Block-II

Economics for Managers

Microeconomics-II

Block

II

MICROECONOMICS – II

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BLOCK II: MICROECONOMICS – II

The second block to the course on Economics for Managers deals with the concept of market structure, factors of production and different methods of demand forecasting. The block has five units. The first two units deal with market structure. The third and fourth units analyze factors of production. The last unit is about importance of forecasting techniques in taking business decisions.

The first unit, *Perfect Competition*, provides an idea of market structure, which has a great influence on how a firm can, maximizes its profit. Perfectly competitive market is an ideal market structure where a large number of buyers and sellers are selling homogenous products and therefore all of them are price takers. Equilibrium price and quantity are determined by the forces of demand and supply, and no single buyer or seller can influence them. Perfect Competition is an ideal form of market structure and therefore to know other market structure, a producer has to understand different aspects of perfectly competitive market. This unit deals with characteristics of perfect competition and discusses equilibrium condition in a perfectly competitive market;

The second unit, *Imperfect Competition*, deals with different type of imperfect market structure. Imperfect competition can be divided into monopoly, monopolistic and oligopoly market structures. Monopoly is a market structure where a single seller sells a unique product and therefore can control the whole market. In oligopoly, there are only a few sellers. And in monopolistic competition, there are a large number of buyers and sellers in the market. To take production decisions, a firm has to understand different type of market structure and how other firms behave in different type of markets. This unit provides a discussion on different types of imperfect market structures and game theory.

The third unit, *Rent and Wages*, provides an idea of factor pricing. Land and labor are two main factors of production and rent and wages are the reward for land and labor respectively. In addition to product pricing, a firm should have a clear understanding of factor pricing also. This unit discusses different theories of factor pricing with special focus on theories of rent and wages.

The fourth unit, *Interest and Profit*, deals with other two factors of production, capital and entrepreneurship. In addition to land labor, capital and entrepreneurship are also required for production. It is, therefore, important to have a clear understanding of how capital and entrepreneurship are rewarded in production. The unit focuses on theories of interest and profit.

The last unit of this block, *Forecasting and Decision Making*, deals with a different concept. Risk and uncertainty are associated with business decisions. Therefore, an idea of how demand forecasting techniques can help to make easy the decision making process is important for managers of a firm. The last unit gives an idea of various demand forecasting techniques and how capital budgeting is used by managers to make important investment decisions.

Unit 6

Perfect Competition

Structure

6.1 Introduction

Till now, we have discussed the theory of demand and supply, concept of elasticity, the utility theory and the theory of production and cost. We have also discussed the concept of equilibrium.

Market structure is important in determining the actions of an organization. The market structure affects the way in which a firm can achieve the objective of profit maximization. Thus the market structure has a major influence on the decisions taken by the firm.

Market structure can be classified into two categories – perfect competition and imperfect competition. In perfect competition there is large number of buyers and sellers selling homogenous products; hence, a single buyer or seller cannot affect the price of a product.

In this unit, we will discuss the characteristics of perfect competition and the equilibrium of the firm under conditions of perfect competition.

Before studying this unit students should recall the theory of supply and demand (Unit 2) and theory of costs (Unit 5).

6.2 Objectives

By the end of this unit, students should be able to:

- Identify characteristics of perfect competition
- Explain short run and long run equilibrium in perfectly competitive market
- Analyze efficiency of perfectly competitive market
- Predict the effects of different types of tax on price and output

6.3 Characteristics of a Perfectly Competitive Market

The following are the important characteristics of a perfectly competitive market:

Large number of buyers and sellers: The market is comprised of a large number of buyers and sellers; hence, a single buyer or seller cannot influence the price of a product by altering his individual demand/supply of the product. This means a single firm is too small in relation to the market to influence price of the product prevailing in the market. Withdrawal by some of the sellers and buyers will not have any effect on the price of the commodity. Therefore, each seller is a *price taker* in perfectly competitive market.

Homogenous product: Firms produce and sell a homogenous product i.e. the product of each firm is similar to that of the other firm in features, size, color, etc. As a result, buyers cannot distinguish the output of one firm and the output of another, so they are indifferent as to the buyer from whom they buy the product. Oil, petrol, copper, iron and steel sheet are fairly homogenous. Economists refer to such homogenous products as commodities. *Homogenous products* features ensure a uniform price for the products in the industry. The assumption of product homogeneity is important because it ensures that there is a single market price, consistent with supply–demand analysis.

Free entry and exit of firms: In perfect competition, firms are free to enter or exit the market. There are no restraints on the independence of firms and no barriers to entry or exit. This means that there are no special costs that make it difficult for a new firm to enter the market and exit if it cannot make a profit.For example, the pharmaceutical industry is not perfectly competitive because Dr. Reddy Labs, Pfizer, and other firms hold patents that give them unique rights to produce drugs. Any new entrant would either have to invest in research and development to obtain its own competing drugs or pay substantial license fees to one or more firms already in the market.

Perfect mobility: Resources can be moved in and out of the market easily. Goods, services and labor are perfectly mobile between firms and consumers. Workers and other inputs can easily move from one job to another and can respond quickly to monetary incentives.

Absence of transportation cost: Transportation costs are absent in perfect competition, so firms do not have to incur costs on transportation of the goods from one part of the market to another.

Perfect knowledge among buyers and sellers about market conditions: In perfect competition, firms possess perfect knowledge about the conditions prevailing in the market. That is, they have perfect knowledge as to present and future prices, costs, and economic opportunities in general. With perfect knowledge of present and future prices and costs, producers know exactly how much to produce. Similarly, consumers will not pay a higher price than necessary for a product.

Absence of selling costs: Selling costs refer to cost of advertisement and other promotional costs required for a firm to sell products. In perfect competition, as all firms sell identical product, there is no need to incur selling costs.

Example: A Perfectly Competitive Market

Rajan is a farmer who cultivates maize. The market price of the maize is ₹ 200 per bag. Rajan wants to raise the price at which he sells the maize. However, when he increases his price over ₹ 200, buyers stop buying from him and switch to one of the numerous other sellers in the market. Unable to sell his maize at a price above ₹ 200, he decides to create an artificial shortage of maize, by asking other farmers to reduce supply, which he hopes will result in a rise in the price. But this does not happen as there are such a large number of farmers growing the same crop that even if a few of them get together they cannot affect the total supply of output in the market in such a way as to influence the market price.

How do we identify a perfectly competitive market? While the presence of the features of perfect competition are one way of identification, another measure is the HHI (Herfindahl-Hirschman Index) that measures market concentration. Exhibit 6.1 discusses how this index is being implemented in India.

Exhibit 6.1: HHI – A measure of Market Concentration in India

Alt Indices is a benchmarking agency and a provider of analytics data solutions with asset capabilities. In March 2021, Alt Indices launched the HHI index for tracking market competition in India. This index is an econometric tool that is widely accepted by various market regulators as a measure of market concentration.

The formula which this index uses is:

$HHI = S_1^2 + S_2^2 + + S_n^2$

Where, HHI = Herfindahl-Hirschman Index

S_n = Market share percentage of firm 'n' expressed as a whole number

HHI index can be used to gauge the market concentration in an industry. The index measures range from zero to 10,000

Zero – Represents the presence of large number of firms in the market with each one having approximately near zero or 0% market share. So, the zero is an indication of perfect competition in the industry.

10,000 – Represents the existence of a single firm having 100% market concentration. In other words, it is a monopoly firm.

The Competition Commission of India considers the HHI reports for evaluation of the presence of Appreciable Adverse Effect on Competition (AAEC) in a merger proposal.

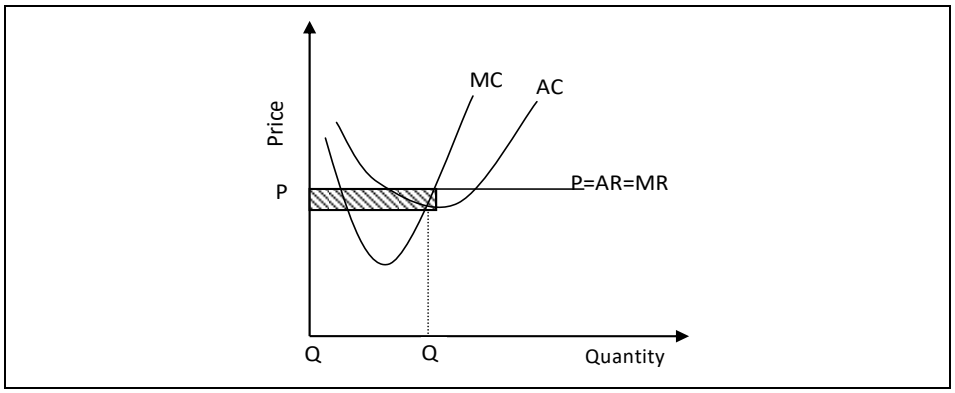
Sources: https://www.livemint.com/brand-post/alt-indices-launches-india-s-first-market-concentration-indices-11616668154205.html
https://www.altindices.com/

6.4 Supply and Demand in Perfect Competition

In perfect competition, the demand curve of a firm is horizontal as the price is determined by the supply and demand forces in the industry. The firm takes the market price as given and accordingly adjusts its production to maximize profits in the short run. The objective of the firm is to maximize profits. The firm adjusts its output level so as to maximize profits. In a perfectly competitive market, the firm has to adhere to the following conditions to attain equilibrium:

The demand curve of a firm in perfect competition is horizontal as the price is determined by supply and demand forces in the industry. Therefore, the equilibrium price is P = MR = MC. Profit maximization depends on two conditions. First condition is that MC = MR = AR = P. (Figure 6.1). The second condition is that the slope of MR curve should be less than the slope of the MC curve. MR = P is constant. Hence, the slope of MR equals zero. The second order condition implies that the slope of the MC curve should be positive or MC must be on the rise.

Figure 6.1: Supply and Demand in Perfect Competition



Source: ICFAI Research Center

To analyze the demand and supply conditions of a firm in a perfectly competitive market in the short run, we have to take a look at the aggregate supply of industry. The aggregate supply curve in the industry helps us to calculate the aggregate supply of all the firms during a particular period of time. In the short run, factors of production (inputs) cannot be changed or altered and so no new firms can enter the market. But in the long run, since all inputs are variable, firms can enter and exit the market freely. Prices are fixed and the demand and supply curves intersect each other.

In the long run, the entry of a firm in the market results in the shift of the supply curve to the right indicating a fall in the price. On the other hand, the exit of an existing firm from the industry results in shift in the supply curve to the left showing a rise in price. In the short run, the fixed costs incurred by the firm cannot be varied. Therefore, profit maximization can be achieved when marginal cost is equal to marginal revenue.

The demand curve is also the firm's average revenue curve. In the industry, the demand curve slopes downwards to the right indicating that demand increases as price falls. The supply curve slopes upwards to the right denoting a rise in the supply due to increase in price. Price is determined at the point where the demand and supply curves intersect.

Numerical Example

The supply function of a firm in a perfect competitive market is $Q_S = 10,000+20P$ and the demand function is $Q_D = 30,000-30P$. The total cost function is $TC = 1500+100Q+Q^2$. What is the profit maximizing output of the firm?

$Q_S = 10,000+20P$ and $Q_D = 30,000-30P$.

At equilibrium, $Q_D = Q_S$

$\Rightarrow 30,000-30P = 10,000+20P \Rightarrow 50P = 20000 \Rightarrow P = 400$

For a firm in perfect competitive market, P = MR

A firm maximizes its profit when MR = MC

$TC = 1500+100Q+Q^2$.

Therefore, $MR = \partial TC / \partial Q = 100+ 2Q$

At profit maximizing output, $400 = 100+2Q \Rightarrow Q = 150$

Exercise

A. The marginal cost of a firm operating in a perfectly competitive environment is $480 – 80Q + 6Q^2$. The firm sells its product at ₹ 1280 per unit. Determine the profit maximizing output for the firm.

   a. 15
   b. 20
   c. 25
   d. 30

Check Your Progress - 1

1. Which of the following is not a characteristic of a perfectly competitive market?
   a. Large number of buyers and sellers
   b. Homogeneous product
   c. Free entry and exit of firms
   d. Presence of high transportation costs
2. In a perfectly competitive market, the demand curve is _____.
   a. Relatively inelastic
   b. Unitary elastic
   c. Relatively elastic
   d. Infinitely elastic

3. Which of the following is the shape of the marginal revenue curve of a firm operating in a perfectly competitive market?
   a. Upward-sloping
   b. Parallel to x-axis
   c. U-shaped
   d. Downward-sloping
4. Which type of demand curve can be seen in a firm operating in a perfectly competitive market?
   a. Upward sloping
   b. Downward sloping
   c. A vertical line
   d. A horizontal line
5. A firm in a perfectly competitive market maximizes its profits when _____.
   a. Demand is equal to supply
   b. Marginal revenue is equal to marginal cost
   c. Marginal revenue is equal to average cost
   d. Average revenue is equal to average cost

6.5 Short Run Equilibrium of the Competitive Firm

In perfect competition, firms adjusts their output levels to the given price levels to maximize their profits, where MC = MR. The rule that profit is maximized when marginal revenue is equal to marginal cost holds for all firms, whether competitive or not. In the short run, a firm operates with a fixed amount of capital and must choose the levels of its variable inputs (labour and materials) to maximize profit. The point of profit maximization of a firm can be determined in two ways – the total revenue and total cost approach, and marginal revenue and marginal cost approach.

Table 6.1: Total Cost and Total Revenue

Market Price	Rate of Output and Sales	Total Revenue	Total Fixed Cost	Total Variable Cost	Total Cost	Profit
10	1	10	30	4	34	-24
10	2	20	30	7	37	-17
10	3	30	30	9	39	-9
10	4	40	30	11.5	41.5	-1.5
10	5	50	30	14.5	44.5	5.5
10	6	60	30	18.5	48.5	11.5
10	7	70	30	25	55	15
10	8	80	30	35	65	15
10	9	90	30	51	81	9
10	10	100	30	75	105	-5

Profit becomes positive in the 5th unit of output. This positive change in profit continues and reaches maximum by the 8th unit and slowly starts declining by the 9th unit. Finally, the profit of the firm becomes negative by the 10th unit of the product. When we analyze the maximization of profit in perfect competition with the help of total revenue and total cost approach, the profit of the firm will be negative for a particular period of time i.e. till the 4th unit of output and with the 5th unit of output it becomes positive.

The marginal approach is explained with the help of the table. It is evident from the table that the firm reaches its maximum profit when marginal cost equals price and marginal revenue. Since firms are price-takers in perfect competition, marginal revenue is the same as the price. In the table the firm maximizes its profit with the 8th output as the marginal cost equals the marginal revenue or the price of ₹ 10. Marginal revenue can be defined as the addition to the total revenue attributable to the addition of one more unit of sale, whereas marginal cost is the addition to total cost as a result of one more unit of output. Thus, a firm increases profit when marginal revenue exceeds the marginal cost and the profit diminishes when marginal cost exceeds the marginal revenue. Therefore, when the marginal revenue and marginal cost are equal, profit is maximum.

Table 6.2: Marginal Cost and Marginal Revenue Approach

Output & Sales	Marginal Revenue / Price (₹)	Marginal Cost (₹)	Average Total Cost (₹)	Unit Profit (₹)	Total Profit (₹)
1	10	4	34	-24	-24
2	10	3	18.5	-8.5	-17
3	10	2	13	-3	-9
4	10	2.5	10.38	-0.38	-1.5
5	10	3	8.9	1.1	5.5
6	10	4	8.8	1.92	11.5
7	10	6.5	7.86	2.14	15
8	10	10	8.12	1.88	15
9	10	16	9	1	9
10	10	24.5	10.5	-0.5	-5

6.6 Long Run Equilibrium of the Competitive Firm

In the long run, firms have the ability to adjust the quantity of all inputs and produce the most profitable level of output as all the inputs are variable. The profits earned in the short run may attract new firms to enter the industry. The entry of new firms increases the aggregate output, which causes a shift in the industry supply curve to the right. The industry supply curve intersects the market demand curve at the price where the firms make zero profits in the long run. In the long run, the firm is said to be in equilibrium at the point where marginal cost equals marginal revenue. In other words, at the point of equilibrium long run MR=MC=AC. Therefore, when economic profit and economic loss have been eliminated and entry and exit have stopped, a competitive market is in long-run

equilibrium. All firms only earn normal profits in the long run. Therefore, a long-run competitive equilibrium occurs when three conditions hold:

- All firms in the industry are maximizing profit.
- No firm has an incentive either to enter or exit the industry because all firms are earning zero economic profit.
- The price of the product is such that the quantity supplied by the industry is equal to the quantity demanded by consumers.

Activity 6.1 The total cost function of a competitive firm selling its product at ₹ 840 is $TC=440Q - 40Q^2 + Q^3$. Find the profit maximization output and the profit at this output. **Answer:**

Numerical Example

The price of the product of a firm is P= 320-8Q. How much should the firm produce to maximize its total revenue?

P = 320 – 8Q

Revenue is maximum when marginal revenue is zero.

To arrive at MR

TR = PQ

TR = (320 – 8Q)Q

$TR = 320Q – 8 Q^2$

MR = 320 – 16Q

Revenue is maximum when MR = 0

320 – 8 Q = 0

Q = 320 / 8 = 40

Therefore, firm should produce 40 units of output to maximize its total revenue.

Exercise

B. The demand function of a firm is Q = 2000 –50P. If the firm wants to maximize its total revenue, what should its output be?

   a. 1200
   b. 800
   c. 750
   d. 1000

6.7 Efficiency of Competitive Markets

A competitive market can achieve an efficient use of resources. Resource use is efficient when we produce the goods and services that people value most highly. If someone can become better off without anyone else becoming worse off, resources are not being used efficiently. This is called Allocation efficiency or Pareto efficiency occurs when a new allocation of resources can possibly make one person better off, but only at the expense of someone else.

Pareto optimality or efficiency can be looked at from three angles. They are:

a. Efficient allocation of resources among firms (equilibrium of production) (relates to the factor market)

b. Efficient distribution of goods produced between consumers (equilibrium of consumption) (relates to the product market)

c. Efficient combination of products (simultaneous equilibrium of production and consumption)

6.7.1 Long run competitive equilibrium and allocative efficiency

For simplicity, we take a single competitive industry that produces bread as an example. Net gains are possible for the seller if the maximum price someone is willing to pay for more bread exceeds the minimum price the seller is willing to accept when he makes that bread available in the market. A situation where net gains are possible for the buyer/seller is not an equilibrium situation since we are assuming both buyer and seller will change the amount bought/sold in order to maximize their benefit i.e. they will adjust the amount bought/sold upto the point where no more net gains are possible.

6.7.2 Efficient output of a good

The maximum price a buyer will pay for another unit of a good is called the marginal benefit of the good. The minimum price a seller will accept for making another unit available is its marginal cost. The marginal cost represents the value of the resources necessary to make one more unit of a good available. Therefore the MC curve is the supply curve of the firm.

The marginal benefit is assumed to decline with the consumption of bread, while the marginal cost is assumed to increase with increased consumption/production. A net gain is possible from making more bread available as long as the marginal benefit of bread exceeds its marginal cost. So goods are made available just up to the point at which their marginal benefit equals marginal cost. If all goods and services are bought and sold under conditions of perfect competition, efficiency is achieved, because the perfectly competitive market satisfies the Pareto optimality condition i.e. that any rearrangement of production will result in a net loss.

6.7.3 Efficiency in competitive markets

In competitive markets, the price of a good equals the marginal benefit and marginal cost of the good. In the long run, the price also equals the minimum

possible average cost (as seen in the earlier discussion on long-run cost curves). In the long run, competitive equilibrium prices equal the minimum possible average cost of a good. Therefore, in the long run, price equals minimum possible average cost which is equal to marginal cost. Consumers can buy goods at the lowest possible price that covers both the average and the marginal cost of production.

Check Your Progress - 2

6. Firms in a perfectly competitive market adjust their output levels to the given price levels to maximize their profits, where
   a. MC = MR
   b. MC > MR
   c. MC < MR
   d. TC = MR
7. The maximum price a buyer will pay for another unit of a good is called_____.
   a. The marginal benefit of the good
   b. The marginal cost of the good
   c. The average cost of the good
   d. The average variable cost of the good
8. _____
   a. Marginal cost.
   b. Marginal benefit
   c. Average variable cost
   d. Average cost
9. When a new allocation of resources can possibly make one person better off, but only at the expense of someone else, it is called_____
   a. Pareto efficiency
   b. Inefficient allocation
   c. Marginal benefit
   d. Marginal cost

6.8 Effect of Taxes on Price and Output

The effects of the imposition of taxes by the government in the form of lump tax, a profit tax, and a specific tax are discussed in this section.

6.8.1 Imposition of a lump sum tax

The imposition of a lump sum tax leads to an upward shift of the average fixed cost and the average total cost curves. There are no changes in the AVC and the MC curves as the lump sum tax is a fixed cost. Given that the MC curve is the

supply curve of the firm, the equilibrium position of the firm is not affected in the short run.

In the long run, the market supply curve will shift upwards to the left which results in lower output, thus leading to a new equilibrium point, where the price for the same level of output is higher. Assuming market demand is constant, fewer firms remain in the industry, because the new (higher) price corresponds to a lower level of demand, which is fulfilled by a smaller number of firms.

6.8.2 Imposition of a profit tax

Profit tax is imposed on the profits of the firm; it is a percentage of the net profit of the firm. The profits tax, while reducing the profits (by adding to the cash expenses of the firm), will not affect its MC. Hence in the short run the equilibrium of the firm and the industry will not change. If all the firms in the industry were earning only normal profits in the pre-tax period, the profits dip to below normal level in the long run, and firms which cannot cover all the costs when a part of the revenue is taken as tax, exit from the industry. Exit of firms lead to a shift in the supply curve towards the left, and thus a new equilibrium point is reached at a higher price with a lower output.

The demand curve for the firm is horizontal as the price is determined by the demand and supply forces of the industry. The firm adjusts its output to the given price to maximize its profits.

6.8.3 Imposition of a specific sales tax

A specific sales tax is the amount charged per unit of output produced. Specific sales tax causes a shift in the firm's supply curve i.e. MC curve moves upwards to its left since each additional unit now costs more by a constant amount. This means that there is a fall in output at the existing price. The greater the elasticity of the market supply, the higher the percentage of the specific sales tax that is passed on to the consumer, and the smaller the burden of the tax on the firm. The specific sales tax is shared between the consumer and the firm as long as the market (or industry) supply curve has a positive slope.

