Review Microeconomic Tools for Health Economics

EE 474 Health Economics

Semester 1/2012

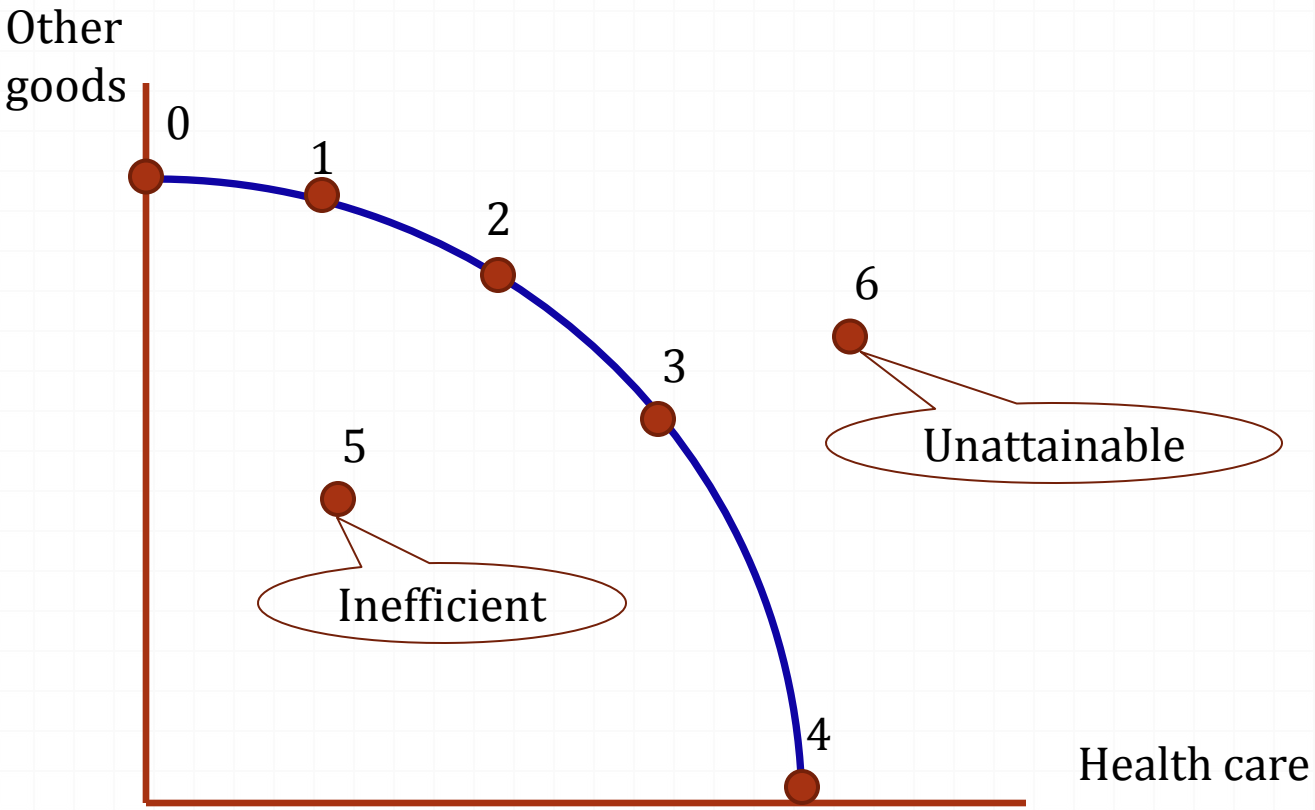
Topics

- Opportunity cost and production possibility frontier
- Consumer behavior theory
- Production and cost
- Perfect competition
- Monopoly

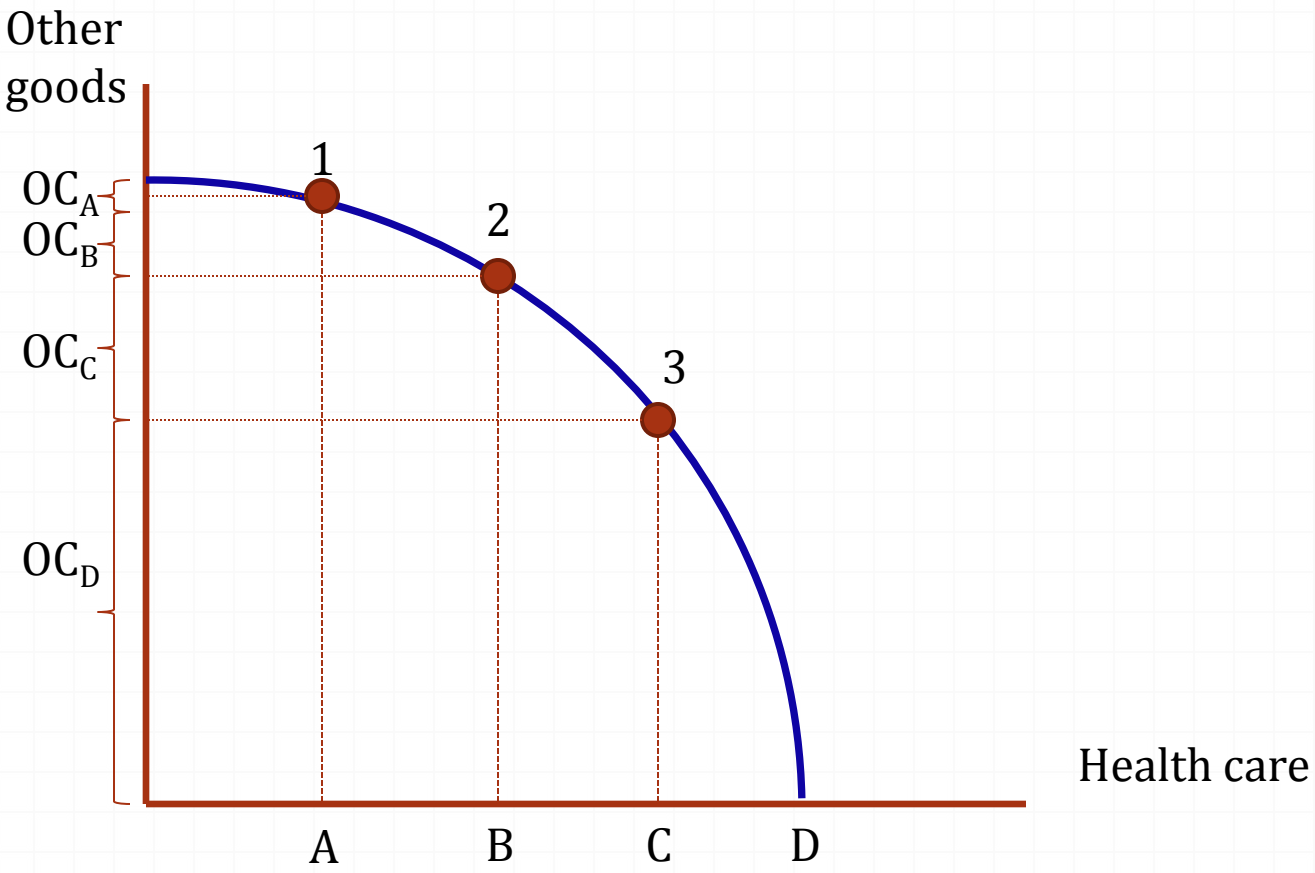
Opportunity costs

- Recall the national health expenditure in Thailand from the first lecture is about 4% of GDP.
- The opportunity cost of health care is represented by the other things in the economy that could be produced with the same resources.
- Opportunity cost:
  - *What must be given up*
  - Depicted by the production possibility frontier (PPF).

Production Possibility Frontier (PPF)



PPF and Opportunity Cost



PPF and Opportunity Cost

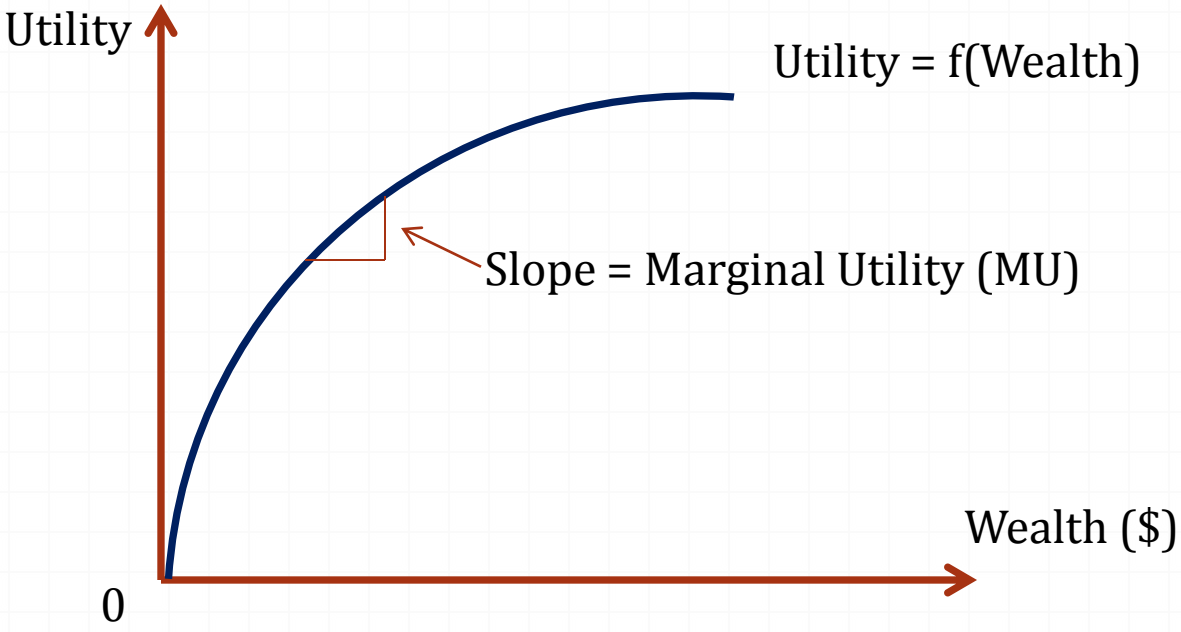
- The PPF illustrates the trade-offs between health care and other goods.
- The slope of PPF represents the opportunity cost:
  - Changing and becoming *steeper* at each level of health care.
- Opportunity cost is increasing as more health care is produced .
  - *The Law of Increasing Opportunity Cost*
  - Rationale?

