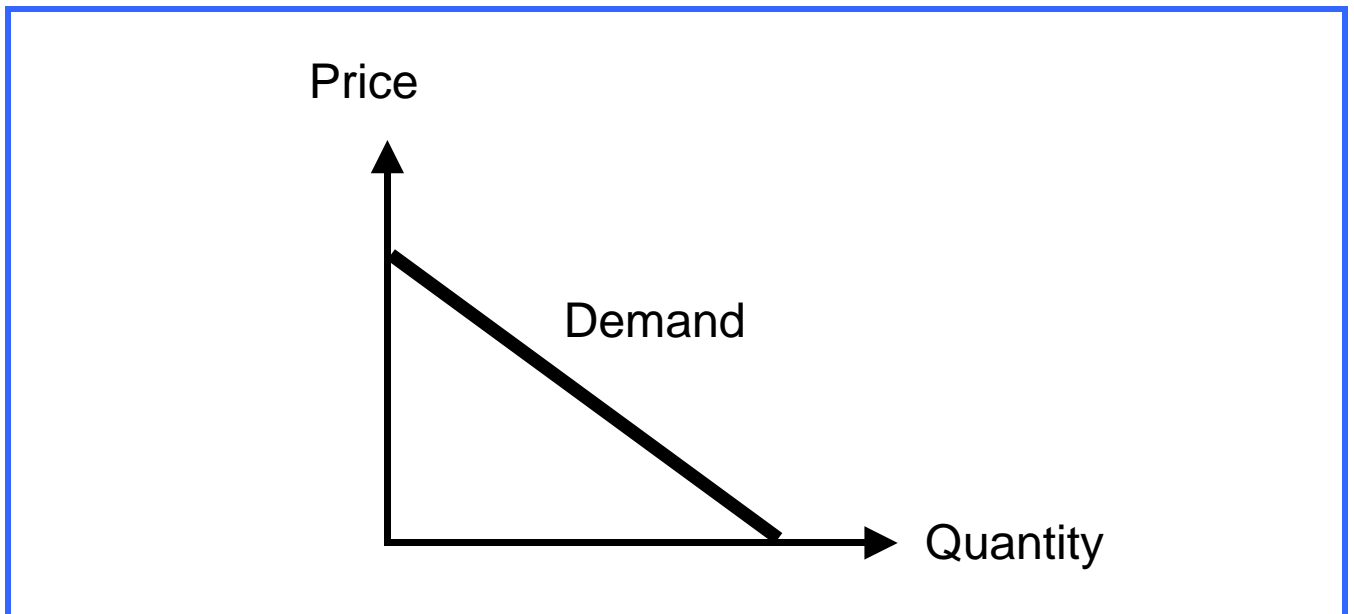


# Market structure and demand

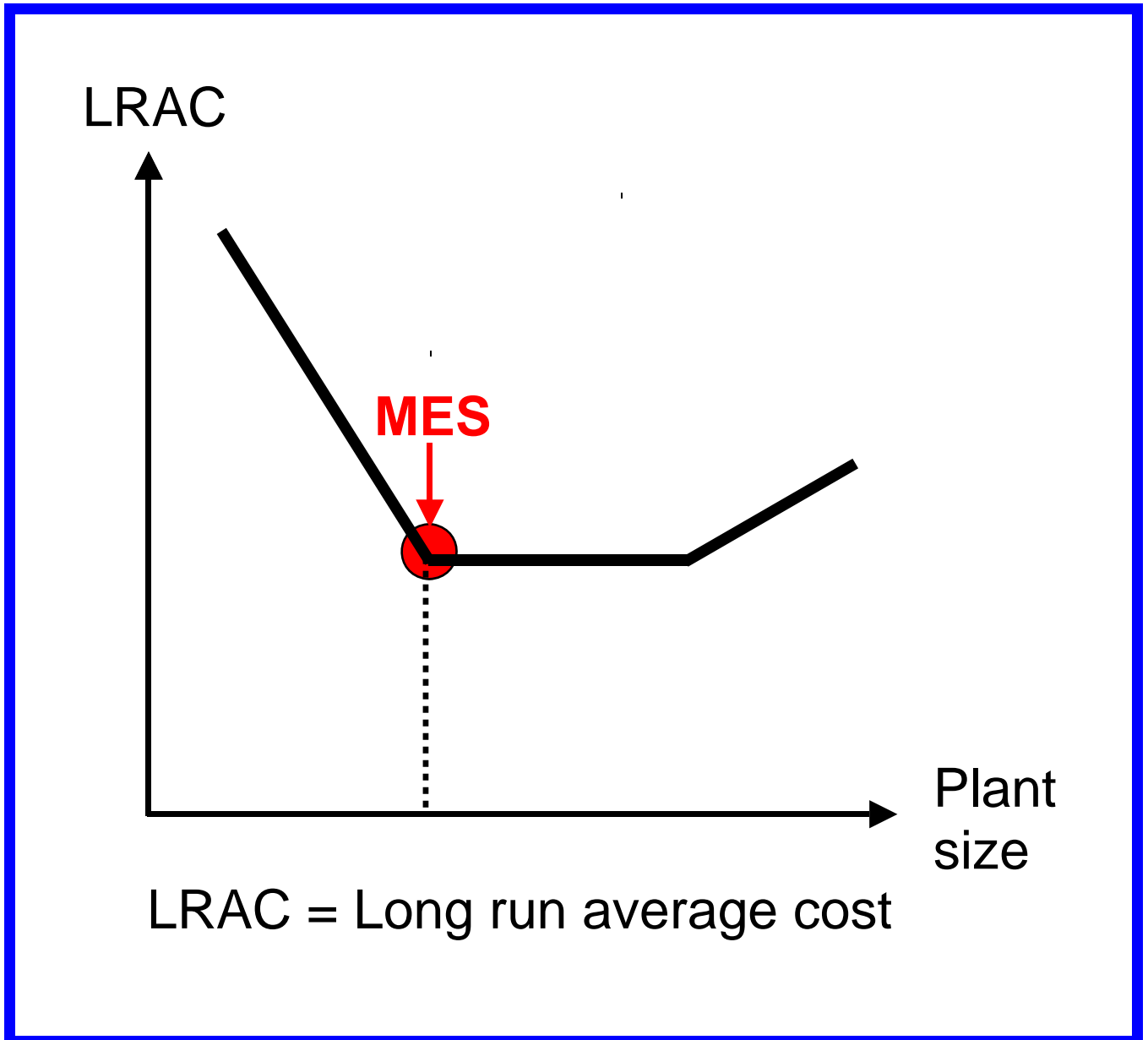
## ① Perfect competition



## ② Monopoly



# Minimum efficient scale (MES)



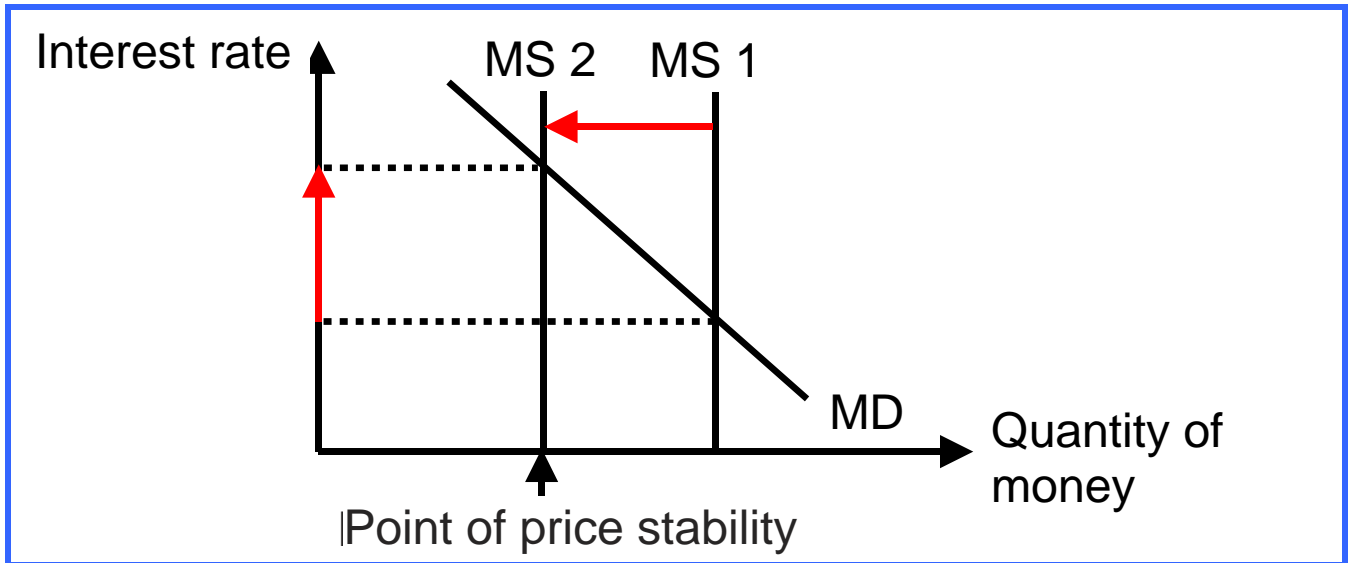
MES is the quantity of production whose further increases would not lead to lower long run average cost.



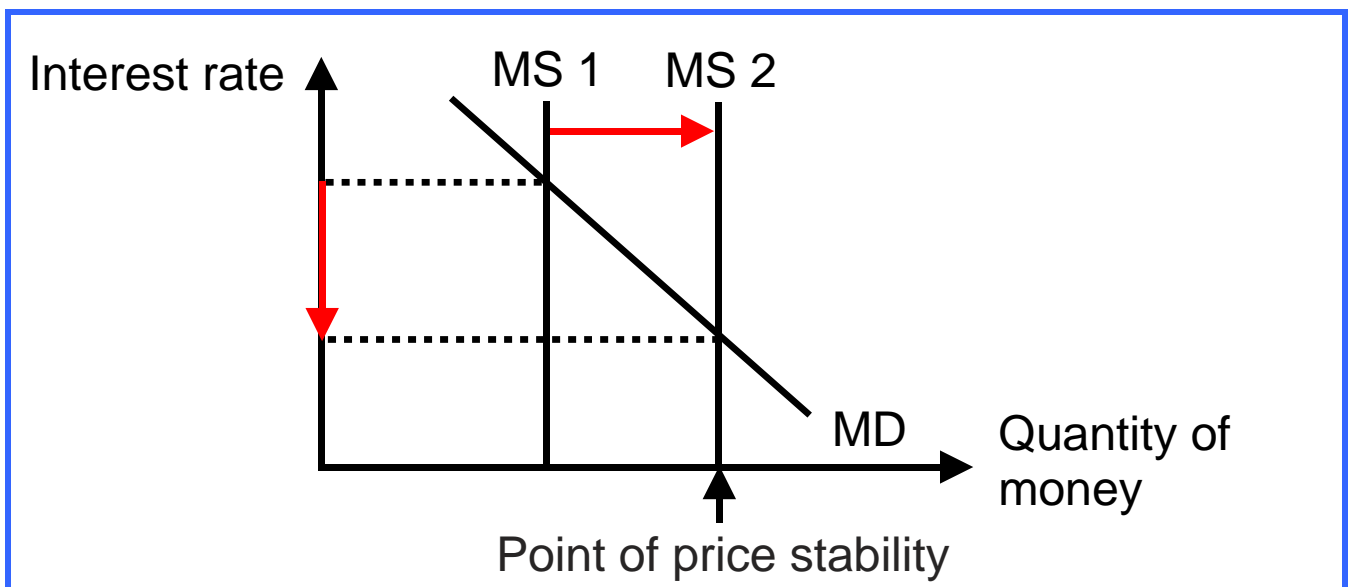
# Monetary policy

We assume that the **price stability** is the primary goal of the monetary policy.

## ① Situation of **inflation**

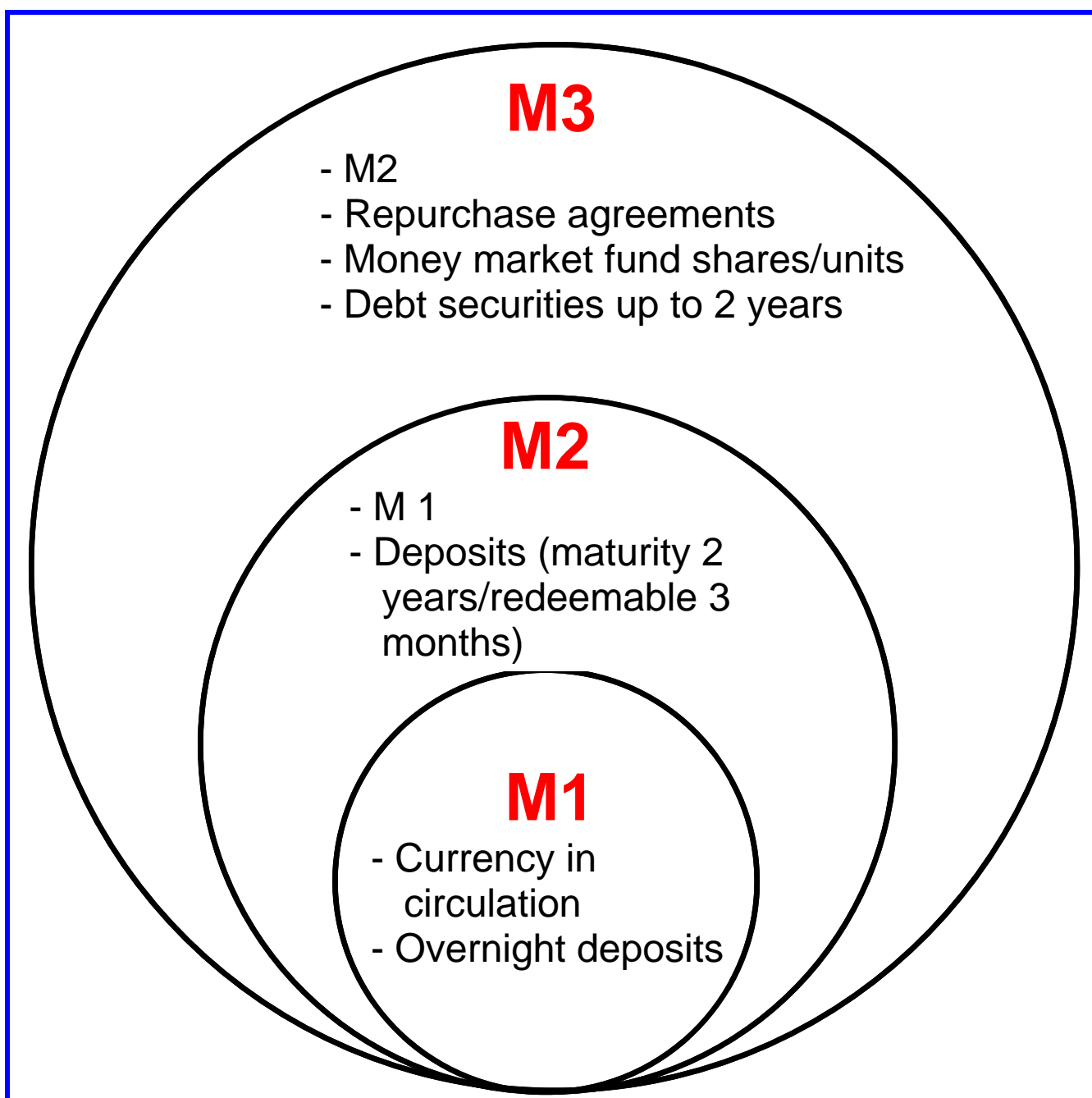


## ② Situation of **deflation**



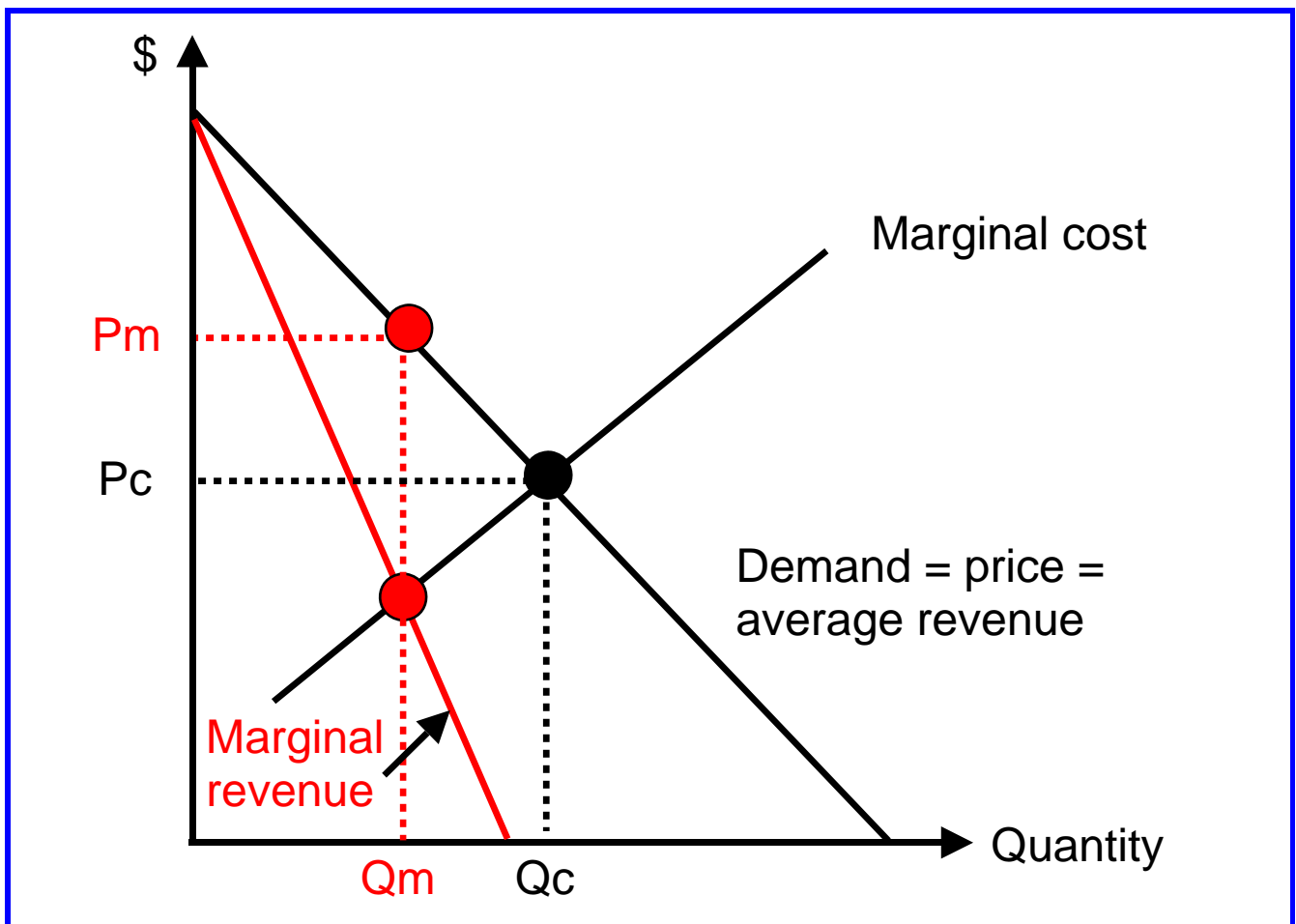
MS = Money supply  
MD = Money demand

# Monetary aggregates ECB



Source: [www.ecb.europa.eu](http://www.ecb.europa.eu) (21.1.18)