Activity 6.2

Identify the following situations as perfect competition or imperfect competition, and justify your answer.

Situation A: A market which consists of large number of buyers and sellers selling slightly differentiated products.

Answer:

Situation B: All sellers in the market sell the same product at the same price to many buyers. **Answer:**
Situation C: Mayur, a fruit seller sells fruits in a market where he cannot dictate the market price of the fruits. **Answer:**

Check Your Progress - 3

10. In a perfectly competitive market, the burden of a specific tax that will be borne by the consumer (buyer) depends on _____, given the market demand.
    a. Elasticity of demand
    b. Demand for the good
    c. Price elasticity of supply
    d. Incidence of taxation

11. Which of the following statements regarding a lumpsum tax is true?
    a. A lumpsum tax will not affect the MC curve as a result the firm's output increases dramatically
    b. The lumpsum tax will push the MC curve down and the firm will continue to produce the same output as before the imposition of the tax
    c. The lumpsum tax will not affect the MC curve and the firm's output also falls considerably.
    d. The lump sum tax will not affect the MC curve and the firm will continue to produce the same output as before the imposition of the tax

6.9 Summary

- Perfect competition is a market situation where there are large number of buyers and sellers. No single seller or buyer can influence the market or affect the price of the product. The firms under perfect competition are price takers and sell homogenous products.
- The demand curve for the firm under perfect competition is horizontal as the price is determined by the forces of supply and demand in the industry. Firms

adjust their output to the given prices to maximize their profits. They reach equilibrium at a point where their marginal revenue is equal to the marginal cost in the short run period.

- In the long run, firms have the ability to adjust the quantity of all inputs and produce the most profitable level of output as all the inputs are variable. In the long run, the firm is in equilibrium at the point where marginal cost equals marginal revenue.
- Taxes such as lump sum tax, a profit tax, or a specific tax, will have an effect on price and output.

6.10 Glossary

Aggregate supply: The total value of goods and services that firms would willingly produce in a given time period. Aggregate supply is a function of available inputs, technology, and the price level.

Aggregate supply (*AS*) curve: The curve showing the relationship between the output firms would willingly supply and the aggregate price level, other things being equal.

Allocative efficiency: A situation in which no reorganization or trade could raise the utility or satisfaction of one individual without lowering the utility or satisfaction of another individual. Also called Pareto efficiency.

Imperfect competition: A market situation in which one or more buyers or sellers are important enough to have an influence on price.

Marginal benefit: The increase in total benefit consequent upon a one unit increase in the production of a good.

Marginal revenue: The addition to total revenue resulting from the sale of one additional unit of output.

Monopolistic competition: Essentially the same as imperfect competition: a market situation in which one or more firms may be capable of influencing the price of the product. It is characterized by product differentiation, often established through advertising.

Monopoly: Strictly defined as a market situation in which there is a single supplier of a good or service, but often used to suggest any situation in which a firm has considerable power over market price.

Net profit: The net profit can be arrived at by subtracting the implicit costs from gross Profits.

Normal profit: It is the minimum return that an entrepreneur receives for performing entrepreneurial functions such as bearing risk and uncertainty, managing other factors of production, etc.

Product differentiation: Causing buyers to believe that a particular version of a product is superior to that being offered by competitors.

6.11 Self-Assessment Test

1. Explain the characteristics of firms operating under perfect competition.
2. What are the effects of the imposition of taxes on the price and output of products?
3. Explain the equilibrium points of the firm under perfect competition in both the short-run and the long-run periods.

6.12 Suggested Reading/Reference Material

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6.13 Answers to Check Your Progress Questions

6.13.1 Model Answers to Check Your Progress Questions

Following are the model answers to the Check Your Progress questions given in the Unit.

1. **(d) Presence of high transportation costs**

   In perfect competition, it is assumed that there are no transportation costs for moving the product from one part of the market to another.

2. **(d) Infinitely elastic**

   In perfect competition all firms are price takers. Hence the demand curve in perfect competition is infinitely elastic which means that the firm can sell any amount of the good at the prevailing market price.

3. **(b) Parallel to x-axis**

   In perfect competition, supply and demand forces play an important role in determining the price of a commodity. The demand curve of the firm in perfect competition is horizontal as the price is determined by supply and demand forces in the industry.

4. **(d) A horizontal line**

   Perfect competition is a market situation where there are a large number of buyers and sellers selling homogenous products. Here, the price is determined by the market forces where the sellers are the price takers. The demand curve is a horizontal line because the price is determined where the marginal cost is equal to the marginal revenue i.e. P = MC = MR.

5. **(b) Marginal revenue is equal to marginal cost**

   In a perfect competition, the demand and supply forces determine the price. Marginal revenue is the additional revenue a seller earns by selling one more unit of a product. Marginal cost is the additional cost a seller incurs in producing one more unit of a product. Since the seller is a price taker in the market, marginal revenue is the same as the price.

6. **(a) MC=MR**

   In a perfectly competitive market firms maximize their profits, where P=MR=MC. Firms adjusts their output levels to the given price levels to maximize their profits, where MR=MC.

7. **(a) The marginal benefit of the good**

   At the efficient level of output, the marginal benefit of the product just equals marginal cost. The maximum price a buyer will pay for another unit of a product is called the marginal benefit of the product. The minimum price a seller will accept for making another unit available is its marginal cost. The

marginal benefit is assumed to decline with the consumption of each additional product.

8. (a) Marginal cost

The minimum price a seller will accept for making another unit available is called marginal cost/

9/ (a) Pareto efficiency

When a new allocation of resources can possibly make one person better off, but only at the expense of someone else, it is called Pareto efficiency.

10. (c) Price elasticity of supply

In perfect competition, the more elastic the market supply, the higher the proportion of the specific tax that the consumer will bear and less the firm's burden from the specific tax. Hence, the burden of specific tax that will be borne by the consumer (buyer) depends on the price elasticity of supply.

11. (d) The lump sum tax will not affect the MC curve and the firm will continue to produce the same output as before the imposition of the tax

The imposition of a lump sum tax will result in an upward shift of both the average fixed cost (AFC) and the average total cost (ATC) curves. However, the AVC and the MC curves are not affected, since the tax is like a fixed cost for the firm.

6.13.2 Model Answers to Exercises

Following are the model answers to the Exercises given in the unit.

A. (b) 20

$MC = 480 – 80Q + 6Q^2$

Profit is maximum, when the Marginal Revenue (MR) is equal to the Marginal Cost (MC).

In perfect competition, the Marginal Revenue is equal to the price i.e. ₹ 1280.

$MR = 1280$

Equating MR and MC

$1280 = 480 – 80Q + 6Q^2$

$80 Q – 6Q^2 + 800 = 0$

$6Q^2 – 80Q –800 = 0$

Using the quadratic equation formula, $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, numeric value of Q can be found.

Where a = 6, b = - 80 and c = - 800.

Q = 20 or – 6.67

Therefore, the profit maximizing output for the firm is 20.

B. (d) 1000

Q = 2000 –50P

P = 40 – 0.02Q

Revenue is maximum when marginal revenue is zero.

To arrive at MR

TR = PQ

TR = (40 – 0.02Q)Q

TR = 40 – 0.02 Q^2

MR = 40 – 0.04Q

Revenue is maximum when MR = 0

40 – 0.04 Q = 0

Q = 40 / 0.04 = 1000

Therefore, revenue is maximum when firm produces 1000 units of output.

Unit 7

Imperfect Competition

Structure

7.1 Introduction

Market structure influences the decisions taken by the firm and the profits that are earned by it in the long run. Market structure is classified into two types – perfect competition and imperfect competition. In the previous unit we discussed perfect competition. This unit is on imperfect competition.

Imperfect competition is any market structure, which is not perfectly competitive. Imperfect competition is categorized into monopoly, monopolistic and oligopoly market structures. Monopoly is a market structure where a single seller controls the whole market selling a unique product. Oligopoly is a market situation where a few sellers exist in the market. Monopolistic competition has a large number of buyers and sellers in the market and sellers divide the market through product differentiation and price discrimination.

This unit will discuss the different types of imperfect market structures, their characteristics and the different strategies adopted by players under game theory.

Before studying this unit, students should recollect their knowledge of perfect market structure (Unit 6).

7.2 Objectives

By the end of this unit, students should be able to:

- Identify different types of market structure
- Compare and contrast the characteristics of monopoly, monopolistic competition and oligopoly
- Explain various strategies of game theory

7.3 Imperfect Competition

In an imperfect market structure, the marginal revenue curve lies below the demand curve, which slopes downwards. A firm achieves profit maximization when its marginal revenue equals the marginal cost. The supply curve slopes upwards from left to right as the supply increases with the rise in price and decreases when there is a reduction in price. Under imperfect competition, the firm reaches the point of equilibrium when the demand curve intersects with the supply curve.

7.4 Monopoly

Monopoly is a type of market structure where there is only one supplier of a good or service. The good/service has no close substitute, and there are barriers preventing new firms from entering the market. The firm operating in the monopoly can either determine the price or the quantity demanded. They can either sell a smaller quantity at a higher price or sell a larger quantity at a lower price. The demand curve of the firm is the demand curve of the industry because there is only one seller. A key feature of a monopoly is the existence of barriers, which prevent the entry of new firms into the market. Some of the barriers are: control over vital raw materials, tariff protection from importers, protective government legislation, temporary low prices to force out competition, and large research and development budgets. Another characteristic of a monopoly structure is price discrimination, which means that the monopoly firm charges different prices to different classes of customers.

Exhibit 7.1 discusses how four companies in India are operating as virtual monopolies in the absence of strong competition.

Exhibit 7.1: Examples of Indian Companies Enjoying Monopoly Position

In an era of intense competition, monopolies are rare to find. But there are companies that enjoy a dominant position in the market that places them in a near monopoly state. Here are four such companies in India, as per a report in livemint.com

1. IRCTC or Indian Railway Catering and Tourism Corporation is the only organization authorized by Indian Railways to offer online railway tickets. E-tickets booked online through IRCTC's website and app accounted for 72.25% of the total reserved tickets over Indian Railways in financial year 2020. It is also the only entity to manage catering services and packaged drinking water under the brand name ‘rail neer’.
2. IEX (Indian Energy Exchange) – There are two nodal power exchanges in India IEX and PXIL (Power Exchange of India Limited). IEX holds a monopoly position in short term energy contracts traded over exchanges in India by accounting for 95% of the trades.

Contd….

3. CAMS - Computer Age Management Services is a technology driven financial infrastructure and services provider for mutual funds. It is India's largest registrar and transfer agent of mutual funds. It has an aggregate market share of approximately 70% based on AUM of mutual funds
4. CDSL – Central Depository Services Limited is the only listed depository in India while the other depository NSDL, is not listed. As such CDSL enjoys a dominant position. It earns approx. 60% of its revenue from demat accounts.

Source: https://www.livemint.com/companies/news/top-4-companies-that-are-strong-monopolies-11626087759636.html

Under monopoly, the supply and demand reaches a point of equilibrium, where marginal cost equals marginal revenue. The equilibrium point determines the selling price and the quantity of output to be produced.

Numerical Example

The total cost function of a monopolist firm is TC = 100+80Q and demand function is P = 200-5Q. What is the profit maximizing output of the firm? What is the profit of the firm?

A monopolist maximizes its profit when MR = MC

P = 200-5Q

TR = P x Q = (200-5Q) x Q = $200Q-5Q^2$

Therefore, MR = ∂ TR/ ∂ Q = 200-10Q

TC = 100+80Q

MC = ∂ TC/ ∂ Q = 80

Therefore, 200-10Q = 80 => 10Q = 120 => Q = 12

Therefore, the profit maximizing output of the firm is 12 units.

Profit = TR-TC

TR = (200 x 12)-(5 x 12 x12) = 2400-720 = 1680

TC = 100+ (80 x 12) = 100+960 = 1060

Therefore, profit = 1680-1060 = 620

Exercises

A. Power Corporation Limited is the sole supplier of electricity to an industrial township near Chennai. The demand for electricity is P = 800 – 16Q, and the firm's marginal cost is MC = 16Q. Find the profit maximizing output.

   a. 32
   b. 20
   c. 12
   d. 17

B. A firm operating in a monopoly market structure has the following cost function: $TC = 125 + 5Q^2$. The demand equation is represented by $P = 100 – 5Q$. Determine the profit maximizing quantity.

   a. 10 units
   b. 5 units
   c. 15 units
   d. 12 units

C. The demand curve for a firm operating in a monopoly market structure is $P = 220 – 8Q$. The marginal cost (constant) is ₹ 20. Find the profit maximizing output and price.

   a. 9.75
   b. 11.5
   c. 10.25
   d. 12.5

7.4.1 Price discrimination

Price discrimination is a situation where firms charge different prices for the same commodity from different customers. Price discrimination can be practiced only when two conditions are fulfilled. They are:

a. The market can be classified into small segments with different price elasticities.
b. Segregation of the segments should be perfect i.e. resale from a lower price market to a higher price market should not be possible.

Price discrimination is based on three factors –

- Consumers' preferences
- The nature of the good
- Distance and frontier barriers

7.4.2 Types of price discrimination

First degree price discrimination*:* This is when every customer is charged the maximum price he would be willing to pay for each unit consumed. Therefore, there is no consumer surplus in the transaction.

Second degree price discrimination: This is when the firm charges different prices for each set of units sold. Put in other words, different prices are charged for different blocks or portions of consumption.

Third degree price discrimination*:* This is when the firm charges different prices for the same product in different segments of the market. This type of discrimination is based on the geography, time, nature of use and personal characteristics of consumers. Usually, third degree price discrimination is applied when markets are geographically separated.

7.4.3 Natural monopolies

A natural monopoly is a market structure where a single seller supplies the quantity of output required to meet the entire market demand. When natural monopolies occur, competition is not expected to work. When there are increasing returns to scale, usually the firm with the largest market share has an advantage over all the others, thus driving out all other small players.

Example: Natural Monopolies

One of the most effective natural monopolies in the world has been the De Beers diamond trading company. De Beers held slightly less than 90 percent of the world diamond market in the mid-1980s. De Beers today dominates the diamond trade not only through mining, but through its Diamond Trading Company, which controls most of world output.

Check Your Progress - 1

1. In imperfect competition, which of the following curves generally lies below the demand curve and slopes downward?
   a. Marginal revenue
   b. Marginal cost
   c. Average revenue
   d. Average cost
2. Which of the following is the equilibrium point of an imperfectly competitive industry?
   a. Intersection point of average cost and marginal cost
   b. Intersection point of total cost and average cost
   c. Intersection point of demand and supply curve
   d. Intersection point of average cost and average revenue
3. In which form of price discrimination are the prices based on the quantities of output purchased by individual consumers?
   a. First degree price discrimination
   b. Second degree price discrimination
   c. Third degree price discrimination
   d. Both in second and third degree price discrimination
4. Which of the following describes price discrimination in a monopoly?
   a. Same product selling at different prices since the costs of production are different
   b. Same product selling at different prices though the costs of production are the same

c. Different products having the same price though the costs of production are the same

d. Different products having different prices since the costs of production are different

5. Which of the following industry in India resembles monopoly to a large extent?

a. Domestic airlines

b. Car industry

c. Railways

d. Internet service providers

7.5 Monopolistic Competition

Most real-world markets are competitive but not perfectly competitive, because firms in these markets have some power to set their prices. This type of market is called monopolistic competition. Monopolistic competition can be defined as a market situation that resembles perfect competition in most respects, except for the presence of product differentiation. If product differentiation is extremely successful, all the producers become virtually monopolists in their differentiated product markets. The examples of products under monopolistic competition are-toothpaste, soap, shampoo, deodorants, shaving cream, cold remedies, and many other items found in a drugstore.The following are the main features of monopolistic competition:

1. A large number of firms compete.
2. Each firm produces a differentiated product.
3. Firms compete on product quality, price, and marketing.
4. Firms are free to enter and exit the industry.

As with monopoly, in monopolistic competition also firms face downward-sloping demand curves. Therefore, they have some monopoly power. But this does not mean that monopolistically competitive firms are likely to earn large profits. In the short run, firms will earn profit or losses but in the long run all firms will earn only normal profits. Note that a firm operating under monopolistic competition in the long run will have *excess capacity* as each firm is operating at the point of equilibrium where average cost is not minimum. Monopolistic competition is also similar to perfect competition: Because there is free entry, the potential to earn profits will attract new firms with competing brands, driving economic profits down to zero.

7.5.1 Product differentiation

Monopolistic competition arises in an imperfect market in which there are many sellers who produce and sell goods that are differentiated from the goods of others in the industry. The key feature of monopolistic competition is product

differentiation. Product differentiation implies that each firm makes its product slightly different from the products of other competing firms in the market. Firms can sell their products at different prices as cost and demand vary from firm to firm. The products offered in this imperfect market structure act as close substitutes. For example, Adidas, Asics, Fila, NewBalance, Nike, Puma, and Reebok all make differentiated running shoes. The products are differentiated mainly on the basis of four aspects:

Physical features: Size, weight, color, taste, texture, scent, thickness, packaging, particular attributes, etc.

Location: The number and variety of locations where a product is available.

Services: Products can be differentiated on the basis of the services that are offered along with them.

Product image: Product differentiation is possible through the image that producers try to build in the consumer mind through packaging, etc.

Check Your Progress - 2

6. Product differentiation is a feature of which type of market structure?
   a. Monopoly
   b. Monopolistic Competition
   c. Perfect Competition
   d. Oligopoly
7. Which characteristic best describes a monopolistically competitive market?
   a. Firms spend a lot on advertising and promotion
   b. Product differentiation is not easy
   c. Number of firms in the market is limited
   d. Firms spend very little on advertising and promotion
8. The products offered in monopolistic competition are_____
   a. Same
   b. Close substitutes
   c. Complimentary
   d. Completely different
9. Which of the following statements about product differentiation is correct?
   a. It exists when consumers perceive the products to be different
   b. It exists only when the products are actually different from each other
   c. It is the first derivative of the production function
   d. It exists when similar goods are sold in different market at different prices

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7.6 Oligopoly

Oligopoly is a market structure, which is dominated by a small number of large firms. Firms supply either identical or differentiated products, and there are barriers preventing the entry of new firms into the industry. In oligopoly, the action of one producer has a large effect on the production decisions of the others in the industry; therefore each oligopolist keeps a close track of its rivals.

In an oligopolistic market, a firm sets price or output based partly on strategic considerations regarding the behavior of its competitors. At the same time, competitors' decisions depend on the first firm's decision. In fact, for almost any major economic decision that a firm makes—setting price, determining production levels, undertaking a major promotion campaign, or investing in new production capacity—it must try to determine the most likely response of its competitors.

Oligopolies may be classified as collusive and non-collusive oligopolies. Collusive oligopoly is a situation where firms cooperate with each other and take collective decisions regarding the determination of price and output. In non-collusive oligopoly, firms take independent decisions as they compete with each other.

The characteristics of the oligopoly market are as follows:

- Natural or legal barriers prevent the entry of new firms.
- A small number of firms compete.
- Interdependence in decision making
- Sticky prices
- Non price competition

Exhibit 7.2 details the oligopolistic market tendencies in India markets

Exhibit 7.2: Large Firms Getting Larger – Indication of Oligopoly

While the pandemic wiped the existence of many small companies from the markets, the larger business entities not only weathered the pandemic storm better but have actually improved their profits. An analysis revealed that top five companies in India together accounted for 21% of all profits earned by listed companies in India in 2020.

This figure was lower at 17%, 6 years ago, suggesting that the pandemic has not stopped these five companies from getting bigger. The results were based on an analysis of 2,863 companies across 20 industries. In almost one-thirds of these industries, the top five accounted for 90% of the profits. Technology and easier acces to capital enabled these companies to create the competitive edge. As per industry experts, oligopolistic tendencies are an indicator of economic development and they opined that the pandemic has hastened the process in India.

Source: https://www.livemint.com/companies/news/india-inc-sees-rising-dominance-of-a-select-few-as-pandemic-favours-the-big-guns-11632119343621.html

Activity 7.1 PC manufacturing companies like Lenovo, Dell, and Hewlett Packard sells PCs to small, medium and large corporates. Which type of market structure do these companies operate in and what are the characteristics of this type of market? **Answer:**

7.6.1 Kinked demand curve

The concept of the kinked demand curve was proposed by Hall, Hutch and Sweezy to describe the sticky pricing in an oligopolistic market. The kinked demand curve explains the behavior of firms relative to the price setting. Firms under oligopoly stick to one price and no firm in the market neither increases nor decreases the price of their products. This happens because a firm fears a sharp decline in its sales if it does not conform to the price setting behavior of its competitors. Since there are only a few sellers in the oligopolistic market, each seller has a relatively big slice of the market. If the oligopolistincreases his price, all his buys will shift to the other lower priced sellers. If the firm decreases the prices, competitors will also resort to price cuts fearing a substantial loss of market share. Therefore, no gain exists for the seller who initiates price cuts. As a result of this, there is a kink formed in the demand curve at the prevailing price. The portion of the demand curve above the prevailing price is elastic and the portion below the prevailing price is inelastic. Thus, a kinked demand curve occurs when the demand curve is not a straight line but has a different elasticity for higher and lower prices. This is why price rigidity or sticky price is one of the characteristics of oligopolistic industries.

7.6.2 Cartel formation

An agreement among two or more firms to co-operate in price setting and/or restricting the amount of output that has to be produced is known as cartel formation. The aim of a cartel is to increase profit by reducing competition. An independent agency is appointed to decide on the quantity of output to be produced and the prices. Two types of cartel are described below:

Cartels aiming at joint profit maximization: Cartels which are formed with open agreements among firms are set up to achieve the objective of profit maximization.

Market sharing cartels: In this cartel, firms agree to share the market and each firm is free to decide on the quantity of output to be produced, selling activities and other decisions. Market sharing cartels operate under two types of agreement. They are:

Non price competition agreements: In this type of agreement, a single price is determined and this price is maintained by all the firms under the agreement. Firms compete on a non-price basis such as advertising, adding extra features, packaging and other selling activities to maximize their profits.