Consumer Theory

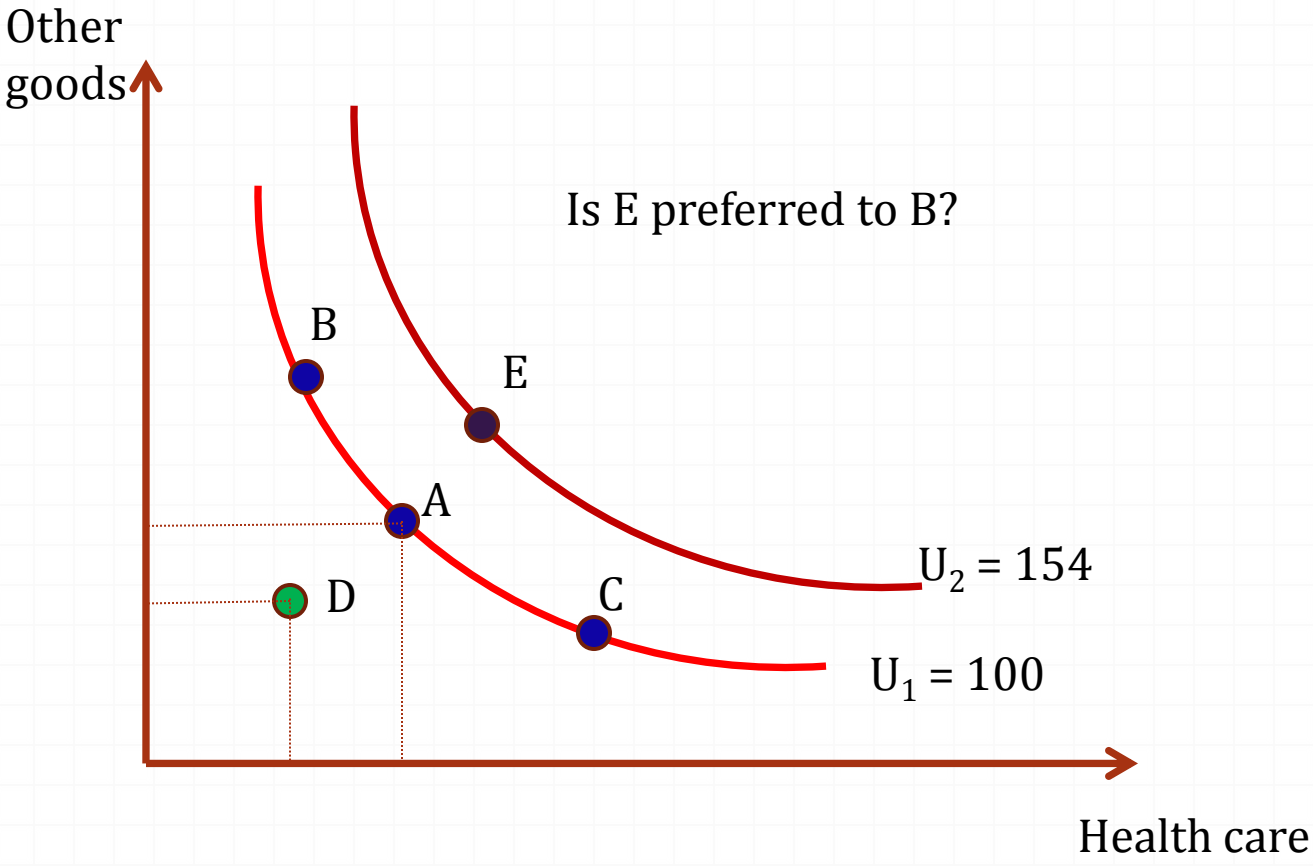
- Preference
- Budget constraint
- Consumer's equilibrium
- Derivation of demand curve
- Market demand
- Elasticities of demand

Preference

- Consumer's preference is represented by a utility function.
  - *Utility is a measure of the level of satisfaction.*
- Example: Amy's utility as a function of wealth

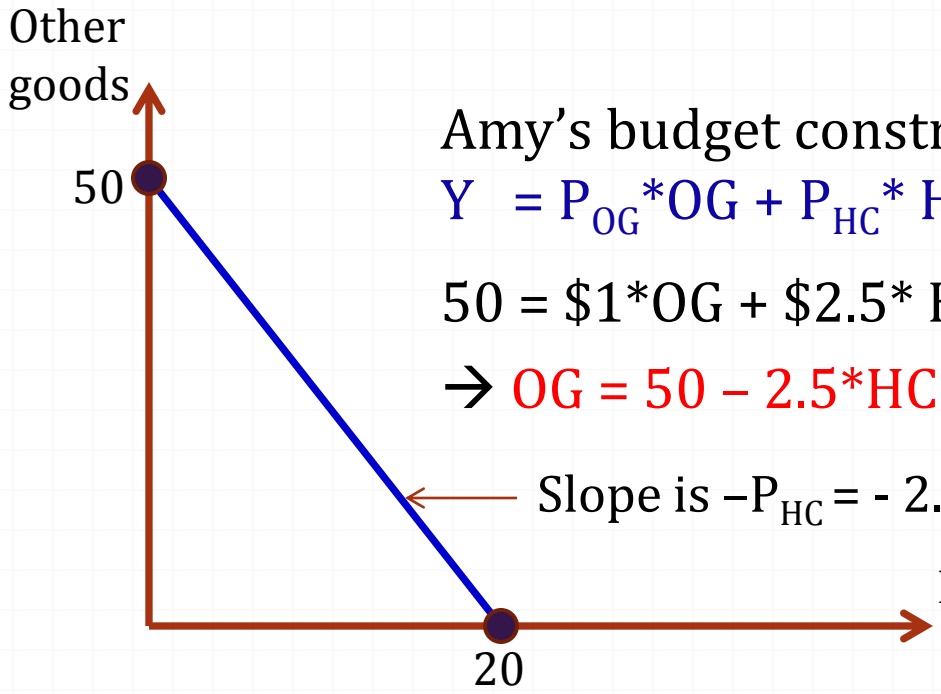


Consumer's Preferences for Two Goods:
Indifference Curve



Budget Constraints

- Budget constraint depicts what the consumer can afford.
- Example: Suppose Amy has $50 income and has to choose between 2 choices: health care (P_{HC}= $2.5 /unit) and other goods (P_{OG}= $1/unit).



Amy's budget constraint:

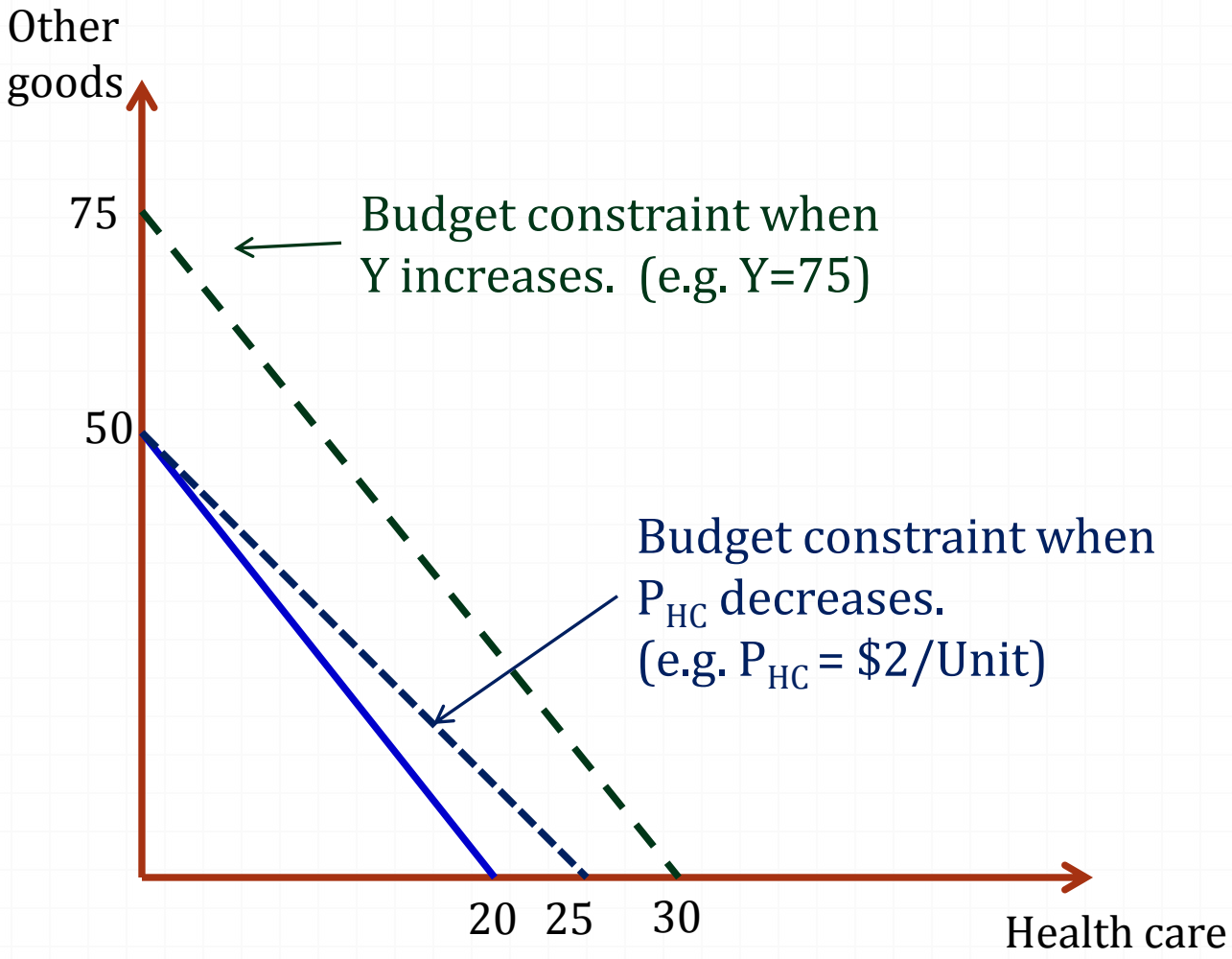
$Y = P_{OG}*OG + P_{HC}* HC$

$50 = \$1*OG + \$2.5* HC$

→ $OG = 50 - 2.5*HC$

Slope is $-P_{HC} = -2.5$

Budget Constraints

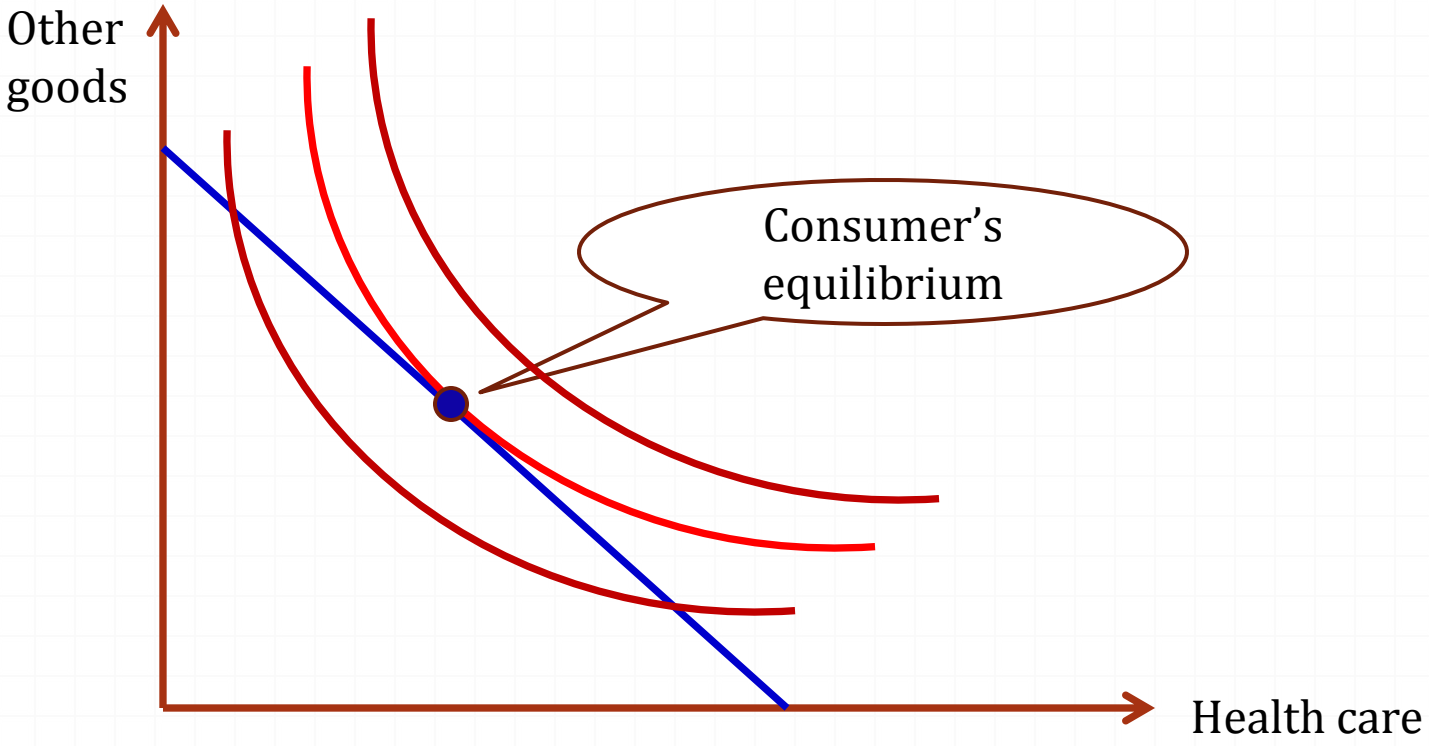


Consumer's Equilibrium

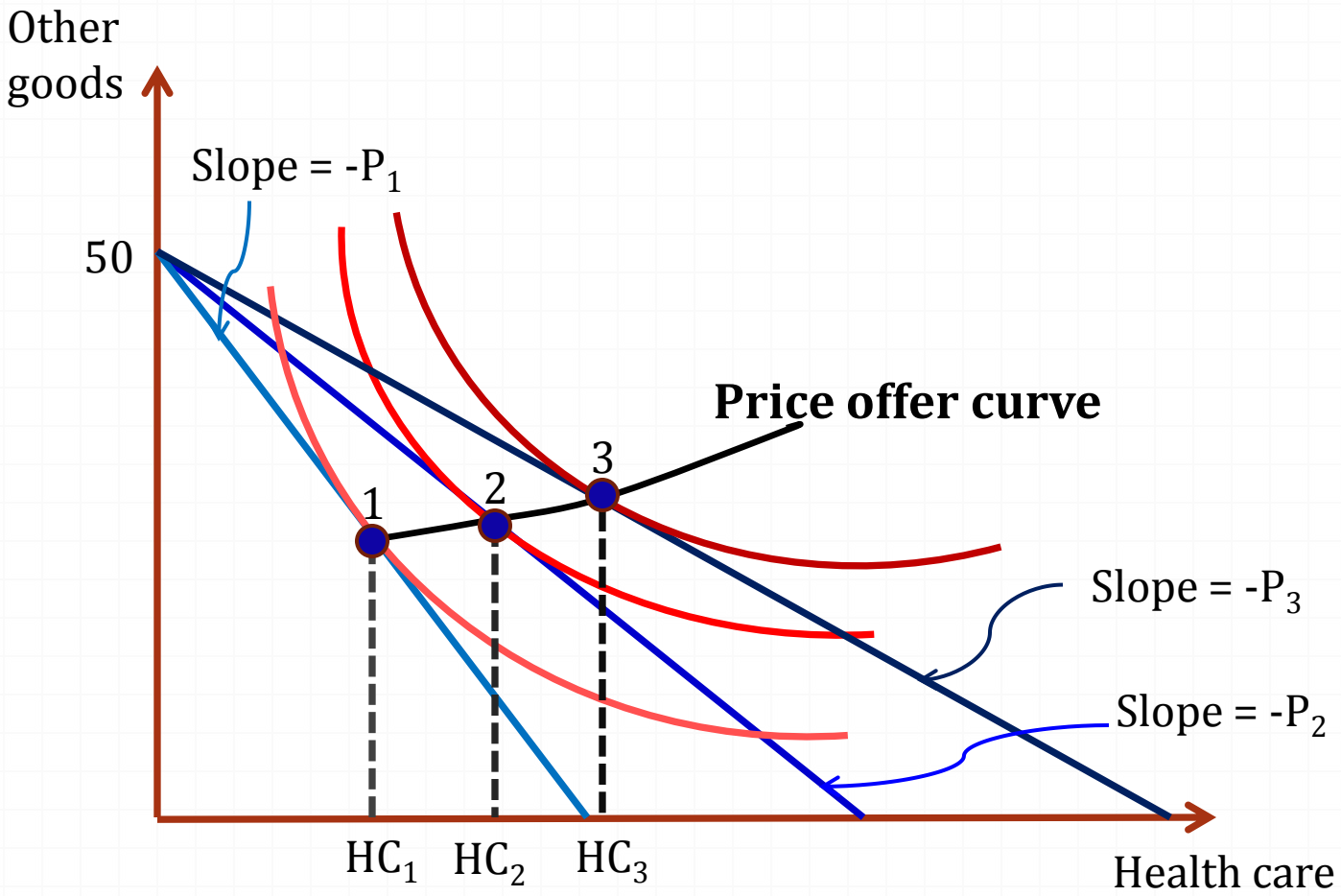
- Consumer's problem:

$$\text{Max } U(HC, OG)$$

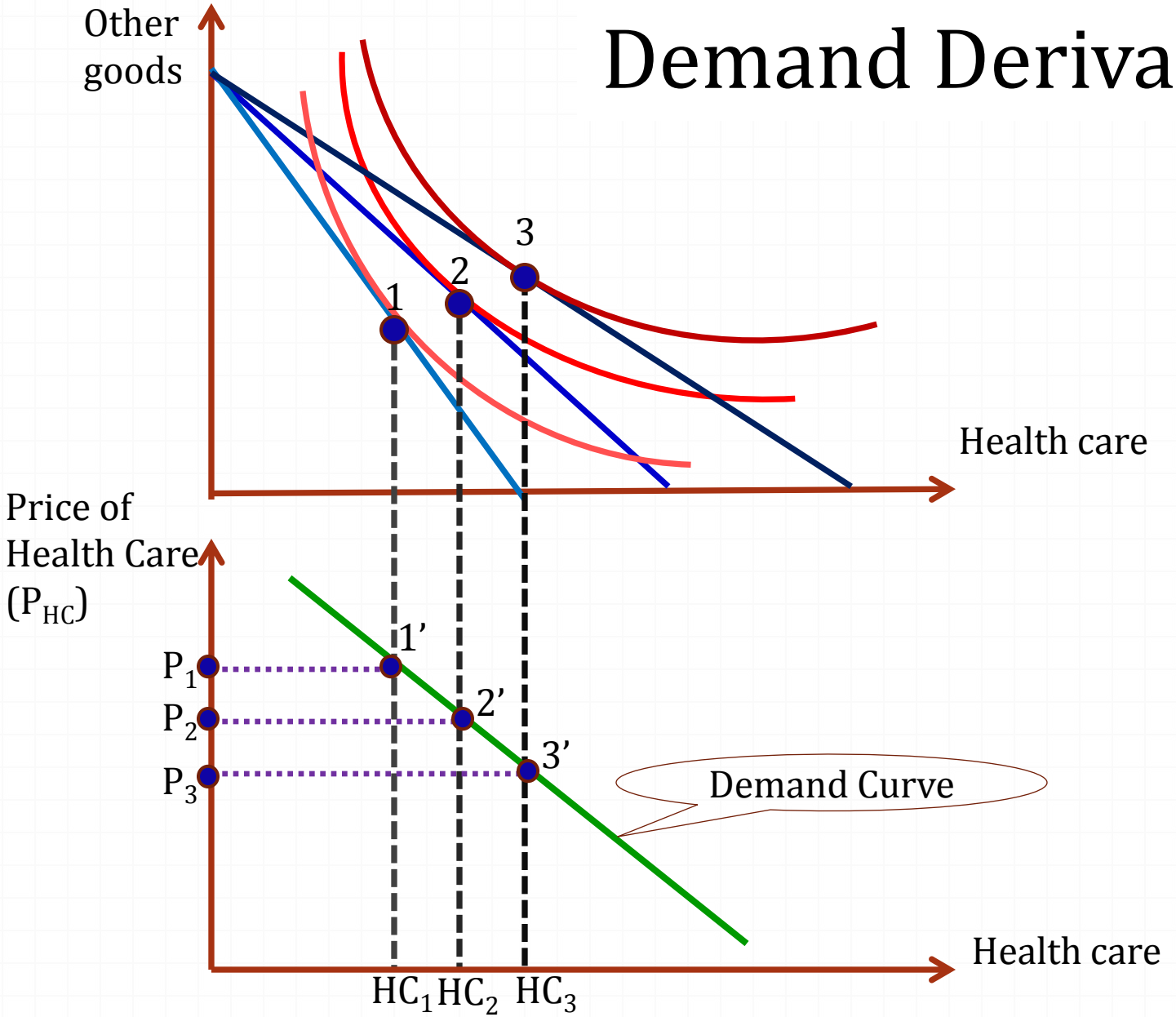
$$\text{subject to } Y = P_{OG} * OG + P_{HC} * HC$$



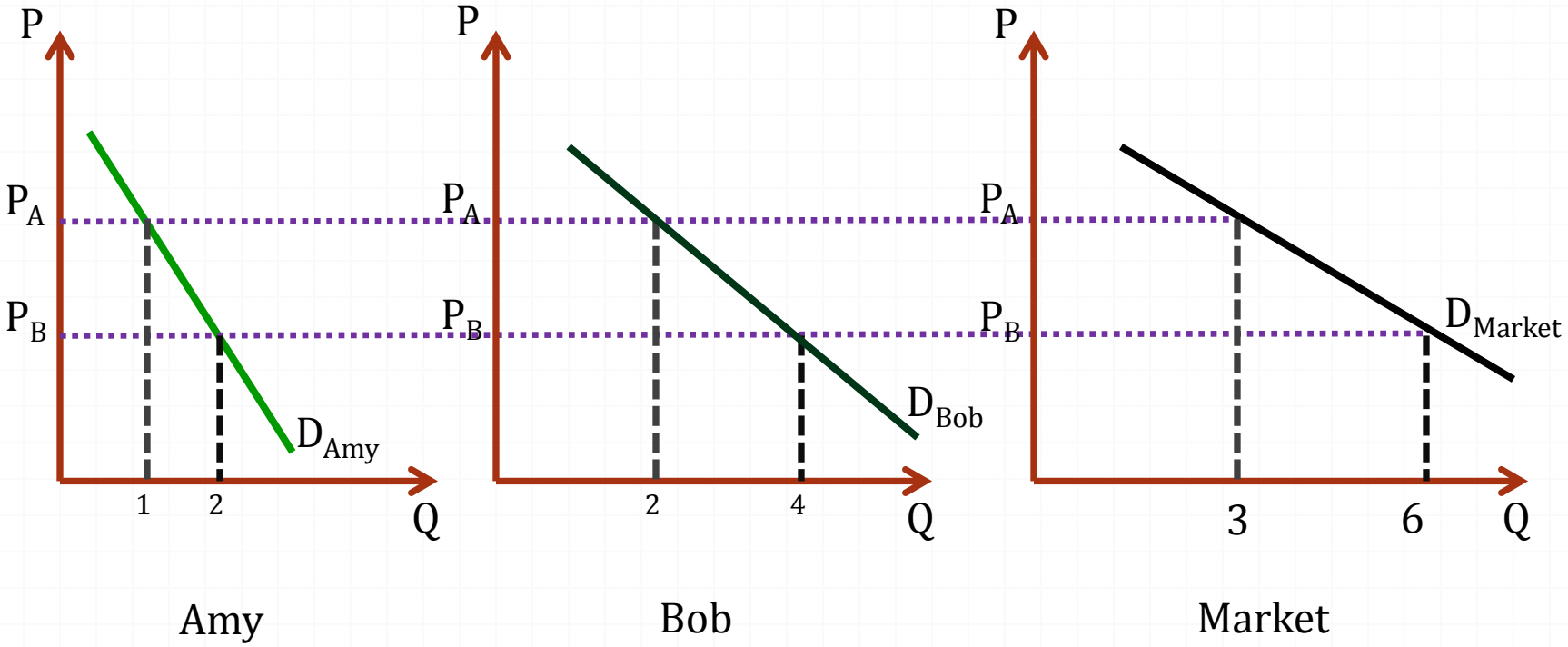
What happens if the P_{HC} falls?



Demand Derivation



Market Demand Curve



Elasticities

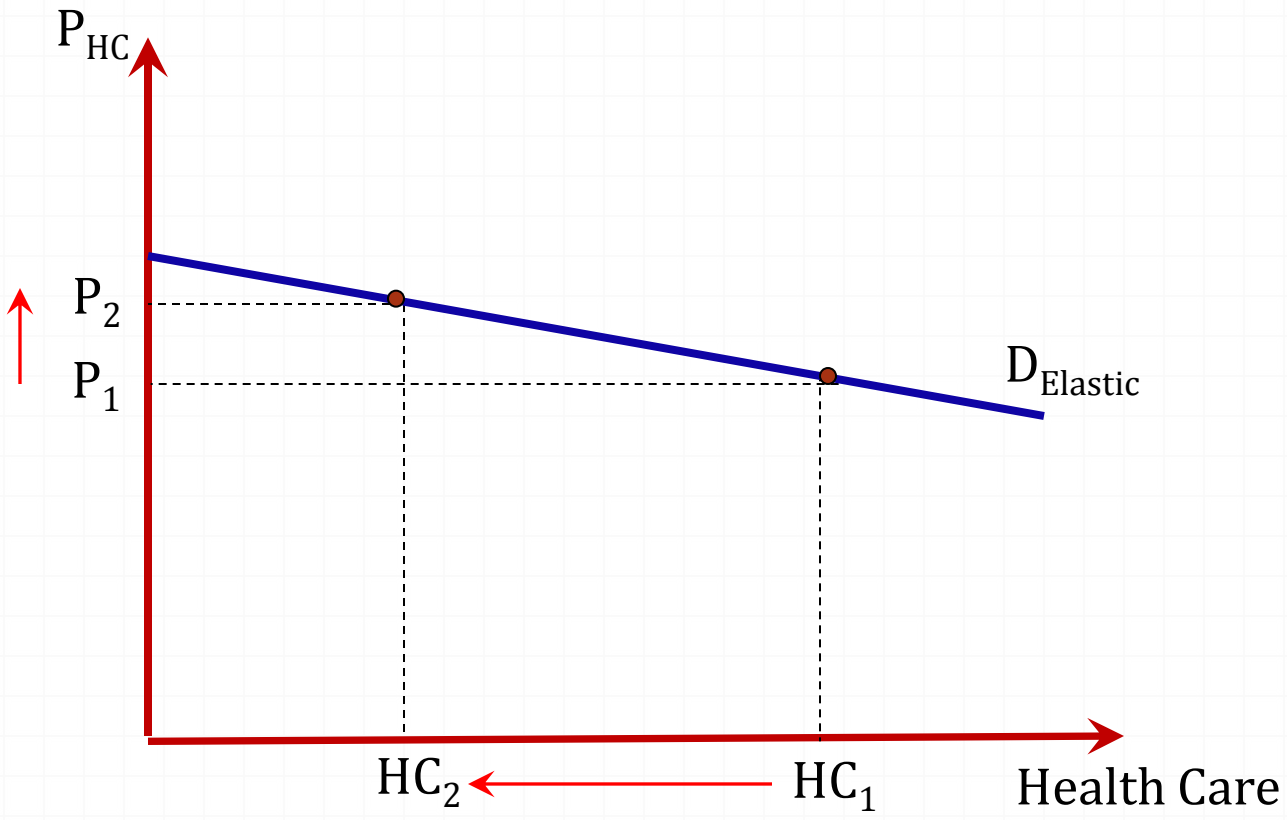
- Elasticities measure the responsiveness of a dependent variable to a 1 percent change in an independent variable
  - Elasticity = (%Δdep variable)/(%Δ indep variable)