# Monopoly and perfect competition - a comparison



$P_m / P_c = \text{Price monopoly} / \text{Price perfect competition}$

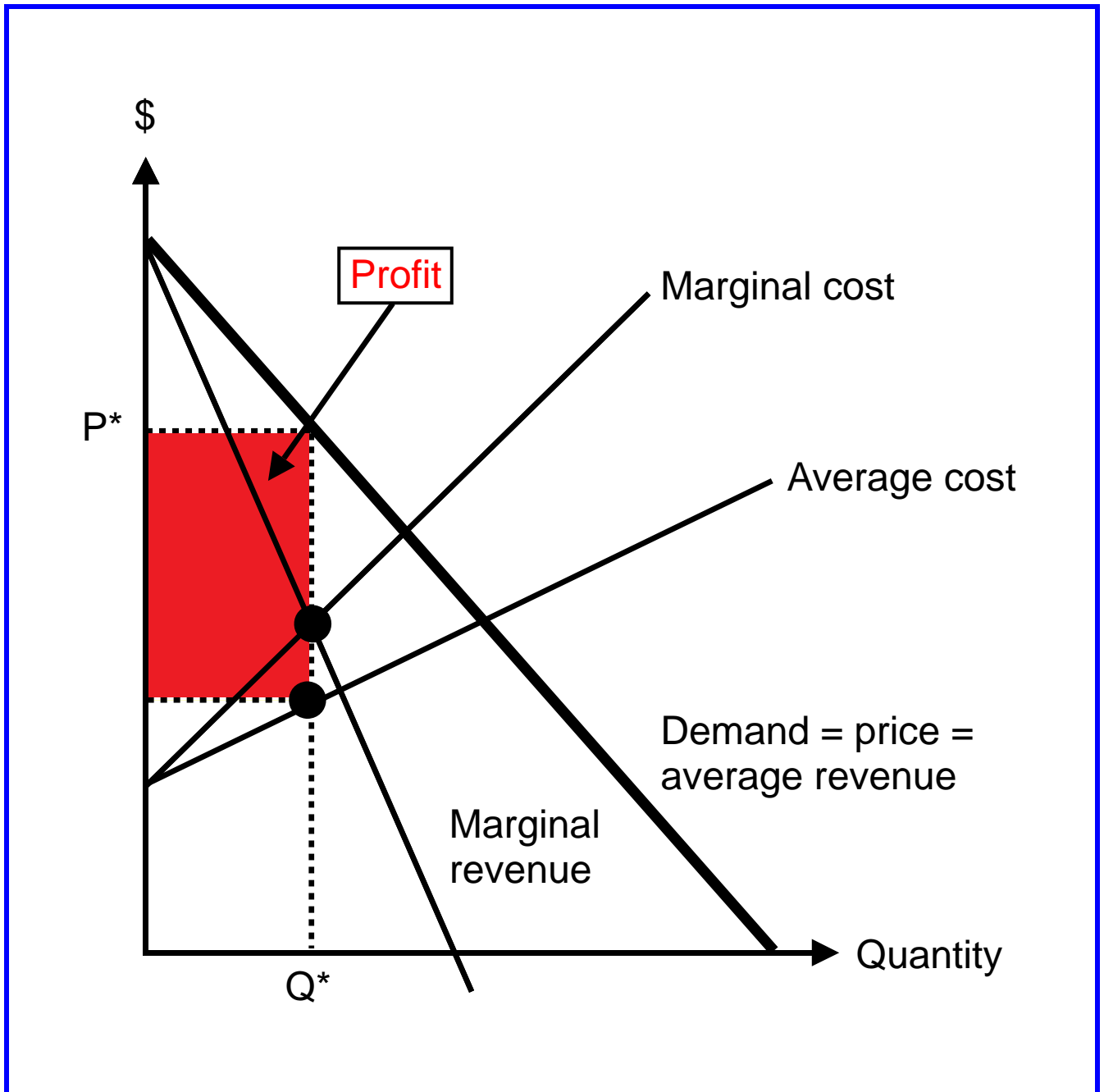
$Q_m / Q_c = \text{Quantity monopoly} / \text{Quantity perfect competition}$

- The monopoly is choosing the following point:  
MR = MC; but price > MC
- The firm in the competitive market is choosing the following point:  
Price\* = MC (\* equally MR = MC, since price = MR)
- Result: The monopoly is choosing a higher price and a smaller quantity than the firm in the competitive market.

MC = Marginal cost

MR = Marginal revenue

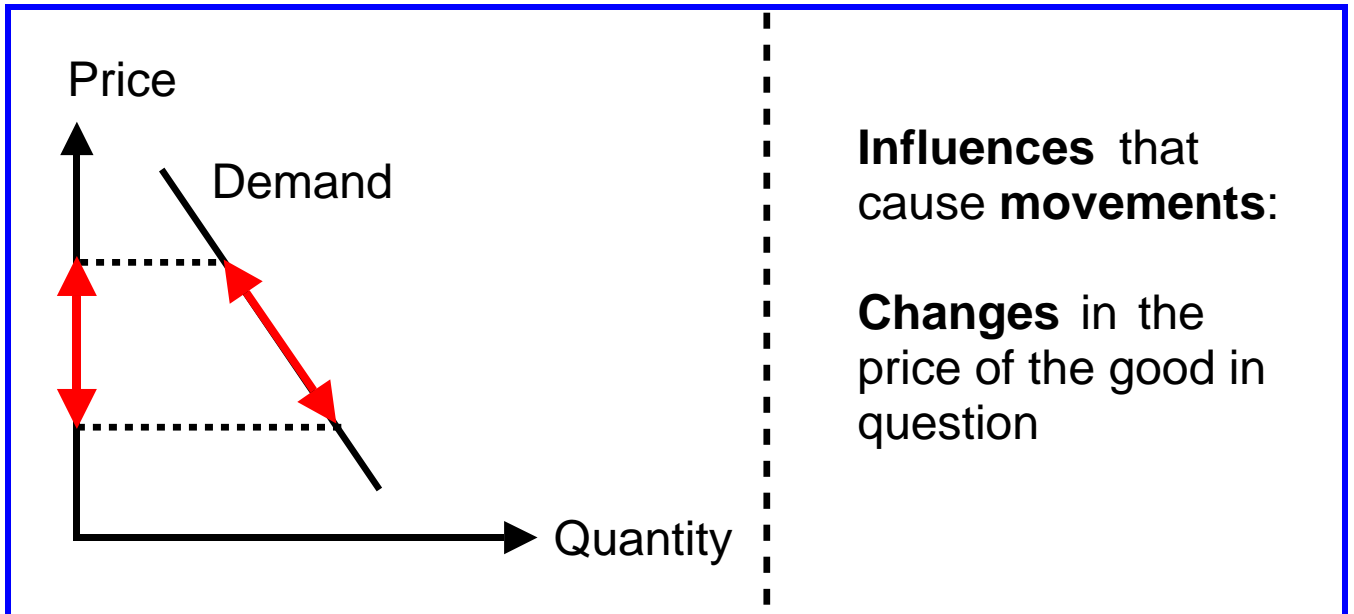
# Monopoly



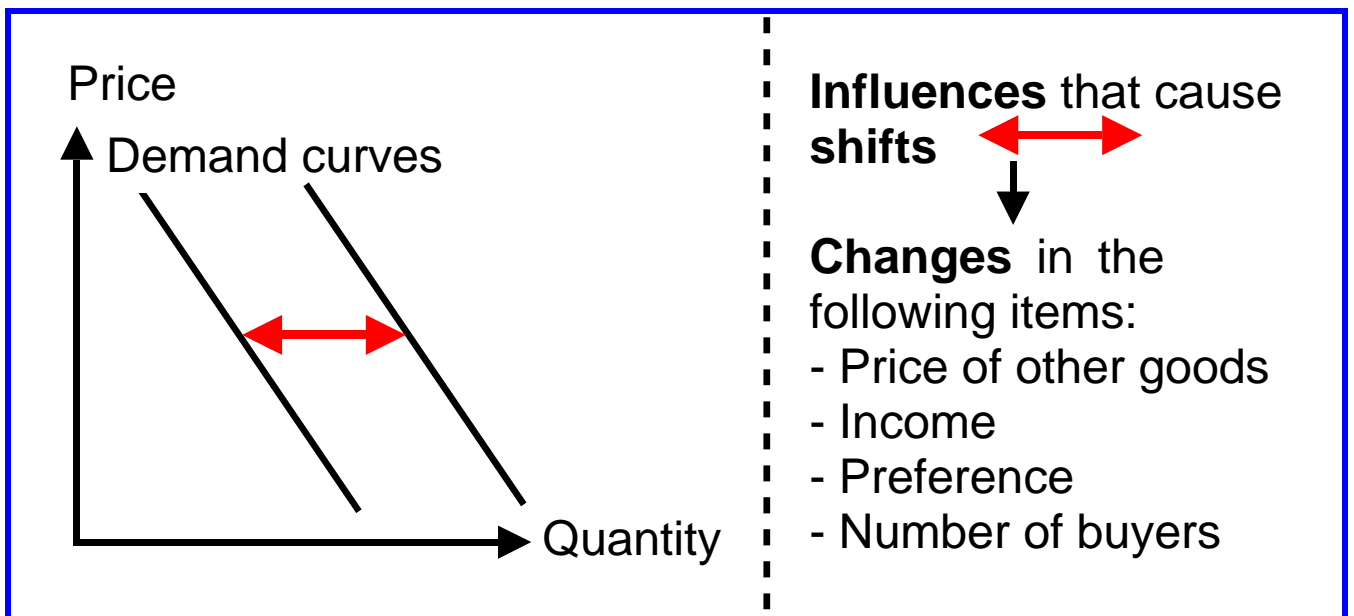
$Q^*$  = Quantity, supplied by the monopoly  
 $P^*$  = Price, charged by the monopoly

# Movements and shifts - demand

## ① **Movements** along the demand curve

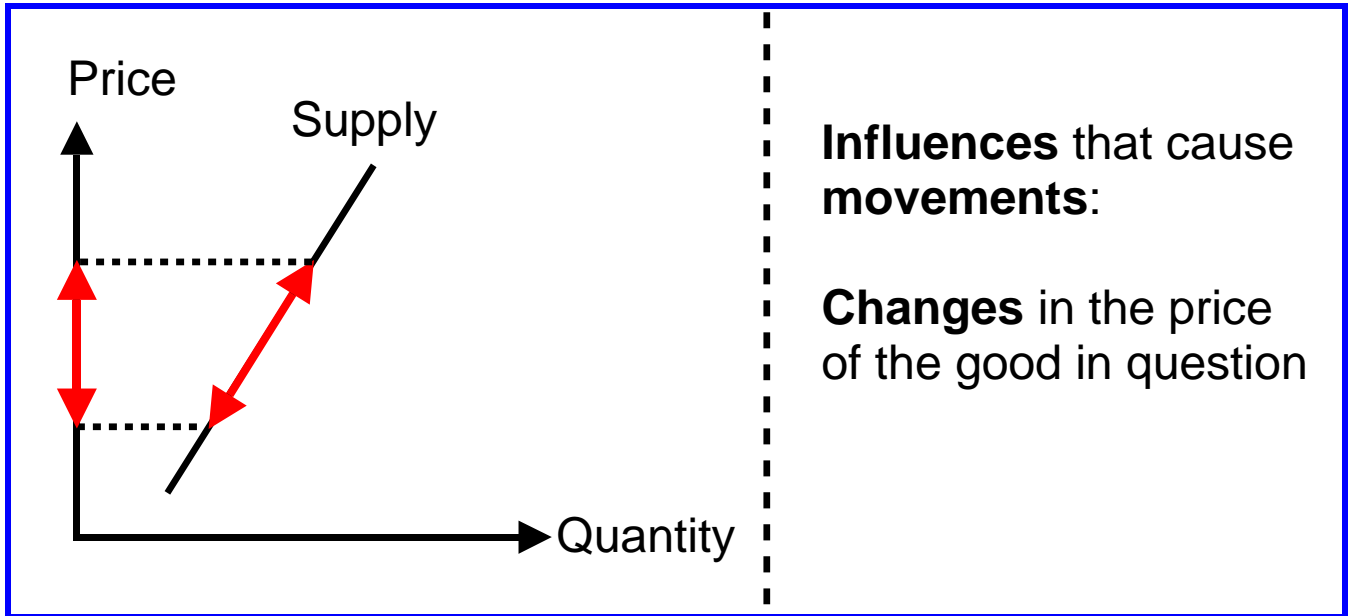


## ② **Shifts** of the demand curve

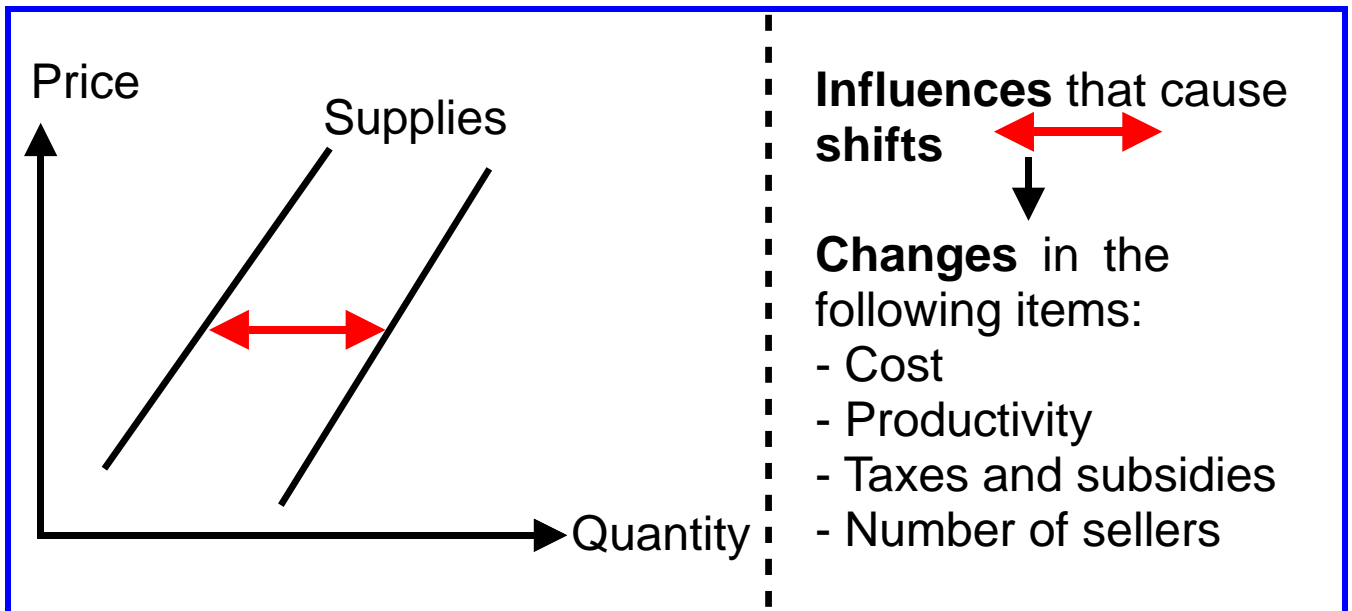


# Movements and shifts - supply

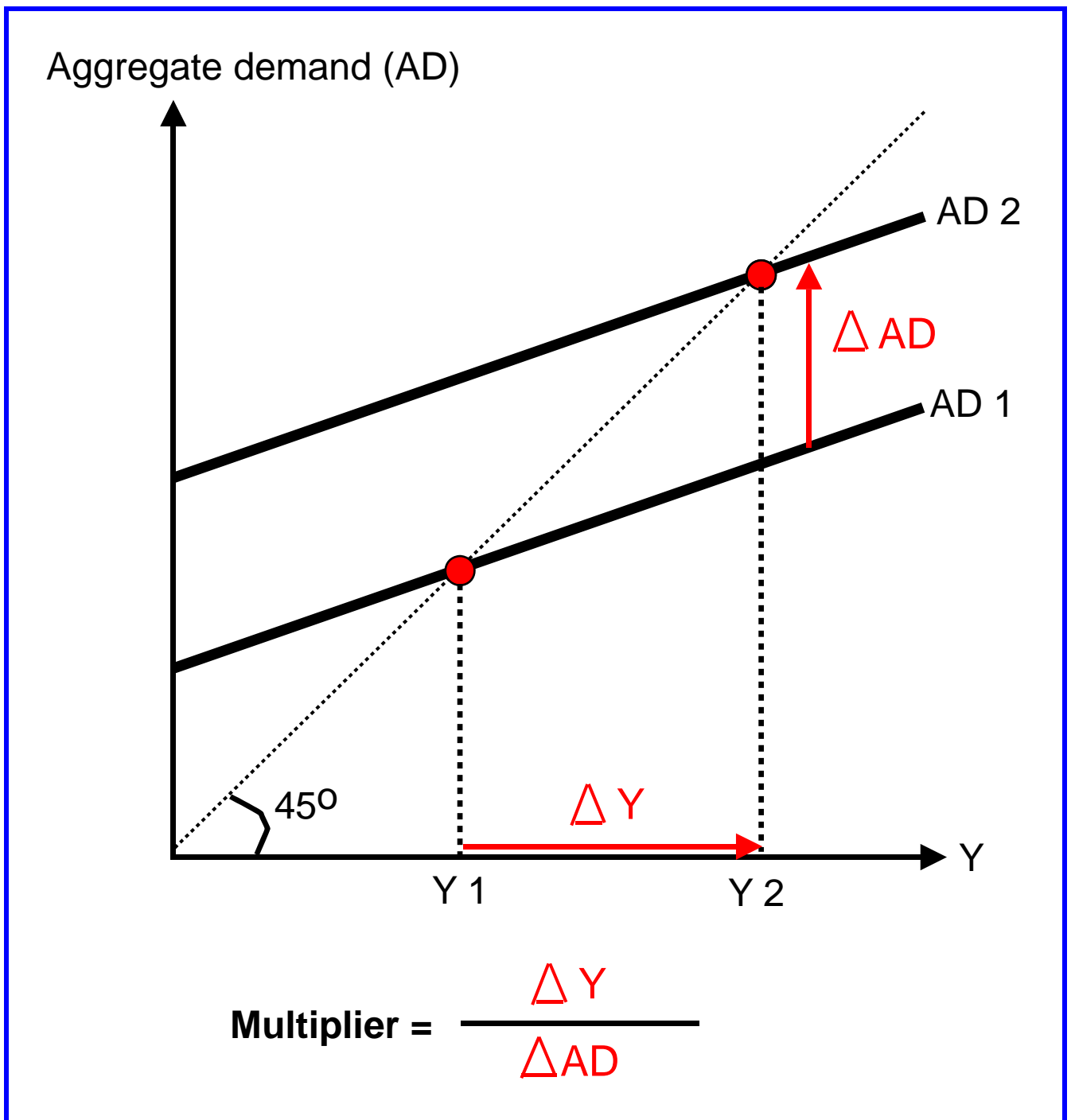
## ① **Movements** along the supply curve