Sharing of the market by agreement on quotas: In this form of agreement, firms assign a fixed to each firm at the agreed upon prices. No member can exceed the quota or change the price at which the output is sold. The quotas and shares of each firm vary according to the firm's size relative to the others.

7.6.3 Price leadership

Sometimes a pattern is established whereby one firm regularly announces price changes and other firms in the industry follow suit. This pattern is called price leadership. The firm who sets the price of a product is called the market leader and the other firms are called the price followers. Price leadership is a situation where the market leader sets the price of a product and other firms try to follow it. The same price is charged by all firms if the product is homogenous. If the product is differentiated, firms vary their prices according to the differences. The most common types of price leadership are:

- Price leadership by a low cost firm
- Price leadership by the dominant firm
- Barometric price leadership

Activity 7.2

Identify the type of market structure from the following situations:

1. A market where there is only one supplier supplying goods without any close substitutes. The firm practices price discrimination; it charges different prices to different classes of customers. The firm decides the prices independently.

Answer:

2. Nicholas is the vice president of the Nectar Steel Corporation Ltd., a steel manufacturing company. The steel industry is dominated by some other large firms, apart from Nectar Steel Corporation and Nicholas considers them as strong competitors. The steel supplied by all the firms is almost identical with minute variations. The actions of the other steel firms affect the actions of the Nectar Steel Corporation to a great extent.

Answer:

7.6.4 Game Theory

The Game theory was developed in the 1950s by Oskar Morgenstern and John Von Neumann. 'Game' is a situation in which the decisions of one player are dependent on those of rival players. The Game theory is a technique which helps in evaluating a situation when different individuals or organizations differ in their objectives. The theory provides guidelines to managers based on which they can take business decisions while considering the moves of competing firms.

All games have the following common features:

- *Rules:* These are a set of general standards, guidelines, or governing principles of how something is done or how one should behave in a given situation.
- *Strategies:* In game theory, strategies are all the possible actions of each player.
- *Payoffs:* These are the outcomes of every possible action. In the Game theory, the pay-off matrix is used to represent the outcome of actions for various players.

In the Game theory, the pay-off matrix is used to represent the outcome of incomes for various players. The various strategies which players can adopt are:

- Dominant strategy
- Nash equilibrium strategy
- Maxi-min strategy

7.6.5 Pay-off Matrix

Pay-off matrix is a table showing outcome/profit (or payoff) to each firm given its decision and the decision of its competitor. In deciding what price to set, the two firms are playing a non-cooperative game**:** Each firm independently does the best it can, taking its competitor into account. Table 7.1 is called the payoff matrix for this game as it shows the profit (or payoff) to each firm given its decision and the decision of its competitor. For example, the upper left-hand corner of the payoff matrix tells us that if both firms charge ₹ 4, each will make a ₹ 12 profit. The upper right-hand corner tells us that if Firm 1 charges ₹ 4 and Firm 2 charges ₹ 6, Firm 1 will make ₹ 20 and Firm 2 ₹ 4.

Table 7.1: The Pay-off Matrix

		Firm 2	
		Charge ₹ 4	Charge ₹ 6
Firm 1	Charge ₹ 4	(12, 12)	(20, 4)
	Charge ₹ 6	(4, 20)	(16, 16)

7.6.6 Dominant Strategy

The dominant strategy in a game situation is the strategy which is profitable for one of the players, irrespective of the strategy adopted by the other player. For example, in the pay-off matrix represented in Table 7.1, firm X earns a profit

when it operates at normal price and if firm Y also operates at normal price. Similar is the situation for firm Y also. Each firm also suffers greater losses when it cuts prices while the other firm operates at normal price. Hence, each firm can benefit by operating at normal price. Therefore, the dominant strategy for each firm is to operate at normal price irrespective of the price strategy followed by the other firm.

7.6.7 Nash equilibrium

Nash equilibrium was named after John Nash, a mathematician, who contributed to the Game theory and also won the Nobel Prize in economics. In the real-world situation, all firms operating in the market may not have a dominant strategy. The Nash equilibrium provides a solution for firms which are in a dilemma over what kind of strategy to adopt when there is no clear dominant strategy. An example of Nash equilibrium is shown in Table 7.2.

Table 7.2: Nash Equilibrium

		Firm X	
		Normal Price	**Price Increase**
Firm Y	**Normal Price**	(₹ 100, ₹ 100)	(-₹ 150, ₹ 400)
	Price Increase	(₹ 400, ₹ -250)	(₹ 700, ₹ 300)

Here, the dominant strategy of firm X is to operate at normal prices. But the chances for firm Y to maximize its profits depend on the strategy adopted by firm X. In this situation, both firms can operate at the Nash equilibrium which is represented in Table 7.2 as an option to operate with the normal prices strategy. At the Nash equilibrium, the pay-off of no player can be improved in relation to the given strategy of the other player. That is, the strategy of each player is the best response to the strategy of the other player and each player chooses a strategy which is most beneficial to it.

Maxi-min strategy

According to the game theory, if players are risk averse they will try to derive the maximum benefit from the worst possible outcome by adopting the maxi-min strategy. With maxi-min strategy, each player tries to get the maximum profit in the worst possible outcome at whatever strategy adopted by the other competing players.

The Game theory is based on the following assumptions-

- All players in the game are rational.
- The selection of strategies by players is simultaneous.
- Each player is aware of the strategies available to him/ her and also the strategies available to competitors.
- Players try to maximize gain or minimize loss and may work out a collusion to achieve objectives.

An example that shows the importance of the Game theory in strategic behavior is the prisoners' dilemma. This is a situation in which two prisoners who have

allegedly committed a crime are interrogated separately by the police. Each is told that if he/she does not confess and if the other person confesses, then a sentence of 14 years will be given to him/her. On the other hand, if both confess, a sentence of 5 years will be given to both. However, if neither prisoner confesses then they would be set free as there is no strong evidence. In this situation, each prisoner is in a dilemma about the strategy to adopt as he/she is not sure about the move of the other prisoner. If the prisoners want to avoid taking any risk, they will adopt the mini-max strategy i.e., minimizing the maximum possible loss and seek to minimize the maximum jail sentence.

The Game theory suffers from some major limitations:

- The players are not certain about the competitors' strategies and reaction
- Game theory analysis is complex and difficult in an oligopoly situation as there are many players operating in the market.
- Collusion between players to maximize profits is impractical. Even if it takes place, it will not last long.

However, the game theory provides a useful insight into the operations of oligopoly markets.

Activity 7.3

Activity: Identify the appropriate strategy to be adopted by the firms in each of following situations and justify your answer:

1. Startek, a cable-connection agency, can make a profit of ₹ 0.5 million by operating at a price of ₹ 150 per household per month while it can earn ₹ 1 million profit by providing the service at ₹ 130 per month if the competitors continue to serve at ₹ 150 per month. However, if the competitors also reduce their prices, Startek's profit comes down to ₹ 0.45 million. What is the best strategy that Startek can adopt and why?

Answer:

2. SNL and BNL are two consumer durable firms operating in the same market. SNL can make steady profits if it maintains the price of its refrigerators at ₹ 17,000 if BNL also offers refrigerators at the same price. If SNL increases the price of its refrigerators to ₹ 20,000, it might lose market share to BNL and make losses. On the other hand, SNL can earn a 10 percent extra margin if BNL also increases the price to ₹ 20,000.

Answer:

Check Your Progress - 3

10. What problem do oligopolists usually face?
    a. They can not produce similar goods
    b. Barriers to entry
    c. There are many firms to influence price
    d. The action of a firm affects the profits of another firm
11. With which of the following strategies does each player try to get the maximum profit in the worst possible outcome, whatever be the strategy adopted by the other competing players?
    a. Dominant strategy
    b. Safe strategy
    c. Nash equilibrium
    d. Maxi-min strategy
12. Which of the following is a characteristic of collusive oligopoly?
    a. Firms produce different products and sell in different markets
    b. Product differentiation
    c. Firms' decisions are not influenced by any external factor
    d. Firms cooperate with one another and jointly set their prices or outputs
13. The concept of the kinked demand curve was proposed by _____.
    a. Adam Smith
    b. Keynes
    c. Hall, Hutch and Sweezy
    d. Professor Robbins

7.7 Summary

- Market structure affects the way in which an individual firm in the market operates. The type of market structure has a major influence on the decisions taken by the firm.
- Market structure is classified broadly into: perfect competition and imperfect competition. Imperfect competition is any market structure which does not fulfill the requirements of a perfectly competitive market. The three common forms of imperfect competition are monopoly, monopolistic competition and oligopoly.
- A monopoly is a market with only one supplier of a good or service that has no close substitute for the product; there are barriers that prevent new firms from entering the market.

- The key features of monopoly are the existence of barriers and the possibility of price discrimination.
- Monopolistic competition can be defined as a market situation where several firms sell closely related but slightly differentiated products. Each producer can set his price and quantity without affecting the market price as a whole.
- Oligopoly is a market structure, where there are a small number of large firms. The firm supplies either identical or differentiated products and there are barriers preventing the entry of the new firms into the industry.
- The Game theory is a technique which helps in evaluating a situation when different individuals or organizations differ in their objectives.

7.8 Glossary

Cartel: An organization of independent firms producing similar products that works together to raise prices and restrict output.

Duopoly: Duopoly is a market where only two players supply products to the same market.

Dominant strategy: The dominant strategy is the strategy, which is profitable for one of the players, irrespective of the strategy adopted by the other player in a game.

Game theory: A technique for determining the strategy that is likely to produce maximum profits in a competitive situation.

Maxi-min strategy: With maxi-min strategy, each player tries to get the maximum profit in the worst possible outcome, irrespective of the strategy adopted by the other competing players.

Natural monopoly: A market situation in which economies of scale are such that a single firm of efficient size is able to supply the entire market demand.

Nash equilibrium: At the Nash equilibrium, the pay-off of no player can be improved at a given strategy of the other player. That is, the strategy of each player is a best response to the strategy of the other player and each player chooses a strategy which is most beneficial to him/her.

Quota: A limitation on the amount of a good that can be produced or offered for sale domestically or internationally.

Risk: Risk can be defined as a situation where there can be more than one possible outcome to a decision. Further, these outcomes can also be measured.

Uncertainty: Uncertainty is a condition, when the businessman is not able to associate probability to the possible outcomes. It cannot be measured.

7.9 Self-Assessment Test

1. Define a cartel and describe the different types of cartels.
2. Describe product differentiation and list out the different types of product differentiation.
3. Explain the various physical features of imperfect competition.
4. Explain how the Game theory is used to take decisions in an oligopoly market situation.

7.10 Suggested Reading/Reference Material

1. H.L.Ahuja. Principles of Microeconomics. 22nd edition, S.Chand Publishing, 2019
2. Dwivedi D.N., "Microeconomic Theory and Applications", 3rd edition, Vikas Publishing House, New Delhi, 2016
3. H.R. Appannaiah. Essentials of Managerial Economics. 3rd edition. Himalaya Publishing House, 2021
4. D.M.Mithani. Macroeconomics. 1st edition, Himalaya Publishing House, 2021
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6. H.L.Ahuja, "Advanced Economic Theory", revised edition, Sultan Chand Limited, New Delhi, 2017
7. Gaurav Datt & Ashwani Mahajan, "Indian Economy", 70thedition, S. Chand & Company Ltd., 2016
8. Sanjiv Verma. The Indian Economy (Economic Survey 2020-21 & Budget 2021-22). Unique Academy Publishers. 2021
9. V.K.Puri and S.K.Mishra. Indian Economy. 38th edition. Himalaya Publishing House, 2021

Additional References:

1. RBI. Handbook of Statistics on Indian Economy. 2020 https://www.rbi.org.in/scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy
2. World Bank open knowledge repository. India Development Update. 2020. https://openknowledge.worldbank.org/bitstream/handle/10986/34367/India-Development-Update.pdf?sequence=1&isAllowed=y
3. IMF Working Paper. Make in India: Which exports can drive the next wave of Growth? 2016.

7.11 Answers to Check Your Progress Questions

7.11.1 Model Answers to Check Your Progress Questions

Following are the model answers to the Check Your Progress questions given in the Unit

1. (a) Marginal revenue

In imperfect competition, the marginal revenue curve generally lies below the demand curve and slopes downward.

2. (c) Intersection point of demand and supply curve

An imperfect market is a market structure where there are many producers offering goods which are close substitutes. The equilibrium point is the point at which the demand and supply curves intersect.

3. (b) Second degree price discrimination

Second degree price discrimination is seen in services like power and telecom, where the price is based on the quantity of output (that is the units consumed) that an individual customer purchases.

4. (b) Same product selling at different prices though the costs of production are the same

A firm enjoys a monopoly power in the market when there are large number of buyers and a single seller. Based on the elasticity of demand for a product in the market, a monopolist charges differently in different markets. For example, let us assume that the monopolist caters to two different markets for the same product. In one market, the demand for the product is inelastic and in the other, it is elastic. The monopolist, therefore, charges a high price in the first market and a low price for the same product in the second market. So, the monopolist sells his product at different prices in different markets with different price elasticities though the cost of production is the same.

5. (c) Railways

Monopoly is a type of market structure in which there is only one seller of the product in the market, there are no close substitutes for the product and there are barriers to entry. Though, existence of true monopoly is very rare in today's market structure, Indian Railways has a monopoly in providing rail transportation, though close substitutes exist in the form of other modes of transportation.

6. (b) Monopolistic Competition

Monopolistic competition can be defined as a market situation that resembles perfect competition in most respects, except for the presence of product differentiation. Through product differentiation, the producer in a monopolistic market tries to differentiate the product from its competitors.

The differentiation could be in the form of changes in packaging, smell, shapes, etc., and through it, the producer tries to create an image in the consumers' mind that his product is superior to its competitors.

7. (a) Firms spend a lot on advertising and promotion

Firms in a monopolistically competitive market rely heavily on product differentiation. Therefore, to promote and publicize the differentiating aspect, firms have to spend a lot on advertising and promotion.

8. (b) Close substitutes

A monopolist market is a market structure where there are many sellers and buyers selling products that are close substitutes.

9. (a) It exists when consumers perceive the products to be different

Consumer perception plays an important role in product differentiation. Consumers accept the product only if they perceive it as being different from an existing and similar product.

10. (d) The action of a firm affects the profits of another firm

In an oligopolistic market, firms know their rivals pretty well and keep a close watch on their actions while formulating their own strategies. Pricing decision depends on the demand conditions, cost conditions and pricing strategies of competitors. In an oligopolistic market, it is difficult to determine the equilibrium price and output because there is interdependence among different firms and it is difficult to anticipate the reactions of their rivals.

11. (d) Maxi-min strategy

The developers of game theory suggested that if the players are risk averse, they will try to maximize the minimum possible benefit from the game. Then each player would adopt the maxi-min strategy.

12. (d) Firms cooperate with one another and jointly set their prices or outputs

In collusive oligopoly, firms collude with each other by sharing the market among them and they also make joint business decisions.

13. (c) By equating the marginal revenue and the marginal cost

The concept of the kinked demand curve was proposed by Hall, Hutch and Sweezy to describe the sticky pricing in an oligopolistic market.

7.11.2 Model Answers to Exercises

Following are the model answers to the Exercises given in the unit.

A. (d) 17

Total revenue = Price Δ Quantity [P ΔQ]

$P = 800 - 16\,Q$

$TR = (800 - 16Q)Q$

$= 800\,Q - 16Q^2$

$$MR = \frac{\partial(TR)}{\partial Q} = 800 - 32Q$$

$MC = 16Q$

Profits are maximized by choosing the quantity where the Marginal Revenue is equal to the Marginal Cost.

Thus MR = MC

$800 - 32Q = 16Q$

$800 = 48Q$

$Q = 16.66 \Rightarrow Q = 17$

B. (b) 5 units

$TC = 125 + 5Q^2$

$MC = 10Q$

Total Revenue = Price Δ Quantity ($P\,\Delta Q$)

$= (100 - 5Q)\,Q$

$TR = 100Q - 5Q^2$

$$MR = \frac{\partial(TR)}{\partial Q} = \frac{\partial(100Q - 5Q^2)}{\partial(Q)}$$

$MR = 100 - 10Q$

For a monopolist, profit is maximum when the marginal revenue is equal to the marginal cost.

MC = MR

$10\,Q = 100 - 10Q$

$20Q = 100$

$Q = 5$ units

C. (d) 12.5

Under monopoly, marginal cost is equal to marginal revenue

Marginal Cost (MC) = ₹ 20

$$\text{Marginal Revenue}\,(MR) = \frac{\partial(TR)}{\partial Q}$$

$TR = P\,\Delta Q$

$P = (220 - 8Q)$

$TR = (220 - 8Q)\,Q$

$TR = 220\,Q - 8Q^2$

$$MR = \frac{\partial(220Q - 8Q^2)}{\partial Q}$$

MR = 220 – 16Q

Equating MR and MC

220 – 16Q = 20

220 –20 = 16Q

$$Q = \frac{200}{16}$$

Q = 12.5

Therefore, the profit maximizing output is 12.5.

Unit 8

Rent and Wages

Structure

8.1 Introduction

In the previous two units we discussed different types of market structure. In this unit, we will discuss about the factors of production.

Resources like land, labor, capital, and entrepreneurship, which contribute to the production of goods and services, are the main factors of production. Each factor of production is rewarded differently for its contribution to production. The reward for land is rent, for labor it is wages, for capital it is interest, and for entrepreneurship it is profit.

Traditional economists were of the opinion that different theories were required to determine the prices of the factors of production. This was because they believed the determination of factor prices was different from that of product pricing, which is based on the demand and supply of products. In contrast, modern economists believed that factors of production can be priced similar to the way products are priced – that is, by taking the forces of demand and supply into consideration.

This unit will discuss the theories of factor pricing, theories of rent and relation between rent and price. The concept of wage and the role of trade unions will also be discussed.

Before studying this unit student should recall the theory of supply and demand (Unit 2), elasticity of demand and supply (Unit 2) and production function (Unit 4).

8.2 Objectives

By the end of this unit, students should be able to:

- Compare different theories of factor pricing
- Identify various forms of rent
- Compare and contrast different theories of rent
- Explain different form of wages
- Analyze different theories of wages and role of trade union in determining wages

8.3 Theories of Factor Pricing

Factor pricing refers to the price paid for the services rendered by a factor of production; it is not the price of the factor itself. Various theories of factor pricing suggest different ways to distribute the income among the factors of production. The two ways in which this can be done are: personal distribution and functional distribution.

The personal distribution of income deals with income distribution among the owners of the factors of production while functional distribution deals with income distribution among the four factors of production -- land, labor, capital, and the entrepreneur. Under functional distribution, the macro theory of distribution deals with the distribution of national income among the factors of production, while the micro theory of distribution, also called the theory of factor pricing, deals with income distribution at the individual level. For example, an individual earns ₹ 20,000 per month; this income can be earned by him/her by wages, rents, or dividends. On the other hand, functional distribution is associated with the distribution of income among different factors of production as per their functions. Professor Alfred Marshall has emphasized that there is a need for a separate theory of factor pricing because the characteristics of commodities and factors of production are different.

Two of the prominent theories of factor pricing are the marginal productivity theory of factor pricing and the modern theory of factor pricing. Marginal productivity theory of factor pricing states, how many units of a factor of production will be employed at different prices and does not deal with the supply side of a factor of production. Whereas Modern theory of factor pricing use the tools of demand and supply in solving the problem of determination of factor prices just as the price of a commodity in the market, which is determined by their forces of demand and supply in the factor market.

8.3.1 Marginal productivity theory of factor pricing

The marginal productivity theory given by J.B. Clark states, "Under static conditions, every factor including the entrepreneur will get remuneration equal to its marginal product."

Explanation

Basic concepts

Marginal Physical Productivity (MPP) is the change in the total physical product or production when one more unit of any one factor of production is added while other factors are kept constant.

Marginal Value Product (MVP) is the monetary representation of the MPP i.e., MVP = MPP × Price.

Marginal Revenue Productivity (MRP) is the change in the total revenue for the producer when an additional unit of a factor of production is employed while the quantity of other factors is kept constant.

Average Revenue Productivity (ARP) is the average revenue per unit of a factor of production.

Assumptions

The marginal productivity theory of factor pricing assumes the existence of perfect competition, the identical productive efficiency for all factor units, perfect substitutability of factor units, perfect divisibility of the factors of production, elastic supply of factors, and full employment.

Based on these assumptions, the marginal productivity theory of factor pricing explained various statements such as, the reward for each factor unit is equal to its marginal productivity; the reward for each factor of production will be the same in every use; and in the long run, under perfect competition, each factor of production will get a remuneration that is equal to its Marginal Revenue Productivity (MRP), which also equals its Average Revenue Productivity (ARP).

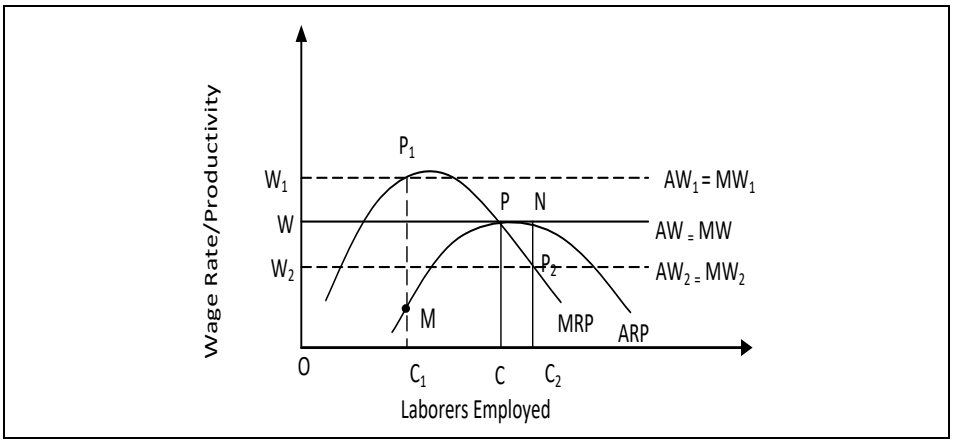
The demand for a factor of production is derived and depends on the productivity of the factor. This implies that the revenue for a producer depends upon the productivity of that factor of production. As every producer wants to maximize profits, the factors of production are employed only up to the limit where the marginal cost and the productivity are equal. This is the equilibrium point for the producer and the producer wants to use the factors of production only till the level at which the marginal cost for an additional unit equals the marginal revenue productivity.