    = $(\Delta Y/Y)/(\Delta X/X)$
- The more elastic a relationship is, the more responsive it is: *"Elastic" = "responsive"*
- 3 elasticities of demand:
  - *Price* elasticity of demand: $(\%\Delta Q_D)/(\%\Delta P)$
  - *Income* elasticity of demand: $(\%\Delta Q_D)/(\%\Delta I)$
  - *Cross-price* elasticity of demand: $(\%\Delta Q_X)/(\%\Delta P_Y)$

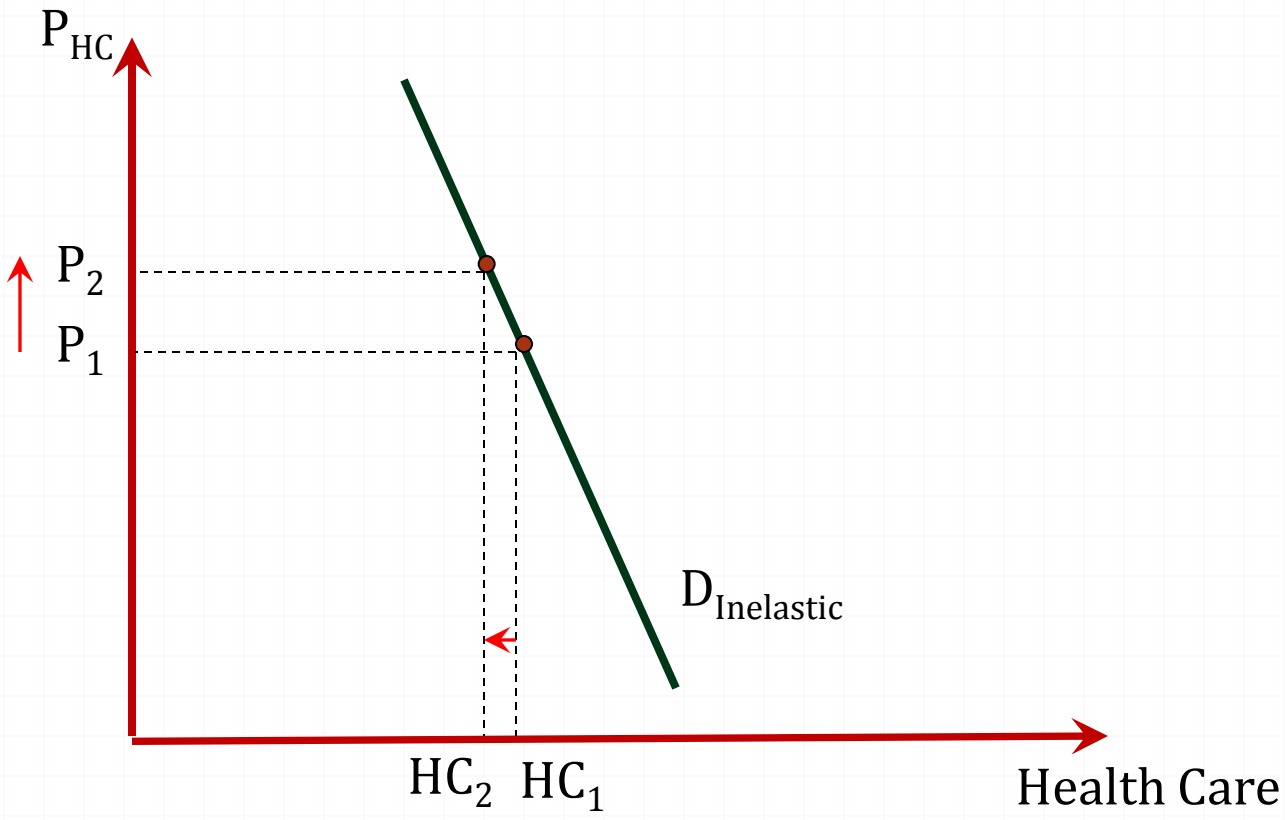
Price Elasticity of Demand (η_D)

- $\eta_D = (\%\Delta Q_D)/(\%\Delta P) = (\Delta Q_D/Q_D)/(\Delta P/P)$
- The price elasticity of demand is negative because demand is downward sloping.
- The price elasticity of demand is often expressed as an absolute value:
  - If $|\eta_D| > 1$, demand is elastic. → "Luxuries"
  - If $0 < |\eta_D| < 1$, demand is inelastic. → "Necessities"