## ② **Shifts** of the supply curve



# Multiplier

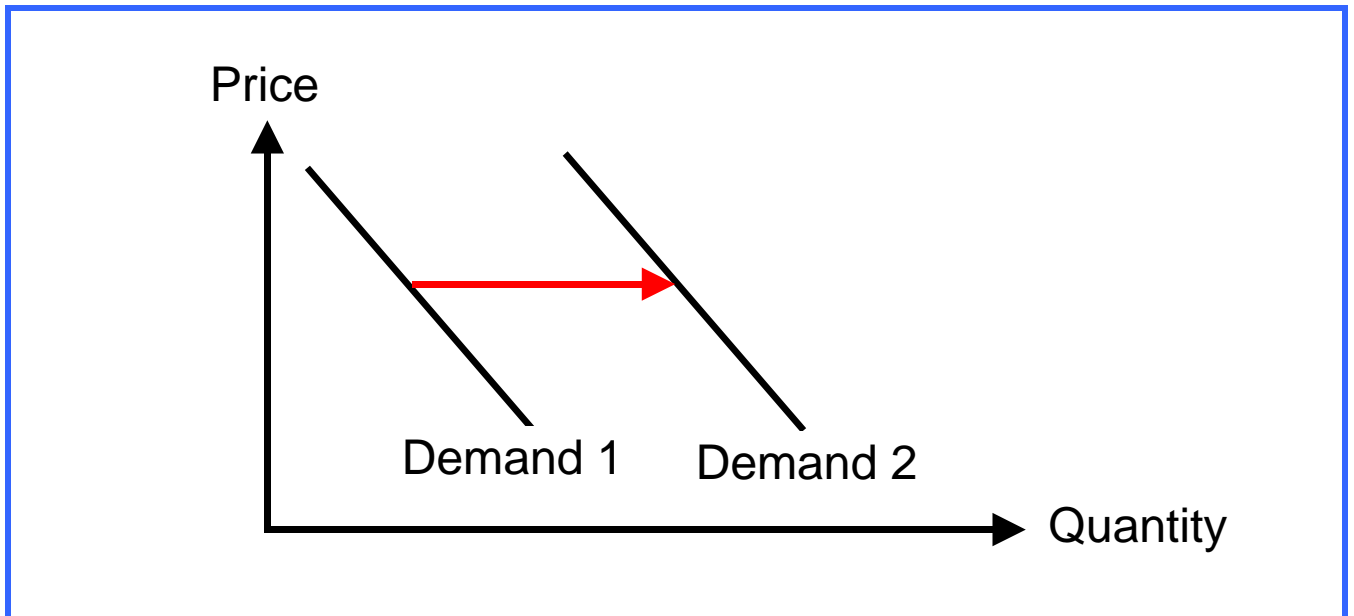


Y = Output, income

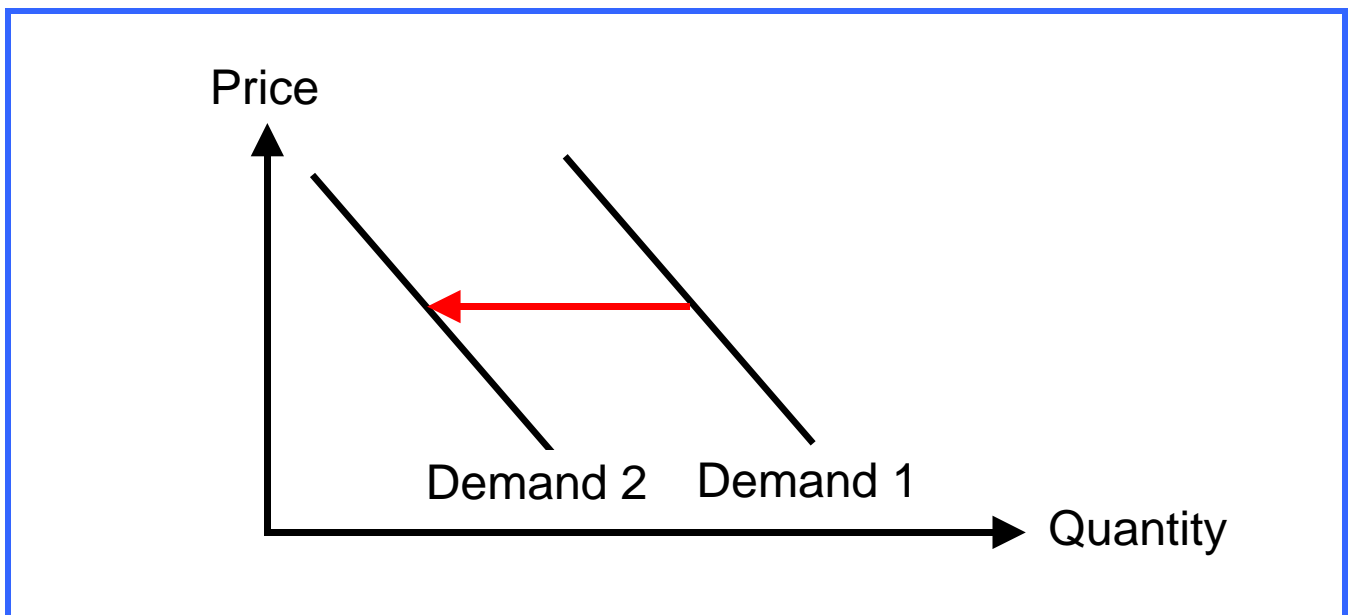
# Normal good

What happens to a normal good if ...

① **income rises;**

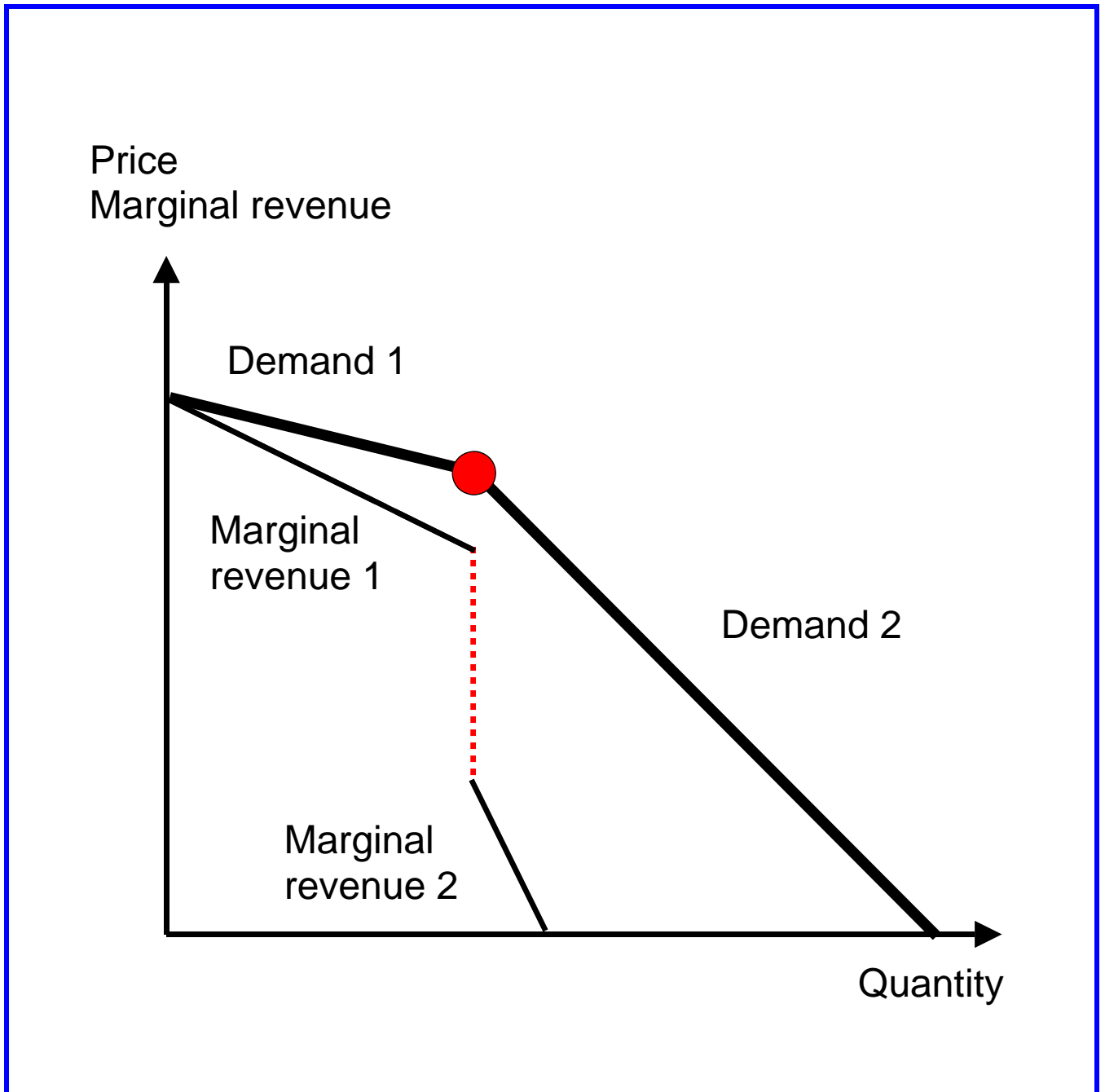


② **income falls?**

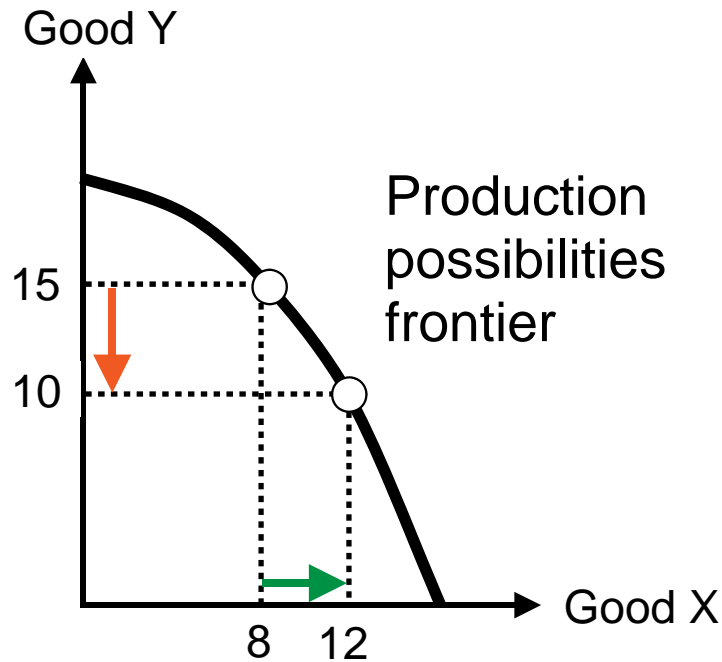




# Oligopoly - kinked demand curve

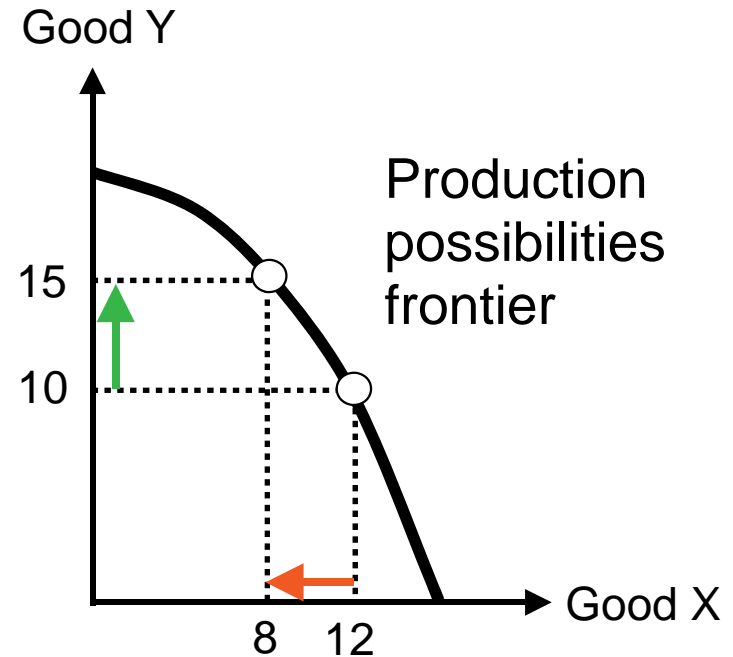


# Opportunity cost (in the case of 2 goods)



$$OC_x = \frac{\text{Loss of Y}}{\text{Gain of X}} = \frac{5}{4} = 1.25$$

$OC_x$  = Opportunity cost of the production X

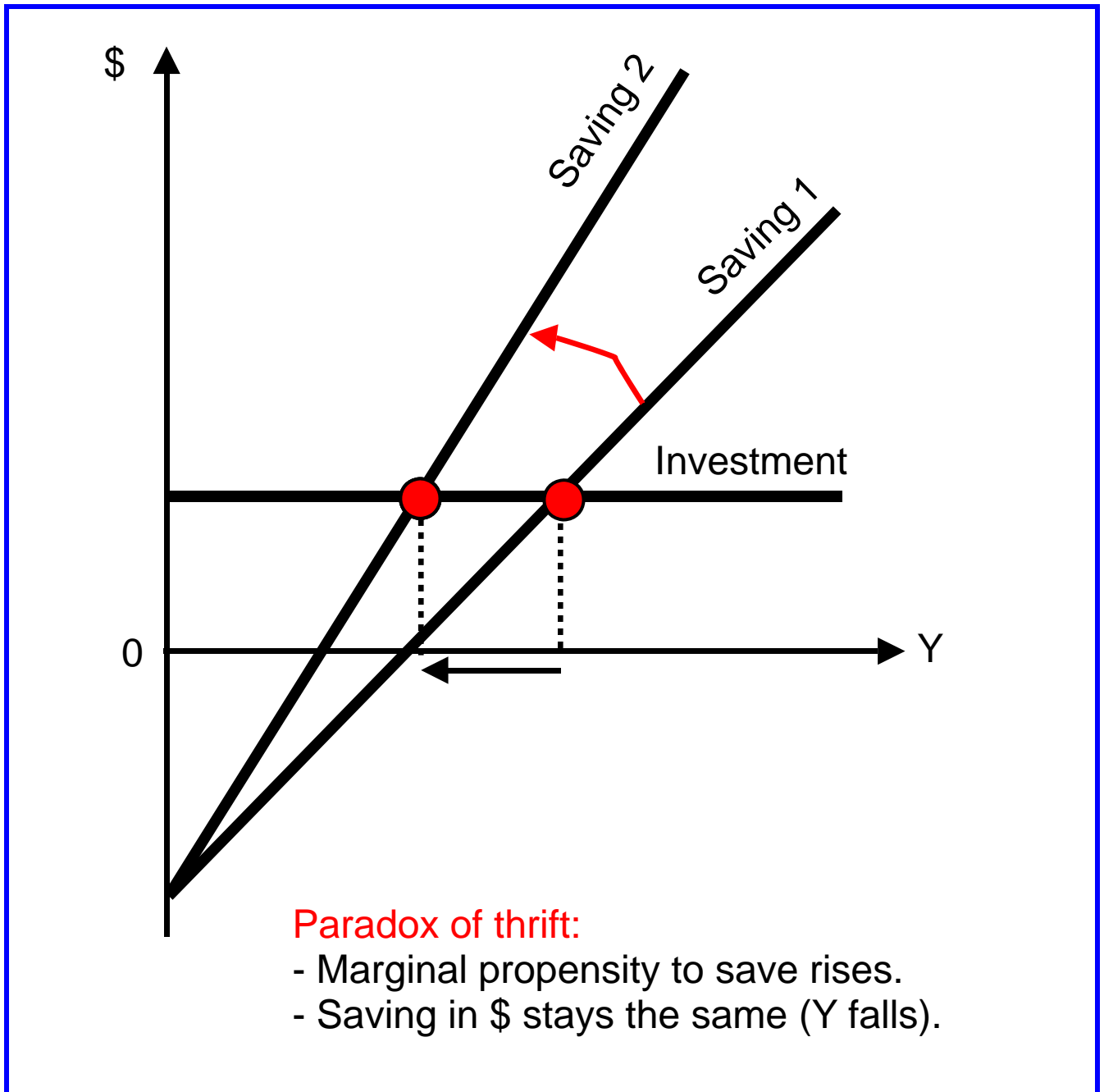


$$OC_y = \frac{\text{Loss of X}}{\text{Gain of Y}} = \frac{4}{5} = 0.8$$

( $OC_y = 1/OC_x = 1/1.25 = 0.8$ )