The marginal productivity theory also suggests that the marginal productivity of a factor of production is equal in all its uses. This is possible when the factors of production are perfect substitutes for each other. Otherwise, the factors of production are substituted with other factors of production, till their marginal products are equal, based on the prices of factors of production related to their productivity. When the ratio of marginal productivity and price is equal for each factor of production, equilibrium is attained.

The equilibrium position for a producer can be maintained in the short run when the average revenue of a factor of production is equal to its marginal revenue. On the other hand, to maintain the equilibrium position in the long run, the marginal revenue productivity, average revenue productivity, and the rate of reward for the factor of production should be equal.

According to the marginal productivity theory, in the long run, if there is perfect competition prevailing in the factor and product markets; the reward for the factors of production remains equal to the average revenue productivity and marginal revenue productivity. Figure 8.1 depicts the wage determination in the long run as per the marginal productivity theory.

Figure 8.1: Wage Determination in the Long Run



Source: ICFAI Research Center

As represented in the figure, the wage rate will be equal to the average revenue productivity and marginal revenue productivity in the long run depicted by equilibrium point P. If the wage rate increases to OW_1, the firm experiences loss as it is operating above the average revenue productivity level by P_1M. Hence, the demand for workers decreases as some of the firms opt out of the labor market, bringing down the wage rate to OW. Similarly, when the wage rate falls to OW_2, the firm gains super-normal profits by operating at a wage rate less than the average revenue productivity by P_2N. This attracts more firms to the market, thereby increasing the wage rate and bringing it back to OW.

Criticism

The marginal productivity theory of factor pricing was criticized by economists for many reasons such as the unrealistic assumptions on which it was based, its lack of practical importance, for ignoring the short-run implications, for concentrating on the demand side while ignoring the supply side, for ignoring the problem of technical change in the production process, etc. Prof. Taussig said that production was achieved through the combined contribution of the factors of production and that the marginal revenue productivity could not be increased by just increasing one of the factors employed. Hobson pointed out that the factors of production were always used in a fixed ratio and could be varied or substituted.

Exercise

A. If 25 workers can produce 300 units of output, and 26 workers can produce 310 units of output, which of the following equations represents the marginal productivity of the 26 unit of labor?

   a. 310/26
   b. 300/25
   c. 300/26
   d. 310-300

8.3.2 Modern theory of factor pricing

The modern theory of factor pricing was developed to explain the determination of factor prices while taking both the demand side and the supply side into consideration.

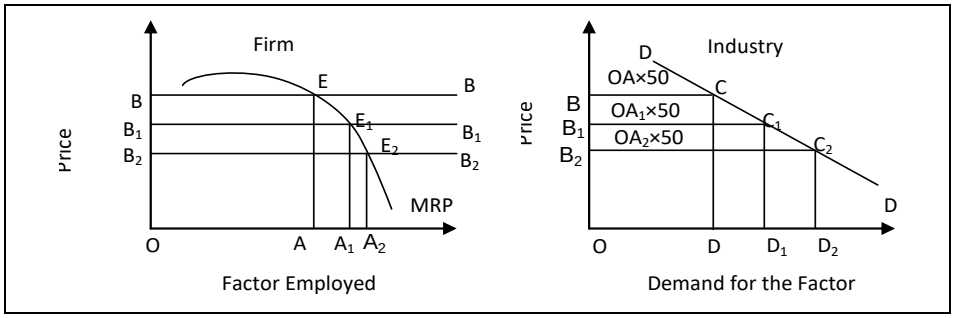
Demand side

Factors of production have a derived demand which is dependent on the productivity of the factors unlike the demand for goods which is direct. The demand for the goods produced using these factors also influences the demand for the factors of production. The market demand curve for a factor of production is obtained by aggregating the Marginal Revenue Productivity (MRP) curves of all the firms in the market. The MRP curve of each factor of production is subject to changes in demand and to changes in quantity demanded. These changes in demand for a factor of production may occur due to changes in the demand for the final product, level of substitutability of factors, the change in the price of substitutes, the change in productivity of the factor, etc.

The demand and price of a factor of production are inversely related. Therefore, the demand curve of a factor of production slopes downward. The derivation of the demand curve for a factor of production is depicted in Figure 8.2.

Figure 8.2(i) illustrates the demand position for a factor of production in a firm while Figure 8.2(ii) depicts the demand for a factor of production in the industry. The equilibrium point for the firm is at point 'E' as shown in Figure 8.2(i), where OA is the number of factor units demanded at a factor price of OB per unit. Hence, MRP = Price of the factor = AE.

Figure 8.2: Derivation of Demand Curve for a Factor of Production



Source: ICFAI Research Center

The demand for a factor of production in an industry is derived by multiplying the number of factor units employed by the number of firms operating in the industry. In Figure 8.2(ii) the demand for a factor of production is depicted to be at point 'C' which is derived by OA× 50 assuming that 50 firms are operating in the industry. It is also depicted that when the price of a factor of production varies, its demand also varies.

Supply side

The supply of a factor of production can be defined as "A schedule of the various quantities of a factor of production that would be offered for sale at all possible prices at any one instant of time". Just as the supply and stock of a commodity can be different, similarly the supply and stock of a factor of production can also vary. If the supply price of a factor is high, other things remaining the same, larger will be the units of factor offered for sale. If the supply price is low, less quantity of factors of production will be supplied in the factor market. **The supply of a factor to an industry depends upon the transfer earnings of the various units of factor.** Another characteristic of factors of production is that they do not bear direct relation between the prices of services offered by the factors of production and their cost of production.

The supply of factors of production is influenced by many factors in addition to the price of the factors. The total supply of labor in the country depends upon various factors, such as size of population, labor efficiency, expenses of training and education, geographical distribution, attitude towards work, etc. The total supply of labor in the country is fixed but for a particular occupation it can be increased by drawing workers from other occupations and by increasing the working hours of the labor already employed. Some of the factors of production may have constant supply in the short run or the supply curve may bend backwards even when there is an increase in the prices of the factors. For example, the supply curve of labor shows a backward bend when wages rise beyond a certain level.

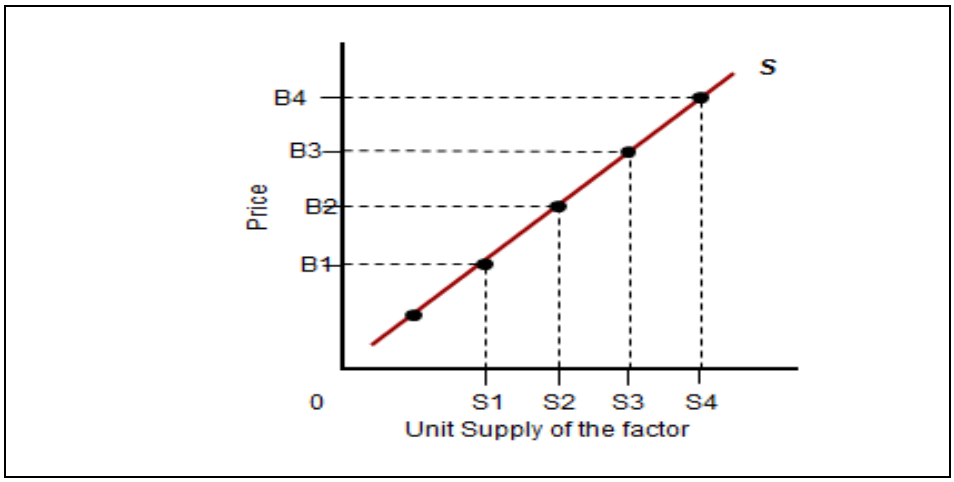
The supply of capital is also complicated as it depends upon the power and willingness of the people to save. The marginal efficiency of capital and the rate of interest also play a very important role in the supply of capital in the country.

Similarly, the supply of land remains perfectly inelastic for a society as a whole although the supply can be increased for an individual firm or organization by their paying a higher price.

In the above diagram, units of a factor, say labor, along OX axis and wage on OY axis. If the wage is OB1, OS1 workers are supplied. At wage OB4, the supply of workers increases from OS1 to OS4. The supply curve of a factor of production is upward sloping with a positive slope and the demand curve of a factor of production is downward sloping. Modern theorists believe that under perfect competition, the price of a factor of production is determined at a level where the supply and demand for a factor are equal i.e., at the level of equilibrium.

In nutshell, we can say that the supply of a factor is also a function of price. The higher the price of a factor of production, other things remaining the same, the greater will be its supply and *vice versa*. The supply curve of a factor of production is positively inclined, i.e., its slopes upward from left to right as is shown below:

Figure 8.3: The Supply Curve



Source: ICFAI Research Center

Conclusion

The modern theory of factor pricing is based on the assumption of full employment as is the marginal productivity theory. Therefore, it is also subject to criticism on the same grounds. However, the modern theory of factor pricing takes both the demand and supply side into account in determining the price of a factor of production. This is a reliable guide in maximizing the profits of a firm with regard to the input market under given market conditions.

Check Your Progress - 1

1. Under which of the following theories of factor pricing, utilization of factors of production from the demand side as well as the supply side is explained?
   a. Marginal productivity theory
   b. Macro theory of distribution
   c. Modern theory
   d. Personal distribution theory
2. What is the nature of demand for factors of production?
   a. Direct demand
   b. Dependable demand
   c. Independent demand
   d. Derived demand

3. Which of the following statements is true?
   a. Factor pricing means the price paid for the factor itself.
   b. Factor pricing is the procedure for fixing the price of a product.
   c. Factor pricing means the price paid for the services rendered by the factor of production but not the price of the factor itself.
   d. All of the above.
4. What is the change in the total revenue for the producer called, when an additional unit of a factor of production is employed while the quantity of other factors is kept constant?
   a. Marginal Physical Productivity (MPP)
   b. Marginal Revenue Productivity (MRP)
   c. Average Revenue Productivity (ARP)
   d. Marginal Value Product (MVP)

8.4 Meaning of Rent

Rent is the reward for land which is one of the major factors of production. According to economists, the term 'land' refers to natural resources like groundwater, forests, rivers, oil fields, mineral deposits, etc., apart from the physical soil.

Land is a gift of nature and its supply is permanently fixed. Any material asset which has a fixed supply can be viewed as land. Rent is the payment made to the owner of the factor for its use. For example, payment made to use a machine, house, or vehicle is referred to as rent. To be precise, economists use the term 'contract rent' as it includes a return on the capital invested in material assets. And they use the term 'economic rent' to refer to the payment for use of land. The different concepts of rent given by economists are:

8.4.1 Rent as a differential surplus

Ricardo defined rent as "the price paid for the use of original and indestructible powers of the soil." According to him, rent is the surplus of revenue over costs arising due to the differences in the fertility level and usability of the land.

8.4.2 Scarcity rent

According to the modern theory of factor pricing, rent arises even if all the lands are of equal quality. The basis for formation of rent, according to this theory, is the scarcity of land. The modern theory also suggests that rent does not determine price but is determined by price.

8.4.3 Quasi-rent

Alfred Marshall, an English economist, believed that apart from land, other factors which have limited supply can also earn rent but only for a short period of time. He termed as 'quasi-rent' the rent earned by other factors such as man-made machines and other appliances.

Activity 8.1

Identify the various forms of rent in the following situations:

- An educational institution is being run in a rented building. What is the most appropriate term to refer to the rent paid for the building?
- Manish, an agriculturist, has leased 4 acres of land for cultivation. What is the rent he pays for the usage of land called?
- Srishta has rented a computer to work upon one of her projects. What is the form of rent she pays for the usage of the computer?

Answer:

8.5 Theories of Rent

Different theories have been given by different economists for the origin of rent. We shall discuss here the Ricardian theory of rent and the modern theory of rent.

8.5.1 Ricardian Theory

According to Ricardo, "Rent is that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil." It can be deduced from this definition that the reasons for the origin of rent are:

- Differences in the productivity of various pieces of land
- Situational differences

Assumptions

Some of the basic assumptions upon which the Ricardian theory of rent was developed are:

- Land is a gift of nature and its supply is permanently fixed.
- Land is a non-perishable factor of production and the quality of land is not destroyed.
- Utilization of land is in the order of fertility grade.
- Law of diminishing returns operates in agriculture.
- Perfect competition prevails in the market.
- There is the existence of marginal land, which is 'no rent land'.

Explanation

Ricardo cited as reasons for the origin of rent the fixed supply of land and the difference in the fertility levels of land from area to area. He made an assumption that 'marginal land' exists. Marginal land is defined as that area of land which barely covers its costs with the market value of its produce. Rent is the differential

surplus of marginal land and intra-marginal land, which is land with better productivity than marginal land.

According to Ricardo, rent arises in both types of farming techniques — extensive cultivation and intensive cultivation.

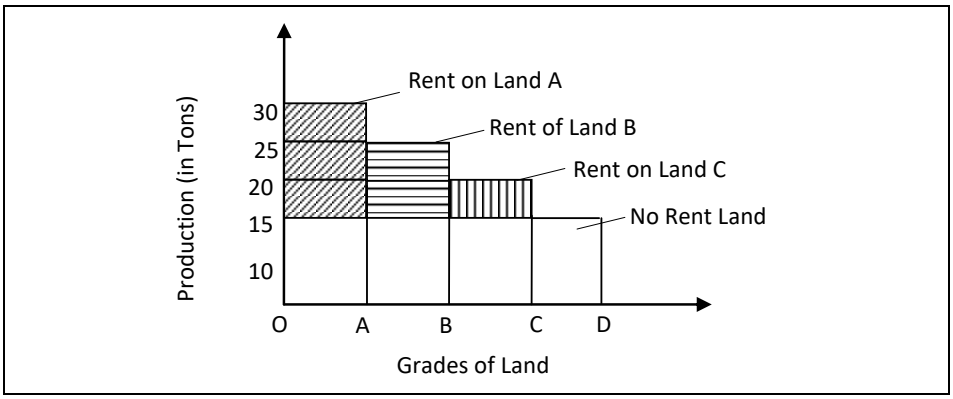
Extensive cultivation

Under extensive cultivation, the production of a farm is increased by bringing more and more land under cultivation. Ricardo explained the origin of rent under this farming technique based upon the assumptions mentioned earlier. He used the example of an island where people had just started settling down. He supposed the land on the island to be of four grades — A, B, C, and D with A being the most productive and D the least. Ricardo believed that people started with cultivating grade A land first and when the need for land increased, brought the B, C, and D grade lands gradually under cultivation. Rent was equal to the difference in the produce of intra-marginal lands and the marginal land at that level. An instance of the origin of rent under extensive cultivation is presented in Table 8.1 and Figure 8.4.

Table 8.1: Derivation of Rent under Extensive Cultivation

Grade of Land	Marginal Production (in tons)	Surplus or Rent (in tons)
A	30	(30-15) = 15
B	25	(25-15)=10
C	20	(20-15)=5
D	15	(15-15)=0

Figure 8.4: Derivation of Rent (Extensive Cultivation)



Source: ICFAI Research Center

As presented in the table and figure, when the marginal production of land type A is 30 tons and the marginal production of land type D is 15 tons, then the rent will be equal to 15 tons (30-15). Similarly, as the produce from different types of lands (B, C) varies, the rent will be the difference between that produce and the produce of the marginal land (D).

Intensive cultivation

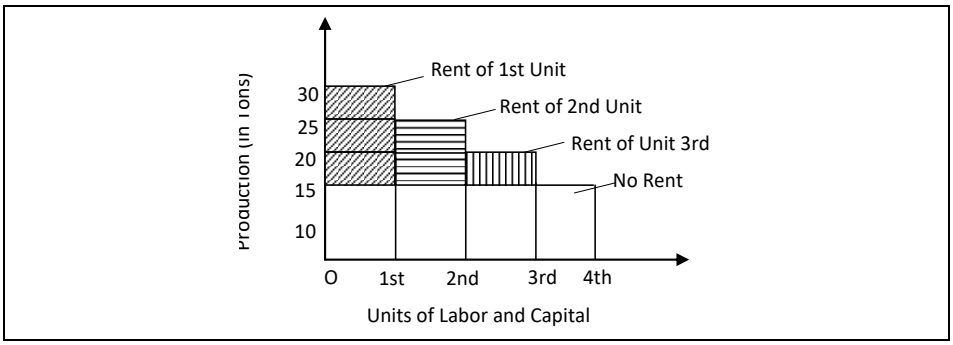
Under intensive cultivation, the production of the land is increased by employing more labor and capital units. Ricardo provided an explanation for the origin of rent under this technique of farming based mainly on the assumption that the law of diminishing returns operates in agriculture. This law suggests that the production of a farm shows a diminishing rate of increase after a certain limit even if more and more units of labor and capital are employed.

Ricardo believed that the marginal product of labor and capital, which is the increase in the total production when one more unit of labor and capital are employed while other factor units are kept constant, will be diminishing as the law of diminishing returns is applicable to agriculture. Rent is the differential surplus between the marginal units of labor and capital, beyond which there is no increase in inputs, and the intra-marginal units which make better addition to production than the marginal units. An instance of the origin of rent under intensive cultivation is presented in Table 8.2 and Figure 8.5.

Table 8.2: Derivation of Rent under Intensive Cultivation

Grade of Land	Marginal Production (in tons)	Surplus (or) Rent (in tons)
A	30	(30-15)= 15
B	25	(25-15)= 10
C	20	(20-15)= 5
D	15	(15-15)= 0

Figure 8.5: Derivation of Rent (Intensive Cultivation)



Source: ICFAI Research Center

As depicted in the table and figure, when the 1st, 2nd, 3rd, and 4th units of labor and capital are employed, the total production is 30, 25, 20, and 15 tons respectively. The surplus production over the production of marginal unit of labor and capital (i.e., the 4th unit which gives a total production of 15 tons) is equal to the rent.

Criticism

The Ricardian theory of rent was criticized by economists on the following grounds:

- Its assumption of the non-perishable quality of land.
- There is no historical proof that the most fertile land is cultivated before less fertile land is brought under cultivation.

- Its impractical assumption of perfect competition.
- Its assumption of 'no rent land' is not possible in the real world.
- The narrow concept of rent given by Ricardo was also criticized by modern economists.

The modern theory of rent

The modern theory of rent is an integral set of ideas given by different economists like Alfred Marshall, Joan Robinson, and Boulding. This theory extended the concept of rent, which was linked to land by Ricardo, to other factors of production which have limited supply in the short run.
Ricardo opined that the supply of land was limited i.e., perfectly inelastic and that rent was the surplus produced by the intra-marginal lands over and above the marginal land. Modern economists applied the qualities of land to other factors of production and suggested that the supply of labor, capital, and entrepreneur could not be altered in the short run to meet the demand for them. Hence these factors of production also could earn rent. Other improvements to the Ricardian theory were that since the supply of land was fixed and was scarce, it earned scarcity rent, and further due to the difference in fertility levels of various plots of land, they earned differential rents.

The modern theory of rent also provided an explanation on how to determine rent (this was not explained in the Ricardian theory). According to the modern economists, rent is determined by the forces of supply and demand similar to the determination of prices for products and other factors of production. The modern theory suggests that because land supply is fixed, if the demand for land rises above the supply of land, then rent also increases. The higher the level of demand over supply, higher will be the rent. Hence, the modern theory is also termed as the scarcity theory of rent.

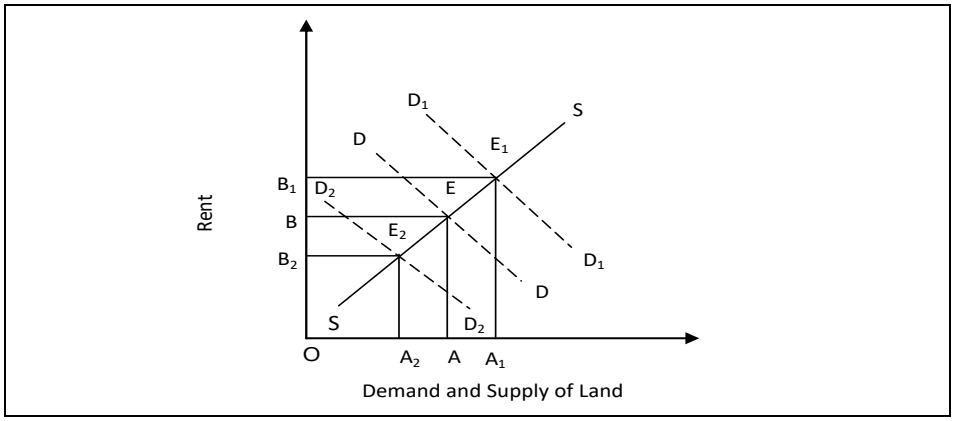
Demand side

The demand for land is derived/indirect demand i.e., the demand for land exists as it is used to produce something. When the demand for goods produced on the land goes up, the demand for that land also increases. The demand for land also depends on its marginal productivity and goes up till the level at which the marginal productivity and the cost of cultivation are equal. Sometimes, more units of land may be demanded at a lower level of rent. Hence, the demand curve of land slopes downward from left to right.

Supply side

While the supply of land is fixed for the society as a whole, for an individual, it is elastic. The supply of land for an individual unit depends on the price it can pay for the land. Hence, for an individual, firm, or industry, the supply curve has an upward slope. Rent is determined to be at the point where the demand curve and supply curve of land intersect i.e., at the equilibrium point. This is depicted in Figure 8.6.

