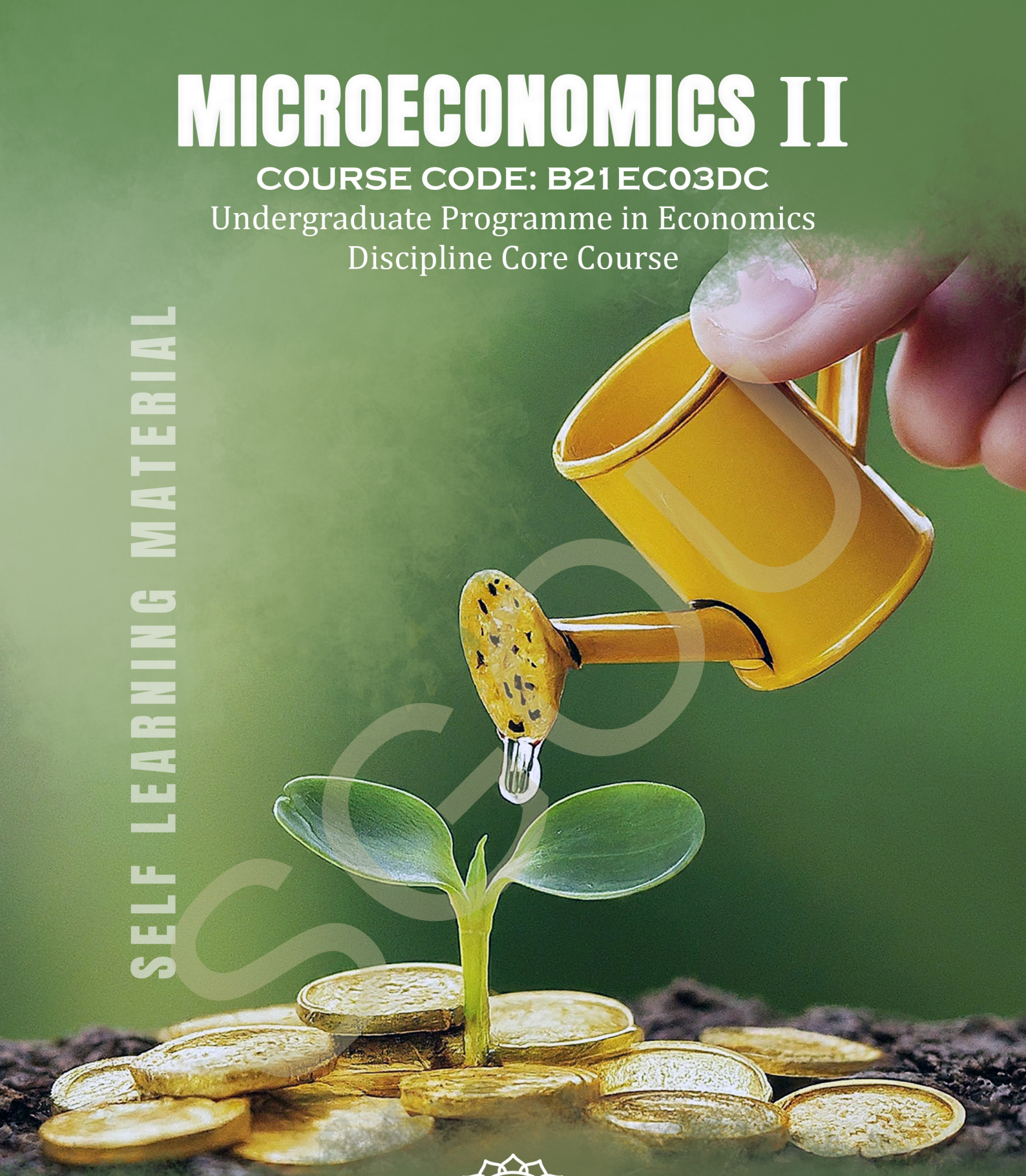
MICROECONOMICS II

COURSE CODE: B21EC03DC

Undergraduate Programme in Economics

Discipline Core Course

SELF LEARNING MATERIAL



SREENARAYANAGURU OPEN UNIVERSITY

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The State University for Education, Training and Research in Blended Format, Kerala

SREENARAYANAGURU OPEN UNIVERSITY

Vision

To increase access of potential learners of all categories to higher education, research and training, and ensure equity through delivery of high quality processes and outcomes fostering inclusive educational empowerment for social advancement.

Mission

To be benchmarked as a model for conservation and dissemination of knowledge and skill on blended and virtual mode in education, training and research for normal, continuing, and adult learners.

Pathway

Access and Quality define Equity.

Microeconomics II

Course Code: B21EC03DC

Semester - III

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Self Learning Material

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Printed and published on behalf of Sreenarayanaguru Open University by Registrar, SGOU, Kollam.
www.sgou.ac.in

ISBN 978-81-971189-4-4

DOCUMENTATION

YouTube

MESSAGE FROM VICE CHANCELLOR

Dear learner,

I extend my heartfelt greetings and profound enthusiasm as I warmly welcome you to Sreenarayanaguru Open University. Established in September 2020 as a state-led endeavour to promote higher education through open and distance learning modes, our institution was shaped by the guiding principle that access and quality are the cornerstones of equity. We have firmly resolved to uphold the highest standards of education, setting the benchmark and charting the course.

The courses offered by the Sreenarayanaguru Open University aim to strike a quality balance, ensuring students are equipped for both personal growth and professional excellence. The University embraces the widely acclaimed "blended format," a practical framework that harmoniously integrates Self-Learning Materials, Classroom Counseling, and Virtual modes, fostering a dynamic and enriching experience for both learners and instructors.

The university aims to offer you an engaging and thought-provoking educational journey. The undergraduate programme in Economics is designed to be on par with the high-quality academic programmes offered at state universities throughout the country. The curriculum incorporates the latest methodologies for presenting economic ideas and concepts. It stimulates students' interest in developing a deeper comprehension of the discipline. The curriculum encompasses both theoretical concepts and historical evidence. Suitable emphasis is placed on India's experiences with economic transformation. This would aid learners in preparing for competitive examinations, should they choose to take them. Upon successfully completing the programme, we anticipate that students will be well-equipped to handle key areas within the economics discipline. The Self-Learning Material has been meticulously crafted, incorporating relevant examples to facilitate better comprehension.

Rest assured, the university's student support services will be at your disposal throughout your academic journey, readily available to address any concerns or grievances you may encounter. We encourage you to reach out to us freely regarding any matter about your academic programme. It is our sincere wish that you achieve the utmost success.

Regards,
Dr. Jagathy Raj V. P.

01-06-2024

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BLOCK

Perfect and Imperfect Competition

UNIT

Perfect Competition

Learning Outcomes

After completing this unit, the learner will be able to:

- familiarise with the market structure under perfect competition
- understand the short-run equilibrium of the firm and industry
- analyse the long-run equilibrium of the firm and industry

Prerequisites

Markets are places where buyers and sellers come together for the purchase and sale of commodities. Today markets are not confined to physical spaces, they can be online too. We can sit in our living rooms in a remote village in Kerala and buy a carpet made in Kashmir online. Markets thus offer us a number of choices for goods. But are all markets the same? No, they are not. The market for agricultural products is different from the market for mobile phones; the market for cosmetics is again different from the oil market. Market structures vary based on the nature of goods, the number of buyers and sellers and approaches to pricing policies.