$OC_y$  = Opportunity cost of the production Y

# Paradox of thrift

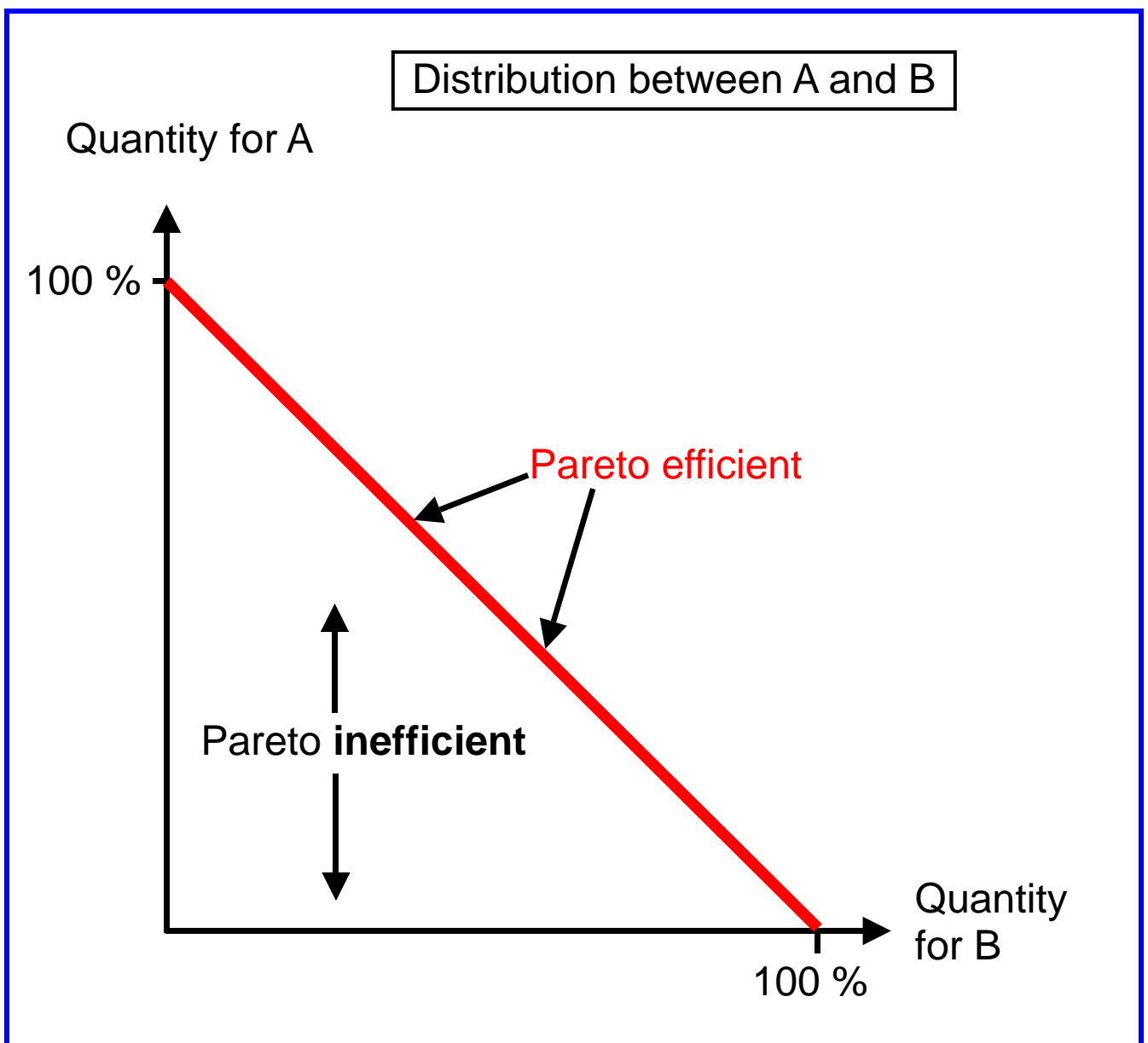


Y = Output, income

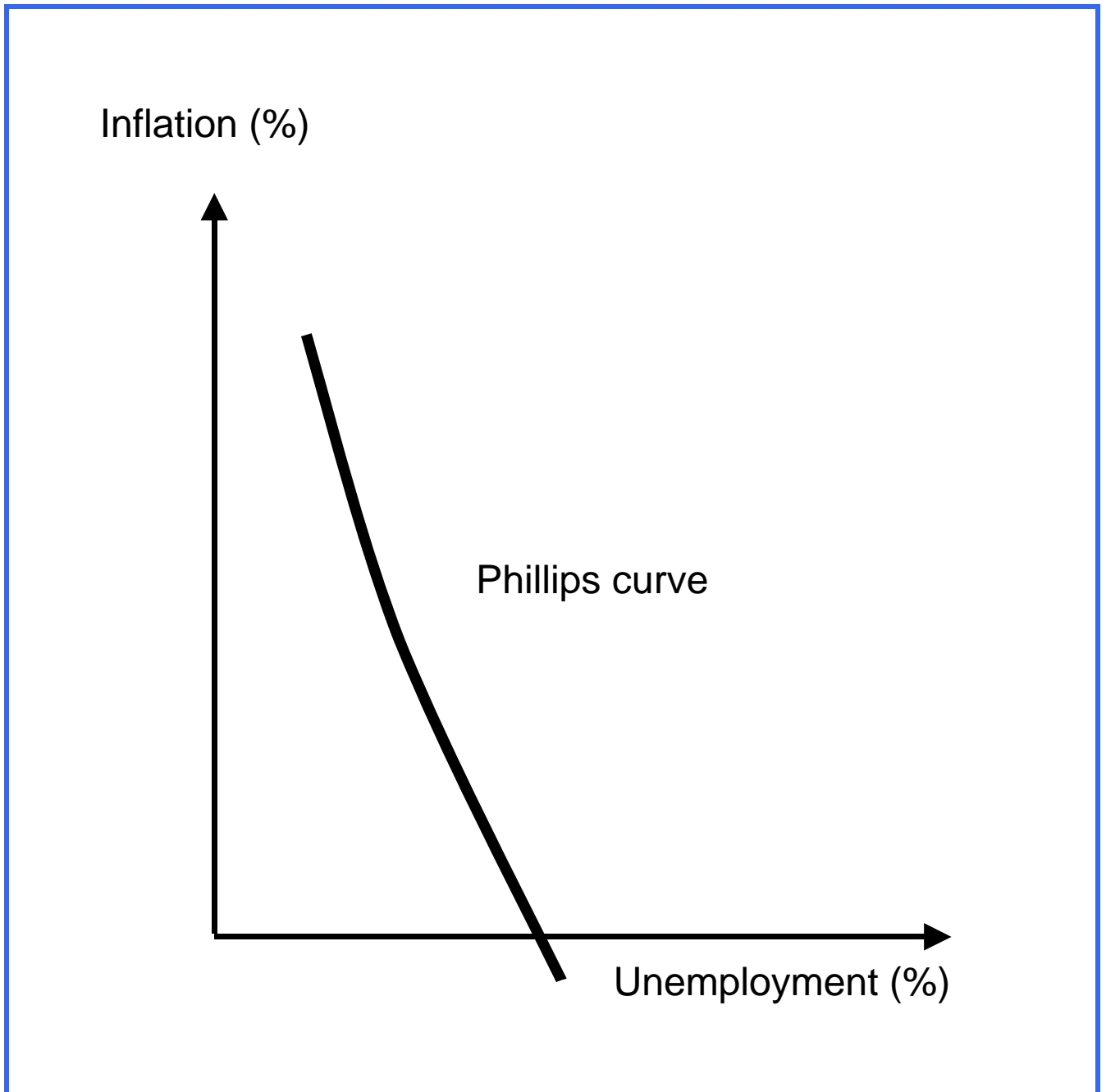
# Pareto efficiency

Introduction:

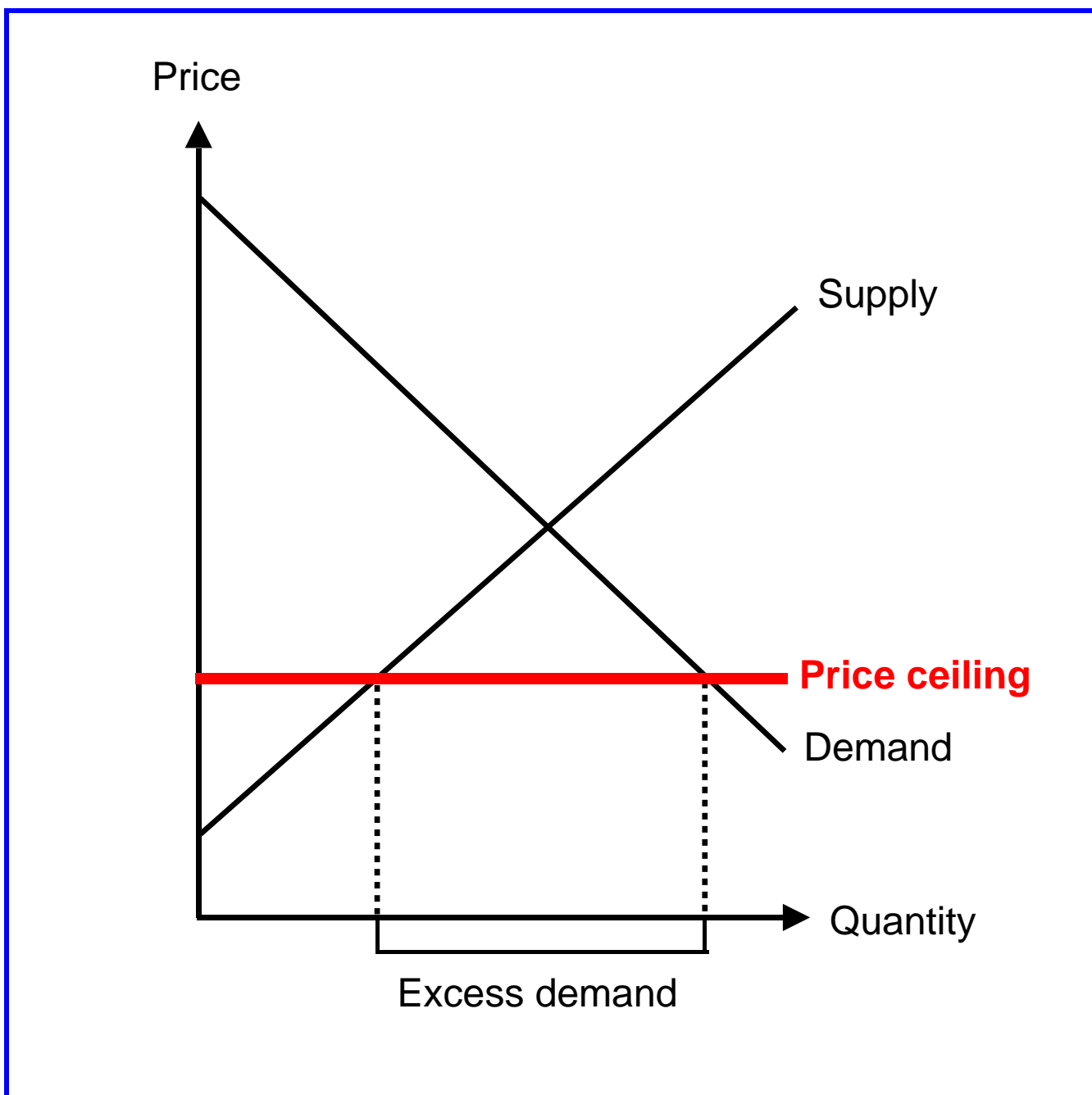
- 2 persons (A and B), distribution of 1 divisible good
- Which possibilities of distribution between A and B are feasible, irrespective of utility and income? What can be said about Pareto efficiency?



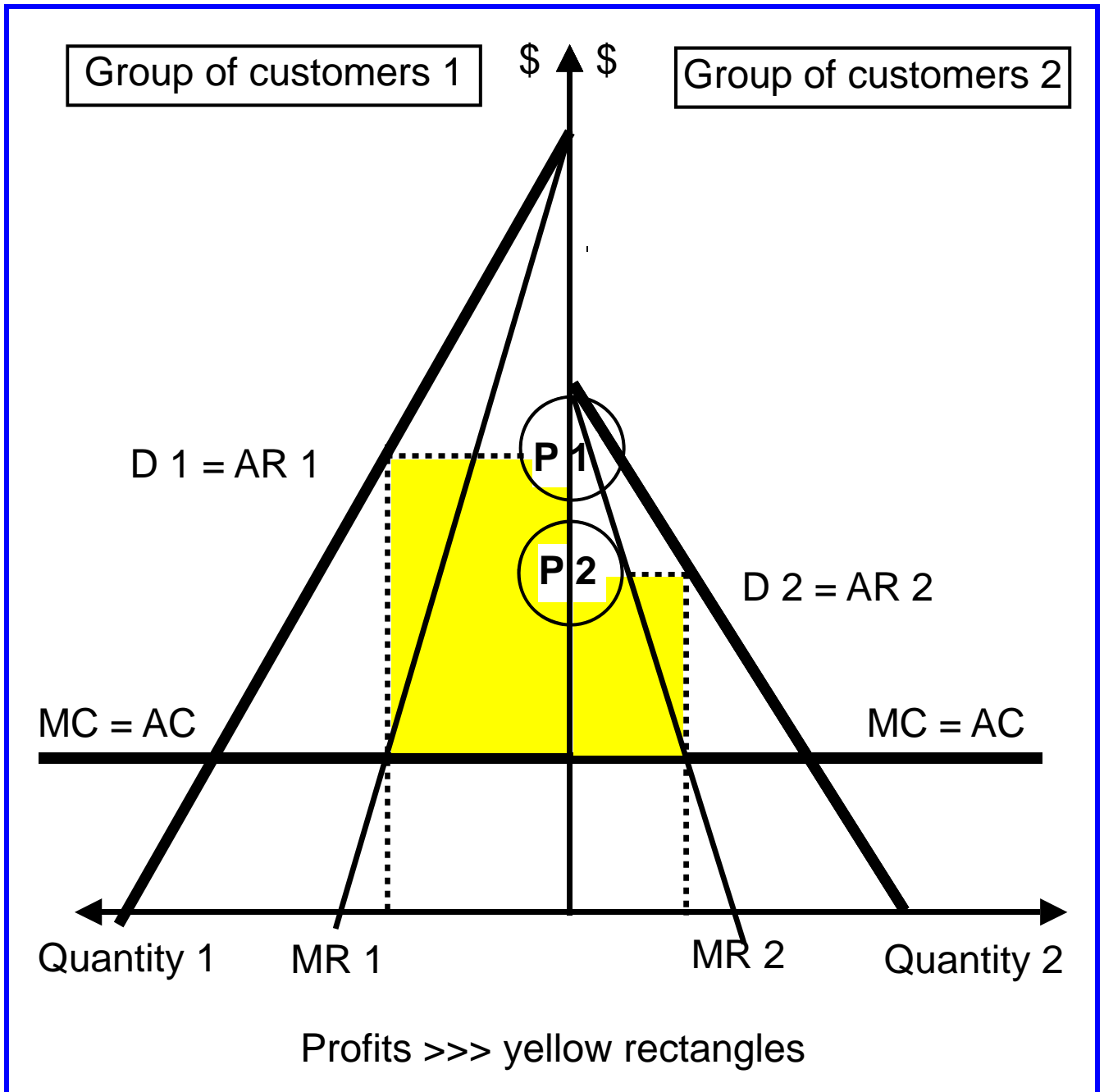
# Phillips curve



# Price ceiling (maximum price)

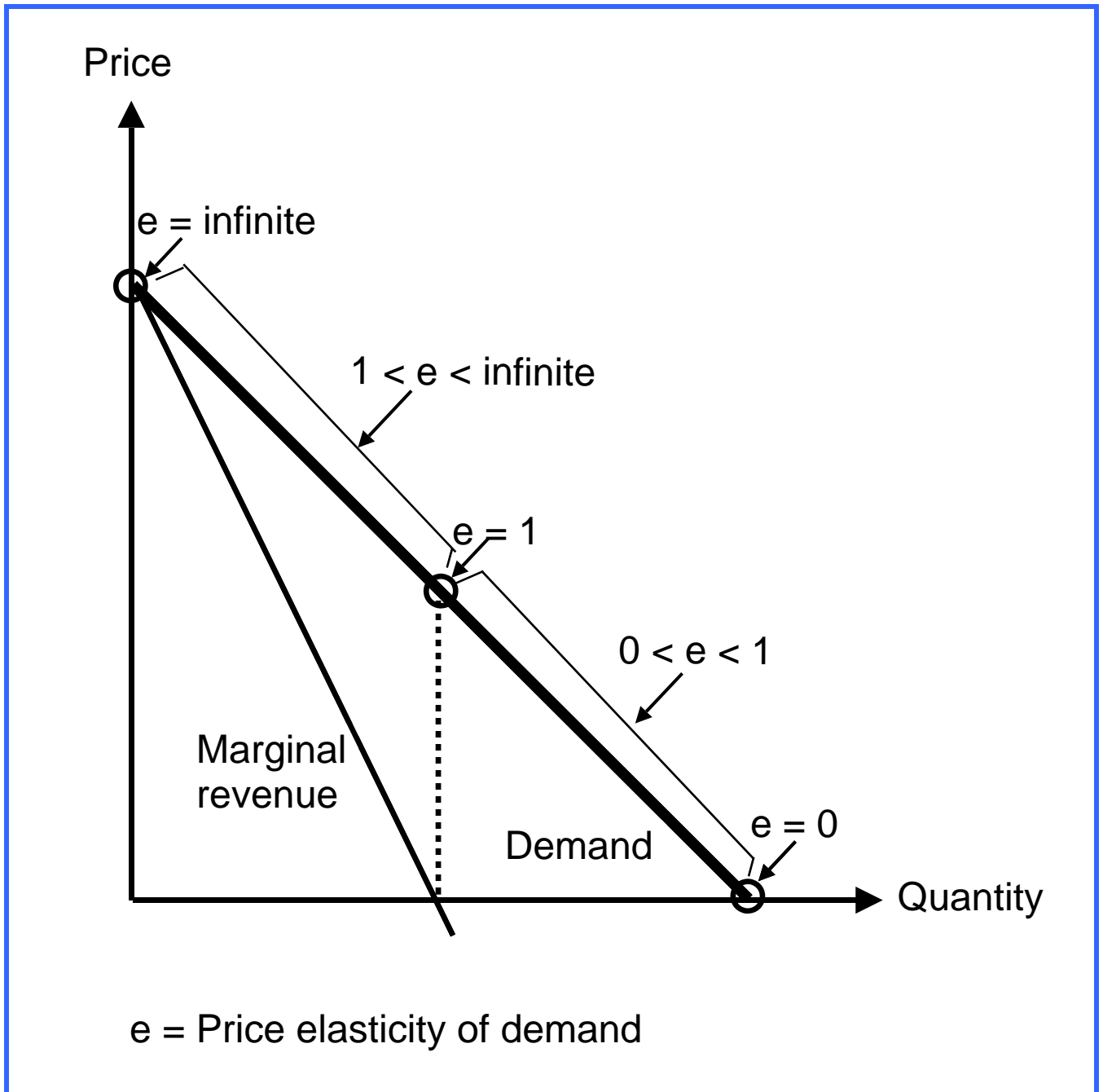


# Price discrimination



|                      |                       |
|----------------------|-----------------------|
| D = Demand           | AC = Average cost     |
| P = Price            | MR = Marginal revenue |
| AR = Average revenue | MC = Marginal cost    |