Figure 8.6: Determination of Rent



Source: ICFAI Research Center

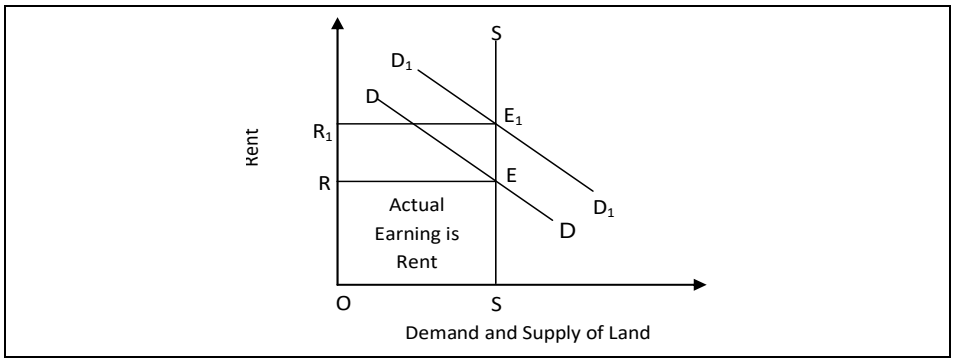
The demand curve (DD) and the supply curve (SS) intersect at the equilibrium point E. At this point, the demand for and supply of land is OA and the rent for land is OB. When the demand for land increases to A_1, the rent of land also goes up to OB_1 and the demand curve D_1D_1 cuts the supply curve at point E_1. Similarly, when the demand for land decreases to OA_2, the equilibrium point shifts to E_2 and the rent falls to OB_2

Joan Robinson believed that rent is a surplus over 'transfer earning', which is the term used to refer to the income earned by a factor of production in its alternative use. The amount of income which a factor of production earns from its present work or industry is the actual earning of the factor of production. According to Robinson, rent is equal to the difference between actual earning and transfer earning.

The supply of land can be classified into perfectly inelastic supply, perfectly elastic supply, and elastic supply.

Perfectly inelastic supply: When the society as a whole is considered, the supply of land is permanently fixed i.e., it is perfectly inelastic and cannot be altered. The supply curve of land 'SS', in this case, is represented by a vertical line as shown in Figure 8.7.

Figure 8.7: Perfectly Inelastic Supply of Land



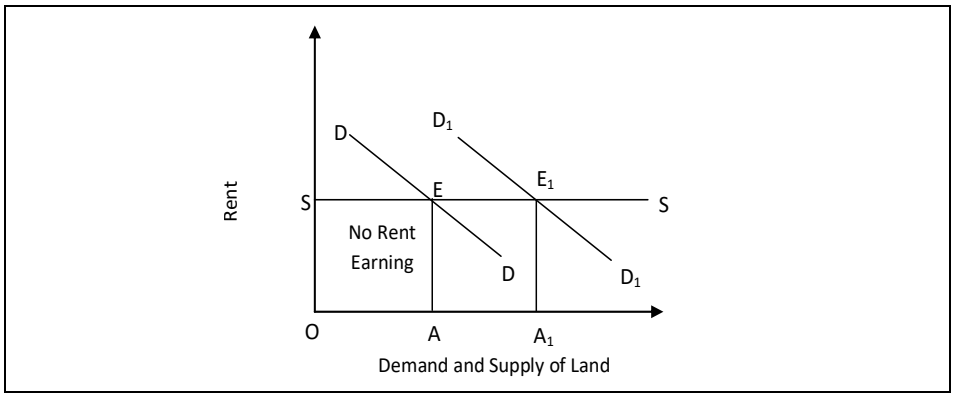
Source: ICFAI Research Center

In the above figure, the supply curve of the land 'SS' is inelastic and the equilibrium point is at E where the demand curve of land 'DD' cuts SS. The price paid for using the land i.e. rent, is fixed at OR and the actual earning of land is OSER which is the same as rent. When the demand increases, the new demand curve D1D1 cuts SS at E1 and the actual earning increases to OSE1R1. Therefore, the rent also increases.

Perfectly elastic supply: The supply of land for a particular use is perfectly elastic and depends on the price paid for the land. Here, the actual earning and transfer earning will be equal and no rent will be earned. The supply curve of land, 'SS' which is perfectly elastic is represented by a horizontal line as shown in Figure 8.7.

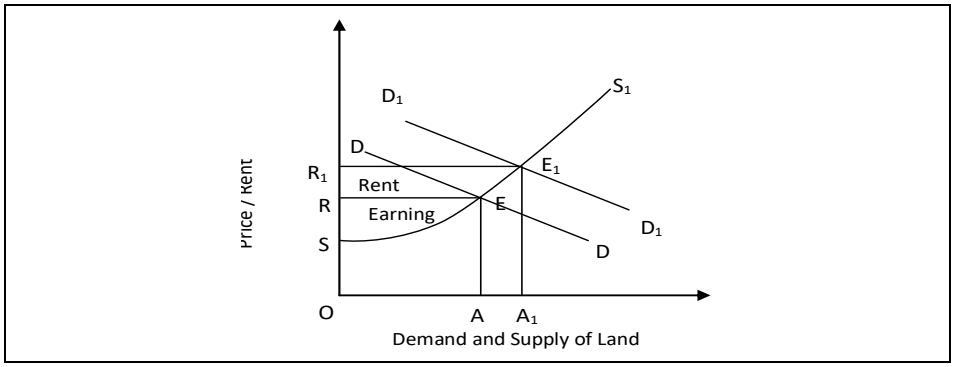
The demand curve DD cuts SS at E and the price per unit of land is fixed at OS. The demand for land is OA and the actual earning of land, which is equal to transfer earning, is OAES. Therefore, rent earned is zero. When the demand curve shifts to D_1D_1, rent remains OS. But the actual and transfer earnings both increase to OA_1E_1S. Here no rent is earned as rent is a surplus of actual earning over transfer earning. So, if a factor of production has a perfectly elastic supply, no rent can be earned by it.

Figure 8.8: Perfectly Elastic Supply of Land



Source: ICFAI Research Center

Figure 8.9: Elastic Supply of Land



Source: ICFAI Research Center

Elastic supply: From the perspective of an individual, firm, or industry, the supply of land is neither perfectly inelastic nor perfectly elastic. It lies between these two and can be termed as less elastic. Figure 8.9 depicts the elastic supply of land.

The supply curve of land, SS_1 shows an upward slope, indicating that supply increases at a higher price level. The equilibrium point is 'E' where the demand curve 'DD' cuts SS_1 and the rent is determined to be OR. Here, the actual earning is OAER and the transfer earning is OAES. The difference between actual earning, OAER, and the transfer earning, OAES, i.e. SER, is the rent. When the demand increases to D_1D_1, the rent goes up to OR_1. Here, the difference of the actual and transfer earnings is SE_1R_1. According to modern economists, the supply of other factors of production apart from land is less than perfectly elastic. Therefore, other factors also can earn rent. Hence, we can say that greater the inelasticity of supply of a factor, higher will be the share of rent in its earnings.

Thus, we can conclude that the modern theory of rent has overcome the shortcomings of the Ricardo's theory.

Exhibit 8.1 captures the impact of pandemic on rental prices.

Exhibit 8.1: Impact of pandemic on rental prices

The 'bid-rent theory' assumes that real estate prices and rents are usually highest in and around a city's business center or district. The real estate prices and rents, on the other hand, are lower as one moves farther away from the vicinity of the city's business hub.

The post-pandemic real estate prices and rents, however, project a reversal of the 'bid-rent theory' assumptions. Post the pandemic, there are a growing large number of people who prefer to move to suburbs. This movement caused a steep hike in the real estate prices and rents in the suburbs. This has been the global trend with rental prices dropping in major cities like New York and San Francisco.

The trend indicated that the decline in rents was more pronounced than the decline in prices. In India this trend is evident as per s survey of 558 respondents who desire to move home in 12 months. Around 87% of these respondents favoured the suburban neighborhood of their current city of residence, while 13% wanted to relocate to another city

Source: 1. https://www.marketwatch.com/story/how-to-predict-the-future-of-rents-in-major-cities-start-by-looking-at-what-share-of-employees-can-work-remotely-11618247295

2. https://economictimes.indiatimes.com/industry/services/property-/-cstruction/covid-19-impact-more-indians-keen-to-shift-homes-to-suburban-neighbourhood/articleshow/85619801.cms?from=mdr

8.6 Relationship between Rent and Price

Economists hold different views on the relationship between rent and the price of produce of land. While some economists believe that rent determines the price of the produce of land, others believe that rent is determined by the price.

8.6.1 Ricardian Analysis

According to Ricardo, rent does not affect the price of the produce of land. He explained this with reference to the situation in England during his time. At that time, the price of corn, which was the staple food of the working class, and the rent of land were very high. Ricardo opined that the price of corn was not high due to the high rent of land but that the rent was high due to the high corn prices.

8.6.2 Modern Analysis

Modern economists differed with Ricardo's view, holding that rent affected the price of produce of land in certain situations like --

- When land is under the control of a few landlords who compel farmers to pay rent on even marginal land.
- If people are more dependent on land in countries like India, then the land owners increase the rents and the actual rent becomes higher than economic rent.
- The productivity of land differs when land is used for the production of different varieties of crops. Then the rent affects price as there may be surplus when a particular variety is produced and no surplus for other varieties of crops.
- The scarcity of fertile/prime land leads to rent has an effect on price.

Check Your Progress - 2

5. What is the term used to define rent earned by factors of production other than land, including man-made machines and other appliances?
   a. Economic rent
   b. Differential surplus
   c. Scarcity rent
   d. Quasi-rent
6. "Rent is that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil." Which of the following economists had this opinion?
   a. Ricardo
   b. Boulding
   c. Marshall
   d. Mrs. Joan Robinson

7. 'Rent does not affect the price of the produce of land.' Which of the following economists had this opinion?

   a. Ricardo

   b. Marshall

   c. Mrs. Joan Robinson

   d. Boulding

8.7 Concept of Wages

Wage is the reward for labor. Both physical and mental work is referred to as labor in economics. Payment of wages for labor can be made in different ways. Some of them are:

- Time wages: Wages which are paid on the basis of number of hours worked.
- Piece wages: Wages which are paid depending on the quantity of output produced.
- Task wages: Wages which consider accomplishment of a task for payment of wages.
- Cash wages: Wages which are paid in money form.
- Kind wages: Wages which are paid in the form of commodities.
- Service wages: Wages which are paid through a return service for the service rendered.

Activity 8.2

Identify the types of wage in the following instances:

- A part of a huge machine is scheduled to be built in a month. Workers are paid for their work when they finish building that part.
- Workers employed in a paddy field are given a bagful of rice for their work.
- A painter is working upon a hoarding. He is paid for the number of hours he spends in a day on painting work.

Answer:

8.8 Distinction between Real Wages and Nominal Wages

There is a difference in the wages earned by workers in terms of the value of wages. Hence, wages can be classified on an economic basis into real wages and nominal wages.

8.8.1 Real wages

Employees are provided with various facilities for their services to the organization. The allowances paid to the employees, in addition to salary, as for example, medical facilities, transportation facilities, accommodation, etc., constitute the real wages of an employee.

According to Prof. Thomas, "Real wages or real earnings refer to the purchasing power of the worker's remuneration i.e., the amount of necessaries, comforts, and luxuries which the worker can command in return for his services."

The prosperity level of employees can be assessed by their real wages. Real wages are considered to be high when the purchasing power of money is high.

8.8.2 Nominal wages

According to Prof. Thomas, "Nominal wages or nominal earnings refer to the amount of the wages as measured in terms of money."

Nominal wages refers to the payment given to a worker for services rendered, in terms of money. They are also known as money wages.

8.9 Factors Determining Real Wages

Many factors determine the real wages of a worker. Real wages are considered to be high if the purchasing power of money is more, if additional facilities are provided by the organization, chances for extra income by doing extra work, social status attached to the job, etc. are high. On the other hand, real wages are considered to be low if the job involves high risk, if the nature of job is temporary, or if the time taken to learn the task is a lot.

Check Your Progress - 3

8. Wages which are paid on the basis on number of hours worked fall under which category of wages?
   a. Time wages
   b. Piece wages
   c. Task wages
   d. Service wages
9. The amount of money paid as wages can be referred as _____ of the worker.
   a. Real wages
   b. Nominal wages
   c. Status wages
   d. Bargained wages

10. Which of the following factors is considered while determining the real wages for workers?
    a. Purchasing power of money
    b. Conditions at work
    c. Nature of job
    d. All of the above

8.10 Theories of Wages

Different theories have been given by economists for the determination of wages for labor. Some of the theories of wages are: the standard of living theory of wages, the bargaining theory of wages, and the modern theory of wages.

8.10.1 The standard of living theory of wages

The standard of living theory of wages was proposed by Torrens in 1815. The theory suggests that wages are determined by the standard of living of the workers.

According to the standard of living theory, workers get used to comforts and want goods beyond their subsistence level. Hence, wages are determined to be at a level which includes necessities and comforts and are beyond the basic survival needs that the workers have been habituated to.

T.R. Malthus provided an explanation for the standard of living theory of wages. According to him, as and when the standard of living of workers rises, the wage level also rises to match the improved standard of living.

Further, the standard of living theory of wages suggests that with an increase in the productivity of workers, there is a chance to increase the wage level. However, some economists have criticized the theory as it concentrates only on the supply side of workers while ignoring the demand side. The other criticisms against this theory are: It is impractical (because the long-run conditions are uncertain), its concept of the standard of living (which is not easily determined) is vague, and it ignores the concept of differential wages.

8.10.2 Bargaining theory of wages

The bargaining theory of wages was developed by Davidson, Thomton, and Maurice. According to this theory, the bargaining power of producers and workers is the basis for determining wages. If the workers have high bargaining power, the wage level will be set high. Contrarily, the wage level is low if the bargaining power of the producers is high. The wage level is determined at the level which is mutually acceptable to the producers and the workers.

The bargaining theory of wages explains the concept of differential wages and also makes a mention of the role of trade unions in determining wages. However, according to some economists, the bargaining power of workers is in general weak when compared to producers and hence the bargaining theory of wages is incomplete.

Marginal Productivity Theory of wages

This theory of wages is an extension of marginal productivity theory of distribution. According to this theory, wage for labour should be equal to the value of the marginal product under conditions of perfect competition. Marginal product is the addition made to total product by the employment of one unit of labour. The value of the marginal product of labour is equal to the price at which the marginal product can be sold.

Under conditions of perfect competition, other things being constant, an employer will continue to employ more and more of labourers till the value of the marginal product is equal to marginal factor cost (MFC). Marginal factor cost is the cost of employing an additional worker. The difference in total production is the marginal productivity. The employment of an additional unit of labour will result in increase in output and cost. As long as MPP is greater than MFC, the employer will employ additional units of labour. But he will stop employing additional units of labour when MPP=MC.

Discounted Marginal Productivity Theory

Taussig has given a modified version of the Marginal Productivity theory of wages. According to this theory, the wage for labour is determined not by its marginal product but by the discounted marginal product. Labourers cannot get the entire amount of the marginal product because production is a long drawn out process.

In the same way, sales also take time. As the labourers are poor and cannot wait till the product is sold, they have to be supported by the employers. The employer does not pay the full amount of the marginal product of labour. In order to compensate the risk involved in giving advance to the workers, the employer deducts a certain percentage from the final output. This deduction is made at the current rate of interest. It is the discounted marginal product that determines the wage of the labourers.

Marginal productivity theory of wages was criticized, in the similar lines of marginal productivity theory of distribution, as this theory deals with the demand side only and the supply side is totally ignored. Further, marginal productivity of the worker cannot be calculated as they are not divisible into small units, their Knowledge is also not uniform. Rejecting the marginal productivity theory Marshall states, “This doctrine has been put forward as a theory of wages. But there is no valid ground for any such pretension… Demand and supply exert equally important influences on wages; neither has a claim to predominance; any more than has either blade of scissors, or either pier of an arch. The doctrine throws into clear light, one of the causes that governs wages”.

Discounted Marginal Productivity Theory was also criticized asit is very difficult to determine the discounted marginal product of labour, fails to take into account other factors which determine the wage rate. And to explain differences in wage rate.

8.10.3 Modern theory of wages

Modern economists developed this theory of wages to overcome the drawbacks of other theories. According to this theory, wages are determined to be at the level where the demand and supply of labor intersect. The demand and supply of labor are different from the demand and supply of goods. This is explained below.

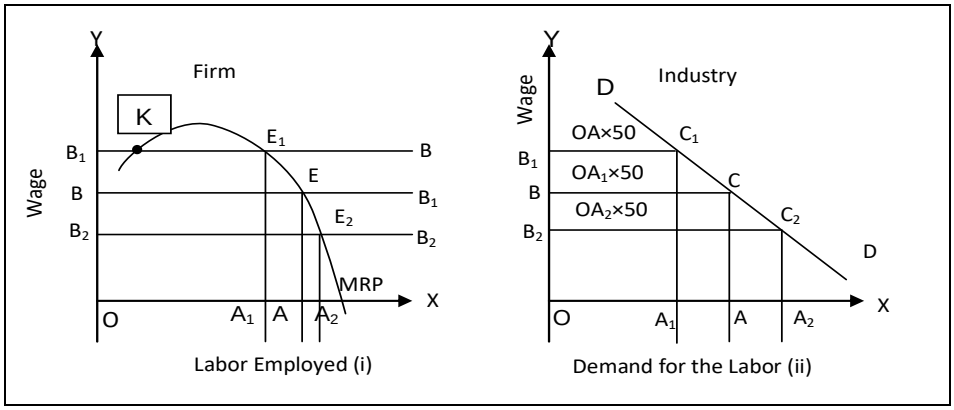
Demand for labor

Labor being one among the factors of production, has a derived demand. The demand for labor depends on the productivity of the workers, the level of substitutability with other factors of production, and the prices of other factors of production.

The demand for labor is also dependent on the Marginal Revenue Productivity (MRP). MRP is the difference in the total income to the producer when one more unit of labor is employed. It is profitable for producers to employ workers only up to the level where marginal productivity and wages are equal as the law of diminishing productivity operates on workers.

The wage level varies with the number of labor employed. The demand curve for labor slopes downward from left to right. The demand curve for industry as a whole is obtained by the horizontal summation of the demand curves of all the firms in the industry. Moreover, the demand for workers is inversely related to the wage level. Figure 8.10 depicts the demand curve of labor under perfect competition. Figure 8.9 (i) depicts the variations in the demand for labor by a firm at different wage levels. Figure 8.9 (ii) depicts the demand for labor by an industry where the demand curve for the industry is obtained by the horizontal summation of the demand curves of all the firms in the industry.

Figure 8.10: Demand Curve of Labor under Perfect Competition



Source: ICFAI Research Center

Supply of labor

The supply of labor refers to the number of workers ready to work at a particular wage rate. It is to be understood differently for a firm, for an industry, and for the economy as a whole.

Firm

Under perfect competition, a single firm cannot influence the wage rate in an industry, as a large number of firms operate in the industry. The demand for labor by a firm should be adjusted according to the wage level in the industry. The supply curve of labor for a firm is represented by a horizontal line.

Industry

The supply of workers to an industry can be increased only if the wage level in the industry is raised. Hence, the supply curve of labor for an industry is represented by an upward sloping line.

Supply of labor for an economy

The supply of labor for an economy as a whole is influenced by various social, political, and economic factors and increases when there is an increase in the wage level up to a limit. Beyond that limit, workers would prefer leisure to work and the supply of labor decreases even with an increase in wages. Hence, the supply of labor curve for an economy is backward sloping.

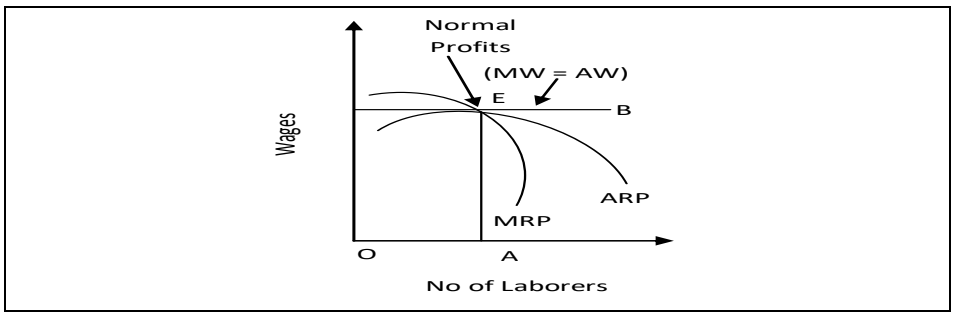
Equilibrium wage level

The equilibrium wage level is determined to be at the point of intersection of the demand curve and the supply curve of labor. The equilibrium wage level for a firm differs according to the division of time i.e., in the short run and in the long run.

In the short run, the supply of labor cannot be fully adjusted to its demand. The firms can earn abnormal profits, normal profits, or abnormal losses.

On the other hand, in the long run, the supply of labor can be adjusted in accordance with the demand for it. Hence, firms can earn only normal profits. The equilibrium wage level is reached at the point where the average wage, marginal wage, average revenue productivity, and marginal revenue productivity are equal. Figure 8.11 depicts the equilibrium wage level in the long run.

Figure 8.11: Equilibrium Wage Level in the Long Run



Source: ICFAI Research Center

As depicted in the figure, in the long run, the equilibrium wage level is reached at the point (E) where marginal revenue productivity, average revenue productivity, average wage, and marginal wage are all equal i.e., the long run equilibrium condition is MRP=ARP=AW=MW.

Check Your Progress - 4

11. The standard of living theory of wages was proposed by
    a. Torrens
    b. Davidson, Thomton, and Maurice
    c. Marshall
    d. Mrs. Joan Robinson
12. Which of the following theories consider only the supply side of labor in determining the wages?
    a. Bargaining theory of wages
    b. Modern theory of wages
    c. Standard of living theory of wages
    d. Classical theory of wages

8.11 Wages and Trade Unions

Trade unions generally comprise people in the same trade. Trade unions are viewed as an organization of workers formed to serve the interests of members in matters related to wages and working conditions. Some studies have shown that the wages of unionized workers are significantly higher than those of non-unionized workers. According to economists, this wage difference is due to the increased productivity among unionized workers and the restricted supply of labor.

8.11.1 Productivity of unionized workers

In a book titled 'What Do Unions Do?' Richard Freeman and James Medoff of Harvard University said, "Unions raise wages of workers by increasing their marginal product." This, they explained, was made possible by the improved communication between workers and the management through unions, resolving disputes by democratic means, and by motivating workers. Hence, unions could collectively voice the concerns of the workers, leading to improved productivity and increased wage levels.

8.11.2 Limited supply of workers

Trade unions have restricted membership. By controlling the supply of workers, trade unions raise the level of wages in an industry. If two industries need workers with similar skill sets and one of the industries has an organized union, then there will be a wage differential. This is because in the unionized industry, workers who are members of the union will have higher wages. But the increase in wage rates will lead to a decrease in the demand for labor. This forces non-unionized workers in the industry to move on to other industries which require workers with similar skill sets. The supply of workers increases in this industry and hence the wage level falls.