Let us look into the operation of a wheat market. There are many sellers who sell wheat and thousands of consumers who make use of wheat and wheat products. As the number of buyers and sellers are many, a single buyer or seller cannot influence the price of wheat, each takes the market price as given. Agricultural goods like carrots, maize, corn and tomatoes can be considered as identical products. A farmer, who sells tomatoes, is actually a very small

part of the larger market for agricultural goods. He thus cannot make pricing decisions. Then what can he decide regarding production? He can always decide on the quantity of goods he sells in the market. The individual seller or firm always sells his product in a perfectly competitive market at a price decided by the industry as a whole. He can sell maximum quantity at the given price. If he raises his price above the industry price then all customers will buy the cheaper product. If he sells below the industry price, his costs will rise and he will not be able to afford production. Conditions in the market are different in different time periods. Short-run and long-run market equilibrium conditions thus vary. Markets that have large number of buyers and sellers that sell the same product, with no entry and exit barriers are identified as perfectly competitive markets. There are a diversity of market types we find in the world, but we begin by studying perfect competition. Perfectly competitive markets are the easiest to relate. Once we learn the supply and demand under perfect competition the same logic can be applied in understanding other complicated market structures. Let us look into the perfect competition, its features, and long-run and short-term equilibrium.

Keywords

Perfect Competition, Price Taker, Equilibrium, Homogenous Product, Free Entry and Exit

Discussion

1.1.1 Perfect Competition

Firms under perfect competition are price takers. They sell different quantities at the given price. The price of a firm is determined at the level of the industry's equilibrium between demand and supply. For instance, we all buy milk for our houses. When you go to a shop, there are milk packets or cartons available, which may be of different shapes and sizes. As a customer, we notice that milk is priced uniformly if it is sealed and has quality assurance. Despite the change in packaging colour, as a consumer, you are totally aware of the product inside the packet. It is an identical product and therefore cannot be priced at different rates. The producers of milk can in no way influence market price, as they might contribute only a very small share of the total market. Such a market does not have artificial restrictions for entry and exit. Now let us see in detail the assumptions of perfect competition.

1.1.2 Assumptions of Perfect Competition

The model of perfect competition can be explained based on certain assumptions.

i. Large number of buyers and sellers

In a perfectly competitive market, there are a large number of buyers and sellers. However, both of them cannot influence the market price by altering their output. Because each firm within the industry supplies only a small portion of the total output in the market. Due to the large number of buyers, no single buyer possesses the monopoly power to influence the market. Therefore, they are only price-takers in the market, not the price makers.

ii. Homogeneous Product

In a perfectly competitive market, products are homogeneous and identical. A homogeneous and identical product means that the goods are the same in all aspects, including quality features and characteristics. Examples include basic agricultural goods like wheat or corn, or standardised goods like electricity or water in certain markets.

iii. Free Entry and Exit

In competitive markets, firms have the freedom to enter and exit the industry at any time. If barriers to entry exist, a firm within the industry may have the power to influence market prices. But, in the case of a perfectly competitive market, there are no barriers to entry. Hence, the firms lack a monopoly power to influence market prices in the industry.

iv. Profit maximisation

The ultimate aim for all firms operating under perfectly competitive market conditions is profit maximisation.

v. No Government Regulation

In a perfectly competitive market, there are typically no government regulations such as tariffs, taxes, or production rationing.

vi. Perfect mobility of factors of production

In the economy, resources like labour and capital can move freely between companies. Also, people can switch jobs easily, and can learn new skills.

vii. Perfect knowledge about market conditions

In a perfectly competitive market, both sellers and buyers know everything about the market. This means there is no uncertainty about what might happen in the future.

1.1.2.1 Demand Curve of a Firm

As discussed, we know that the firm is just capable of supplying various quantities of goods at the given market price under perfect competition. The demand curve or the average revenue curve is parallel to the X-axis. Each firm in this model is a profit maximiser. As the firms are price takers in the market, output is the only variable that they can control. Being price takers, any quantity can be sold at the given market price. If you produce a good for which there are few close substitutes, you have a great deal of market power. If you are producing a good that is identical to other products in the market, then your demand

curve will be very elastic. This means that if you increase your price even by a marginal amount the demand for your product will decrease suddenly.

The demand curve is perfectly elastic under perfect competition. This implies that any quantity can be demanded at the given price. A slight price change will cause a huge change in demand as products have very close substitutes. The shape of the demand curve is shown in the diagram below, where different quantity is demanded at the same price P.

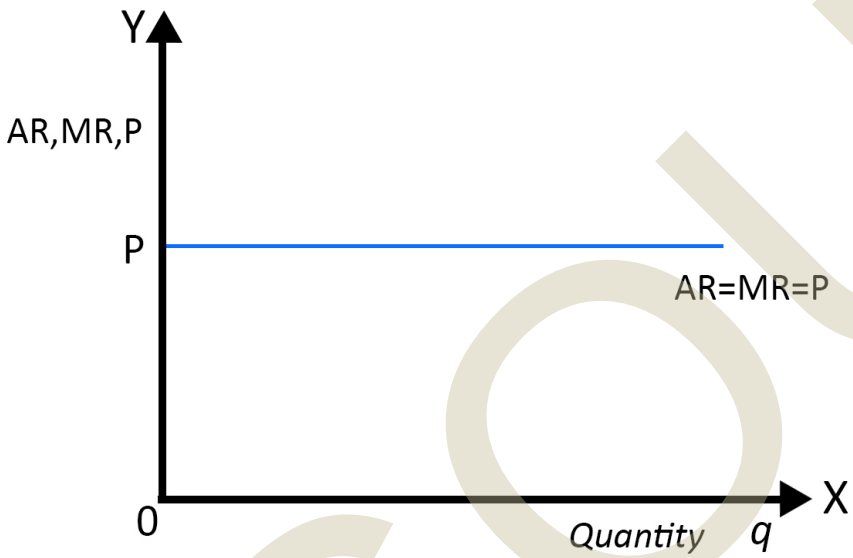

Fig 1.1.1 Demand Curve of a Perfectly Competitive Firm

As shown in figure 1.1.1 above, the demand curve or average revenue curve is horizontal in the case of a firm under perfect competition. A horizontal straight line average revenue curve indicates that price or average remains the same at OP level when quantity sold is increased. The marginal revenue (MR) curve coincides with average revenue (AR) curve since marginal revenue is equal to average revenue. Industry demand curve on the other hand is downward sloping, as it is the summation of individual demand curves. The market demand curve or industry demand curve fluctuates according to market changes, as more is demanded at a lower price and vice versa.

1.1.2.2 Supply Curve of the Firm

The supply curve tells us how much the firm will produce at different prices. The individual supply curve shows us how much output a firm in a perfectly competitive market will supply at a given price. The supply curve of the firm can be explained with the help of a diagram.