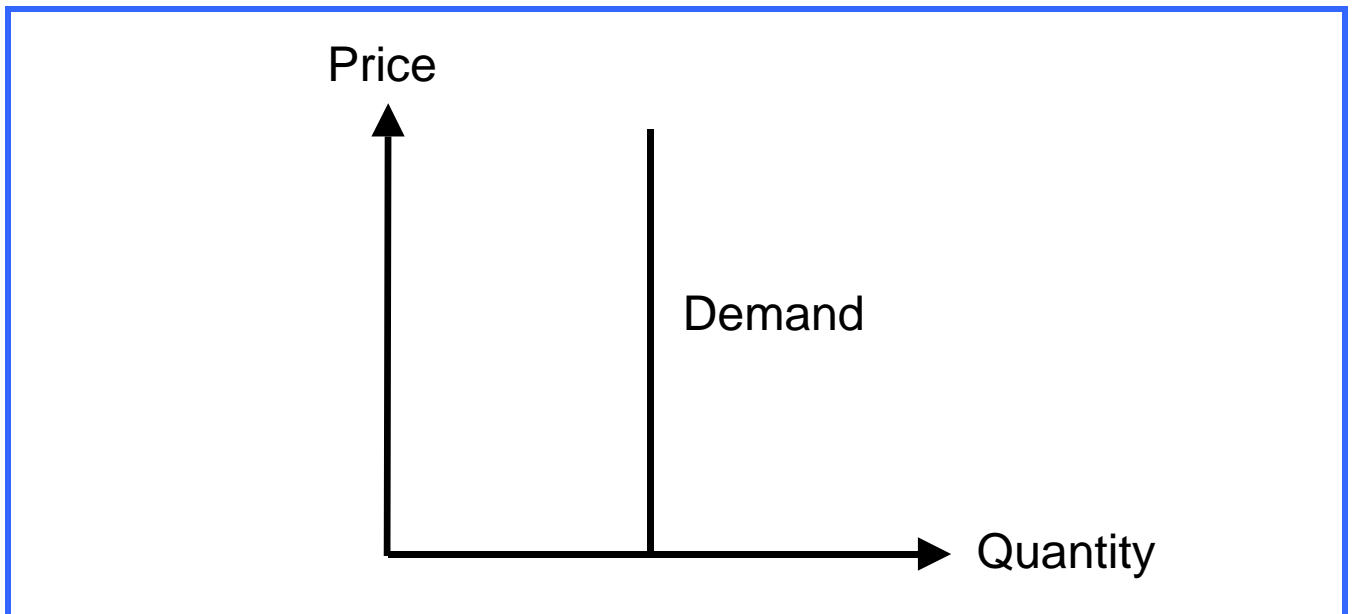
# Price elasticity of demand 1 - linear demand