Example: An Instance of when the Union was Successful in Raising the Wage Level of Workers.

In 1902, coal mine workers in America had a union by name United Mine Workers (UMW). When 100,000 miners in northern Pennsylvania went on strike all through the summer that year asking for arbitration, President Theodore Roosevelt intervened and appointed a commission for mediation. The presidential commission awarded a 10 percent wage rise to the workers.

8.12 Summary

- Factors of production are the resources that are used to produce goods and/or services. The major factors of production are land, labor, capital, and entrepreneurship.
- Various theories of factor pricing suggest ways to distribute income among the factors of production. Prominent among the theories of factor pricing are the marginal productivity theory of factor pricing and the modern theory of factor pricing.
- Rent can be termed as the reward for land which is one of the four factors of production.
- Different theories of rent have been given by economists. Among them the Ricardian theory and the modern theory of rent are discussed in this unit.
- Labor is one of the four factors of production. In economics, the term labor refers to both physical and mental work. Wage is the remuneration paid for labor.
- Various theories were developed by economists to determine the wages of workers. The theories of wages discussed in this unit are the standard of living theory of wages, the bargaining theory of wages, and the modern theory of wages.

8.13 Glossary

Abnormal profit: The income remaining with the entrepreneur after subtracting all costs (both implicit and explicit) from the revenues received from the business. It is an excess over the normal profit.

Capital goods: Unlike goods intended to be consumed, capital goods are used to produce other goods. Machinery in a factory would be an example of capital goods.

Cash wages: Cash wages are the wages which are paid in money form.

Equilibrium condition: A condition which must be satisfied for equilibrium to exist, equilibrium being defined as a situation in which there is no tendency for change.

Extensive cultivation: In the farming technique of ‘extensive cultivation’, production of farm is increased by bringing more and more land under cultivation.

Factor pricing: Factor pricing means the price paid for the services rendered by the factor of production but not the price of the factor itself.

Functional distribution: Functional distribution of income distribution deals with the distribution of income among the four factors of production - land, labor, capital, and the entrepreneur.

Intensive cultivation: Under intensive cultivation technique of farming, the production of the land is increased by employing increased number of labor and capital units.

Kind wages: Kind wages are the wages which are paid in the form of commodities.

Marginal physical product: The change in total product measured in physical terms caused by a one unit increase in a variable input.

Marginal revenue product: The change in total revenue that results from employing one more unit of a factor.

Marginal physical productivity (MPP): MPP is the change in the total physical product or production, when one more unit of any one factor of production is added while other factors are kept constant.

Marginal revenue productivity (MRP): MRP is the change in the total revenue for the producer when an additional unit of a factor of production is employed while the quantity of other factors is kept constant.

Marginal land: Marginal land can be defined as that area of land that barely covers its costs with the market value of its produce. To put it differently, marginal land represents the grade of land below the level of which no land is used.

National income: The general term used to refer to the total value of a country's output of goods and services in some accounting period without specifying the formal accounting concept such as Gross Domestic Product.

Nominal wages: Nominal wages or nominal earnings refer to the amount of the wages as measured in terms of money.

Personal distribution: The pattern of individual income generation is studied under personal distribution.

Piece wages: Piece wages are the wages which are paid depending on the quantity of output produced.

Real wages: Real wages or real earnings refer to the purchasing power of the worker’s remuneration i.e., the amount of necessaries, comforts and luxuries which the worker can command in return for his services.

Service wages: Service wages are the wages which are paid through a return service for the service rendered.

Theory of factor pricing: Theory of factor pricing/micro theory of income distribution concentrates on individuals unlike macro theory which deals with aggregates of a nation. The theory of factor pricing determines the ways to distribute rewards for factors of production.

Transfer earning: Transfer earning refers to the income earned by a factor of production in its next best or alternative use.

Time wages: Time wages are the wages which are paid on the basis on number of hours worked.

Task wages: Task wages are the wages which consider accomplishment of a task for payment of wages.

Trade unions: Trade unions are in general an organization of workers formed to serve the interests of members in relation to wages and working conditions. Trade unions usually have a limited membership and are comprised of people in the same trade.

8.14 Self-Assessment Test

1. Explain the various theories of rent.
2. Critically analyze the various theories of wages.
3. What are the major factors of production? Explain two theories to determine factor pricing.

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8.16 Answers to Check Your Progress Questions

8.16.1 Model Answers to Check Your Progress Questions

Following are the model answers to the Check Your Progress questions given in the Unit.

1. (c) Modern theory

As the marginal productivity theory of factor pricing was based on impractical assumptions, and concentrated only on demand side ignoring the supply side; the modern theory of factor pricing was developed to explain the determination of factor prices. Modern theory considers both the demand side and s2

2. (d) Derived demand

Demand for factors of production is derived demand or indirect demand unlike the demand for goods which is direct. The demand for a factor of production is based on the contribution of the factor with regard to the production of a good, which can be termed as the productivity of the factor.

3. (c) Factor pricing means the price paid for the services rendered by the factor of production but not the price of the factor itself.

For example, rent is the price paid for usage of land, but it is not the price to own the land itself.

4. (b) Marginal Revenue Productivity (MRP)

Marginal Revenue Productivity (MRP) is the change in the total revenue for the producer when an additional unit of a factor of production is employed while the quantity of other factors is kept constant. According to the marginal productivity theory of distribution, in the long-run, under perfect competition, each factor of production will get its remuneration that will be equal to its Marginal Revenue Productivity (MRP).

5. (d) Quasi-rent

Alfred Marshall stated that rent of land is different from remuneration for other factors of production. In his view, as the supply of land is fixed, rent can be earned even in the long-run. Apart from land, other factors which have limited supply can also earn rent but only for a short-period of time. He termed this rent earned by other factors which include man-made machines and other appliances as 'quasi-rent'.

6. (a) Ricardo

"Rent is that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil," was the opinion of Ricardo. According to this definition, the reasons for the origin of rent are differences in the productivity of various pieces of land and situational differences.

7. (a) Ricardo

Ricardo believed that rent is a surplus arising because of differences in fertility and locations of land. Ricardo explained the origin of rent based on the assumption that 'marginal land' exists. Marginal land can be defined as that area of land that barely covers its costs with the market value of its produce.

8. (a) Time wages

Labor is one of the four factors of production. In economics, the term labor refers to both physical and mental work. Wage is the remuneration paid for labor. Payment of wages can be done in different modes. One of them is time wages which are paid on the basis of number of hours worked. .

9. (b) Nominal wages

According to Prof. Thomas, "nominal wages or nominal earnings refer to the amount of the wages as measured in terms of money." Nominal wages are also known as money wages and refers to the payment to a worker in terms of money for the service rendered.

10. (d) All of the above

The factors which determine the real wages of a worker include purchasing power of money, additional facilities like the allowances for transportation, food, etc., chances of extra income, conditions at work, nature of job, the time spent by the worker to learn a task and the expenses for training, the future prospects of a worker, and the social status attached with a job in a society.

11. (a) Torrens

The standard of living theory of wages was proposed by Torrens in 1815. The theory suggests that wages are determined by the standard of living of the workers.

12. (c) Standard of living theory of wages

According to the standard of living theory, the wages will be influenced by the necessities and comforts to which a worker has been habituated. It has been criticized by some economists that the standard of living theory of wages is a one-sided theory as the demand side of labor is ignored and only the supply side of labor is considered in determining the wages.

8.16.2 Model Answers to Exercises

Following are the model answers to the Exercises given in the unit.

A. (d) 310-300

The marginal product of any input can be defined as the extra output added by an extra unit of that input while other inputs are held constant. In this case, the extra output added by the 26^{th} unit of labor is 310 – 300.

Unit 9

Interest and Profit

Structure

9.1 Introduction

Production of goods is not complete without the combined efforts of all the factors of production. In the previous unit, we discussed two factors of production, namely land and labor. The compensation for land is called rent and the compensation received by labor is known as wages. This unit will discuss the remaining two factors of production -- capital and entrepreneurship.

This unit will explain the concepts of interest and profit and the various theories that attempt to explain the origin of interest and profit. The unit will also discuss profit policies that assist entrepreneurs and business houses to function under diverse conditions.

Before studying this unit student should recall the theory of supply and demand (Unit 2) and production function (Unit 4).

9.2 Objectives

By the end of this unit, students should be able to:

- Compare and contrast various theories of interest
- Compute equilibrium rate of interest with given demand and supply of capital
- Analyze different theories of profit
- Explain the importance of profit policy to business

9.3 The Concept of Interest

Interest is the reward received by the owner of capital for lending the capital to others. There are two types of capital, namely fixed capital and variable capital.

Interest is the compensation received for lending only variable capital. It can also be defined as the price paid by the borrower to the lender who parted with his/her money.

According to John Maynard Keynes (Keynes), "Interest is a reward for parting with liquidity for a specified period."

9.3.1 Basic Concepts

Interest rate is of two types. Nominal and real interest rates. Nominal interest rates are those given in the contracts between the two parties. Real interest rates are rate after the deduction of inflation rate from the nominal rates. For example, if inflation was 10%, in the preceding example the real interest rate can be said to be 20%-10% = 10%.

Nominal Interest rate is the Gross interest rate. It is the actual amount paid by the borrower to the owner of capital. The Gross Interest following elements:

1. Compensation for Risks: Giving a loan to somebody always involves a risk that the borrower may not repay it. To cover this risk, the lender charges more, in addition to the net interest.
2. Compensation for Inconvenience: Saving involves some inconvenience. Moreover, lending money means the lender may not be able to get it back when he needs for his own use. Hence a payment to compensate for this inconvenience is charged by the lender.
3. Payment for Management Services: A lender of capital funds has to spend money & time in management of credit. Certain legal formalities also have to be completed. He also has to maintain clerical staff. For all such services reward has to be paid to the lender. Hence, gross interest includes payment for management services.
4. Compensation for the changing Value of Money: When prices are rising during inflation, the purchasing power of money declines and creditor loses. To avoid such a loss, a high rate of interest may be demanded by the lender.
5. Net Interest: It is the price for the use of capital. Thus, net interest is a part of gross interest.

Thus,

Gross interest =net interest + payment for risk + payment for management services + compensation for changing value of money.

9.4 Theories of Interest

Following are some of the important theories that attempt to explain the emergence and origin of the rate of interest.

9.4.1 The Classical Theory of the Rate of Interest

Marshall and Fisher proposed the classical theory of the rate of interest. This theory is also known as the 'saving-investment theory', 'demand and supply of

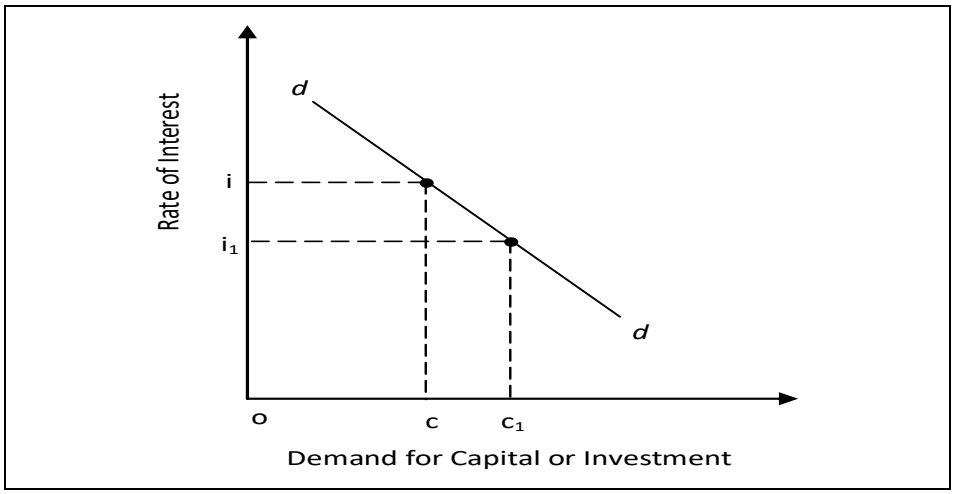
capital theory of interest', and 'real theory of interest'. According to the theory, interest rate is determined when the forces of demand for capital meet the forces of supply of capital. This theory states that the rate of interest is determined by the equilibrium between the demand for and supply of capital.

Capital demand

The demand for capital is purely dependent upon its efficiency. There is a demand for capital because entrepreneurs believe that the money borrowed can be put to use for producing goods and services. Entrepreneurs are also willing to pay a price i.e., pay interest on the money borrowed because the borrowed money can be put to some productive use.

The demand for capital is determined by its marginal productivity. Marginal productivity of capital can be considered as the increase in total production due to the addition of one more unit of the capital. The demand for capital increases with an increase in the marginal productivity of capital and vice versa. However, after a particular point of time, the marginal productivity of capital diminishes as more and more units of capital are added. The drop in marginal productivity is owing to the fact that diminishing returns on the marginal productivity of the capital have set in. Thus, the demand for capital is determined at the point where the marginal productivity of capital is equal to the rate of interest on capital. When the marginal productivity of capital is more than the rate of interest, it implies that the borrower will benefit by borrowing more capital. Similarly, when the marginal productivity of capital is less than the rate of interest, then there is less profitability in borrowing more capital.

Figure 9.1: Demand for Capital



Source: ICFAI Research Center

The determination of demand for capital is graphically explained in Figure 9.1. In the diagram, the demand for capital increases from oc to oc_1 when there is a decrease in the rate of interest from oi to oi_1. Due to this, the demand curve slopes downward from left to right.

Capital supply

Individuals tend to lend that part of their money which they do not use or spend on consumption. In other words, people lend their savings to others with a view to gaining interest on the money lent. Thus, the savings levels of people influence the supply of capital. Capital supply is influenced by:

- Ability to save: Factors such as purchasing power of currency, NNP, amount of personal income, size of family, government policies, etc. determine the capacity of individuals to save. For example, on getting a pay rise, a person's income increases. He/she can now choose to spend more or save.
- Determination to save: The savings level of people also varies depending upon the attitude of people. For instance, people who are pessimistic about their future tend to save more.

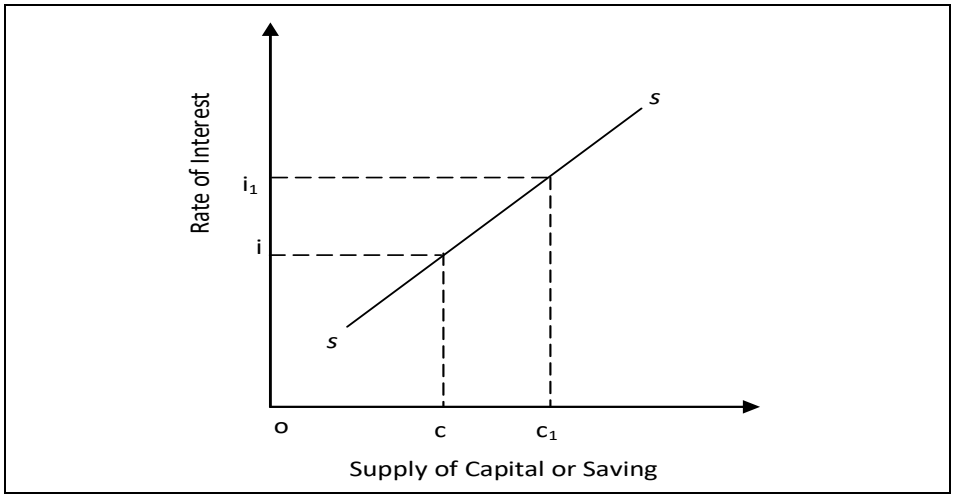
People are more willing to save when interest rates are high because they expect to earn higher returns on their money. In other words, the willingness of people to save is influenced by the rate of interest.

There is a direct relationship between the supply of capital and the rate of interest. This is shown in Figure 9.2. In the diagram, the supply of capital increases from oc to oc_1 with an increase in the rate of interest from oi to oi_1. Therefore, the supply curve *'ss'* is upward sloping from left to right.

Determining the equilibrium rate of interest

According to the classical theory of the rate of interest, the equilibrium interest rate lies where the demand for capital is equal to the supply of capital. So, the equilibrium between saving and investment of capital determines the rate of interest. Let us look at the following illustration to understand the determination of the equilibrium rate of interest.

Figure 9.2: Supply of Capital



Source: ICFAI Research Center

Table 9.1: Table Showing Equilibrium Rate of Interest

(₹ million)

Rate of Interest	Demand for Capital/ Investment	Supply of Capital/ Saving
8%	1000	1800
7%	1200	1600
6%	1400	1400
5%	1600	1200
4%	1800	1000
3%	2000	800

In Table 9.1, when the rate of interest is 8%, individuals' demand for capital is ₹ 1000 million and their savings level amounts to ₹ 1800 million. As the interest rate is reduced from 8% to 7%, the demand for capital increases to ₹ 1200 million but the savings levels of individuals drops to ₹ 1600 million. From the table, we can see that the demand for capital has increased with the decrease in interest rate. Similarly, the supply of capital (or savings level of individuals) has decreased with the decrease in interest rate. However, at 6% rate of interest, the demand for capital is equal to the supply of capital. Thus, at 6% interest rate, there is an equilibrium between demand for and supply of capital. Therefore, 6% is the equilibrium rate of interest.

Example: RBI's Monetary Policy

The monetary policy of the Reserve Bank of India (RBI) plays a crucial role in guiding the demand and supply patterns of capital in the economy. This is because it is the RBI that announces certain norms for all banking and financial institutions in the country.

How does RBI control the interest rates charged by banks?

The RBI controls the money available with banks by increasing or decreasing the bank rate. The bank rate is the rate at which the central bank allows the commercial banks to borrow from it. If the RBI increases the bank rate, then the rate at which banks lend money to the public also increases. Similarly, a decrease in the bank rate would lead to a decrease in the lending rates of banks.

How do interest rates impact demand and supply of capital in the economy?

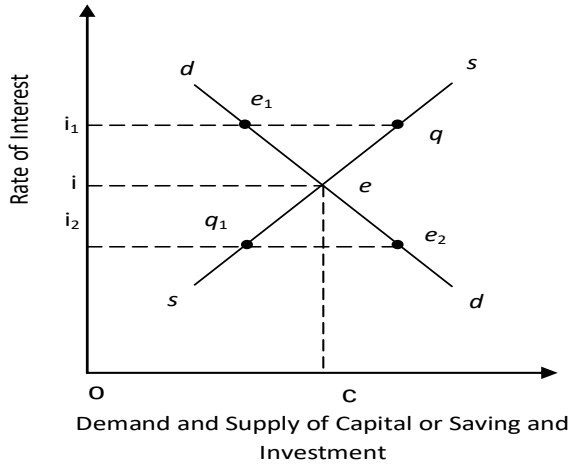
The rate at which banks lend their money is of great importance to individuals and businessmen alike. A reduction in interest rates will decrease the rate at which an individual is borrowing loans or offering deposits to the bank. Similarly, an increase in the bank rate will induce banks to increase interest rates. This implies that an individual will be charged a higher rate of interest for borrowing from banks and be offered a higher rate of interest on deposits made with the bank.

Contd….

An increase in interest rates would induce individuals to save in bank deposits as they would earn higher interest on deposits made with the bank. This means that there would be an increase in the supply of capital (in the form of bank deposits). However, this also means that businessmen would be required to pay a higher rate of interest on the amount borrowed (loans) from the banks and therefore they would like to lower their capital requirements. Thus, RBI influences the demand and supply of capital in the economy.

The determination of the equilibrium rate of interest is further explained with the help of a graph. In Figure 9.3, the equilibrium rate of interest lies at point *'e'* and is given by oi. However, when the interest rate is increased to oi_1, the demand for capital is less than the supply of capital. This is depicted by the portion $e_1 q$ on the graph. Similarly, when the interest rate is lowered to oi_2, the demand for capital is more than the supply of capital. This is depicted by the portion $e_2 q_1$ in the graph. Thus, the equilibrium rate of interest lies at point *'e'* where the demand for capital is equal to its supply.

Figure 9.3: Determination of Equilibrium Rate of Interest



Source: Icfai Research Center

Limitations

- Keynes criticized the classical theory on the grounds that it assumed full employment in the economy. He argued that full employment did not exist in the real world.
- The theory is not applicable in the short run, as it assumes the occurrence of the equilibrium rate of interest only in the long run.
- The theory holds that there is equality between savings and investment as a result of changes in interest rates. However, Keynes opined that the equality between savings and investment was due to the changes in the income levels of individuals.

- Keynes said that the classical theory of the rate of interest considered only real factors and did not take into consideration the impact of monetary factors on determination of rate of interest.
- According to the classical theory, the savings level of individuals changed with the changes in the interest rates. The savings level in turn determined the equilibrium interest rate[1]. Thus, the determination of interest rate itself was dependent upon the rate of interest. Thus, the theory is indeterminate.

9.4.2 The Liquidity Preference Theory of Rate of Interest

The liquidity preference theory of the rate of interest was proposed by Keynes. This theory was established on the belief that people preferred liquid money (cash) to other forms of money in the short run. Keynes believed that the interest rate was purely a monetary phenomenon. He said that the equilibrium rate of interest lay at the point where the demand for money was equal to its supply. Thus, the equilibrium between the demand and supply of money in the economy determined interest rate.

Activity 9.1

From the data given below draw a graph depicting the equilibrium rate of interest.

Rate of Interest	Investment (₹)	Savings (₹)
10%	2500	4500
8%	3000	4000
6%	3500	3500
4%	4000	3000
2%	4500	2500

Answer:

Keynes defined interest as "the reward for parting with liquidity for a specified period."

He disagreed with the classical view which held that interest is the reward earned by individuals for 'waiting' or 'saving'. According to Keynes, interest is the compensation received by individuals for parting with their liquid money for a particular period of time.

[1] The classical theory states that the equilibrium rate of interest is determined at the point where the demand for capital is equal to the supply of capital.

Liquidity preference: Keynes explained that people preferred cash to other forms of money (such as shares, debentures, gold, etc.) because it enabled them to purchase anything that they desired. Therefore, individuals preferred liquidity as it gave them 'purchasing power'. People's preference for cash or liquidity over other forms of money is called 'liquidity preference'.