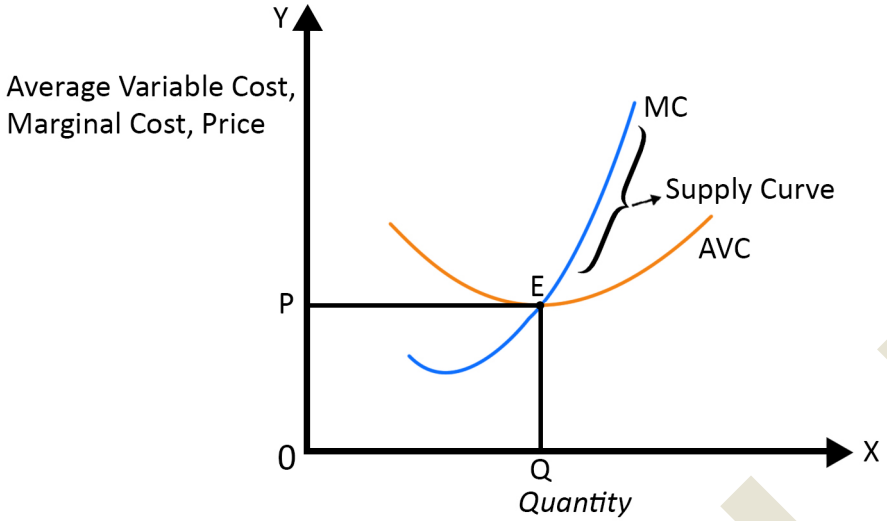

Fig 1.1.2 Supply Curve of a Perfectly Competitive Firm

The upward portion of the MC curve above the minimum of the Average Variable Cost curve is the supply curve. The supply curve shows the relationship between the price and quantity supplied. Under perfect competition in the short-run , production can continue only if the price exceeds average variable costs, P > AVC. This means that the firm will continue production if at least the variable costs are covered. The firm will shut down in the short-run if the price is less than the Average variable Cost (AVC). The point where the MC = minimum of the Average Variable Cost is the shutdown point of the firm.

1.1.3 Short-Run Equilibrium under Perfect Competition

Here, we explain the short-run equilibrium for the perfectly competitive market. Market forces of demand equal supply which determine the equilibrium market-clearing price for the industry. Before we explain the industrial equilibrium, let us understand the short-run equilibrium within the firm.

1.1.3.1 Short-run Equilibrium of the Firm

In perfect competition, each firm does not have control over the price of their product. They have to accept whatever price the market sets. This means their demand and average revenue curves are horizontal straight lines (i.e., perfectly elastic) at the prevailing price. Since they sell each unit at the same price, their marginal revenue (extra revenue from selling one more unit) is also the same as the price. Marginal cost curve, as usual, is U-shaped. To figure out how much to produce, the firm compares the cost of making one more unit (marginal cost) with how much they will earn from selling it (marginal revenue). It will be in equilibrium at the level of output where marginal cost equals marginal revenue and

marginal cost curve is cutting marginal revenue curve from below. Since under perfect competition, marginal revenue equals price, the firm aims to produce where marginal cost equals the price, which maximises their profit.

Based on the above analysis, we can say that mainly two conditions satisfy the short-run equilibrium of the firms:

i. MC=MR. It is a necessary condition for profit maximisation but it is not the sole determinant of equilibrium.

ii. The second condition is the marginal cost curve must cut marginal revenue from below

Let us explain the short-run equilibrium condition of the firm with the help of the figure given below.

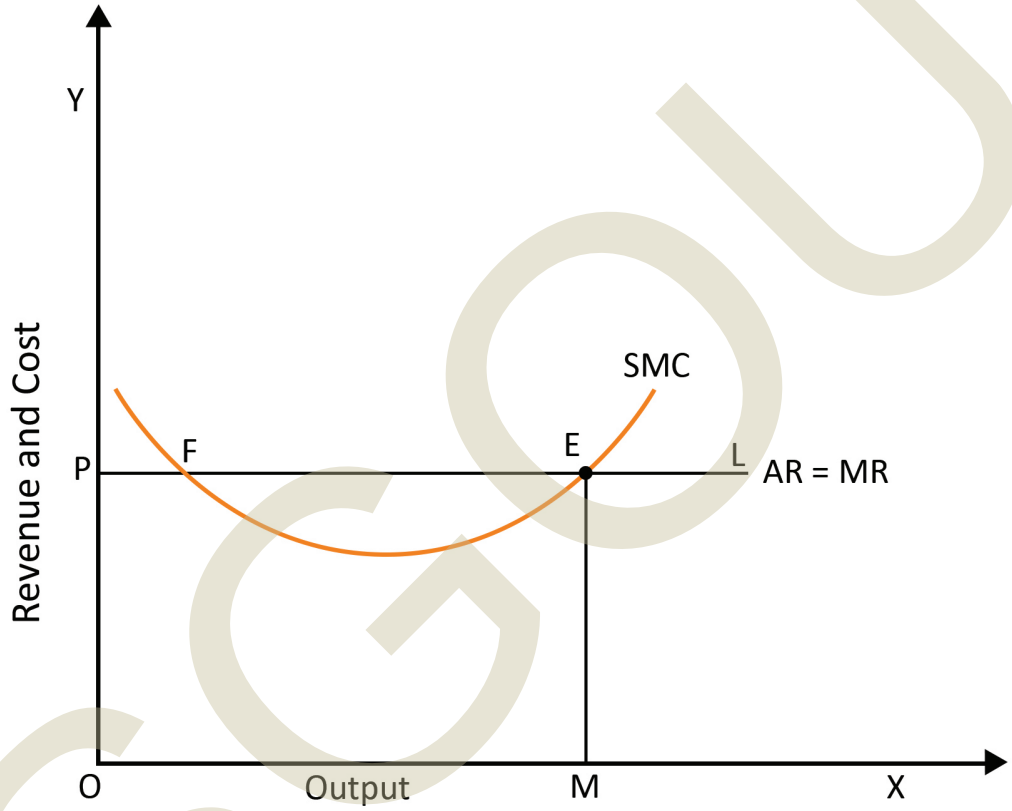

Fig 1.1.3 Short-run Equilibrium of the Firm

In the figure 1.1.3, the market price is OP. The demand curve or the average and marginal revenue curve of the firm are represented by PL. In the figure, the marginal cost curve intersects the average and marginal revenue curves at two different points, F and E. F cannot be the equilibrium point because the condition that the marginal cost curve must intersect the marginal revenue curve from below is not met at F. The firm can increase its profits by producing more beyond F since marginal revenue exceeds marginal cost.

The equilibrium point is at E or output OM because at E, marginal cost equals marginal revenue (or price), and the marginal cost curve intersects the marginal revenue curve from below. In perfect competition, where the marginal revenue curve is a flat line, the marginal cost curve must be upward-sloping to

intersect it from below at equilibrium. Therefore, in perfect competition, the condition for equilibrium requires that the marginal cost curve must be rising at the equilibrium point. Hence, the twin conditions for a firm's equilibrium under perfect competition are matched here.

1.1.3.2 Short-run Equilibrium of the Industry

In the short-run, equilibrium in the industry is determined by the intersection of demand and supply curves. The demand curve is downward-sloping and the supply curve is upward-sloping. The intersection of these two curves determines the industry equilibrium. However, this situation only holds in the short-run, and at the prevailing price, firms may experience either excess profits or losses.

