

# Production and Business Organisation

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# What is a Firm?

- A firm is an organization that comes into being when a person or a group of people decides to produce a good or a service.
- A Firm can be organized in the form of: Sole Proprietorship, Partnership or Corporation.
- Firms can be classified in terms of Single or multiple product firms. They can also be classified in terms of Domestic and Multinationals.

# Market structure

- Firms operate under different market structure:
- Pure/Perfect Competition
- Monopoly
- Oligopoly and
- Monopolistic Competition

# Three basic questions?

- How much will be produced?
- What combination of inputs will be used?
- How much profit will be made?

# production

- “Production” refers to the transformation of inputs or resources into outputs of goods and services.
- Inputs are broadly classified into labour (including entrepreneurial talent), capital, and land or natural resources.
- Inputs can also be classified as fixed (if they cannot be readily changed during the time period under consideration) and variable (if they can be varied easily and on very short notice).
- The time period during which at least one input is fixed is called the short-run.
- If all inputs are variable, we are in the long run.

# Production function

- A production function is an equation, table, or three-dimensional graph that shows the maximum output that a firm can produce per period of time with each set of units.
- If inputs and outputs are measured continuously, the production function is smooth.

# TP, AP & MP

- Total product (TP) is the output produced by using different quantities of an input with fixed quantities of other(s).
- Marginal product (MP) is the change in total product per unit change in the variable input used.
- Average product (AP) equals total product divided by the quantity of the variable input used.
- Output elasticity measures the percentage change in output or total product divided by the percentage change in the variable input used.

# Law of diminishing returns

- The law of diminishing returns postulates that, after a point, the marginal product of a variable declines.
- “Stage I of production” refers to the range of increasing average product of the variable input.
- “Stage II of production” is the range from the maximum average product of the variable input to where the marginal product of the input is zero.
- “Stage III of production” refers to the range of negative marginal product of the variable input.



# Returns to scale – long run Prod. Fn.

- “Constant,” “increasing,” and “decreasing returns to scale” refer to the situation where output changes, respectively, by the same, by a larger, and by a smaller portion than inputs.
- Increasing returns to scale arise because of specialization and division of labour and from using specialized machinery.
- Decreasing returns to scale arise primarily because as the scale of operation increases, it becomes more and more difficult to manage the firm and coordinate its operations and divisions effectively.
- In the real world, most industries seem to exhibit near-constant returns to scale.

# Examples

- CRS – handicrafts & handloom industry in many developing countries
- IRS [economies of scale] – many engineering industries
- DRS [inefficiencies set in beyond some scale of operation, due to increasing costs of management & control] – electricity generation, production involving use of natural resources, providing drinking water.

# Short and long run

- Efficient production requires time as well as conventional inputs like labour.
- We distinguish between two different time periods in production and cost analysis.
  - Short run only some variable inputs can be adjusted
    - Fixed factor like plant & equipments cannot be fully modified or adjusted
  - Long run all factors employed by the firm, including capital, can be changed

# Technological change

- Can be dramatic – fibre optics
- Can be subtle – adjustment in production process to reduce waste [or energy consumption] and increase output
- Process innovation – new engineering knowledge improves production techniques for existing products
- Product innovation – new or improved products are introduced in markets

# Market failure and technological regress

- An unregulated company might introduce a socially wasteful process, say, dumping toxic wastes into a stream, because the wasteful process is more profitable.
- The economic advantage of inferior technologies comes only because the social costs of pollution are not included in the firm's calculations of the costs of production.
  - Pollution tax – inferior products will extinct

# Economies of scope

- Occur when a number of different products can be produced more efficiently together than apart.
  - Software programmes

Specialisation and division of labour that increase productivity, as economies become larger and more diversified.

# Productivity growth

- Total factor productivity and productivity of all the inputs used [land, labour, capital, material inputs, energy, etc]
- It is an indicator of efficiency.
  - It can grow because of technological advances, process and product innovations
  - Economies of scale and scope.

# MRP and MRC

- The marginal revenue product (MRP) of the variable input equals the marginal product (MP) of the variable input times the marginal revenue (MR) from the sale of the extra output produced.
- The marginal resource cost (MRC) of a variable input is equal to the increase in total costs resulting from hiring an additional unit of the variable input.
- As long as MRP exceeds MRC, it pays for the firm to expand the use of the variable input used because by doing so, it adds more to its total revenue than to its total cost (so that the firm's total profits rise).
- On the other hand, the firm should not hire those units of the variable units for which the MRP falls short of the MRC.
- The optimal use of the variable input is (i.e., the firm maximizes profits) where  $MRP = MRC$  for the input.



# Equilibrium of the producer

- An isoquant shows the various combinations of two inputs that can be used to produce a specific level of output. Ridgelines separate the relevant (i.e., the negatively sloped) from the irrelevant (or positively sloped) portions of the isoquants.
  - The absolute slope of the isoquant is called “the marginal rate of technical substitution” (MRTS).
  - This equals the ratio of the marginal products of the two inputs.
  - As we move down along an isoquant, its absolute slope or MRTS declines so that the isoquant is convex to the origin.
  - When isoquants are straight lines ( so that their absolute slope or MRTS is constant), inputs are perfect substitutes.
  - With right-angled isoquants, inputs can be combined only in fixed proportions (i.e., there is zero substitutability of inputs in production).

- Given the wage rate of labour ( $w$ ), the rental price of capital ( $r$ ), and the total costs or expenditures of the firm ( $C$ ), we can define the isocost line.
- This shows the various combinations of  $L$  and  $K$  that the firm can hire.
  - With  $K$  plotted along the vertical axis, the  $Y$  intercept of the isocost line is  $C/r$  and its slope is  $-w/r$ .
  - In order to minimize production costs or maximize output, the firm must produce where an isoquant is tangent to an isocost.
  - There,  $MRTS=w/r$ , and  $MP_L/w=MP_K/r$ . Joining points of optimal input combinations where isoquants are tangent to isocosts, we get the expansion path of the firm.

- To maximize profits, a firm should hire each input until the marginal revenue product equals the marginal resource cost of the input.
- If the price of an input declines, the firm will substitute the cheaper for the more expensive input in order to reach a new optimal input combination.

# Consumer and Producer equilibrium compared

- In Consumer equilibrium,
  - Law of equi-marginal utility
  - At the point of equilibrium, the consumer's substitution ratio is just equal to the slope of the budget line.
    - Substitution ratio or the slope of the IC is the ratio of the marginal utility of food to the marginal utility of clothing.
    - The ratio of prices must be equal to the ratio of Mus
    - In equilibrium, the consumer is getting the same marginal utility from the last paise spent on food as from the last paise spent on clothing.

# In Producer equilibrium

- Least cost conditions
  - The ratio of marginal products of any two inputs must equal the ratio of their factor prices:
    - $\text{MP of labour} / \text{MP of capital} = \text{slope of equal-product curve} = P \text{ of labour} / P \text{ of capital}$

It follows that that the MP per rupee received from the (last) rupee of expenditure must be the same for every productive input:

$$\text{MP of L} / P \text{ of L} = \text{MP of K} / P \text{ of K}$$

How a firm will distribute its expenditure among inputs to equalise the MP per rupee of spending.

# Forms of business organisation

- Sole proprietorship
  - individual
- Partnership
  - Limited or unlimited liabilities
- Corporations
  - Share holders and manages
    - Principal – agent problem

***Public Sector undertakings***