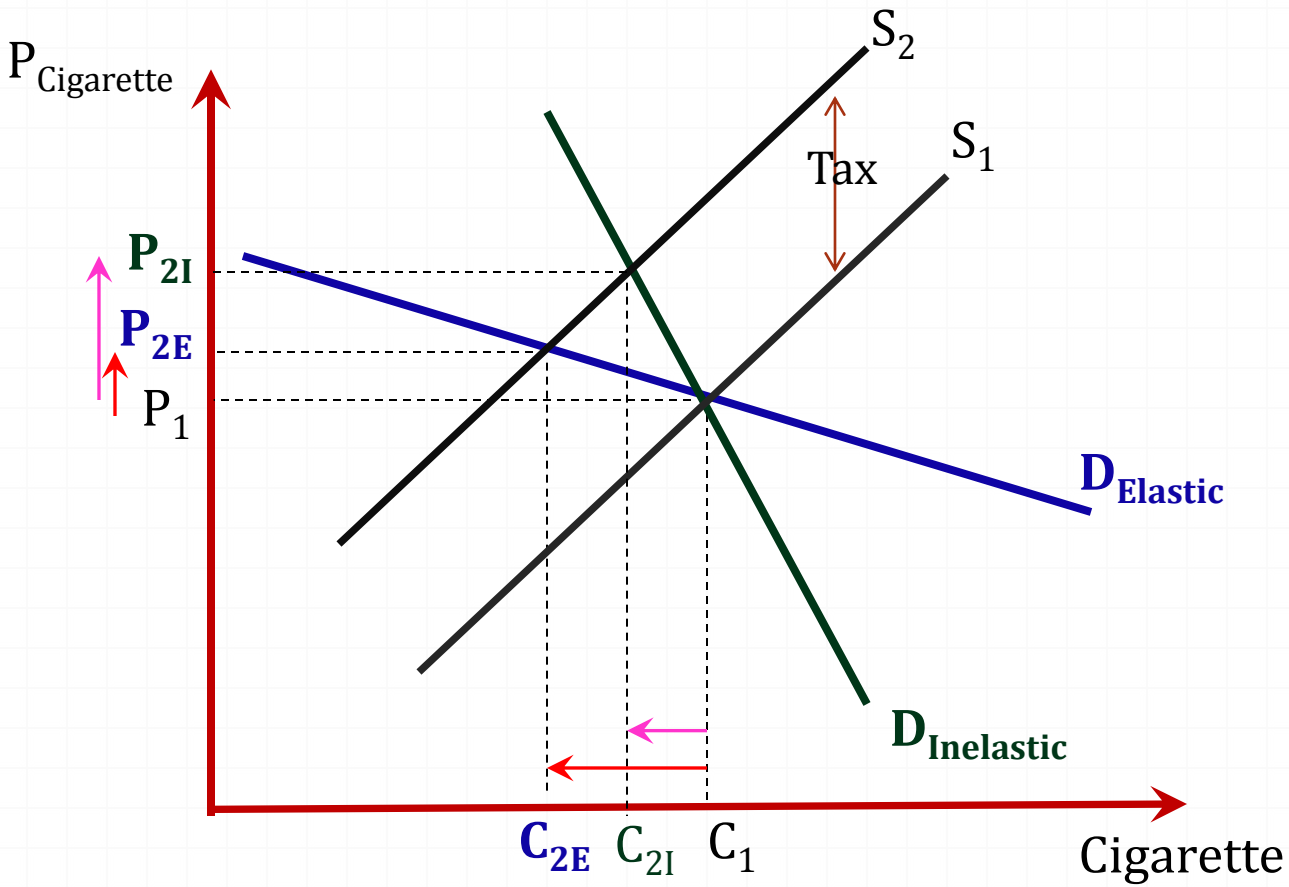
Elastic Demand



Inelastic Demand



Impact of Cigarette Tax



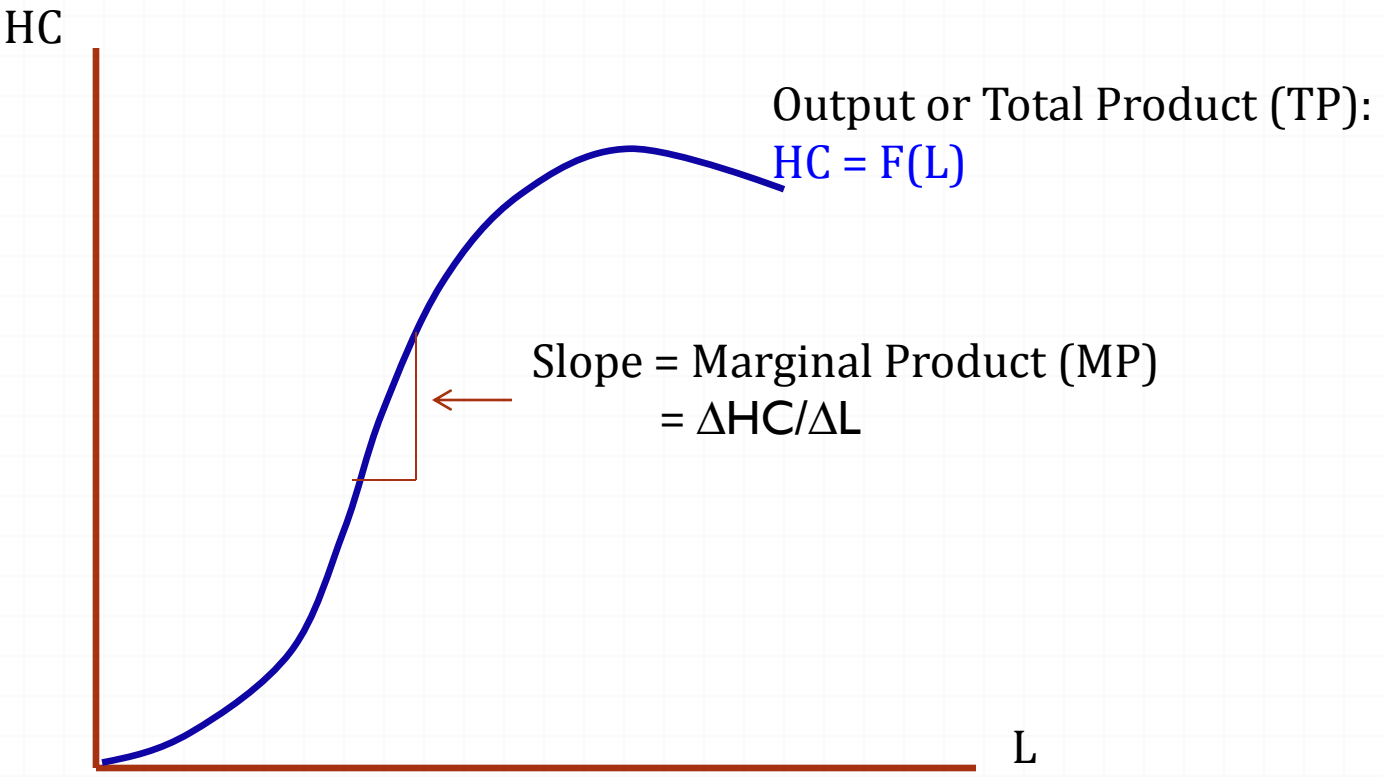
Production and Market Supply

- Production function
- Cost minimization:
  - Isoquants
  - Isocost curves
- Firm's supply curve under perfect competition
- Marker supply

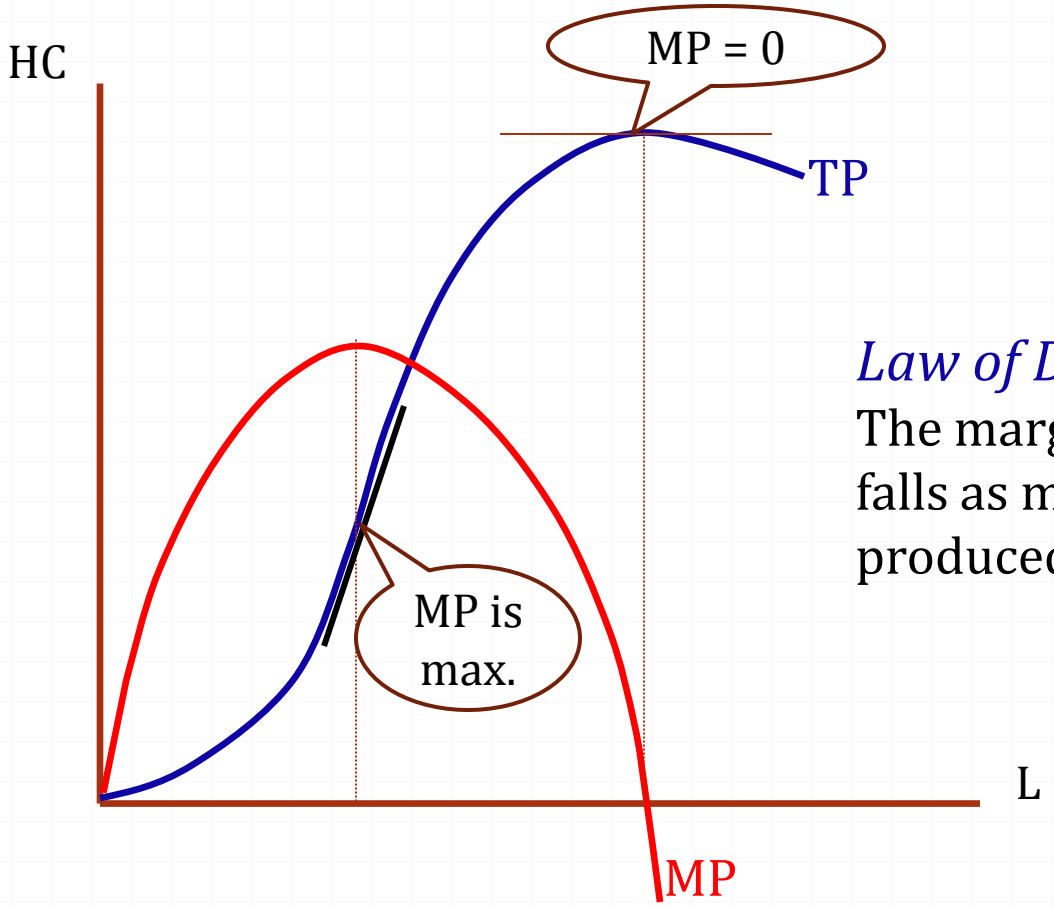
Production Function

- Production function shows the maximum output that can be produced from different combinations of inputs: $Q = f(X_1, X_2, X_3, \ldots)$
- Example: $Q = f(K, L) = K^{0.2}L^{0.8}$
  - Q is output
  - K and L are inputs.
  - This function is called "Cobb-Douglas" function.

Production Function: 1 Input & 1 Output

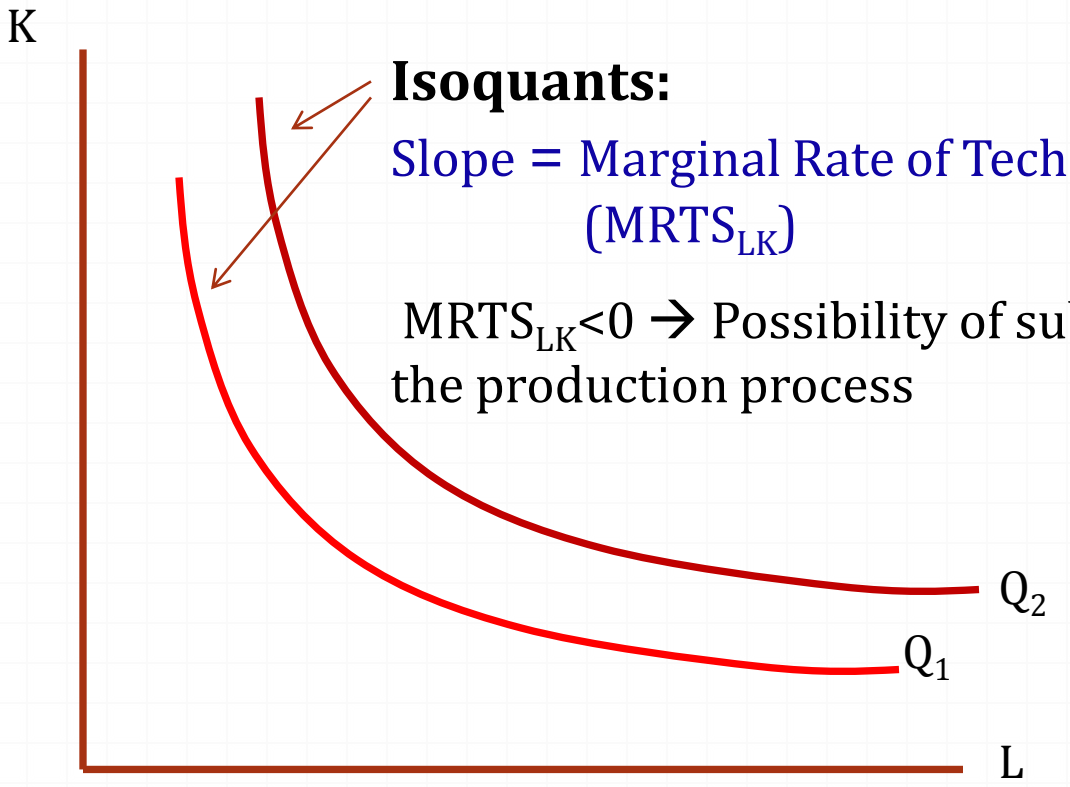


Production Function



Law of Diminishing Returns:
The marginal product of labor falls as more output is produced.