The firm makes excess profit when the prevailing price is above the cost of production. This situation may attract more firms into the market, leading to an increase in supply and a shift in the market equilibrium. Conversely, if firms are experiencing losses, it indicates that the price is below the average cost of production. In such a scenario, firms may consider reducing production or even exiting the market, which could reduce supply and shift the market equilibrium. The short-run equilibrium of industry is depicted below.

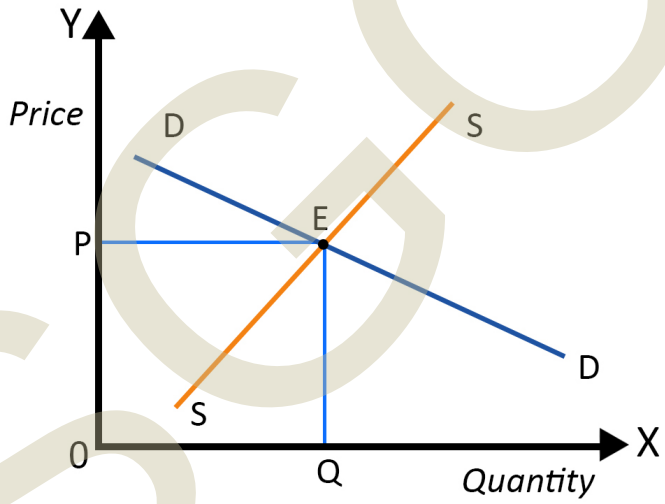

Fig 1.1.4 Short-run Equilibrium of the Industry

The X-axis represents the quantity, while the Y-axis represents the price. DD represents the demand curve, and SS represents the supply curve. The demand and supply curves intersect at point 'E' and thereby determine the equilibrium price OP and the equilibrium quantity OQ of the industry in the short-run.

1.1.4 Long-run Equilibrium of The Firm

In the long run, firms achieve equilibrium by adjusting their production levels to the minimum point of their longrun average cost (LAC) curve, which is tangent to the demand curve defined by the market price. At this equilibrium, firm earns normal profit included in the LAC. If firms make excess profits, new firms will enter the market and increase the total supply of the product. With more firms producing the same product, the increased supply leads to a decrease in the market price. As the industry grows and more firms compete for resources like labour, raw materials, etc, the prices of these resources go up because the demand for them increases. This will lead to increased cost for each firm to produce their products.

Due to this increased cost, some firms will leave the industry. With fewer firms supplying goods or services, the reduced competition and lower supply will lead to higher prices for the remaining goods or services. The costs of operating within the industry might decrease for the remaining firms. This can happen because there might be less demand for resources that the industry uses, leading to lower prices for these resources. Alternatively, the remaining firms might become more efficient. The firms that remain in the industry will eventually be able to cover all their costs, including a normal profit.

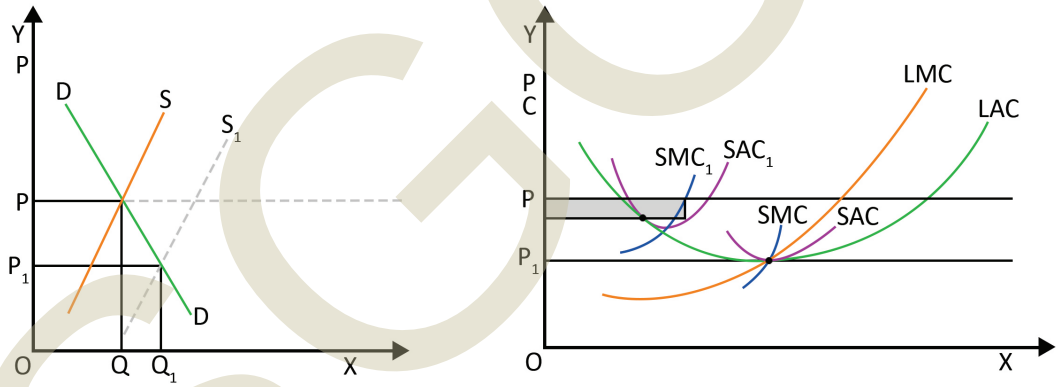

Fig 1.1.4 Long-run Equilibrium of the Firm

In the figure 1.1.4 given above, firms adjust to long-run equilibrium. When the price is (P) excess profits are earned by the firm operating at the cost denoted by SAC_1. This prompts the firm to expand its capacity along its long-run average cost (LAC) curve. Simultaneously, new firms enter the industry attracted by these profits, increasing market supply and causing prices to decline. This process continues until the market reaches long-run equilibrium at price P_1, where firms operate at minimum LAC.

In the above figure, the long-run average cost (LAC) curve represents final costs, incorporating any factor price increases due to industry expansion. At equilibrium in the long-run, the firm's long-run marginal cost be equal to the price and to long-run average cost.

LMC=LAC=P

The firm adjusts its plant size to produce at the level where the long-run average cost (LAC) is minimised, given the technology and factor prices. At equilibrium, short-run marginal cost (SMC) equals long-run marginal cost (LMC), and short-run average cost (SAC) equals long-run average cost (LAC).

Thus, given the above equilibrium condition, we have

SMC = LMC = LAC = LMC = P = MR

At the lowest point of the long-run average cost (LAC) curve, the corresponding short-run plant operates at its optimal capacity, coinciding the lowest points of both LAC and short-run average cost (SAC) curves. Additionally, the long-run marginal cost (LMC) cuts the LAC at its minimum point, and the short-run marginal cost (SMC) intersects the SAC at its minimum point. This intersection ensures that the equality between short-run and long-run costs is satisfied at the minimum point of the LAC.

1.1.5 Long-run Equilibrium of the Industry

In long-run equilibrium, the industry reaches a price where all firms operate at the minimum point of their long-run average cost (LAC) curve, earning normal profits. This state signifies stability, with no additional firms entering or exiting the industry, given the prevailing technology and factor prices. Figure 1.1.5 illustrates this long-run equilibrium of the industry.

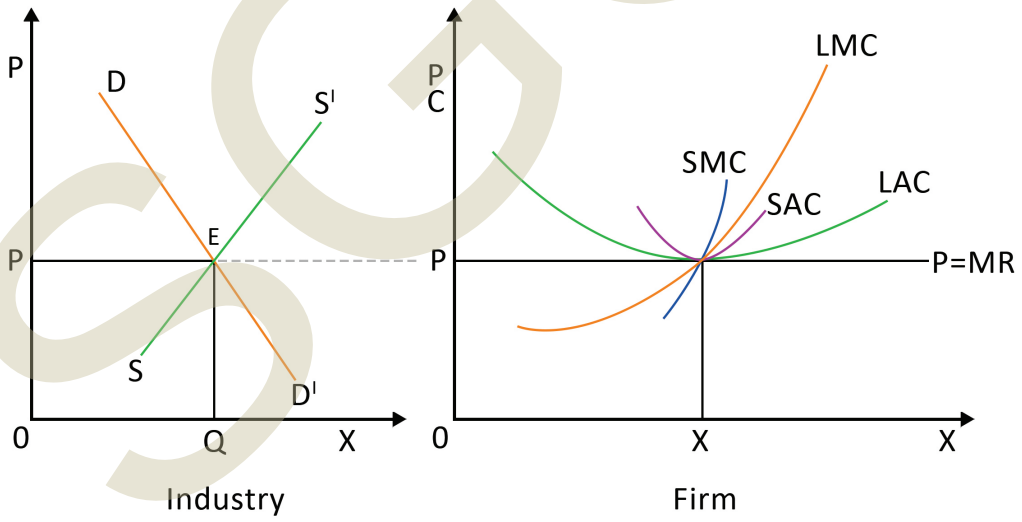

Fig 1.1.5 Long-run Equilibrium of the Industry

At the market price (P), firms produce at their minimum cost, earning normal profits. At output level X, the firm achieves equilibrium because:

Long-run marginal cost (LMC) equals short-run marginal cost (SMC), which equals price (P), and also equals marginal revenue (MR). i.e.;

LMC=SMC=P=MR

This equality ensures that the firm maximises its profit at this output level.

