



# Producer and Optimal Production Choice

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# The producer and the production process

- Business firms demand factors of production in input markets and supply goods and services in output market
- Purchase inputs to produce and sell outputs

# The producer and the production process

- The behaviour of profit maximising firms should include
  - Optimal combination of factors, to minimise its cost for a given output
  - To maximise its output for a given cost

# The producer and the production process

- Central to our discussion- production
- The process by which inputs are combined, transformed and turned into outputs

# The producer and the production process

- Irrespective of size and internal organisation firms take inputs and transform them into things
- Example- Carpenter combines labour, raw material like wood, capital to prepare wooden objects and structures

# What is a firm?

- An organisation that comes into being when a person or a group of people decides to produce a good or service to meet a perceived demand

# Production is not limited to firms....

- Production and productive activity are not confined to private business firms
- Both households and government engage in transforming factors of production into useful things

# Production function

- Production function- the relationship between inputs and outputs of a firm
- An expression of the technological relation between physical inputs and output of a good



# Production function

- Symbolically
  - $O_x = f(i_1, i_2, i_3, \dots, i_n)$
  - $O_x$  is the output of commodity X
  - $f$  is the functional relationship
  - $i_1, i_2, i_3, \dots, i_n$  are input needed for  $O_x$

# Production function

- Specifies either the maximum output that can be produced with the given inputs/ the minimum quantity of inputs needed to produce a given level of output
- Establishes a relation between inputs and output which is technical in nature

# Production function

- Always defined with respect to a given technology. If there is an improvement in the technique of production- increased output can be obtained with the same physical inputs

# Short run and Long run

- Short run- a period in which output can be changed by changing only variable factors
- Fixed inputs like plant, machinery, building can not be changed
- Production can be raised only by increasing variable factor

# Short run and Long run

- Long run refers to a period in which output can be changed by changing all factors of production
- Firms can change its factory size, switch to new techniques of production, purchase new machinery etc.

# Variable factors and fixed factors

- Variable factors refer to those factors which can be changed in the short run
- Vary directly with the level of output
- Example- raw material, casual labour, power, fuel etc.

# Variable factors and fixed factors

- Fixed factors refer to those factors, which cannot be changed in the short run
- The quantity of fixed factors remain same in the short period irrespective of level output

# Concepts of Product/Output

- Output refers to the volume of goods produced by a firm or an industry during a specified period of time
  - Total product
  - Marginal Product
  - Average Product



# Total Product

- Total quantity of goods produced by a firm during a given period of time with given number of inputs
- Example- 10 labourers produce 60 kgs of rice
- Total product is 60 kgs

# Total Product

- In the short run a firm can expand TP by increasing only the variable factors
- Total product/Total physical product/Total output

# Average Product

- Refers to output per unit of variable input
- It is obtained by dividing TP by units of variable factor
- $AP = \frac{\text{Total Product}}{\text{Units of Variable factor}}$
- TP in terms of AP will be =  $AP \times \text{Units of variable factor}$

# Marginal Product

- Addition to total product, when one more unit of variable factor is employed
- $MP_n = TP_n - TP_{n-1}$
- $MP = \frac{\text{Change in Total Product}}{\text{Change in units of variable factor}}$
- TP is summation of MP