People prefer liquidity to other forms of cash because they wish to satisfy three kinds of motives:

- Transaction motive
- Precautionary motive
- Speculative motive

Transaction motive

People demand liquid money to carry out their day-to-day transactions. The motive behind the demand for such liquidity is known as the 'transaction motive'. The transaction motive of individuals is influenced by the following factors:

- The amount of income earned by individuals
- The time period between the successive receipts of income of individuals
- The spending habits of individuals

The transaction demand for liquidity is dependent upon the income levels of individuals. Thus, changes in the income levels of individuals impact their transaction demand for liquidity. The higher the income levels, the greater will be the demand for money i.e., the transaction demand for cash by people is income elastic. The transaction demand for liquidity can be expressed as:

$$T = f(i)$$

Where, T is the demand for cash (or liquidity) due to the transaction motive and $f(i)$ is the function of income.

Precautionary motive

People also demand liquidity with a view to safeguarding their future. The motive behind the demand for such liquidity is known as the 'precautionary motive'. The precautionary motive of people is influenced by:

- The size of the income earned by individuals
- Nature of the people: For example, pessimistic people anticipate higher risks in future and hence their precautionary demand for liquidity will be more.

The precautionary demand for liquidity, like transaction demand, is dependent upon the income levels of individuals. Thus, changes in the income levels of individuals invariably have an impact on the precautionary demand for liquidity. The precautionary demand for liquidity can be expressed as:

$$P = f(i),$$

Where, P is the precautionary demand for liquidity and $f(i)$ is the function of income.

Speculative motive

When people demand liquidity to take advantage of the changes in the price levels of securities in the market, then the motive behind the demand is known as the 'speculative motive'. The speculative demand for liquidity can be better understood with the help of the following:

- People demand higher liquidity if they think that the prices of securities will increase in the future. This belief makes them want to purchase these securities now.
- People's demand for liquidity is less if they think that the prices of securities will go down in the future. This is because they would like purchase securities at the lower rate in the future.

Exhibit 9.1 details the liquidity preference of Indians during the COVID -19 Pandemic.

Exhibit 9.1: Liquidity Preference of Indians during COVID -19 Pandemic

The YouGov-Mint-CPR Millenial survey was conducted in October – November, 2020 in association with the Center for Policy Research to assess the impact of the pandemic on the incomes of Indian households. 10,000 respondents, half of who were millennials (aged 24 -39) from 203 urban centers took part in the survey.

The survey highlighted the income disruptions faced by the millennials. More than three fourths of the respondents said that they suffered financial stress during lock down. Around 50% of the respondents reported that they had to draw from their savings to meet the financial commitments. Almost one third expressed the fact they had to borrow to meet the expenses.

These income constraints and the uncertainty surrounding future cash flows forced many respondents to adopt the precautionary motive for liquidity preference. Most opted to keep money in easily usable forms such as cash and demand deposits. They also did not show the inclination to spend any money received during these difficult times. The survey concluded that the shift from precautionary motive to spending may not escalate until the fear and anxiety of the households diminish or cease.

Source: https://www.livemint.com/opinion/online-views/a-post-pandemic-crisis-of-income-uncertainty-11609171181315.html

Activity 9.2

Identify the motive behind the demand for liquidity in each of the situations given below. Justify your answer.

1. Radha withdrew money from the bank to pay her tuition fees.

Answer:

2. Sonam needs money to pay a premium on her LIC policy. **Answer:**
3. Sanjay took a loan from Ajay to purchase shares in JK Company Limited. **Answer:**
4. Manisha is requesting her mother to increase her allowance so that she can purchase a Walkman. **Answer:**

The liquidity preference curve

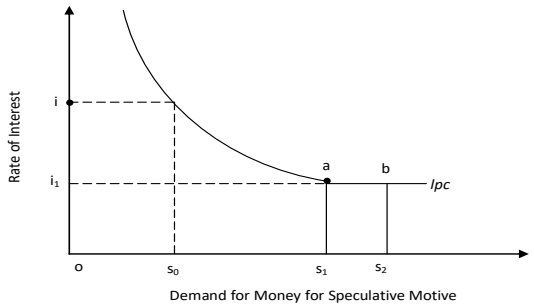
It has generally been observed that interest rates fall when there is a rise in the prices of bonds and securities and vice versa. Thus, rate of interest and the prices of securities have an inverse relationship. People's demand for liquidity is dependent upon their expectations with respect to the prices of bonds and securities. Thus, the speculative motive influences the liquidity preference of people. The speculative demand for liquidity can be expressed with the help of the following equation:

$$M_2 = f\,(\text{int}),$$

Where M_2 is the speculative demand for money and f (int) is the function of the rate of interest.

Figure 9.4 illustrates the inverse relationship between interest rates and the speculative demand for liquidity. In the graph, when the interest rate is at oi, the speculative demand for liquidity is represented by os_0. When the rate of interest goes down from oi to oi_1, the speculative demand for liquidity increases from os_0 to os_1. As a result of this, the liquidity preference curve *'lpc'* is a downward sloping curve from left to right.

Figure 9.4: The Speculative Demand for Money



Source: ICFAI Research Center

In this theory, the aggregate demand for liquidity is determined by adding $M_1 + M_2$. Therefore, the aggregate demand for liquidity is given by:

$$AD = M_1 + M_2 = f(i) + f(int)$$

$$Or, AD = f(i, int)$$

Thus, the aggregate demand for liquidity is determined by the transaction, precautionary, and speculative demands for liquidity. Of these three motives, the transaction and speculative demands for liquidity are largely dependent upon the income levels of individuals. Thus, the transaction and precautionary demands demonstrate minor changes if there is no (or some) change in the income levels of individuals. Therefore, Keynes's liquidity preference is largely influenced by the speculative motive of people.

The liquidity trap

According to Keynes, the interest rate cannot come down further below an institutionally-determined minimum limit. Interest rate could never be negative or zero. This concept is popularly referred to as the 'liquidity trap'. The concept of a liquidity trap is further explained with the help of Figure 9.4. In the graph, the liquidity trap is represented by the portion 'ab'. At this point, even though there is an increase in supply of money from os_1 to os_2, the interest remains constant at oi_1.

Money supply

Keynes believed that the supply of money remained constant in the economy in the short run. This is because the supply of money in the economy is controlled by the government and cannot be influenced by individuals. In other words, the supply of money is interest-inelastic. Therefore, the supply curve is parallel to the y-axis.

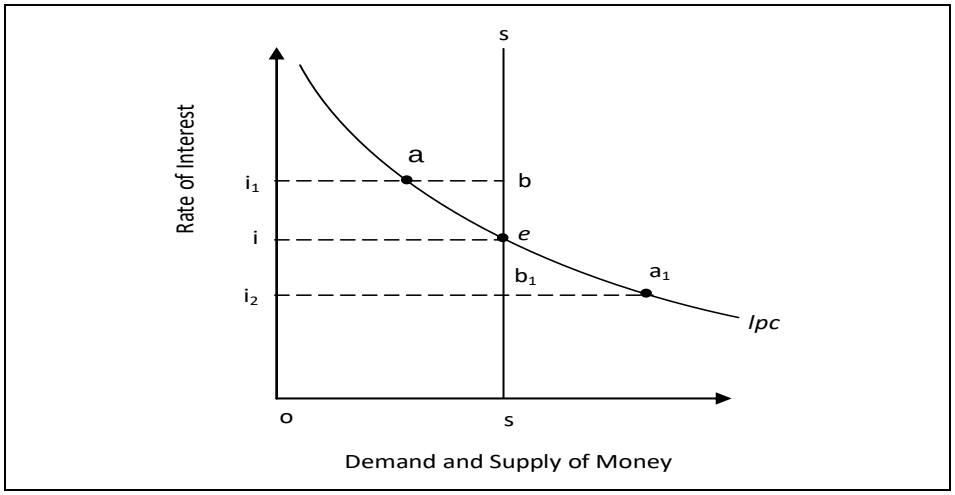
Determining the rate of interest

The equilibrium rate of interest is determined at a point where the demand for money is equal to the supply of money. Therefore, interest rate is determined when

$$AD = SS$$

The determination of the rate of interest is better explained with the help of Figure 9.5. In the figure, the equilibrium point rests at *'e'*. At this point, the demand for and supply of money are equal and the interest rate is oi. However, an increase or decrease in the interest rate leads to a disequilibrium between the demand and supply of money. For instance, when the interest rate is increased to oi_1, the supply of money is more than the demand for money. This is represented by the portion 'ab' on the graph. Similarly, a decrease in interest rate from oi to oi_2 also leads to a disequilibrium in the demand and supply of money. This disequilibrium is represented by a_1b_1.

Figure 9.5: Determination of Rate of Interest



Source: ICFAI Research Center

Limitations

- The liquidity preference theory of the rate of interest was criticized on the grounds that it concentrated only on monetary factors.
- The demand for liquidity was dependent upon three motives -- transaction, precautionary, and speculative. Of these, the speculative motive was influenced by interest rates. The theory states that interest rate is determined by the equilibrium between the demand for and supply of money. Thus, it leads to an equation where interest rate is determined by the interest rate itself. Therefore, economists held that the theory was indeterminate.
- Economists also said that the theory did not elaborate on the differences in interest in various markets.

Check Your Progress - 1

1. Which of the following best defines net interest?
   a. Compensation for borrowing capital only
   b. Compensation for management of loan
   c. Compensation for taking risk of money lending
   d. Compensation for inconvenience of investment
2. Which of the following does not reflect the concept of 'liquidity trap'?
   a. Interest rate cannot come down further below an institutionally-determined minimum limit
   b. Interest rate can be zero or negative
   c. Interest rate is sticky towards the downward direction of the *lpc* curve
   d. Interest rate always remains positive

3. The classical theory of the rate of interest is also known as _____.
   a. Demand supply theory
   b. Saving- Investment theory
   c. Standard of living theory
   d. Liquidity preference theory
4. The liquidity preference theory of rate of interest was proposed by _____.
   a. Marshall and Fisher
   b. Ricardo
   c. Keynes
   d. Torrens
5. Which of the following economists propounded the real theory of interest?
   a. Marshall and Fisher
   b. Keynes
   c. Schumpeter
   d. Walker

9.5 The Concept of Profit

9.5.1 What is Profit?

Profit is the reward for entrepreneurship or organization. While the reward for other factors of production viz. land, labor, and capital is paid by the entrepreneur, profit is the reward the entrepreneur himself/herself earns. The entrepreneur gets profit for utilizing his/her entrepreneurial abilities and running the business.

Profit is the surplus amount remaining with the entrepreneur after he/she has paid all the factors of production. Thus, profit can also be represented as

Profit = Value of Outputs – Value of Inputs

Basic concepts

Profit consists of two major components namely, gross profit and net profit.

Gross profit: The amount remaining with the entrepreneur after all the explicit costs have been deducted from the revenues of the business is known as gross profit. It can be shown as:

Gross Profit = Total Revenues – Total Explicit Costs

Activity 9.3

Padma a trained beautician was working in a beauty parlor for a monthly salary of ₹ 5000. She has now started a beauty parlor with an investment of ₹ 200,000. She has further spent ₹ 10,000 and renovated two rooms of her own house. Padma intends to attend to her customers here. Earlier, Padma earned a rent of ₹ 1,500 per month for these two rooms. She also spent ₹ 20,000 on other

expenses such as equipment, promotional expenses, etc. By the end of the year, Padma's total revenues stood at ₹ 2,35,000. Calculate the gross profit/loss and net profit/loss of Padma. **Answer:**

Net profit: The amount remaining with the entrepreneur after the explicit as well as implicit costs have been deducted from the business revenues is known as net profit. It can be represented as:

Net Profit = Total Revenues – (Explicit Costs + Implicit Costs)

Or, Net Profit = Gross Profit – Implicit Costs

Exercises

A. Suppose the price function of a firm is represented by P = 100 +2Q, and the cost function is represented by function, $2Q^2 – 50Q +1500$. If Q stands for quantity, at what level of output will the firm be able to earn a profit of ₹ 7500?
   a. 75
   b. 90
   c. 60
   d. 50

B. The total revenue and the total cost functions of a garment manufacturing company are TR = 450 – 2Q and TC = 120 + 3Q. What would be the daily profit of the company if it sold 10 units per day?
   a. ₹ 250
   b. ₹ 200
   c. ₹ 280
   d. ₹ 300

9.6 Theories of Profit

Given below are some of the prominent theories that attempt to explain the emergence and origin of profits.

9.6.1 Traditional Theories

Various economists like Adam Smith, Walker, Taussig, and others have propounded theories which tried to explain the origin of profits. Let us now discuss one of the important traditional theories of profit namely, the rent theory of profit given by F. A. Walker.

Walker's rent theory of profit

Walker believed that different lands earned different rents due to the difference in their fertility. Similarly, some entrepreneurs earned 'rent of ability' called profit. According to him, there were intra-marginal and marginal entrepreneurs and the intra-marginal entrepreneurs were more able than the marginal entrepreneurs. They earned higher rents because they possessed greater ability to run the business than the marginal entrepreneurs. Thus, the intra-marginal entrepreneurs earned the 'rent of ability' called profit.

Exhibit 9.2 highlights the efforts of one such entrepreneur whose entrepreneurial abilities enabled the company to achieve growth.

Exhibit 9.2: Kanika Tekriwal's Jet Set Go

Kanika Tekriwal, a 24 year old cancer survivor, created history when she broke the barriers of aviation industry and steered her company 'jet set go' into a ₹ 150 crore turnover company. Kanika is the founder of "Jet Set Go", an airline aggregator company that offer private charter services.

The company was started in 2012 with a meagre investment of ₹ 5,600. She built an app that allowed booking of chartered flights. The business was initially run by taking advances from customers and credit availed from vendors. By 2021, the company grew with 200 employees operating from Delhi, Mumbai, Chennai and Hyderabad. In 2020, the company purchased its own fleet of 8 aircrafts to cater to surge in demand post the pandemic.

The company is also a trendsetter with its fledging urban air mobility service called the eVTOL (electrical Vertical Take-Off) aircraft service. These aircrafts are capable vertical take-offs and landing. The shuttle service charges, introduced in Mumbai, were highly competitive and almost same as what an Uder costs.

Kanika Tekriwal is an example of entrepreneur whose abilities have created "rent of ability" called profit.

Source: https://www.theweekendleader.com/Success/2993/flying-high.html

Limitations

- Economists criticized Walker's theory saying that comparing rent with profits was impracticable. This was because profits could be negative or zero, but rent was always positive and could never be zero.
- Economist J.B. Clark opined that rents occurred both under static and dynamic conditions. However, profits accrued to business only under dynamic conditions.
- Many economists said that profits also accrued as a result of innovation, risk-bearing, etc. and not only because certain entrepreneurs were more able than others.

9.6.2 Modern Theories

The important modern theories of profit discussed in this unit are Clark's dynamic theory, Schumpeter's innovation theory, Hawley's risk theory, and Knight's uncertainty-bearing theory.

Dynamic theory of profit

This theory has been given by J.B.Clark. According to J. B. Clark, profits arise due to the difference between the costs and prices of goods. He said that in a stationary state, there is equilibrium between the demand for and supply of goods. Thus, there is no difference between the costs and the prices of the goods. Therefore, profits do not accrue. However, in a dynamic state, there is disequilibrium between demand and supply conditions in the economy. As a result, there arise differences between the costs and prices of goods. These differences give rise to a surplus in the revenues of the business, in other words, to profit.

According to Clark, there will be no profits in a static society. In static state there will be no changes in the society. In a static economy everything remains constant. Under competitive conditions price equals AC hence surplus is zero. Therefore, there are no profits. Profit is the outcome of dynamic changes in the economy. According to Clark, the following changes cause profits.

1. Increase in population
2. Changes in tastes & preferences
3. Multiplication of wants
4. Capital formation
5. Technological advancement
6. Changes in the form of business organization.

On account of these changes the economy tends to be dynamic. Some entrepreneurs take advantage of changing conditions and therefore reap profits.

Limitations

- Clark's theory does not elaborate on the determination of the size of profits.
- Taussig believed profits to be the wages earned by the entrepreneur for utilizing his/her entrepreneurial abilities to manage the business. Thus, he criticized Clark's theory as it made a distinction between wages and profits.
- Economists pointed out that Clark disregarded the element of risk-taking in managing a business.

Innovation theory of profit

The innovation theory of profit was given by Joseph Schumpeter. According to him, an entrepreneur earns the reward of profit if he introduces innovations in business processes and the innovations prove successful in the marketplace. He explained that there would be differences between costs and prices of the product

as a result of continuous innovations in the marketplace. Profits accrued to the entrepreneur as a result of these differences. However, these differences ceased to exist if competitors too introduced similar innovations in their business processes. In such a scenario, the entrepreneur was required to introduce new innovations so that he again increased the difference between the costs and prices of goods. This once again would enable the entrepreneur to earn profits.

Limitations: Economists opined that Schumpeter gave a narrow definition of profit. They believed that profits also accrued as a result of several other activities of the entrepreneur and not just innovation.

Uncertainty-bearing theory

Frank H. Knight in his theory of profit proclaimed that entrepreneurs earned profits for bearing the risks and uncertainties of business. Knight also differentiated between risk and uncertainty and said that bearing uncertainty in business was the most important function of an entrepreneur. To explain the differences between risk and uncertainty, Knight divided risk into:

- Insurable risks: These refer to risks which the entrepreneur can avoid through insurance coverage.
- Non-insurable risks: These refer to risks which are unpredictable. The entrepreneur cannot avoid the risk of loss in case of such risks. This is because he/she cannot cover these risks through insurance coverage.
- According to Knight, uncertainty arises due to non-insurable risks in business. An entrepreneur earns the reward called profit for bearing the loss of non-insurable risks.

Limitations

- The theory concentrates only on a single function of entrepreneurs viz. uncertainty-bearing. It ignores the importance of other functions such as estimating market demand, innovations in business processes, etc.
- Economists were of the view that the definition of profit had been confined to a micro perspective. It did not explain the determination of profit sharing among a large group.

9.7 Profit Policies

Entrepreneurs draft profit policies because they believe that these will be useful in managing business under diverse conditions. Profit policies give entrepreneurs a clear picture of the rate of profits the business ought to earn and what should be the profit performance of the business in the long term. The profit policies of a business must reflect the goals and objectives of the business. Profit policies must thus take into consideration the following issues:

- Standards of reasonable profits
- Reasons for limiting profits

9.7.1 Standards of Reasonable Profits

Entrepreneurs select a specific concept and measure of profit, when setting a standard of reasonable profits. They then use these standards to measure and compare the anticipated and achieved profits of the business.

9.7.2 Reasons for Limiting Profits

So far we have been discussing profits from an entrepreneur's perspective. However, in today's business environment, there is a difference between ownership and management. Managers manage the business on behalf of the shareholders. Thus, they are answerable to them. Taking these factors into consideration, there is a need for business houses of today to limit their profits. Given here are some of the important reasons for limiting the profits of business houses:

- To discourage or avoid competition
- To maintain the firm's goodwill
- To control the demand for higher wages
- To maintain the liquidity of firms
- To avoid risk

Check Your Progress - 2

6. Gross profit for an entrepreneur does not exclude _____.
   a. Explicit costs
   b. Economic costs
   c. Implicit costs
   d. Fixed costs
7. Walker's theory of profit bears similarities to the rent theory proposed by which of the following economist?
   a. Marshall
   b. Ricardo
   c. Boulding
   d. Joan Robinson
8. Which of the following best describes the objective behind drafting profit policies?
   a. Profit policies aim to enhance future profits of the firm
   b. Profit policies aim to analyze the past profits of the firm
   c. Profit policies aim to correlate profits and present performance
   d. Profit policies aim to reflect the goals and objectives of the firm

9.8 Summary

- The reward for capital is called interest. It consists of two components – gross interest and net interest
- The classical theory of the rate of interest proposes that interest rate can be determined when there is equilibrium between demand for and supply of capital in the economy.
- The liquidity preference theory of the rate of interest was propounded by Keynes. According to him, the equilibrium rate of interest lies at the point where the demand for money is equal to its supply in the economy.
- Profit is the reward that the entrepreneur earns for utilizing his/her entrepreneurial abilities and running a business. It has two components namely, gross profit and net profit.
- Several economists propounded several theories to explain the emergence and origin of profits. The theories can be broadly classified into – traditional theories and modern theories
- Walker's rent theory of profit was one of the important traditional theories of profit.
- Some of the important modern theories of profit are – Clark's dynamic theory of profit, Schumpeter's innovation theory of profit, and Knight's uncertainty-bearing theory.
- Entrepreneurs can use profit policies to make the business function efficiently under diverse conditions.

9.9 Glossary

Aggregate demand: Total planned or desired spending in the economy during a given period. It is determined by the aggregate price level and influenced by domestic investment, net exports, government spending, the consumption function, and the money supply.

Central bank: A government-established agency (in India, Reserve Bank of India) is responsible for controlling the nation's money supply and credit conditions and for supervising the financial system, especially commercial banks and other depository institutions.

Demand for money: A summary term used by economists to explain why individuals and businesses hold money balances.

Gross interest: The total amount paid by the borrower to the lender of the money.

Gross profit: It is the difference between the total revenues and the total explicit costs of the business.

Insurable risks: Insurable risks are those risks which the entrepreneur can avoid through insurance. These risks can be in the form of loss of assets due to fire, accident, theft, etc.

Liquidity preference: People's fondness for cash or liquid money is called as 'liquidity preference'.

Liquidity trap: The portion of *lpc* where the interest rate remains same even if there is increase in supply of money is popularly called as the 'liquidity trap'.

Monetary policy: The objectives of the central bank in exercising its control over money, interest rates, and credit conditions.

Money supply: The narrowly defined money supply (M_1) consists of coins, paper currency, plus all demand or checking deposits; this is narrow, or transactions, money. The broadly defined supply (M_2) includes all items in M1 plus certain liquid assets or near-monies- savings deposits, money market funds, and the like.

Net interest: It is the reward paid to the capitalists exclusively for the use of capital.

Non-insurable risks: Non-insurable or unpredictable risks are those risks which are unforeseen and for which no information is available to estimate or forecast.

Precautionary motive: When people demand liquid money to safeguard their future, the demand for such liquidity is known as the 'precautionary motive'.