At price P, the industry is in equilibrium because profits are normal, covering all costs, eliminating incentives for entry or exit. The equality LAC = SAC = P, observed at the minimum point of the LAC curve, indicates that firms earn normal profit (neither excess nor losses). With all firms stable and no entry or exit, industry supply remains constant. Given market demand DD' in Figure 1.1.5, price P is a long-run equilibrium price.

Recap

- Perfect competition is an important market type
- Perfect competition-large number of buyers and sellers selling homogenous products
- Perfect information and free entry and exit of firms
- Examples of perfect competition include agricultural products, milk, copper, steel etc.
- The firm is a price taker under perfect competition
- The demand curve is highly elastic for the firm under perfect competition
- The supply curve of the firm is the upward part of the MC curve that lies above the AVC curve
- In the short-run firms will supply only up to the point, where the price is equal to AVC. This is the shutdown point
- The demand and supply curves of the industry are the summation of individual firms demand and supply curve
- In the short-run profit maximisation is at the point where MC= MR, in case of perfect competition MC=MR= Price
- At equilibrium in the long-run, LMC=LAC=P
- In long-run equilibrium, the industry earns only normal profit

Objective Questions

1. Write down two assumptions of perfect competition.
2. Why is the firm a price taker under perfect competition?
3. Give an example of a perfectly competitive market.
4. Define the equilibrium condition of a firm?
5. What is the short-run equilibrium condition of a firm under perfect competition?
6. What is the supply curve of the firm under perfect competition?
7. The demand curve of a firm under perfect competition is horizontal. Why?
8. Why is the assumption of free entry and exit important under perfect competition?

Answers

1. Large number of buyers and sellers, the firm under perfect competition is a price taker.
2. Each firm has only a relatively small market share.
3. Wheat market, steel market
4. The equilibrium condition of the firm is MC=MR=P.
5. MC=MR=P

6. Supply curve is the upward part of the MC curve that lies above the AVC.

7. As the firm is a price taker, it is free to supply whatever quantity at the given price.

8. Because of free entry and exit firms exit the industry when there are losses and enter when others are making profits-it drives the industry to zero profits in the long-run.

Assignments

1. Explain the concept of perfect competition and list its key assumptions.

2. Describe the short-run equilibrium of a firm in perfect competition. What factors determine this equilibrium?

3. How does a firm achieve long-run equilibrium in perfect competition? What role do entry and exit play in this process?

4. Discuss the conditions necessary for long-run equilibrium in a perfectly competitive industry. How does this equilibrium affect the market price and output?

Suggested Reading

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2. Hal R Varian (2010, *Intermediate Microeconomics: A Modern Approach*, 8th Edition, W.W Norton and Company/ Affiliated east-West Press (India).

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UNIT

Imperfect Competition

Learning Outcomes

After completing this unit, the learner will be able to:

- get aware of the concept of imperfect competition
- familiarise with characteristics of monopoly markets
- describe the short-run and long-run price and output decisions under monopoly
- examine the concept of price discrimination

Prerequisites

In the first unit, we have seen in detail the characteristics of perfect competition and also looked into short-run and long-run equilibrium conditions in such markets. Perfect competition is very hard to find in the real world. How often as customers do we know everything about the commodity that we want to buy? Is there always perfect information out there in the market? We see advertisements in televisions and newspapers for products, attractive offers in malls and a range of discount for home appliances during festival seasons. When sportspersons and film stars promote certain products people start noticing them and buy them in large numbers. Firms believe that this would increase their brand value. Creating an impression about a brand actually decides whether the consumer will buy the commodity or not. All this adds to the selling costs of the firms. It also sets a price war in the market. Sometimes price leaders emerge, whereas sometimes groups are formed to maximise industry profits. Let us take the simple case of

bathing soaps. Almost all bathing soaps have the same contents and are used for the same purpose. But different people have different preferences for soaps. Some of the common soaps in our market are Lux, Pears, Hamam, Lifebuoy, and Medimix. They all differ in their packaging and attract customers in different ways. Some soaps attract kids as some boast of medicinal qualities and attract older people. Thus, in the soap market, though products are identical, they are differentiated in some way or the other.

In perfect competition price at which the firm sells the product is the market price. The firm is too small to have any influence on the market price. This need not be true in all markets. Suppose there is only one doctor in a village, can't he charge a high price for his services? The producer cannot set any price he wants. It depends on the demand from the consumers. In any case, in such markets, the producers always face a downward slopping demand curve or average revenue curve, which shows that more is demanded at a lesser price and vice versa. In markets where there is stiff competition like markets for toothpaste or curry powders a small cut in prices is followed by all paste manufacturers, to get more market share, whereas a rise in price is not followed by anyone. This sometimes leads to price rigidity in the market, where cost and demand conditions cannot change the price of the product. Market structures like monopoly, monopolistic competition, and oligopoly are called imperfect markets. The most extreme form of imperfect competition is monopoly market structure- where we have a single seller of a commodity. Monopoly markets are interesting to study as you might have commonly come across these markets. Let us now look into the characteristics of imperfect markets and study in detail about monopoly market structure.

Keywords

Imperfect Competition, Monopoly, Short-run and Long-run Equilibrium, Price Discrimination.

Discussion

1.2.1 Imperfect Competition

Perfectly competitive markets sell homogenous goods, where there are many buyers and sellers and the firms are just price takers. But in the real world, markets have different characteristics. Let us look around us; the soft drink market, cosmetics market, stationery market, and umbrella market are not perfectly competitive. These markets are characterised by differentiated products, sellers fighting for market share, pricing power, and barriers to entry. Most markets in the real world fall under imperfect competition. Imperfect competition prevails in an industry whenever individual sellers can affect the price of their output. The major kinds of imperfect competition are monopoly, oligopoly, and monopolistic competition.