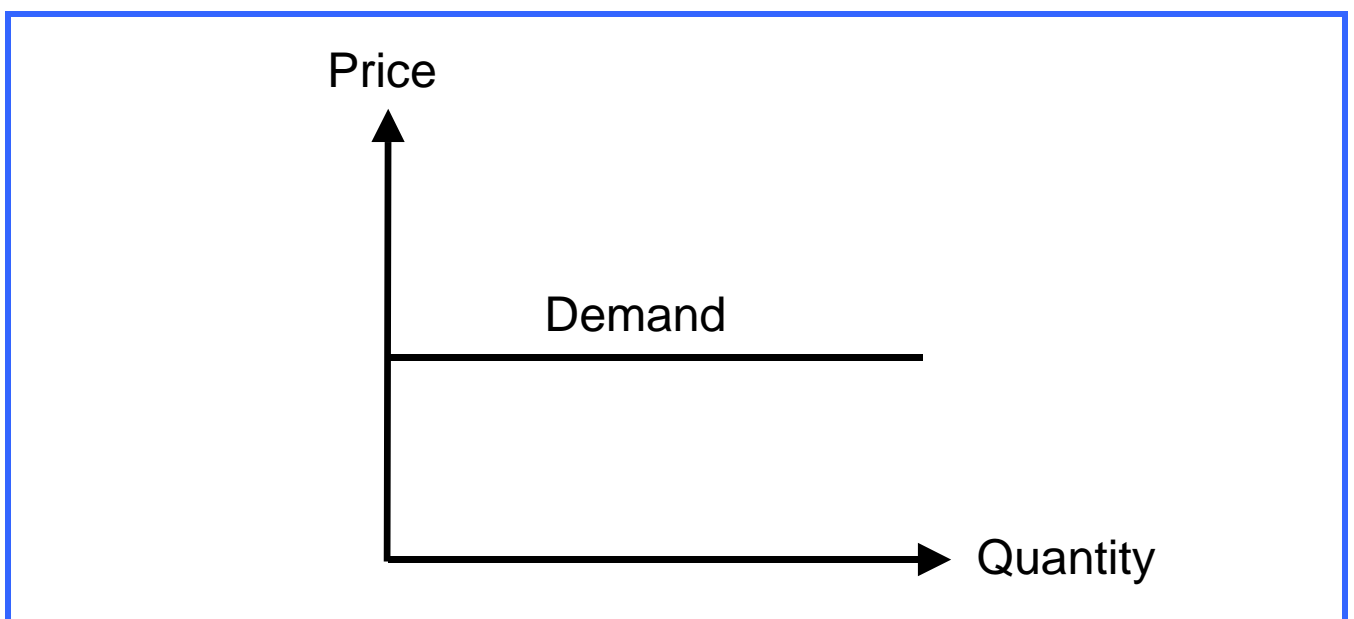


# Price elasticity of demand 2 - extreme cases

## ① Price elasticity of demand = 0

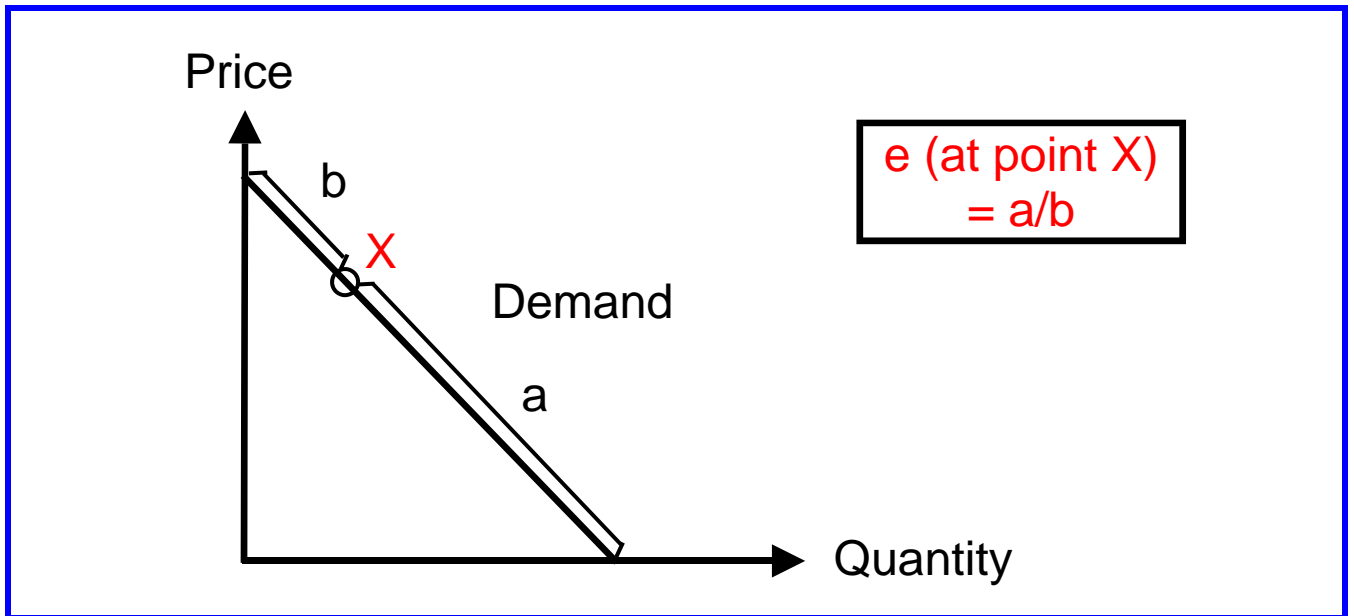


## ② Price elasticity of demand = infinite

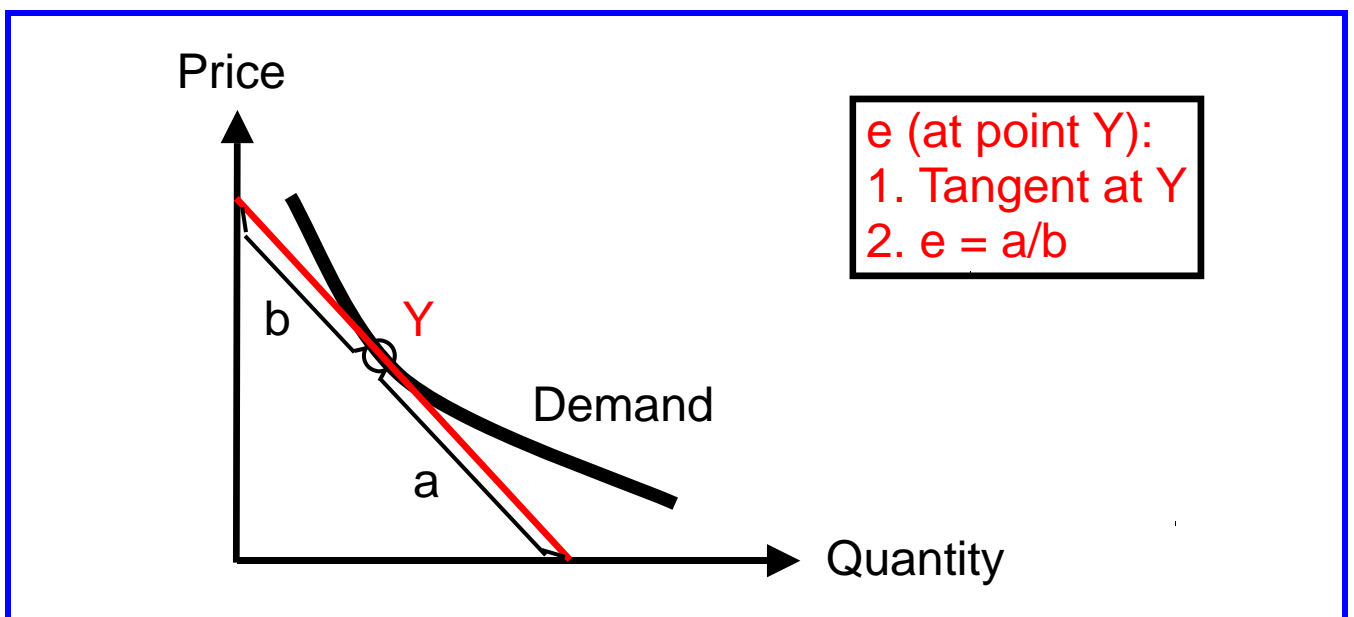


# Price elasticity of demand 3 - given point

## ① Linear demand

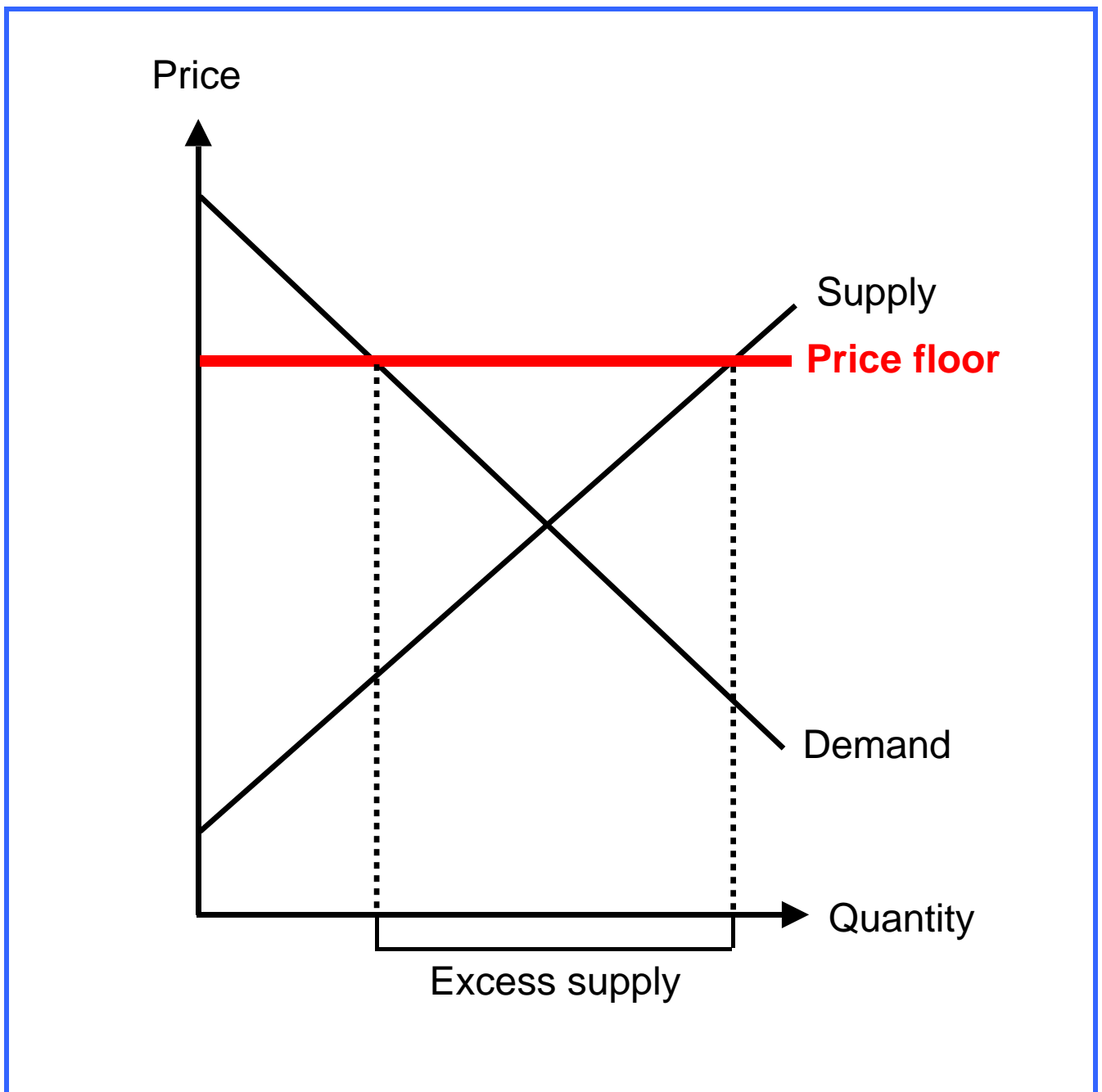


## ② Demand curve

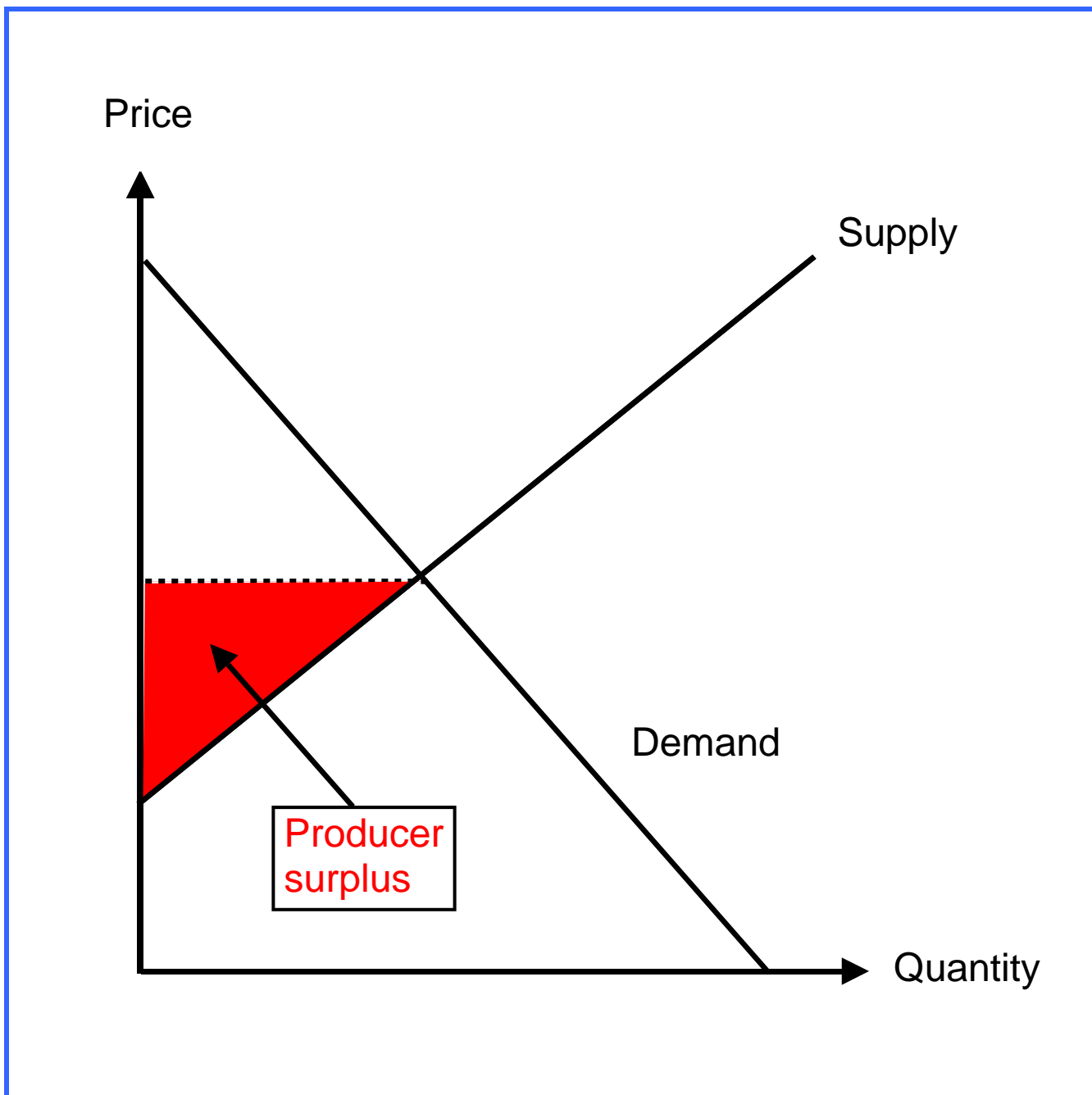


$e$  = Price elasticity of demand

# Price floor (minimum price)



# Producer surplus

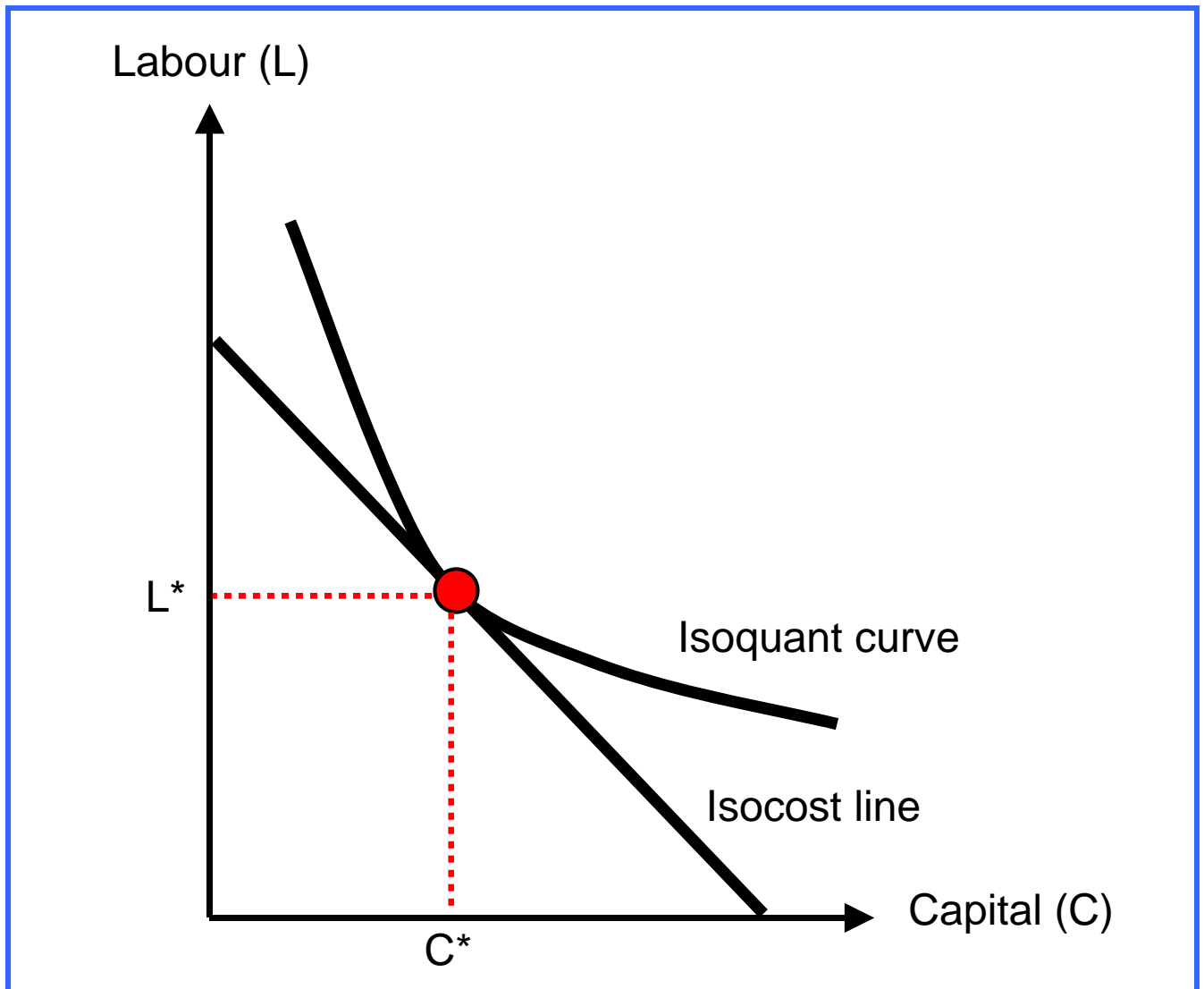


# Production - minimum cost

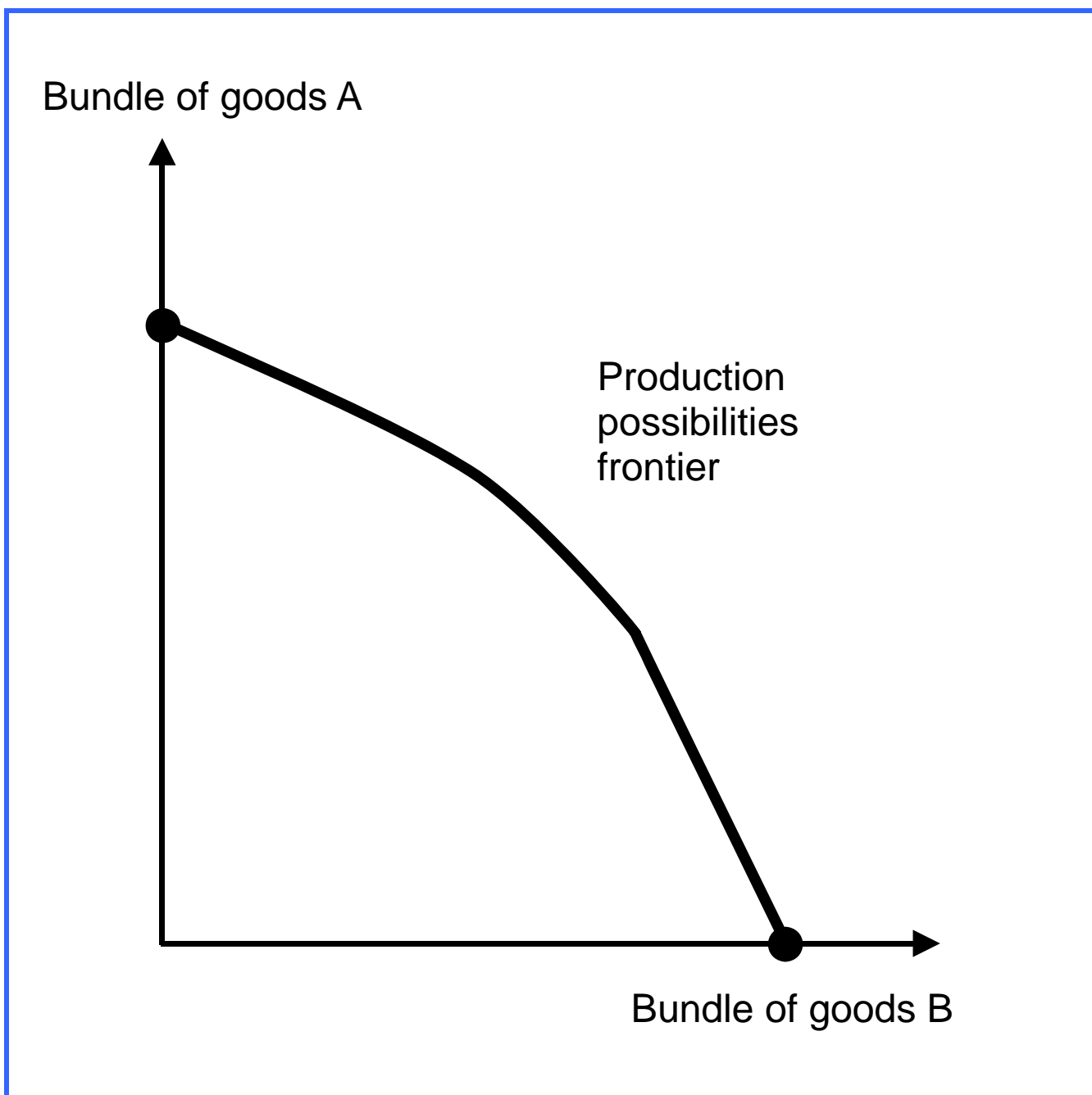
The minimum cost of production is at the point where the isocost line and the isoquant curve have the same slope, that is, where the isocost line touches the isoquant curve.

Information about

- the isoquant. [Click here!](#)
- the isocost. [Click here!](#)

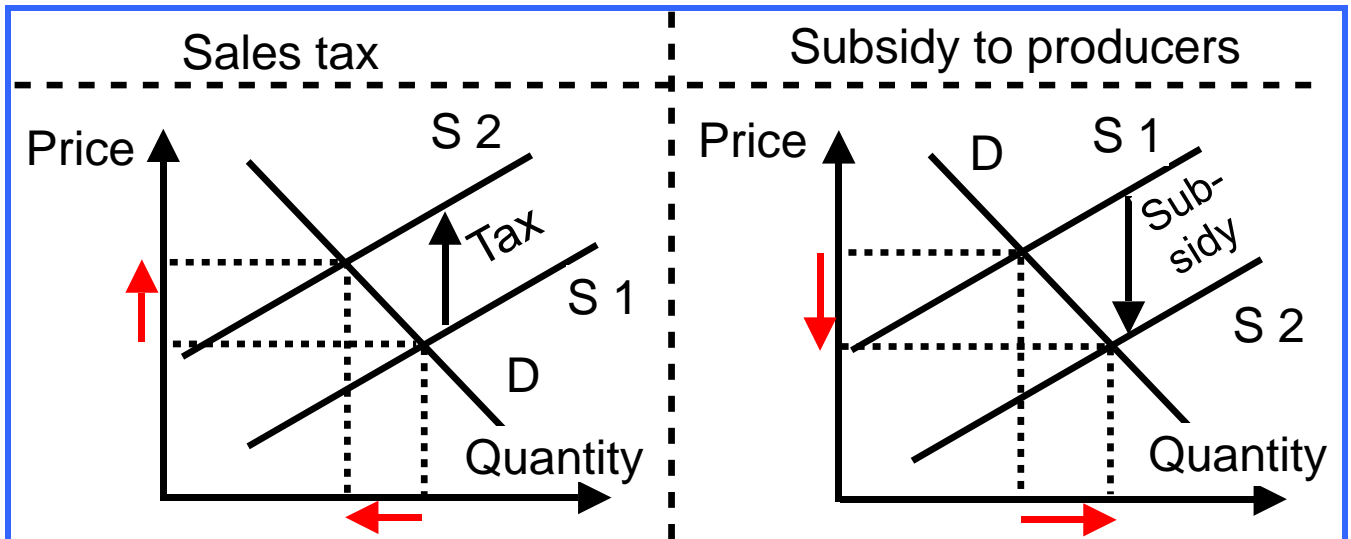


# Production possibilities frontier

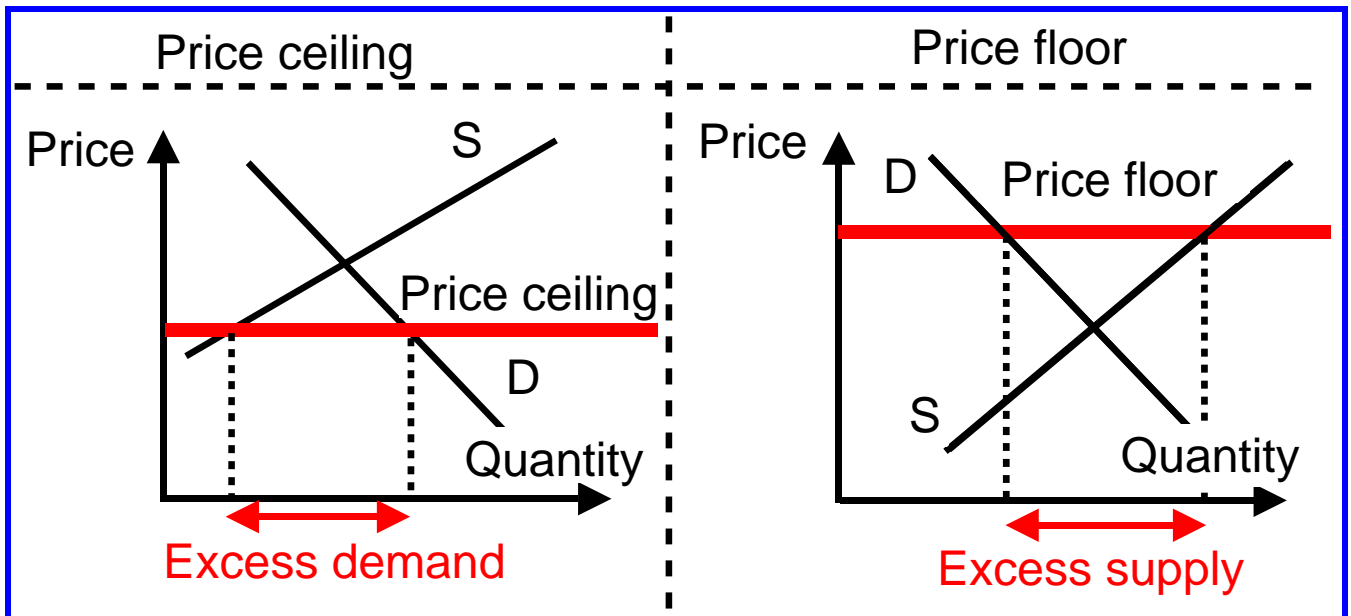


# Public interference and market

① The public interference creates a **new equilibrium**.



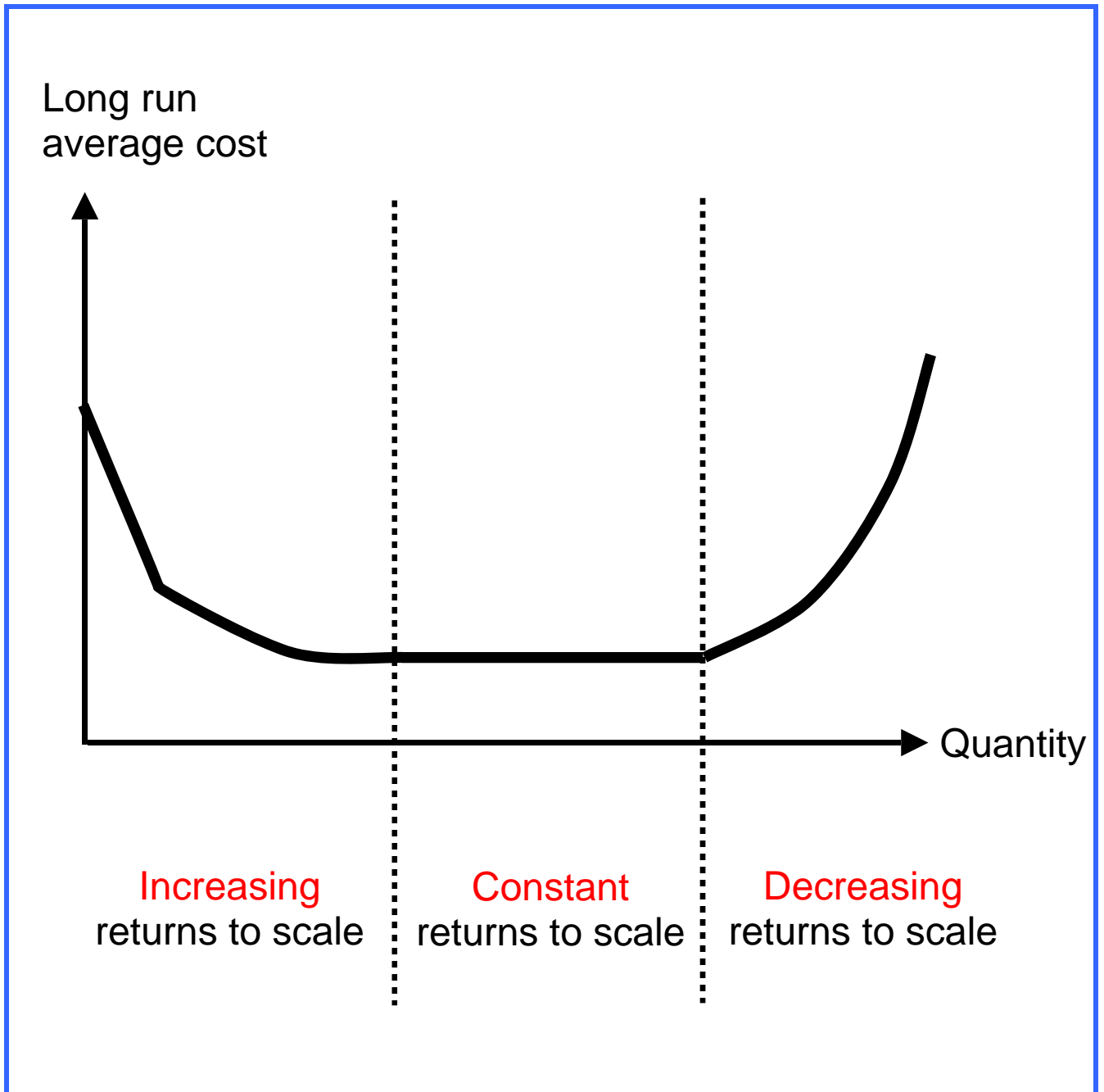
② The public interference creates a **disequilibrium**.