Saving: The act of abstaining from consumption. In terms of the national accounts, the difference between personal income less taxes and total consumption spending.

Speculative motive: When people demand liquid money with a view to take advantage of the changes in the price levels of securities and bonds.

Transaction motive: When people demand liquid money to carry out their day-to-day transactions, the demand for such liquidity is known as 'transaction motive'.

9.10 Self-Assessment Exercises

1. What is interest? How is interest rate determined under the liquidity preference theory of rate of interest?
2. Explain the classical theory of the rate of interest.
3. What is profit? How does Clark define profit in his 'dynamic theory of profit'?
4. Explain Knight's uncertainty-bearing theory of profit.

9.11 Suggested Reading/Reference Material

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3. IMF Working Paper. Make in India: Which exports can drive the next wave of Growth? 2016.

9.12 Answers to Check Your Progress Questions

9.12.1 Model Answers to Check Your Progress Questions

Following are the model answers to the Check Your Progress questions given in the Unit

1. (a) Compensation for borrowing capital only

Interest has two components namely, gross interest and net interest. Gross interest is the total amount paid by the borrower to the lender of the money whereas, net interest is the reward paid to the capitalists exclusively for the use of capital. Thus, net interest is a compensation for borrowing capital only.

2. (b) Interest rate can be zero or negative

Keynes, in his liquidity preference theory of rate of interest proposed that interest rate can never be zero or negative. According to him, the rate of interest cannot come down further below an institutionally determined minimum limit. This concept is referred to as 'liquidity trap'.

3. (b) Saving-Investment theory

Marshall and Fisher proposed the classical theory of the rate of interest. This theory is also known as the 'saving-investment theory', 'demand and supply of capital theory of interest', and 'real theory of interest'.

4. (c) Keynes

The liquidity preference theory of the rate of interest was proposed by Keynes. Keynes believed that the interest rate was purely a monetary phenomenon. He said that the equilibrium rate of interest lay at the point where the demand for money was equal to its supply. Thus, the equilibrium between the demand and supply of money in the economy determined interest rate.

5. (a) Marshall and Fisher

The classical theory of rate of interest also known as the real theory of interest was propounded by Marshall and Fisher.

6. (c) Implicit costs

The gross profit is arrived at after excluding all the explicit costs from the revenues received by the business. It does not exclude implicit costs such as rent forgone by entrepreneur for utilizing his own land for business purposes, interest forgone on his own capital, etc.

7. (b) Ricardo

While explaining the rent theory of profit, Walker said that the intra-marginal entrepreneurs earned rent of ability called 'profit'. This is because the intra-marginal entrepreneurs are abler than the marginal entrepreneurs. This concept of profit bears similarities to Ricardo's 'rent theory'. According to Ricardo's theory, the difference in productivity levels of two lands determined the rent of the superior land. Therefore, rent is the 'differential surplus' over the costs incurred on the marginal land.

8. (d) Profit policies aim to reflect the goals and objectives of the firm

Profit policies assist entrepreneurs to work under diverse conditions. Profit policies give entrepreneurs a clear picture about the rate of profits the business ought to earn and what should be the profit performance of the business in the long-term. Profit policies should be such that they reflect the goals and objectives of the business.

9.12.2 Model Answers to Exercises

Following are the model answers to the Exercises given in the unit.

A. (c) 60

Profit = Total revenue(TR) – Total cost(TC)

TR = Price × Quantity

TR = (100 +2Q) Q

$TR = 100Q + 2Q^2$

$TC = 2Q^2 – 50Q + 1500$

Profit = $100Q + 2Q^2 – (2Q^2 – 50Q + 1500)$

$7500 = 100Q + 2Q^2 – 2Q^2 + 50Q – 1500$(since profit given is ₹ 7500)

$7500 = 150Q – 1500$

$150Q = 9000$

$Q = 60$

B. (c) ₹ 280

Profit = Total revenue – Total cost

Total revenue = $450 – 2Q$

At Q = 10,

TR = 450 - 20 = 430

Total Cost = $120 + 3Q$

At Q = 10,

TC = 120 + 30 = 150

Profit = TR – TC

= 430 – 150 = ₹ 280

Unit 10

Forecasting and Decision Making

Structure

10.1 Introduction

In the previous two units we discussed about different theories of factors of production. The present unit will discuss a different concept.

Business decisions are characterized by risk and uncertainty. If these two factors are not tackled properly, it can lead to ineffective decision making. In the face of such risks and uncertainty, decision makers use forecasting as a tool to facilitate the decision-making process. Thus, forecasting is an integral part of business decision making.

This unit explains the concept of economic forecasting and discusses the various demand forecasting techniques that managers can use to make appropriate business decisions. The unit also discusses the concepts of risk and uncertainty. This unit explains capital budgeting as well and how it is used by managers to make key investment decisions.

Before studying this unit student should recall the concepts of demand forecasting (Section 8 of Unit 2) and game theory (Section 6 of Unit 7).

10.2 Objectives

By the end of this unit, students should be able to:

- Appreciate the importance of economic forecasting
- Assess the role of risk and uncertainty in decision making
- Describe the process of capital budgeting

10.3 Economic Forecasting

The process of forecasting the economic conditions in a country either in full or in part is known as 'economic forecasting'. Forecasting the economic conditions in the economy has various advantages, both at the micro and macro levels. These advantages are outlined here.

- Macro level: Economic forecasting is useful in estimating the economic growth of the whole economy. If the forecasts predict that the economy is moving at a slow pace, then the government can make the required changes in the monetary and fiscal policies with a view to improve the economic conditions in the country.
- Micro level: As economic forecasting predicts the rate of growth of the economy, it helps individuals and businessmen in making prudent investment and business decisions.

Importance of Forecasting and Decision Making in Businesses

- Forecasting plays a very key role in decision making. This is because forecasts are help in improving the decision-making process in a business. Businessmen uses large number of qualitative and quantitative methods for demand forecasting in order to predict future demand for their products and take appropriate business decisions. Qualitative methods include expert opinion on certain decision, primary survey and market experiments, whereas quantitative techniques include time series analysis and barometric method.
- Businesses can understand the new changes taking place in the economy and study its impact on their business by economic forecasting. Business decisions are always characterized by risk and uncertainty. While forecasting about their businesses the business analysts have to keep in mind the risk and uncertainty and forecasts are always given with probabilities.
- Risk is a situation in which the business can measure the possible profits and losses arising from a certain decision with given probabilities. But, in case of uncertainty it is not possible for the business to measure the risk involved in business decision. They attempt to reduce the uncertainty by using certain quantitative methods such as maximax criterion, maximin criterion, minimax criterion, Laplace criterion, etc. Since businesses have huge investment decisions to be made, forecasting and decision making should be done with greatest care because such decisions are not reversible. Companies therefore make use of capital budgeting as a tool to plan and make decisions.

10.4 Demand Forecasting

This part has been covered earlier in this self-learning material under Unit 2 "Theory of Demand and Supply".

10.5 Risk and Decision Making

10.5.1 Risk and Uncertainty

A condition of risk and uncertainty arises in the decision-making process when the decision maker is not sure or is unaware of the outcome of a particular decision. In general, people tend to think of risk and uncertainty as being the same. However, in economic theory, there is a difference between the two. Let us now understand the distinction between risk and uncertainty.

Risk

One of the important differences between risk and uncertainty is that risk is calculable, while uncertainty is non-calculable. Risk can be defined as a situation where there can be more than one possible outcome to a decision. In addition, the decision maker can assign probabilities to the possible outcomes of a particular decision. For example, the shareholder gets a dividend (return) for investing his/her money in the shares of a company. He/she anticipates that in a particular year, the share prices may go up and that he/she may get more returns. However, the actual returns may be more than or less than his/her expectations. Thus, there is an element of risk. But, the shareholder can approximately estimate the gain or loss by comparing it with the existing share price. Therefore, the risk is measurable. Also, risk is associated with returns. In the above example, the shareholder can measure his/her risk in terms of the returns on his/her investment.

Uncertainty

Under conditions of uncertainty, the decision maker is not aware of the possible outcomes of a particular decision. More importantly, he/she cannot calculate the risk of loss or profit that may arise by taking a particular decision. For example, a farmer might incur huge losses in the event of a monsoon failure. This is a condition of uncertainty because the value of the crop lost is dependent upon the prevailing market conditions. The meteorological department also cannot exactly determine the chances of a monsoon failure in a particular year.

10.5.2 Risk and Decision Making

While making decisions under conditions of risk, the decision maker is required to assign expected values to all the possible outcomes of a particular decision. He/she then chooses that outcome which has the highest expected value. In case two outcomes have the same highest expected values, then the decision maker takes a decision based on the degree of risk associated with the outcomes. He/she then selects that outcome which has the lowest degree of risk. Statistical measures such as probability distribution, standard deviation, etc. which help measure risk, are used by decision makers in their decision making process.

Exhibit 10.1: Outlines the Major Risks for Businesses Post COVID-19 Pandemic

Exhibit 10.1: Major Risks for Businesses post COVID-19 Pandemic

There were several risks that knocked the doors of businesses during the Pandemic. From operational disruption to loss of key people in the organizations, cash flow issues, societal unrest etc., there were of diverse nature and impact.

The World Economic Forum's article on "the top risks for business in the post-COVID world" highlights the global risks landscape in 2021 as comprising of these risks:

Extreme weather, climate action failure, Human environmental damage, Infectious diseases, biodiversity loss, Digital power concentration, digital inequality, interstate relations fracture, cybersecurity failures and livelihood crises.

When analysed from the impact on their likelihood of occurrence, extreme weather disruptions was considered the risk that was most likely to occur. On the other hand, taken from the impact of the risk perspective, infectious disease had the most profound impact.

The article sounds a note of caution by identifying three drivers of risk – political, technological and societal.

Political risks may evolve from the trajectory of stimulus packages to certain sectors of the economy. Added to this, several economies are adopting protectionist measures to create self-sustaining economies. Social policies could also hamper inflow of foreign talent and access to global markets.

Technological risks relate to cybersecurity threats, ethical and catastrophic risks etc. Societal drivers or risks are pressures on ESG compliance, environmental risks etc.

Source: https://www.weforum.org/agenda/2021/01/building-resilience-in-the-face-of-dynamic-disruption/

10.5.3 Uncertainty and Decision Making

Decision making can be effective under conditions of uncertainty if the decision maker is capable of converting the condition of uncertainty into a condition of risk. A condition of uncertainty may be converted into a condition of risk if the decision maker is able to identify the possible outcomes and also estimate and assign probabilities to each strategy. This he/she can do with the help of certain qualitative and quantitative measures. Decision makers can reduce the uncertainty in the decision-making process by using qualitative methods such as hedging[2], product diversification, monitoring the marketing environment, acquiring monopoly status, etc.

[2] It is a strategy through which an investor purchases or sells a security or investment with a view to setting off the losses arising out of another security or investment.

Some of the quantitative measures used to convert a condition of uncertainty into a condition of risk are:

Maximax criterion: While making decisions under the maximax criterion, the decision maker takes an optimistic view about the possible outcomes or pay-offs. He/she selects the most promising outcomes from among all the outcomes in a pay-off matrix and chooses that outcome which, according to him/her, is the 'best among the best'.

Maximin criterion: In contrast to the maximax criterion, the maximin criterion takes a conservative approach to decision making. The decision maker here chooses the worst possible outcomes from among the pay-off matrix. He/she then selects that outcome which maximizes the minimum pay-off.

Minimax criterion: Under the minimax criterion, the decision maker focuses on the opportunity loss of a strategy. Opportunity loss is referred to as 'regret' in this criterion. The regret or opportunity loss of a strategy is given by the difference between a particular outcome or pay-off and the highest possible pay-off for the resulting state of nature. According to the minimax criterion, the decision maker attempts to minimize the highest possible regret that could have been incurred.

Laplace decision criterion: When the decision maker is unable to estimate the probabilities of possible outcomes, he/she assigns equal probabilities to all the possible outcomes. Therefore, the expected pay-off will be the average of all the pay-offs. The decision maker then calculates the expected value of each strategy. He/she then chooses that strategy which has the highest expected value.

Check Your Progress - 1

1. The process of predicting the trends in the economic conditions of a country is known as _____.
   a. Demand forecasting
   b. Business forecasting
   c. Economic forecasting
   d. Market forecasting

2. In which of the following decision making criterion is opportunity loss referred to as 'regret'?
   a. Maximax criterion
   b. Maximin criterion
   c. Minimax criterion
   d. Laplace criterion

10.6 Capital Budgeting

Capital budgeting is the process by which companies effectively plan and control huge investments or expenditures, the returns on which are generally expected to carry forward to the future.

According to Craig Peterson and Cris Lewis, "Capital budgeting refers to the process of planning capital projects, raising funds, and efficiently allocating resources to those capital projects."

Mark Hirschey defines capital budgeting as a "long-term investment planning process".

Utility of Capital Budgeting

Capital budgeting is the one of the most most powerful technique employed in measuring the financial viability of projects which the companies are planning for the future, It aims at, allocating funds prudently amongst the projects by providing useful procedures in identifying valuable projects and grade them in terms of economic desirability to choose the most promising ones. Thus, capital budgeting helps a firm in improving its financial health and so also its position amongst its competitors.

Capital budgeting also acts as a device for planning and control. As a tool for planning, it helps the management to decide on the long-term capital requirements and also the timings of such requirements. It is also serves as a control device when it is used to control firm's expenditure.

10.6.1 Capital Budgeting Process

Following are the various steps involved in the capital budgeting process:

1. Project selection
2. Sources of capital
3. Criteria for resource allocation

Project selection

In project selection, the company selects the viable project/s that have to be taken up out of the many investment proposals. The investment proposals of companies can be broadly classified into:

Expansion projects: Proposals to make investments with a view to expanding the company's product portfolio, production or manufacturing facilities are known as expansion projects. An example is the purchase of new machinery or equipment.

Replacement projects: Investment projects that involve the replacement of old and worn out machinery are known as replacement projects.

Welfare projects: Those investment projects from which the company does not reap any direct benefits but gains indirect benefits in the form of improved labor efficiency, employee and customer goodwill, etc., are known as 'welfare projects'.

Let's take an example of an expansion project of Godrej Properties.

Exhibit 10.2: Godrej Properties Expansion Projects

In September, 2021, Godrej Properties signed an agreement for a mega project in Mumbai. The Project was redevelop a land parcel in the Wadala region of Mumbai. The project involves re-development of two housing societies and 357 tenants. This project marks the entry of Godrej Properties into Mumbai's micro market and is seen as part of the expansion plans of the company to spread to various cities in India. The company had prior to this project, launched a project in Bengaluru for construction of residential apartments. The company has engaged in seven re-development projects so far.

To fund these projects, the company raised ₹ 1,000 crore through issue of Non-convertible debentures with a coupon rate of 7.5% and tenure of 3 years. Prior to this the company already raised ₹ 2,100 crore in 2019-20 through a QIP (Qualified Institutional Placement)

The re-development projects are an example of capital budgeting decisions that invlve huge allocation of resources.

Source: https://www.livemint.com/companies/news/godrej-properties-signs-large-redevelopment-project-in-mumbai-11632889233994.html

Sources of capital

The company needs financial resources to implement the selected projects. Thus, it is faced with the task of financing the selected projects. The company can gather financial resources from external sources (borrowing from bank, funds from capital market) or internal sources (retained earnings of the company).

Criteria for resource allocation

While allocating funds for the selected projects, companies take into consideration two main criteria. They are – the cost of financing the project and the expected returns on the project. Projects with higher expected returns are generally given preference over others in the allocation of resources.

10.6.2 Evaluation of Projects

Project evaluation in capital budgeting involves the following:

1. Making a list of investment proposals
2. Projecting cash flows of different projects
3. Evaluating project feasibility using different methods

Making a list of investment proposals

By listing out the various project proposals, the company can get a clear picture about the total number of investment proposals it can choose from. Also, it can screen out the less feasible projects right in the initial stages. Making a list of investment proposals is a crucial step as the company can identify and choose those projects which will enable it to achieve long-term growth.

Projecting cash flows of different projects

After selecting the project/s, the company has to estimate the cost of the project and the returns it is expected to generate over a period of time. To estimate the cash flows (cash outflows[3]and cash inflows[4]) of the project accurately, the company needs to gather data from various departments such as accounts, production, research and development, etc. While projecting the cash flows of the project, the company must consider the risk involved in the estimation of future cash flows. Also, the company must compare the returns on the project with the returns on other 'low risk' or 'riskless' investments.

Activity 10.1

Padmaja Electronics Company (PEC) is thinking of investing in any one of the following investment proposals. Assume that you are the Financial Manager of the company. You have been asked to choose a project which would give maximum benefit to the company. Given below are the present values of cash flows of the investment proposals. If you base your decision on the NPV method of evaluation, which project would you suggest to PEC? Justify your answer.

Particulars	Present Value of Cash Inflows (₹)	Present Value of Cash Outflows (₹)
Project 1	4,500	4,500
Project 2	6,000	4,500
Project 3	3,500	4,000
Project 4	3,800	3,500
Project 5	4,500	5,00

Answer:

The company should then calculate the present value of cash outflows and cash inflows with the help of a 'discount rate'[5]. It has to select a project for which the present value of cash inflows is greater than the present value of cash outflows.

[3] Cash outflows represent the expenses incurred on building the required facilities for the project.

[4] Cash inflows are the returns the project would generate (during specified periods, say, annually) after its implementation.

[5] This is an interest rate used by companies to calculate the value of cash flows now, as compared to the value of cash flows at a future date.

Evaluating project feasibility using different methods

The method of project evaluation differs depending upon the requirements of the company. Given below are some of the important methods of evaluating project feasibility:

- NPV: The net present value (NPV) method of evaluating projects considers and compares the present values of cash inflows and cash outflows. If the net present value of cash inflows is greater than the net present value of cash outflows, then the company selects the project.
- IRR: In the internal rate of return (IRR) method, the company finds out a discount rate (with the help of the trial and error method) which when applied equates the present value of cash inflows and the present value of cash outflows.
- Payback period: In this method, the company selects the project which takes the lowest number of years to get back the cost incurred on it.
- Profitability index: In the profitability index method, the company calculates the ratio of the present value of cash inflows to the present value of cash outflows. It selects the project if the profitability index is equal to or more than 1.

Capital Budgeting in Practice

- In practice, it has been generally found that normally small proposals of cost reduction or replacement or plant and equipment originate at the plant level and they go upwards for their approval. On the basis of these requests, the top management decides after proper review at various levels. The proposals for expansion are initiated at the top level and a decision is taken after following the process of appraisals and consultations at various levels. In practice the payback and ARR are very commonly used. This is true not only in India but also abroad. Payback is used very commonly for numerous reasons. First, it is very simple to understand and easy to calculate. Second, it involves assessment of cash flows in for first few years only rather than for the entire life of the asset. Third, since the payback is focusing on recovery of capital, it also takes care of risk factor of future. It has been found that in smaller investments, the uses payback method, while in larger investments other more elaborate methods are used. ARR is also normally used because of large number of factors. First, corporates are more used to Income Statement, P& L a/c etc. rather than cash flow statement; Second, it may be projected for future on the basis of first few years, whereas NPV calculation needs data for the entire life of an asset including its scarp value at the end. Thus, calculating ARR seems relatively easy, Third, it is more appealing to the executives, because the firm’s objective of profit maximization and ARR is a measure of profitability. Infact, now a days, instead of relying upon any one method, the practice is to test a proposal from several techniques and then decide accordingly.

Check Your Progress - 2

3. Companies select a project if the profitability index is _____
   a. Positive
   b. negative
   c. Less than 1
   d. Equal to or more than 1
4. Which among the following does not constitute the capital budgeting process?
   a Project selection
   b Sources of capital
   c Evaluating the market environment
   d Criteria for resource allocation
5. In which of the following evaluation methods does the company determine a discount rate by using trial and error method?
   a NPV
   b IRR
   c Profitability index
   d Payback period

10.7 Summary

- Economic forecasting is the process of predicting the future economic conditions in an economy. It has various advantages both at the macro and the micro level.
- Demand forecasting can be described as predicting a future level of demand on the basis of past and present knowledge and experience, in order to avoid underproduction and overproduction. Various types of demand forecasting techniques are used to estimate demand. There are quantitative and qualitative techniques in demand forecasting.
- Risk and uncertainty form an integral part of the decision-making process. The condition of risk is different from a condition of uncertainty. A condition of uncertainty may be converted into a condition of risk with the help of certain qualitative and quantitative measures.
- Capital budgeting is a process that helps companies in planning and controlling huge investment decisions.

10.8 Glossary

Capital budgeting: Capital budgeting is the process through which companies effectively plan and control such huge investments or expenditures, the returns on which are generally expected to carry forward to the future.

Discount rate: (1) The interest rate charged by the central bank on a loan that it makes to a commercial bank. (2) The rate used to calculate the present value of some asset.

Economic forecasting: Economic forecasting can be termed as a process of predicting conditions in the economy as a whole or in part.

Investing: Creating capital goods. Acquiring or producing structures, machinery and equipment or inventories.

10.9 Self-Assessment Test

1. Define capital budgeting. What are the various steps involved in evaluating the feasibility of projects?

10.10 Suggested Reading/Reference Material

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10.11 Answers to Check Your Progress Questions

10.11.1 Model Answers to Check Your Progress Questions

Following are the model answers to the Check Your Progress questions given in the Unit.

1. (c) Economic forecasting

Economic forecasting is the process of predicting conditions in the economy as a whole or in part. Economic forecasting is used to predict the trends in the economic conditions of a country.

2. (c) Minimax criterion

The minimax criterion concentrates on the opportunity loss of a particular strategy. Opportunity loss is referred to as 'regret' in this criterion.

3. (d) Equal to or more than 1.

In the profitability index method, the company calculates the ratio of the present value of cash inflows to the present value of cash outflows. It selects the project if the profitability index is equal to or more than 1.

4. (c) Evaluating the market environment

The process of capital budgeting involves the following:

- Project selection
- Sources of capital and
- Criteria for resource allocation.

5. (b) IRR

In the internal rate of return (IRR) method, the company tries to determine a discount rate by using a trial and error method. This discount rate when applied should equate the present value of net cash inflows and the present value of cash outflows.

Economics for Managers

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