The monopoly market is one of the major imperfect markets. A monopoly is a market where one seller has complete control over the entire industry. There are no close substitute goods available in the market; therefore, the price elasticity of demand is small. The monopolist market maintains barriers to entry, so the market is completely secured from attacks by competitors. Monopoly firms follow the price discrimination strategy based on consumer's willingness to pay. Price discrimination occurs when a firm charges a different price to different consumer groups. This strategy allows the monopolist to exploit the consumer surplus present in the market. By identifying and segmenting consumers based on their willingness to pay, the monopolist can extract more value from each group, maximising its profits. This practice is enabled by the monopolist's control over the market and the absence of competition, allowing them to set prices without fear of losing customers to alternatives. Thus, price discrimination serves as a tool for the monopolist to enhance its revenue by capturing a larger share of the available consumer surplus.

Another marketing model that comes under the imperfect competitive market is monopolistic competition. In the market large number of sellers produce differentiated products. Differentiated products refer to goods or services that are distinguishable from one another based on attributes such as quality, design, features, brand, or other characteristics, therefore, they can sell the product at different prices, and the availability of close substitute goods ensures price elasticity of demand.

Another imperfect competitive market structure is oligopoly. Oligopoly means few sellers. The main characteristic of this type of market is the interdependence between the firms; therefore, the market decision of one firm affects the decision of other firms. Each of them competes with each other to control the market through the advertisements. So, selling cost keeps the main role in the oligopoly market.

1.2.2 Monopoly

Monopoly is the extreme opposite of a perfectly competitive market structure. A monopoly is a market structure characterised by a single seller with a large number of buyers. Because of this feature in a monopoly market, there is no competition and it can earn profits even in the long-run. Several reasons can lead to the emergence of a monopoly in an economy. Let us explain them below.

1. Control over Strategic Resources or Exclusive Knowledge of Production

The existence of exclusive knowledge of production technology or dominant control over certain resources allows a firm to maintain a monopoly position in the market.

2. Patent Rights

Monopolies can arise from holding patents for products or production processes. A patent is an intellectual property right that grants its owner the legal right to exclude others from making, using, or selling an invention for a limited period of time in exchange for publishing an enabling disclosure of the invention.

3. Government Licensing and Trade Barriers

Governments may grant exclusive licenses to operate in certain industries or impose trade barriers, such as tariffs or quotas, which restrict foreign competition and protect domestic monopolies.

4. Natural Monopoly

Sometimes the market leads to a natural monopoly due to the availability of natural resources or the significance of economies of scale. The most common natural monopolies are mines, natural gas pipelines, etc.

4. Limit Pricing Policy of Existing Firms

Another reason for the emergence of a monopoly firm is the limit pricing policy of the existing firm. Limit pricing refers to a pricing policy aimed at preventing the entry of new firms. Limit pricing may be combined with heavy advertising or product differentiation, making entry of new firms unattractive.

1.2.2.1 Features of Monopoly

1. Single Seller

In a monopoly market, there is only one seller or producer for producing a particular product or service. The single seller controls the entire market.

2. No Close Substitutes

In the monopoly market, no close substitute goods are available in the market. Consumers do not have alternative options that are comparable in terms of price, quality, or functionality.

3. Price Maker

The monopoly has significant control over the price of its product or service. Unlike in competitive markets where prices are determined by supply and demand forces, a monopoly can set prices independently to maximise its profits.

4. Barriers to Entry

Barriers to entry exist in the monopoly firm that prevents the entry of new firms. These barriers can take the form of legal restrictions, high initial investment costs, exclusive access to resources or technology, economies of scale, etc.

1.2.3 Price and Output Decision in the Short-run

Under monopoly for equilibrium and price determination, two different conditions have to be satisfied

1.MR=MC

2.MC must cut MR from below

Equilibrium in monopoly markets, or price and output determination, can be studied using two approaches:

1. TR and TC approach
2. MC and MR approach

1.2.3.1 TR and TC Approach

Any monopolist operates in the market with the main aim of earning maximum profits. Maximum profits can be earned when the difference between Total Revenue (TR) and Total Cost (TC) is at its maximum. Total revenue refers to the overall amount of money a firm earns through the sale of its goods and services over a specific time period. Total cost is the sum of expenses incurred by a firm to produce a specific level of output. The equilibrium output and price of the monopolist is the point where he earns maximum profits. Let us explain with the help of the figure below.

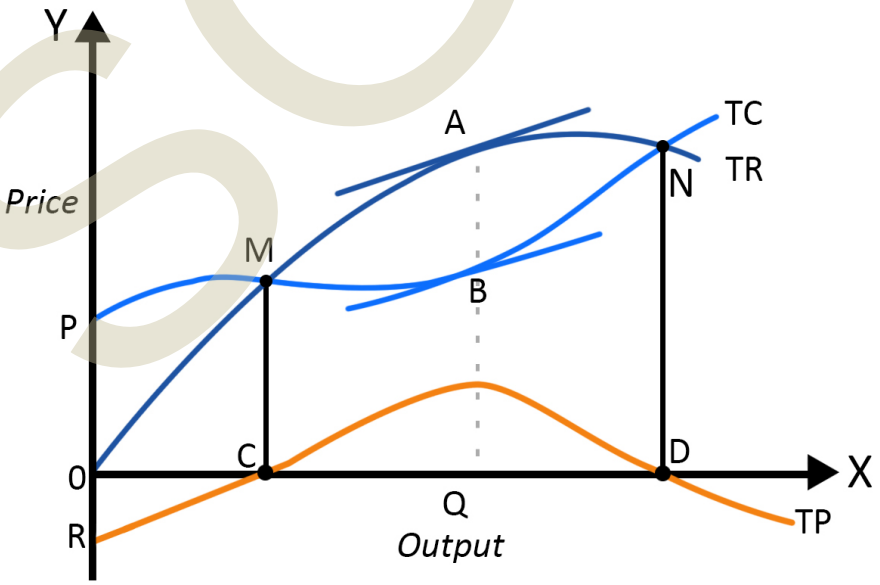


Fig 1.2.1 TR-TC Approach

The X-axis represents the level of output, and the Y-axis represents the price. The TC is the total cost curve, and TR is the total revenue curve, while TP represents the total profit. The TR curve starts from the origin, which means that at the zero level of output, the firm's total revenue is zero. The TC curve starts at the point P, which means that in the initial stage, the firm will face losses of fixed costs if the firm discontinues its production. The TP curve depicts the total profit curve, starting from point R, indicating that the firm operates at negative profit in the initial stages of production. As the firm increases production, TR also increases. However, in the initial stages of production, TR is less than TC, indicating losses, as depicted by the RC section on the TP. At point M, TR equals TC, signifying that the firm is operating without loss or profit. Beyond point M, where TR exceeds TC, it indicates that the firm is earning more profit, as shown by the CD points on the TP curve. When production reaches the level of OQ, the firm maximises its profit. Beyond point N, where TC exceeds TR, it indicates that the firm has entered the loss stage.

1.2.3.2 MR-MC Approach

The MR-MC Approach demonstrates that the monopolist maximises short-run profits when the following two conditions are met:

1. MR=MC, Where MR is marginal revenue, which means the additional revenue a company earns from each additional unit sold and MC is the marginal cost which means the additional cost incurred by a firm when its production rises by one unit.