Production of 2 Inputs:
Isoquant



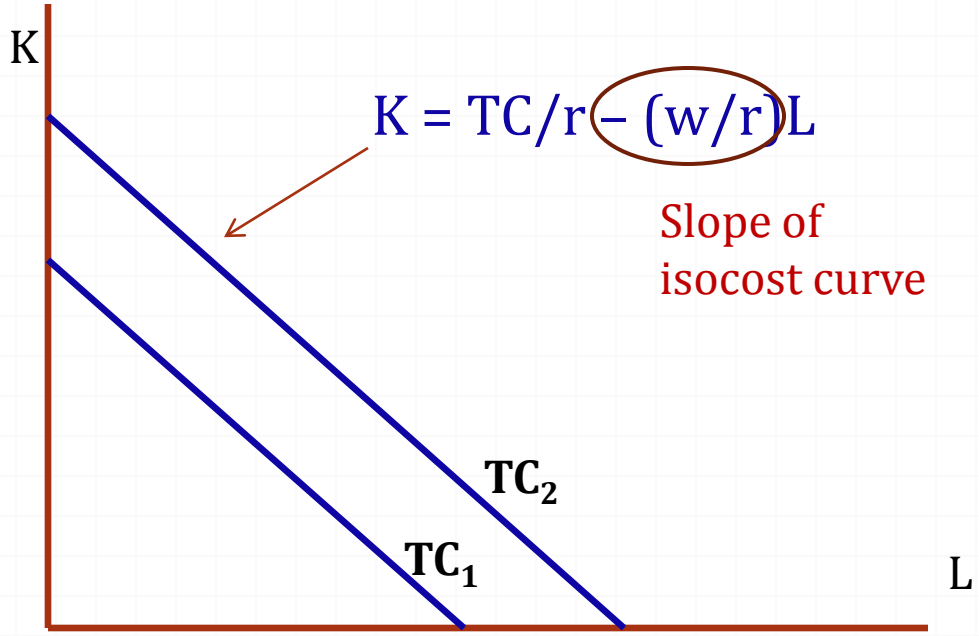
Isoquants:

Slope = Marginal Rate of Technical Substitution ($MRTS_{LK}$)

$MRTS_{LK}<0$ → Possibility of substituting inputs in the production process

Isocost Curve

- The isocost curve represents all the combinations of K and L that could be purchased at a given cost.
- TC = rK + wL , where r is the price per unit of capital and w is the price per unit of labor

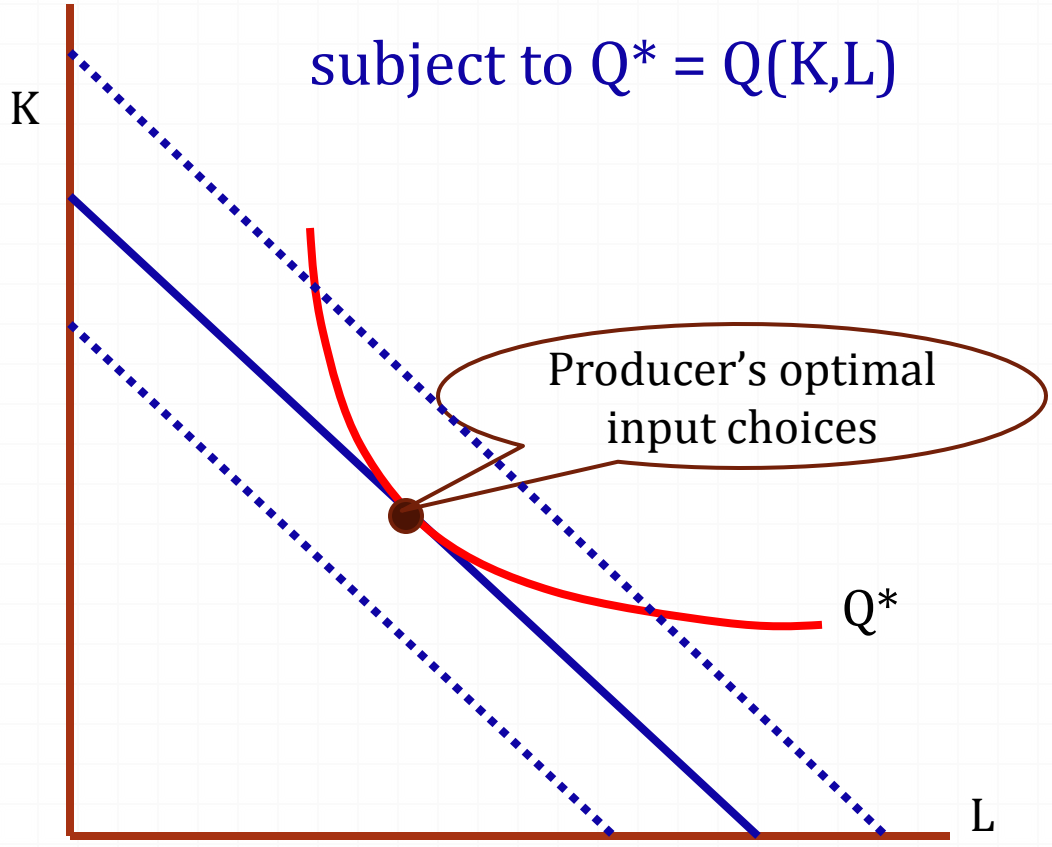


Cost Minimization

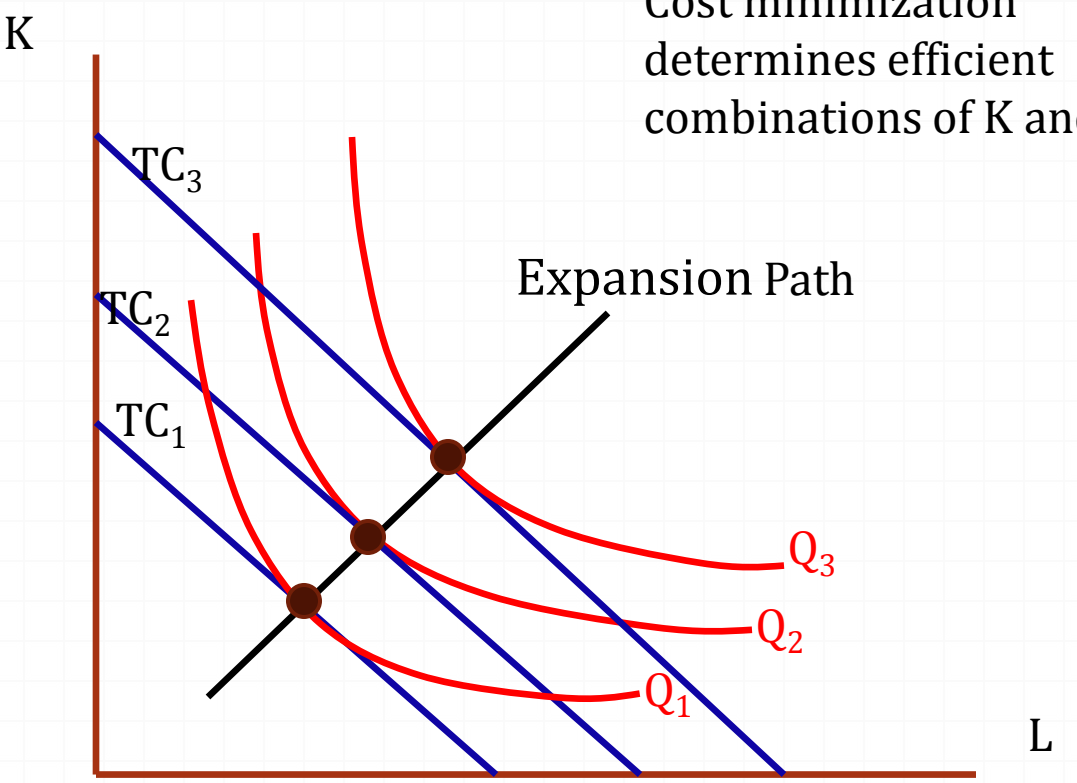
- Producer's problem:

$$\text{Min } TC = rK + wL$$

$$\text{subject to } Q^* = Q(K,L)$$



Efficient Combinations of Inputs



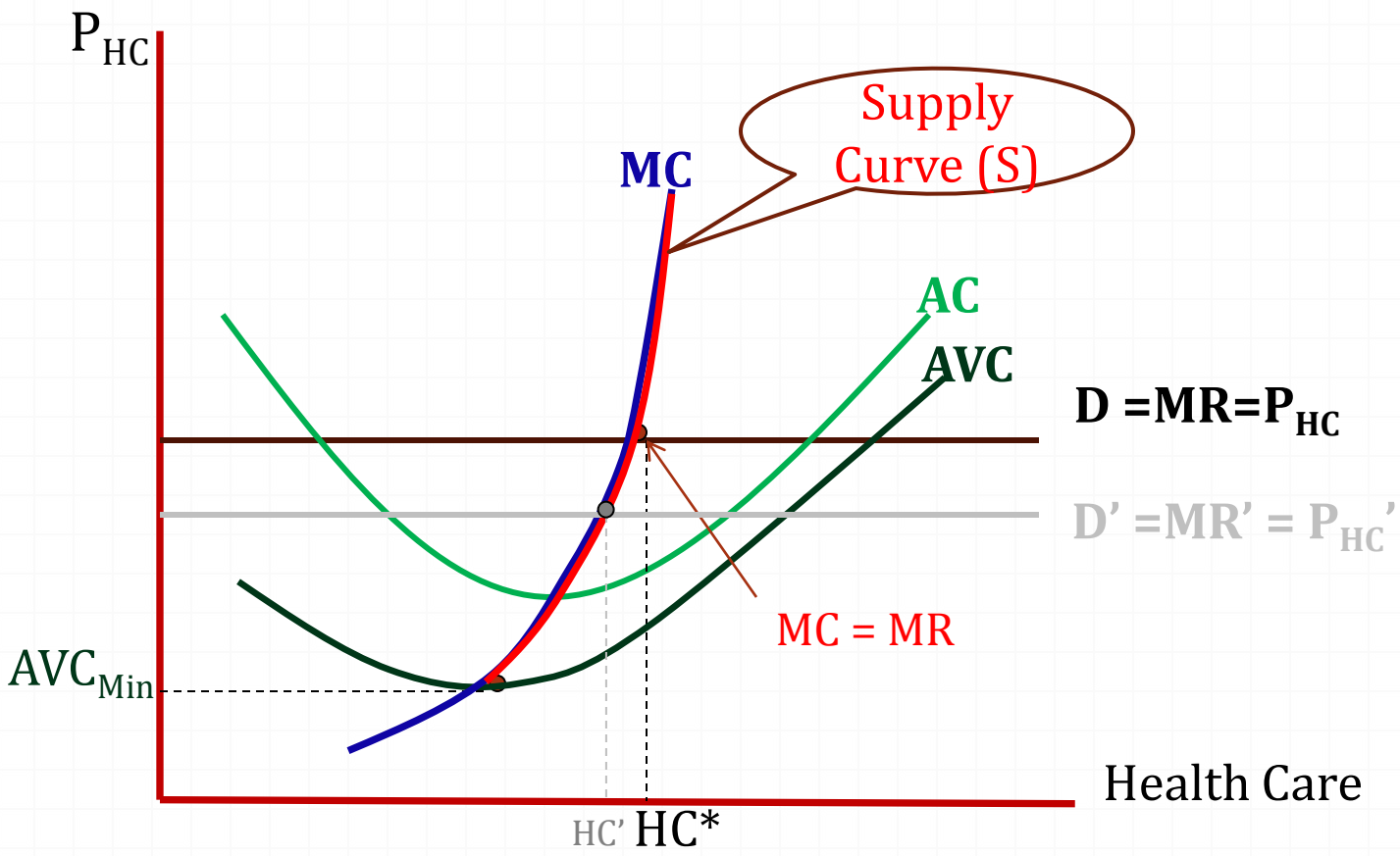
Cost minimization determines efficient combinations of K and L.

Firm's Supply Curve under *Perfect Competition*

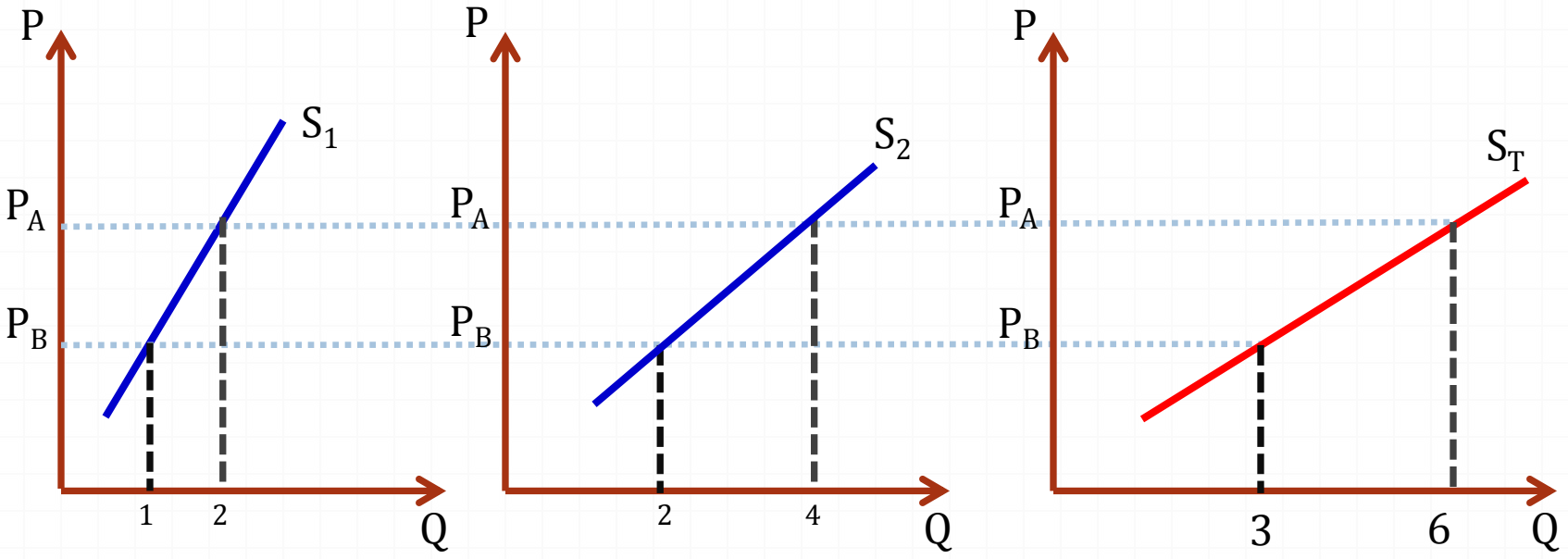
- To derive the supply curve, we need to know the demand curve of the firm's product.
  - Need to know the market structure
- Assumptions of perfect competition:
  - Large number of sellers and buyers → *"Price takers"*
  - Homogeneous product
  - Perfect information
  - No barriers to entry or exit

  → *Demand curve is flat*: **D = MR = P** .

Competitive Firm's Supply Curve

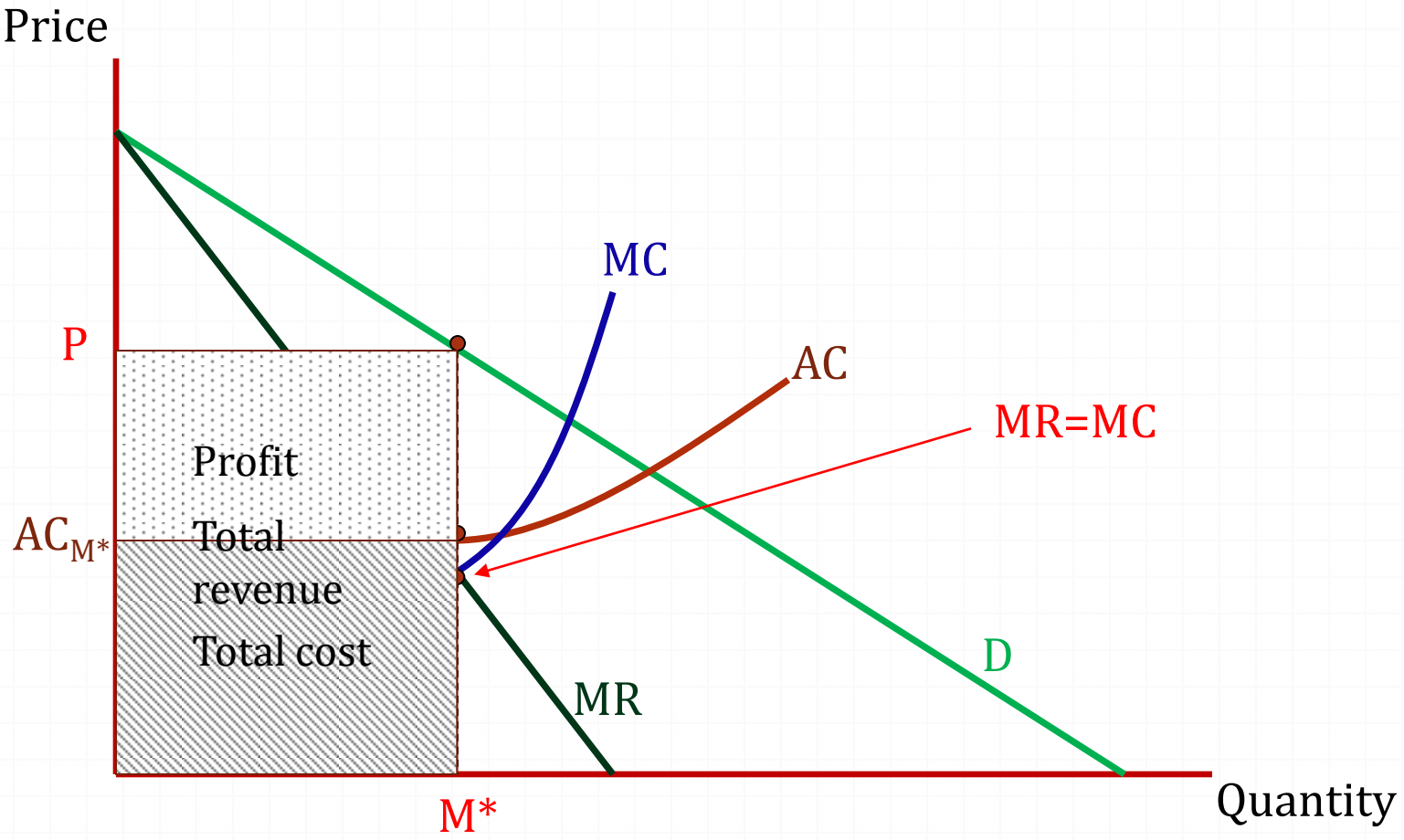


Market Supply



Firm 1 Firm 2 Market

Monopolist


Price
MC
P
AC
MR=MC
Profit
AC_{M*}
Total revenue
Total cost
D
MR
M*
Quantity