D = Demand

S = Supply

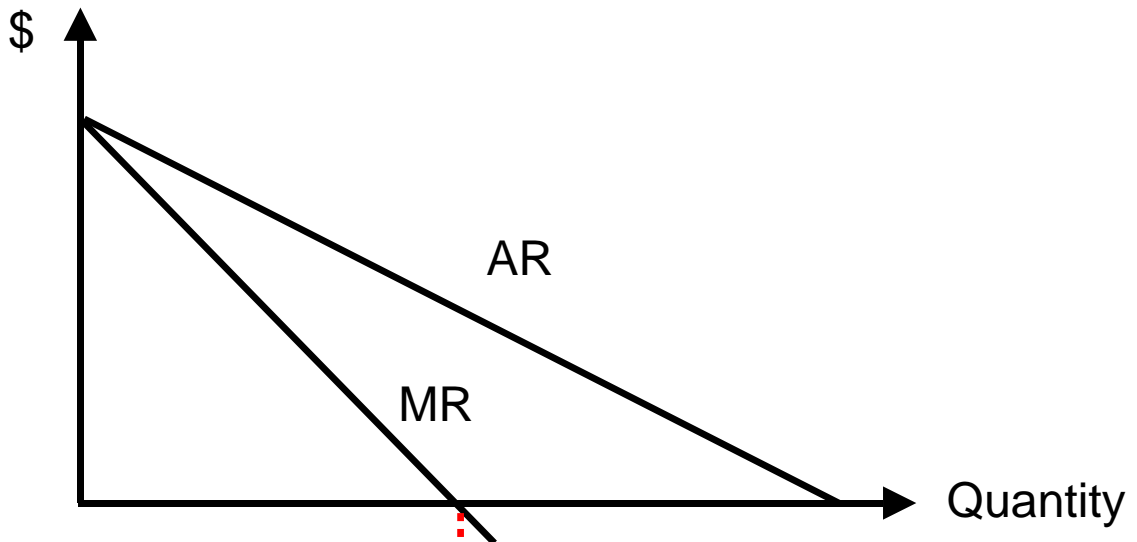
# Returns to scale



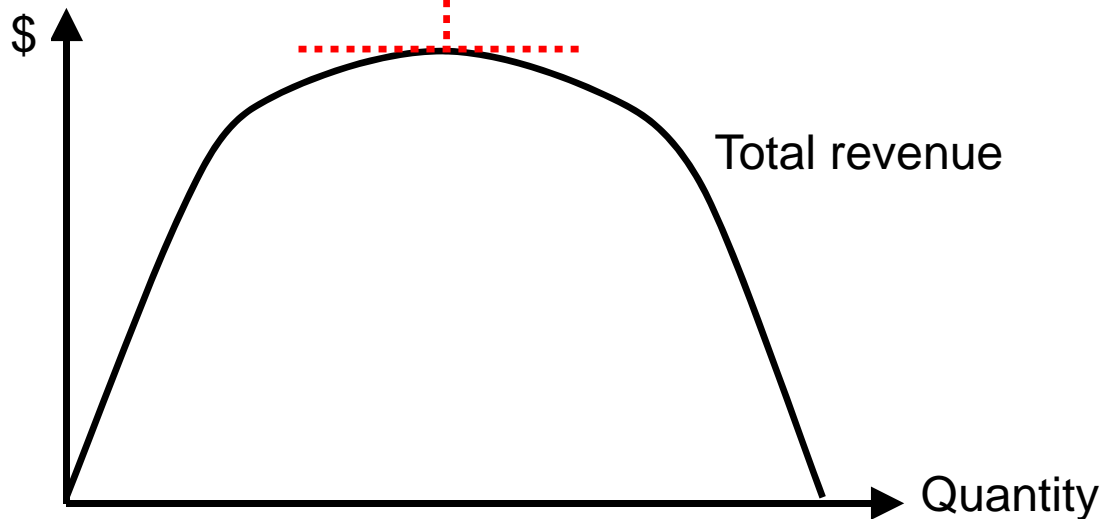


# Revenue - marginal, average and total

1. Marginal revenue and average revenue

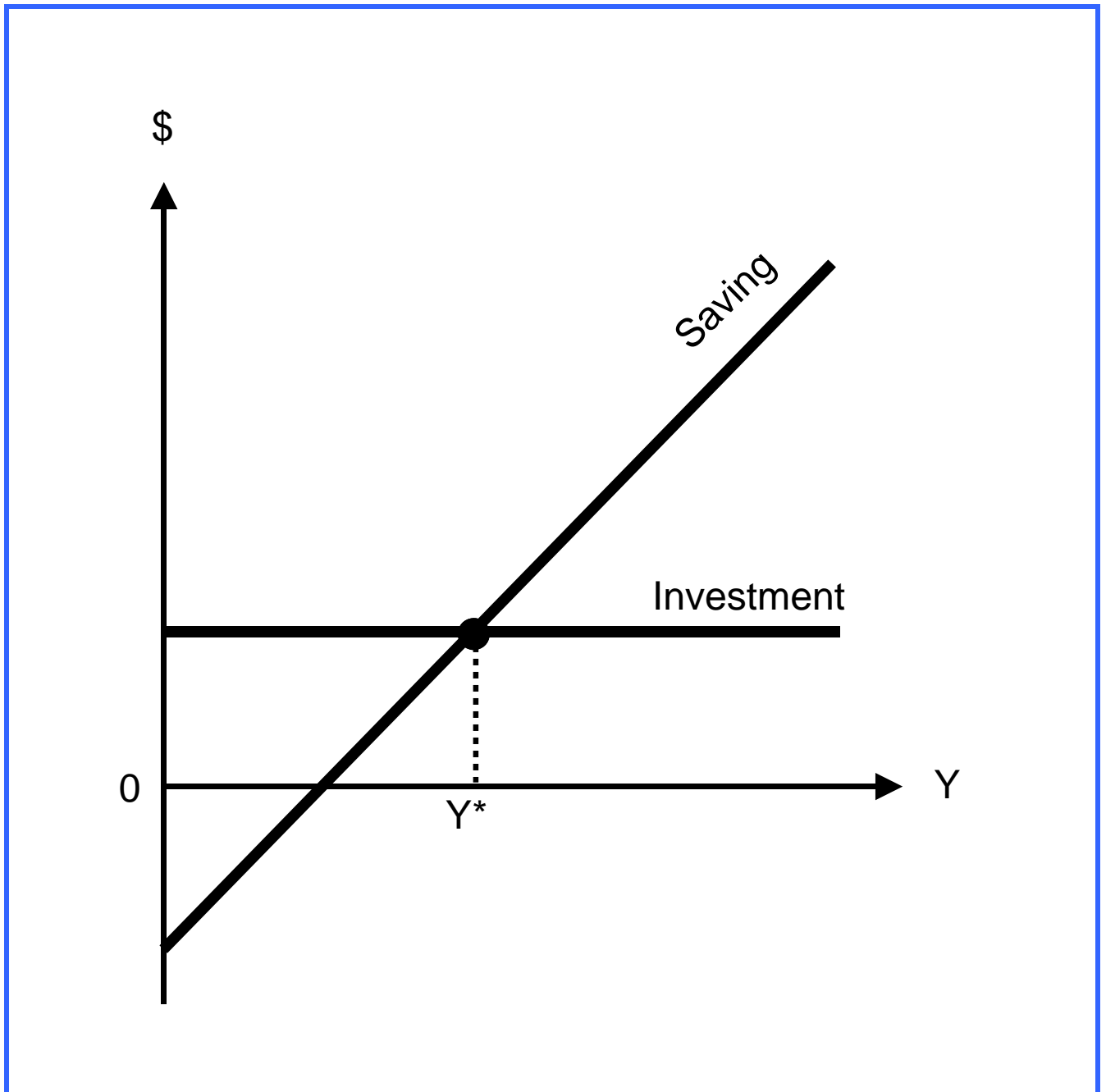


2. Total revenue



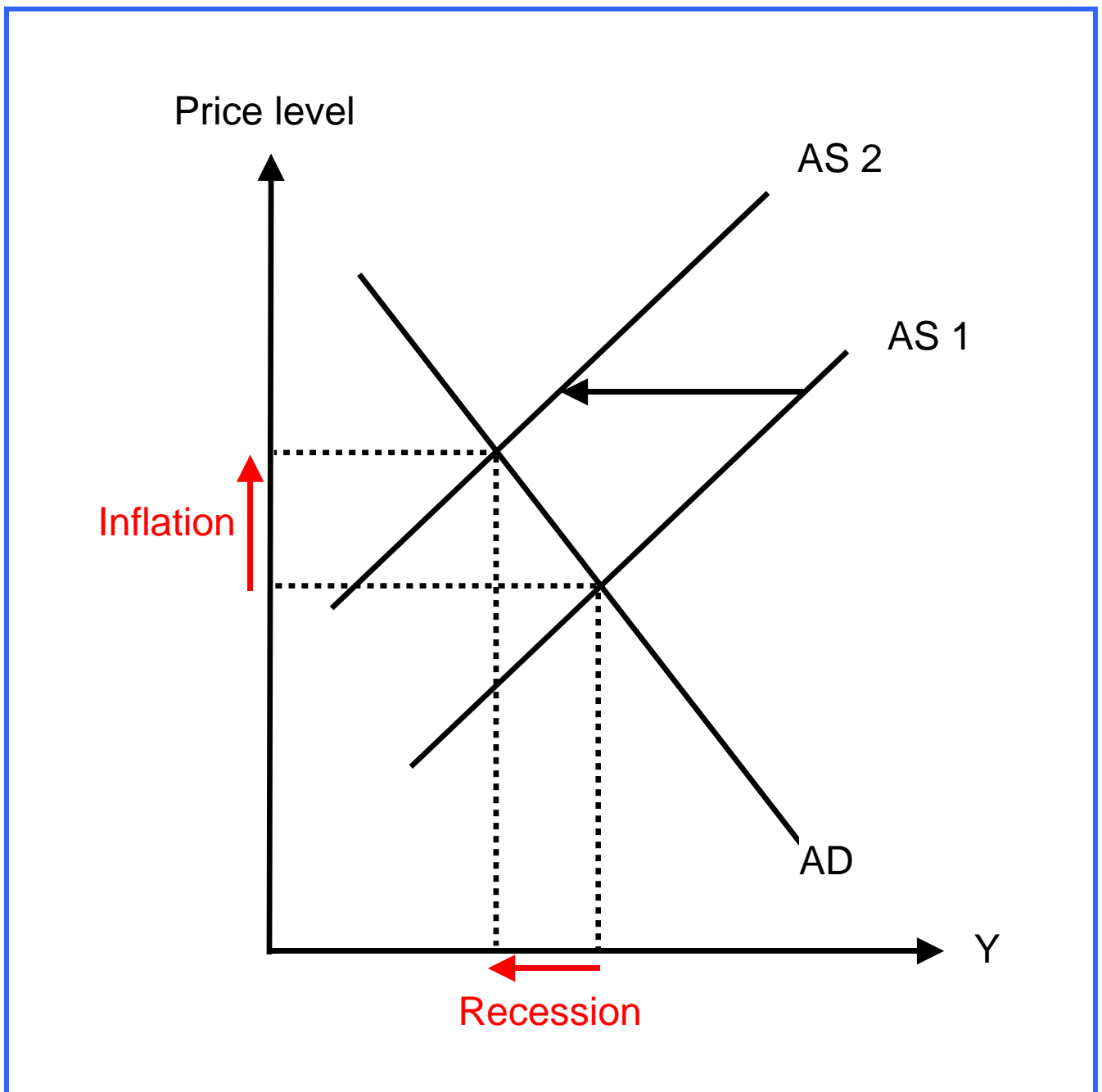
MR = Marginal revenue  
AR = Average revenue

# Saving and investment



$Y$  = Output, income  
 $Y^*$  = Equilibrium of  $Y$

# Stagflation

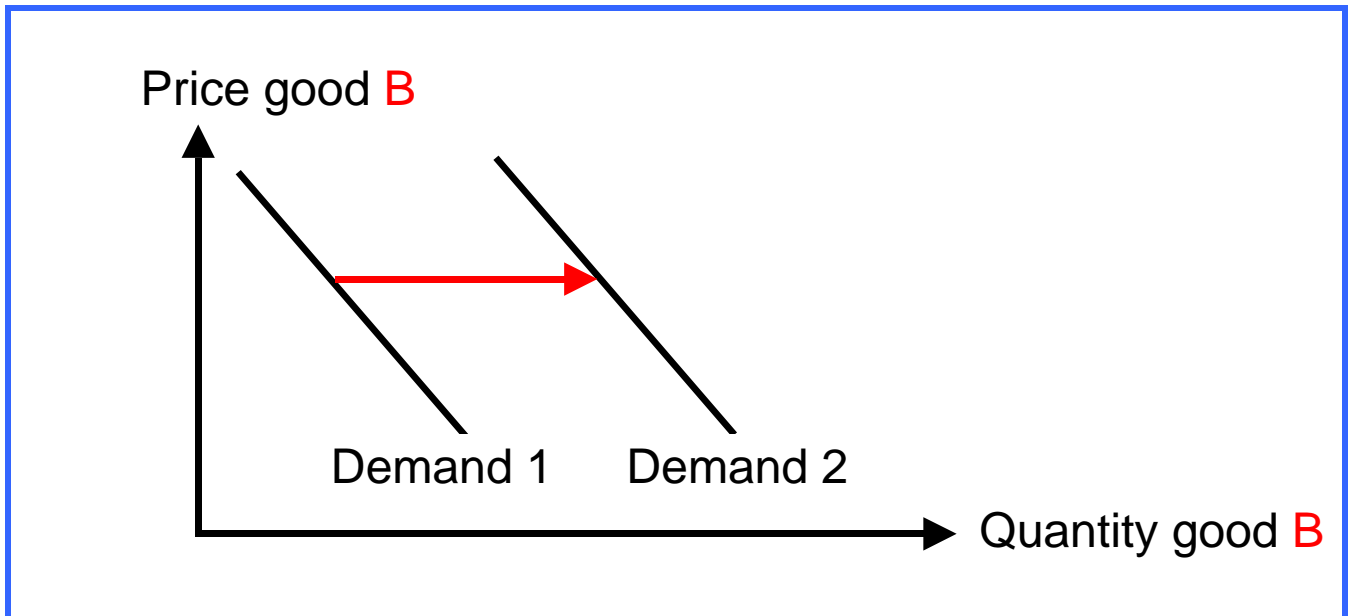


Y = Output, income  
AD = Aggregate demand  
AS = Aggregate supply

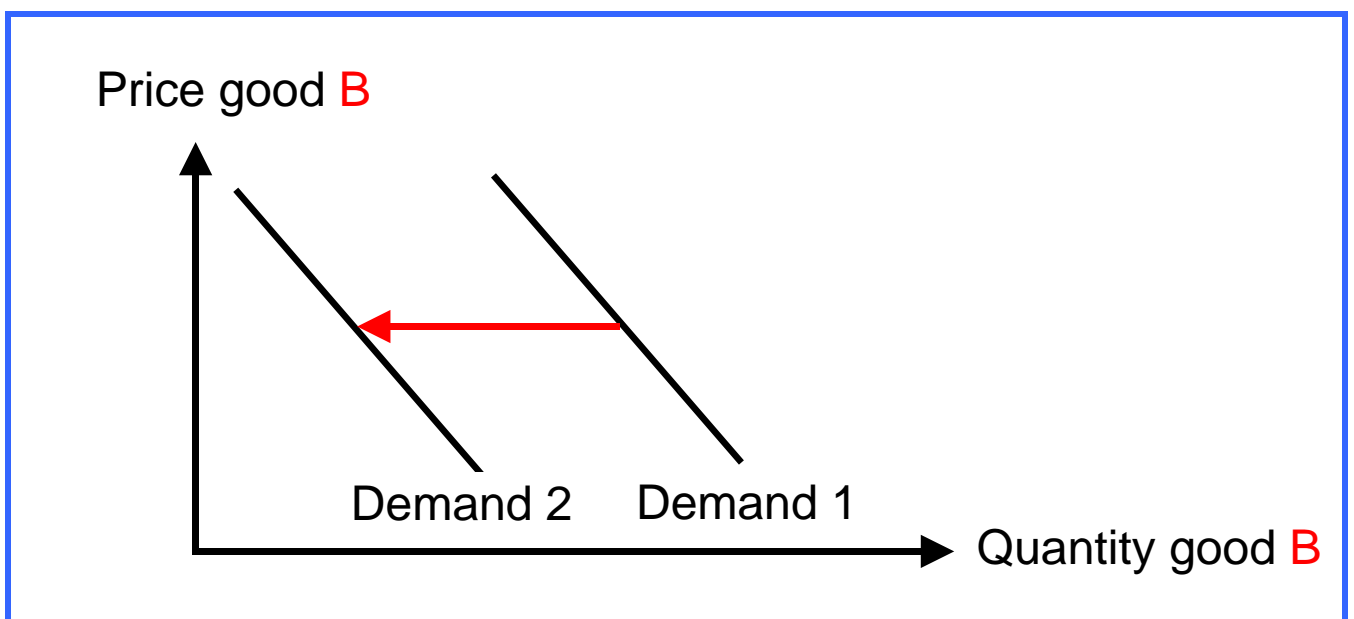
# Substitutes

The goods A and B are substitutes.

- ① The price of good **A rises**. What happens to B?

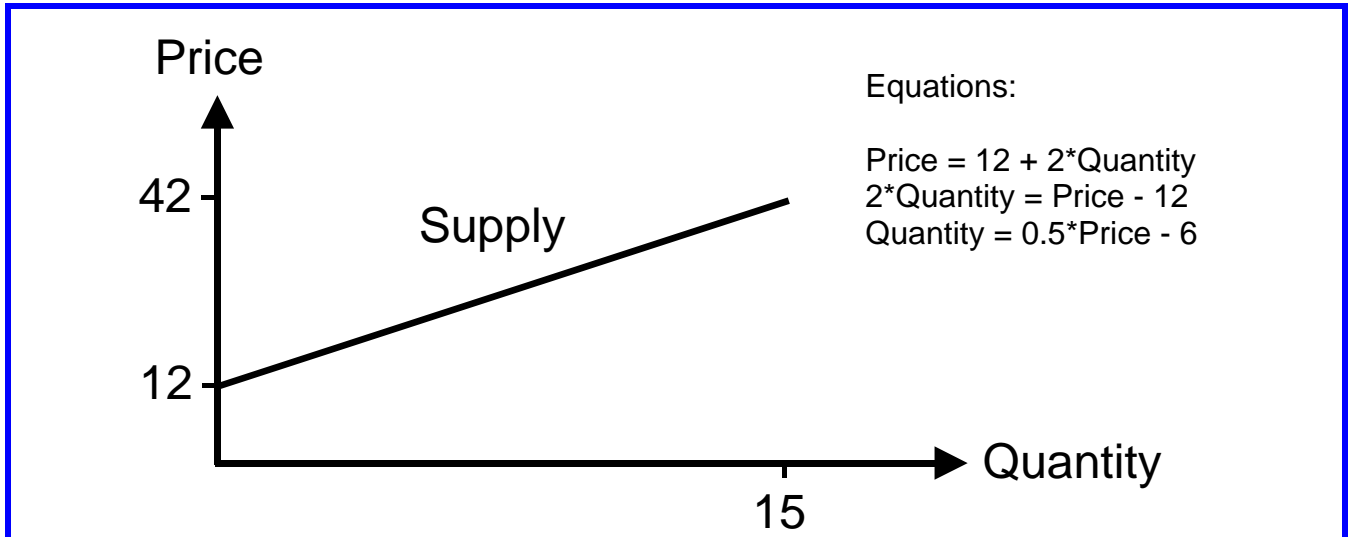


- ② The price of good **A falls**. What happens to B?