2. Slope of MR > slope of MC that is the MC curve must cut the MR curve from below.

In the short-run , the monopoly firm cannot change fixed factors such as machinery and plant, so the monopolist operates with the existing plant. Here the only way for them to increase output is through changes in variable factors. During this period, the monopolist can experience supernormal profits, normal profits, or losses. These three conditions can be discussed with the help of figures.

i. Super Normal Profits

In the short-run, the monopolist firm earns supernormal profits when the price exceeds the average cost. The equilibrium level of output occurs when marginal cost (MC) equals marginal revenue (MR). Let us discuss with the help of the following figure.

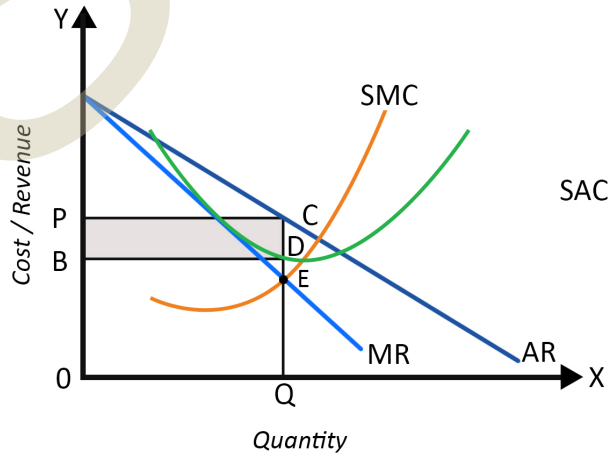


Fig 1.2.2 MR and MC Approach of Equilibrium Under Monopoly

In the given diagram, the X-axis represents quantity, while the Y-axis denotes cost and revenue. At point 'E', marginal revenue (MR) equals marginal cost (MC), indicating the short-run equilibrium or profit-maximising condition for the monopolist firm. It's important to note that the MC curve intersects the MR curve at this point, signifying the profit-maximising quantity. Here, the monopolist firm produces the OQ quantity of output and sells it at the OP price, maximising its profit. The firm sells the OQ quantity of output and earns OPCQ of total revenue, with the corresponding total cost being OBDQ. Here, it is clear that at the OQ level of output produced, the firm's cost is much less than the revenue it earns, resulting in supernormal profit after selling output to its customers, as shown in the shaded rectangle area PCDB.

ii. Normal Profits

In the short-run, the firm makes enough profits to cover its cost of production. When the cost of production equals the revenue earned from the sale of the commodity, the firm just earns a normal profit. Let us explain the normal profit condition of the monopolist firm in the short-run with the help of figures.

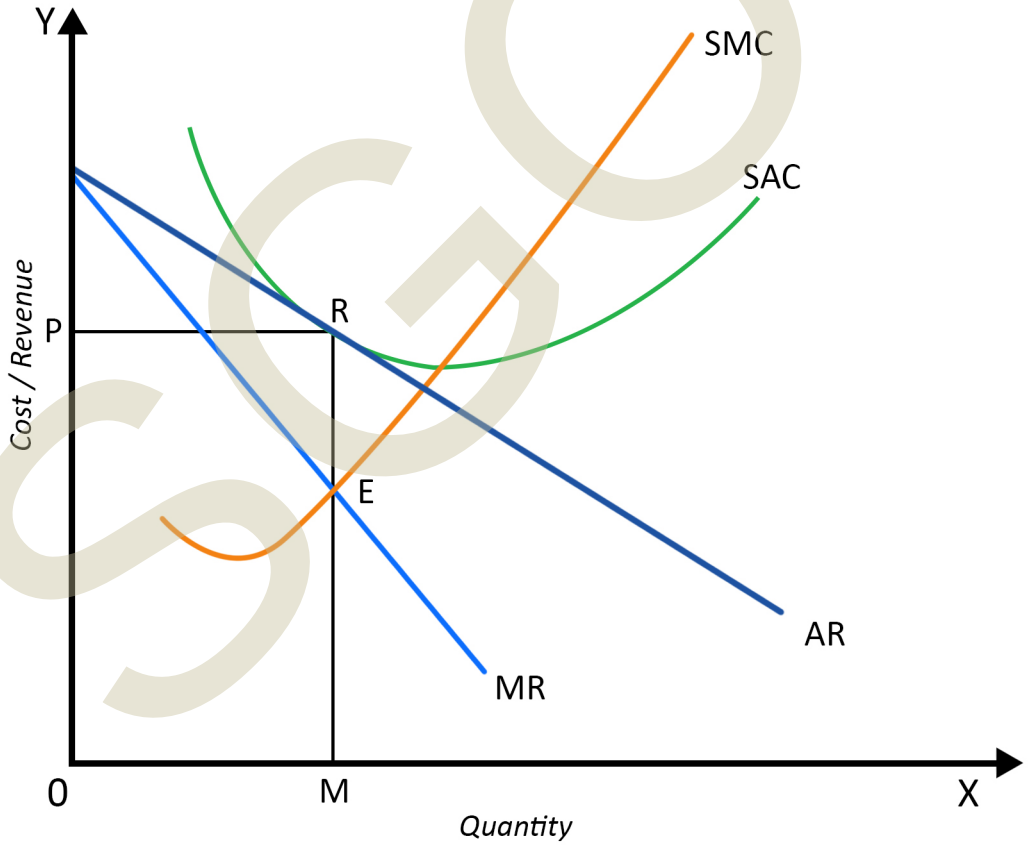


Fig 1.2.3 Normal Profit Condition of the Monopoly Firm

The monopoly firm produces OM level of output at OP cost. Here, the firm attains equilibrium at point 'E', where the marginal cost (MC) equals the marginal revenue (MR). The OM quantity of output sold by the firm in the market earns OPMR revenue. This revenue covers just the cost of production, indicating that the monopoly firm earns only normal profit in the short-run

iii. Loss

In the short-run even if the firm is a monopoly it may have to incur loss. This happens when in the short-run price is less than the variable cost. If the price falls due to slow market conditions and a fall in demand, the monopolist will still produce and the price covers the Average Variable Cost (AVC). Whenever the price falls below the AVC the monopolist will quit the market. In the short-run, the monopolist is ready to undertake a minimum loss which is the fixed cost he must pay. The equilibrium price is then equal to the AVC.