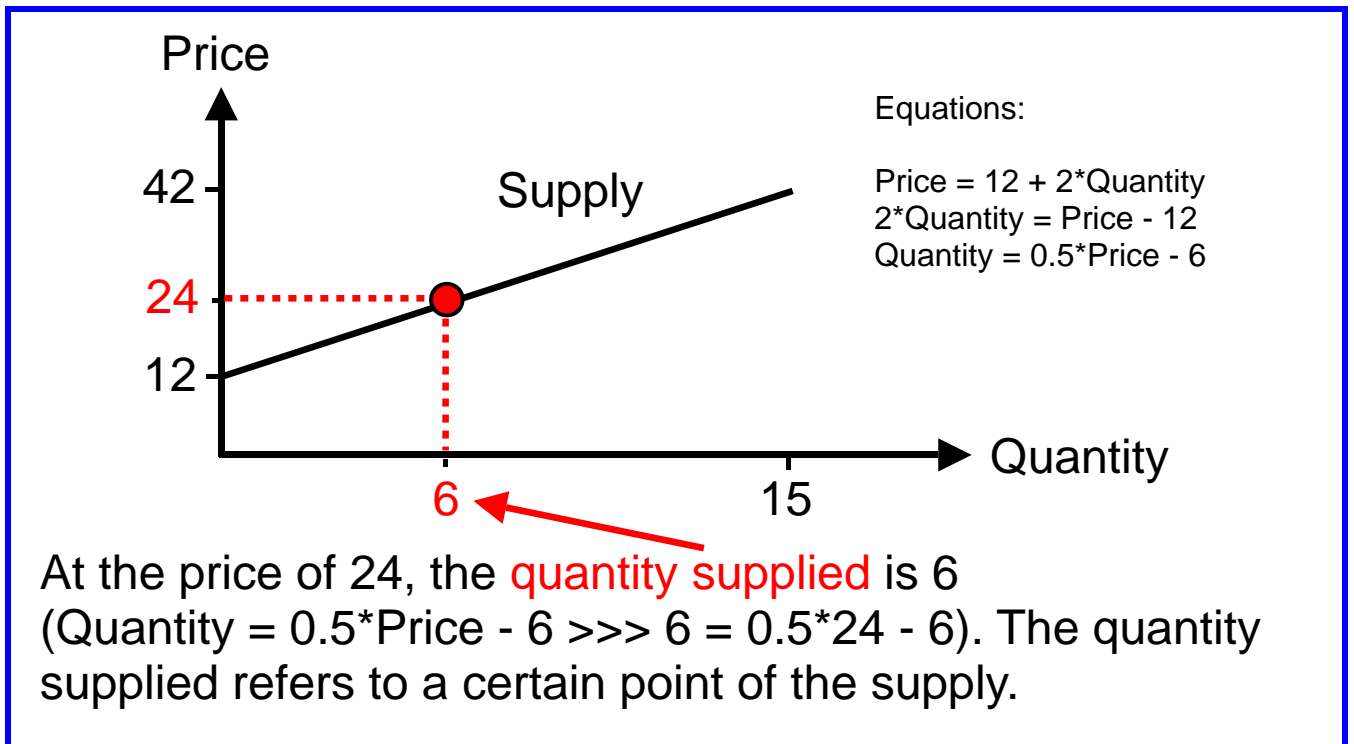


# Supply and quantity supplied

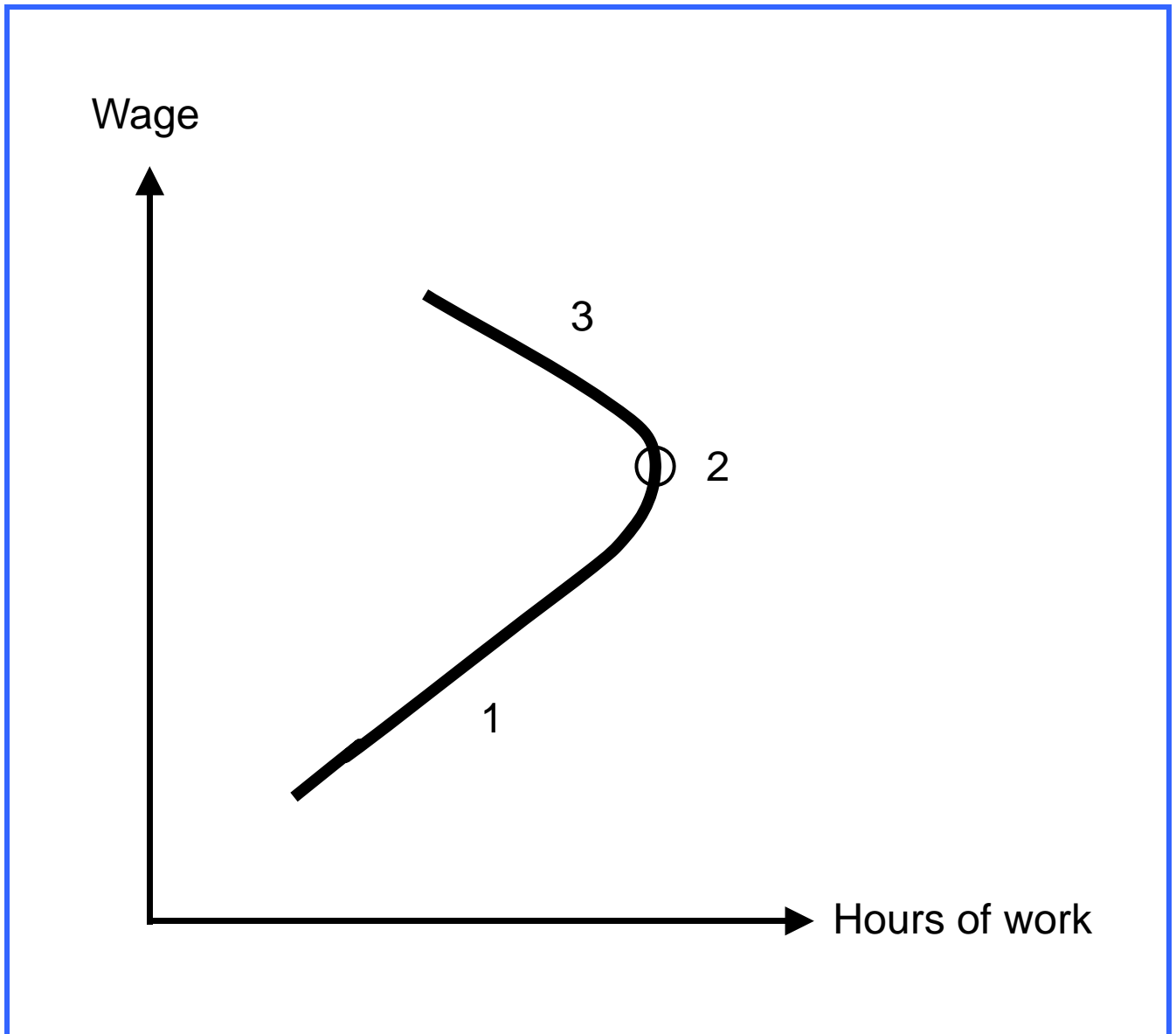
## ① Supply



## ② Quantity supplied

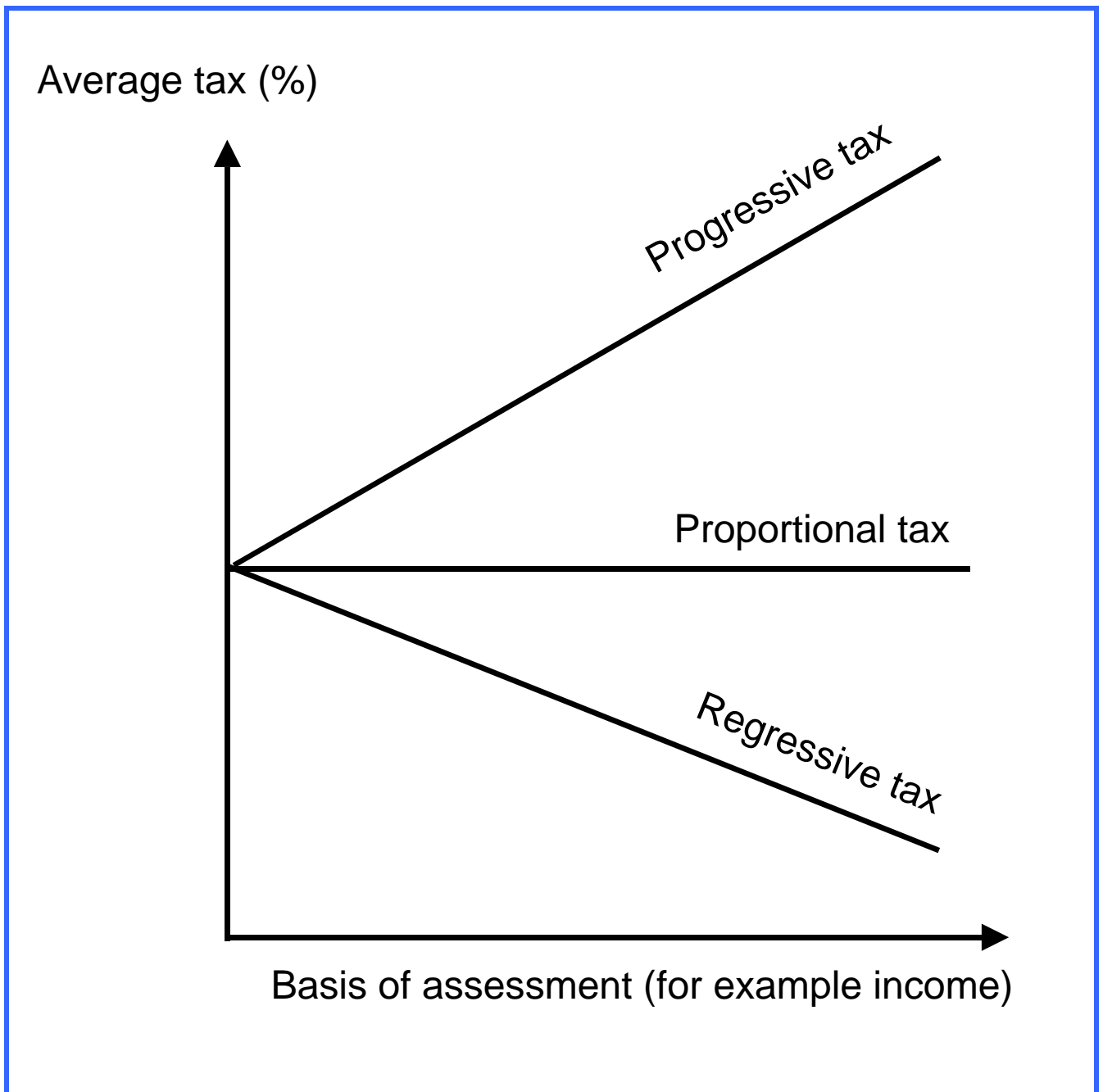


# Supply of labour - individual



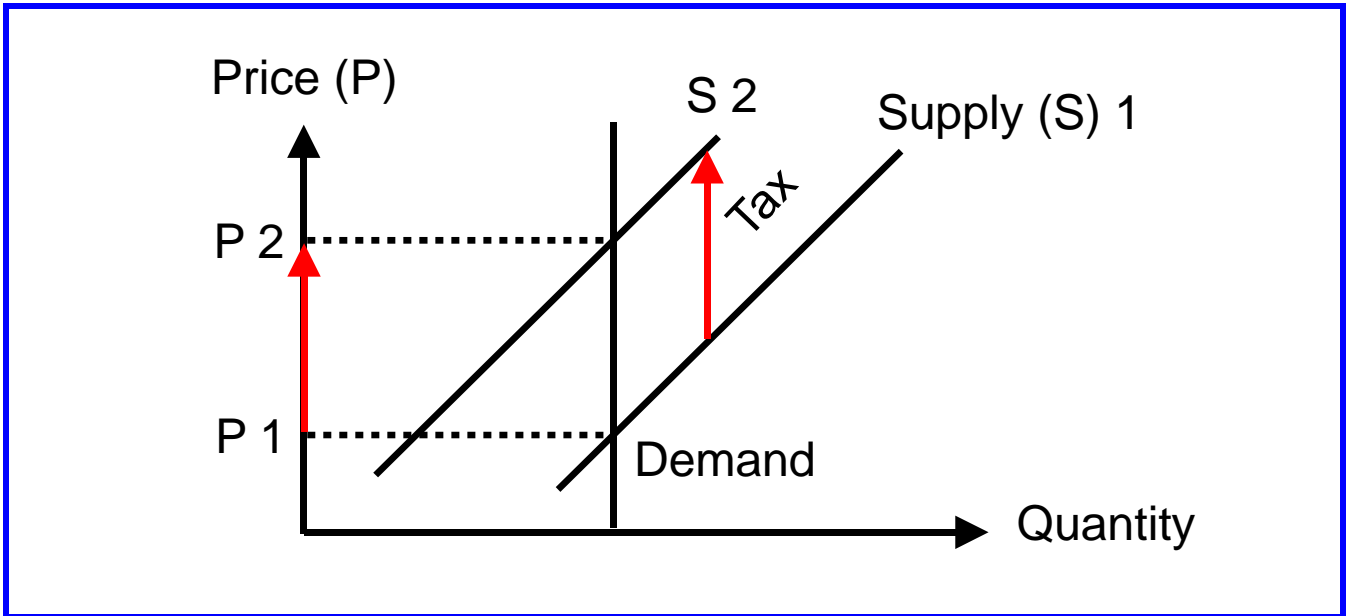
- 1 Substitution effect  $>$  Income effect
- 2 Substitution effect = Income effect
- 3 Substitution effect  $<$  Income effect

# Tax - progressive, proportional and regressive

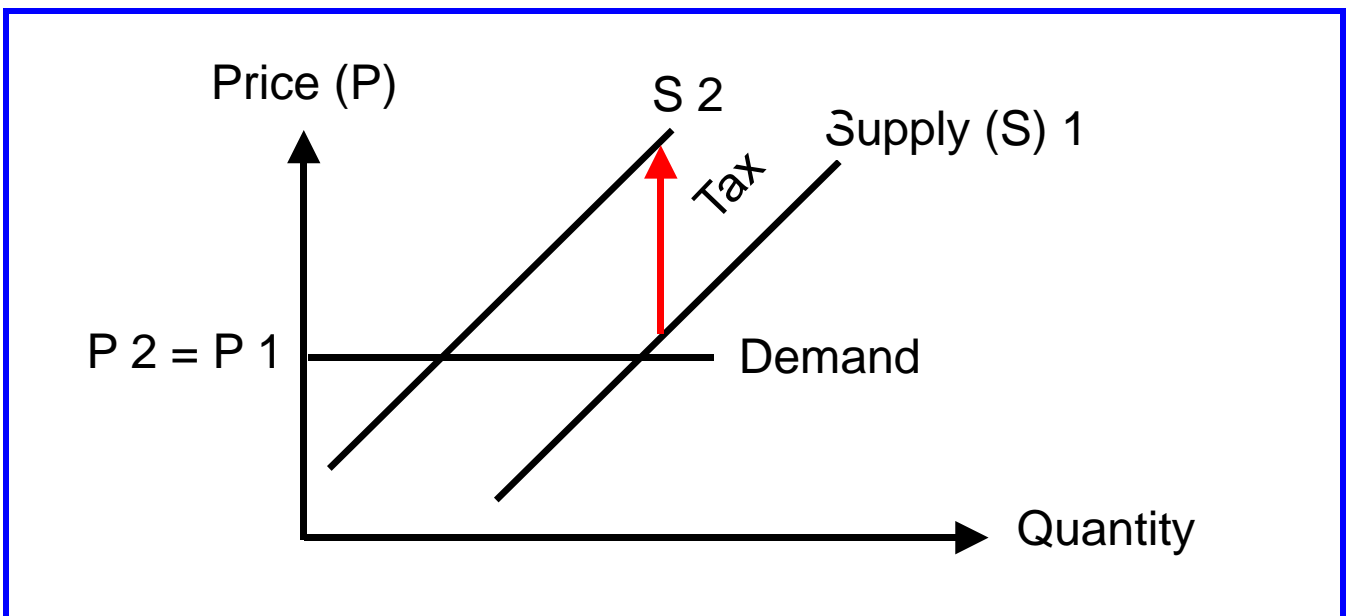


# Tax incidence - extreme cases

- ① The tax is borne entirely by the **buyer**.



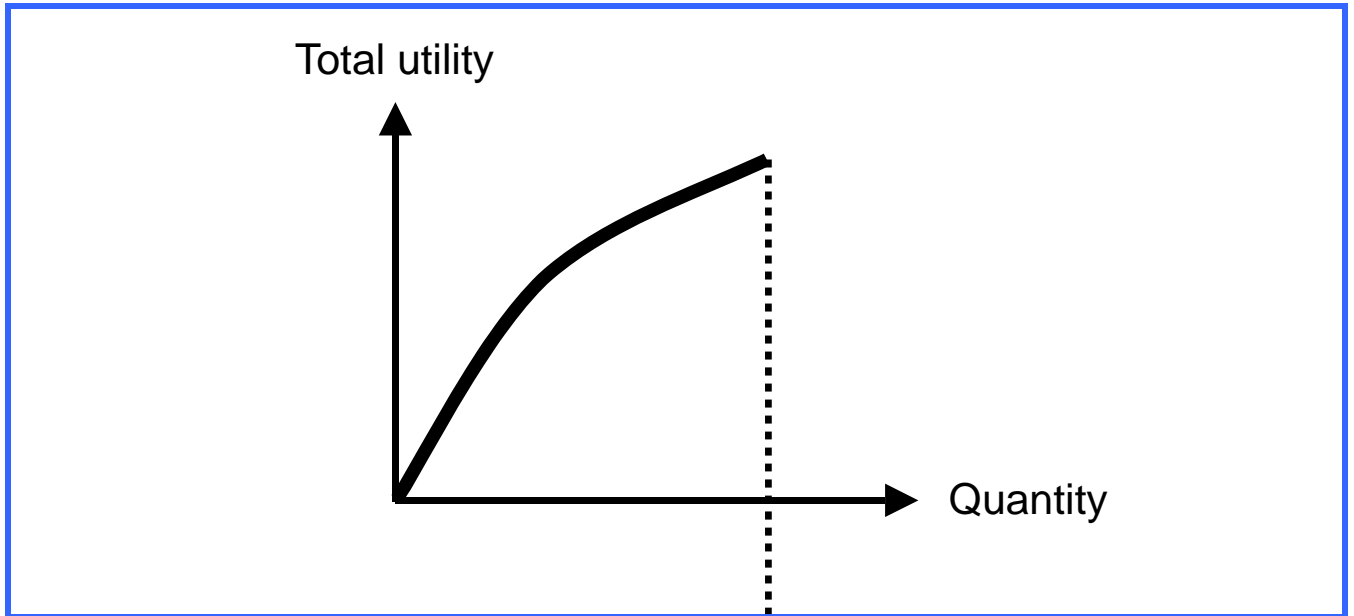
- ② The tax is borne entirely by the **seller**.



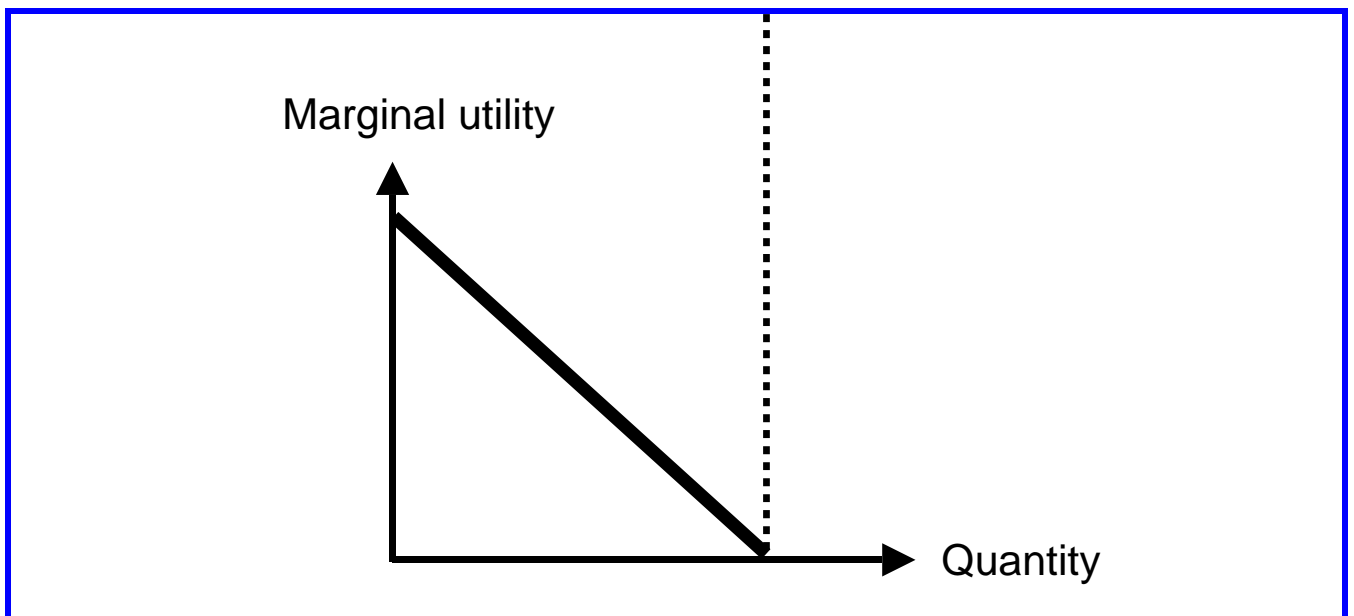


# Utility - total and marginal

## ① Total utility



## ② Marginal utility



# Welfare loss of a tax