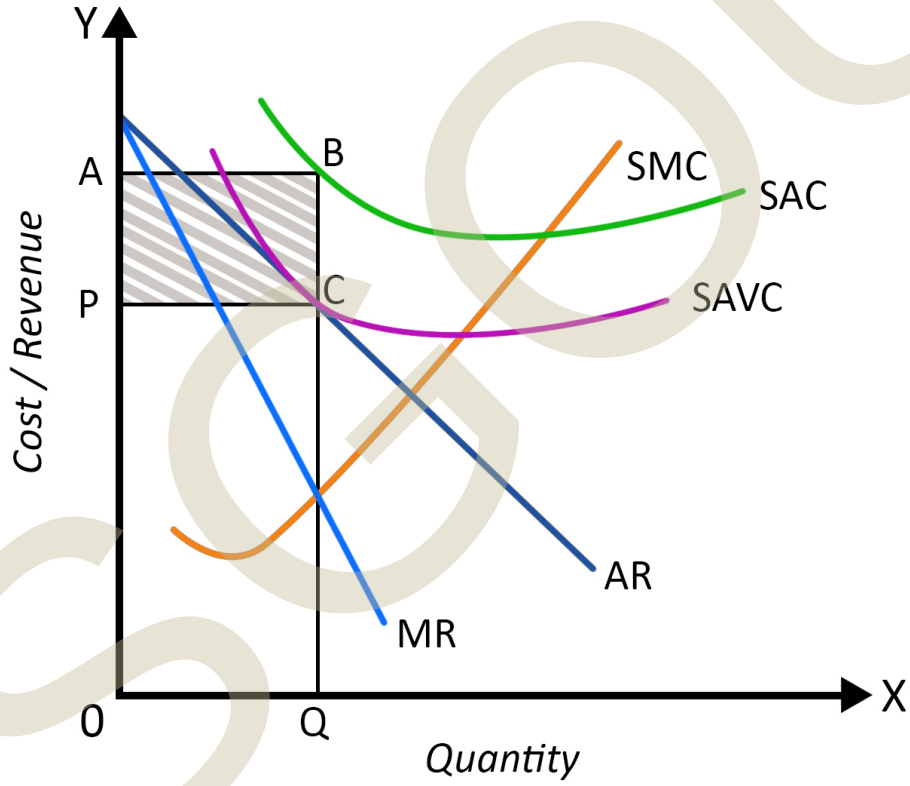
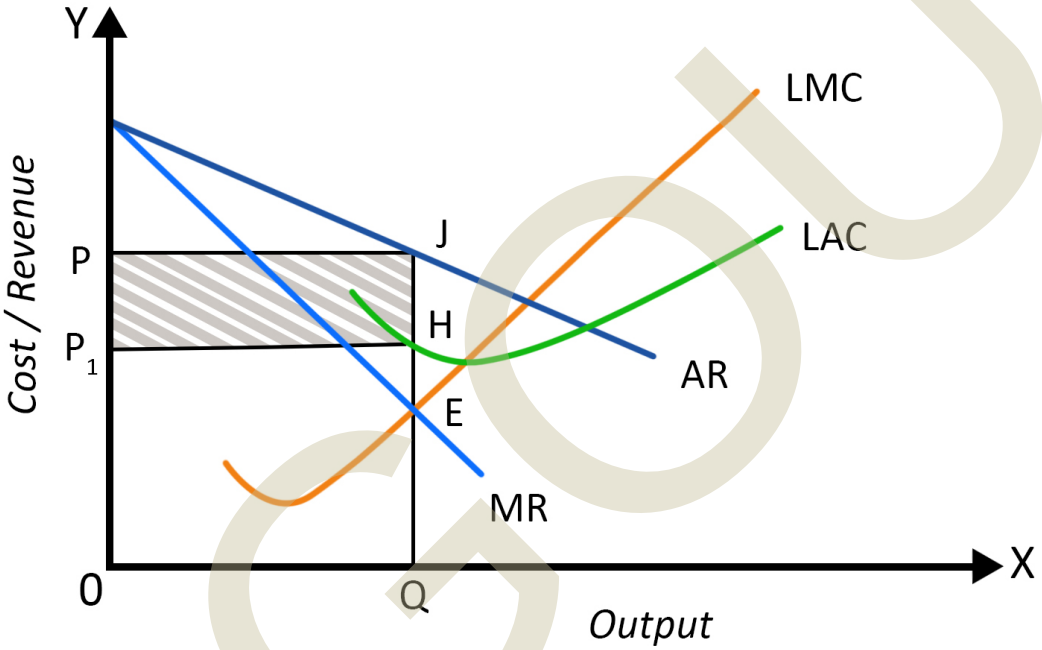


Fig 1.2.4 Loss Condition of the Monopoly Firm

The X-axis represents quantity, and the Y-axis shows cost or revenue. At the OQ quantity of output, the average cost curve lies above the average revenue curve. The firm produces OQ level of output, which is sold at the OP price, resulting in OPCQ revenue earned. However, the cost of production is OABQ at the OQ level of output produced. Thus, the firm faces a loss represented by the area PABC in the short-run. In some cases, a monopolist may choose to set a lower price and incur losses to discourage entry by new firms' resources or technology, economies of scale, etc.

1.2.4 Long-run Price and Output Determination

In the long-run, all factors are variable and the monopolist can make changes in the production process. As the monopolist is the sole seller, he is able to earn super-normal profits in the long-run. At the equilibrium level of output MR=LMC (long-run marginal revenue is equal to long-run marginal cost). Let us explain with the help of the below figure.



1.2.5 Long-run Equilibrium of the Monopoly Firm

The X-axis represents the output and Y axis represents the cost and revenue of the firm. The LMC represents the long-run marginal cost and LAC represents the long-run average cost. MR represents the marginal revenue curve and AR represents the average revenue curve. At point E, the firm achieved long-run equilibrium, producing output at the OQ level and selling it at the price OP. Here, HQ represents the long-run average cost (LAC), while OP is the price exceeding the LAC. Consequently, we can infer that the monopolist firm generates supernormal profits in the long-run. Specifically, the monopolist earns JQ-HQ=JH in supernormal profit per unit. The total supernormal profit of the monopolist shows the shaded area $PJHP_1$.

1.2.5 Price Discrimination

The market must be divided into sub-markets with different price elasticity of demand. There must be an effective separation of the sub-markets so that no reselling can take place. When we go to the market, we see that various business strategies are used by charging different prices to different customers. Many cinema theaters charge lower ticket prices for children. If there is perfect competition in the market, then the price is equal marginal cost and the marginal cost of giving a seat to any customer is the same. Then how can we understand the logic of charging different prices? If the theatre is a monopoly in the local area, then the particular kind of pricing can be explained easily. Children in that case will usually have a lower willingness to pay for a ticket. So, to increase profits, the theatre, that is a monopoly, raises its profits by adopting price discrimination.

Sometimes malls or supermarkets give discount coupons in newspapers. The customer has to cut out the discount coupons and produce it in the shop to get 10% discount on the next purchase. The policy of giving discount coupons rather than cutting prices directly is a practice of price discrimination. Not all consumers would take time to cut out coupons or collect them and produce them in shops for discounts. A very rich person will not have the time to cut out the coupon and will be willing to pay a higher price. A person who has a lower income or an unemployed person is ready to cut out the coupons, as this person cannot afford to buy at the existing prices. So by charging a lower price only to those customers who clip coupons, firms can actually practice price discrimination. There are mainly three degrees of price discrimination. They are:

- First Degree Price Discrimination or Perfect Price Discrimination
- Second Degree Price Discrimination
- Third Degree Price Discrimination

1.2.5.1 First-Degree Price Discrimination or Perfect Price Discrimination

The first degree of price discrimination means that the consumers are charged the maximum price by the monopolist based on their willingness to pay. It takes away the total surplus in the economy so it is also known as perfect price discrimination. For instance, in your locality, if there is only one doctor available, the doctor will be able to charge different consultation fees depending on the willingness to pay. In such cases, the doctor takes the consumer's entire consumer surplus away. Even though perfect price discrimination is very difficult to practice, it does not create inefficiencies in the market.

1.2.5.2 Second Degree Price Discrimination

The second-degree price discrimination means that when consumers are charged different prices based on the quantity consumed or based on different groups or charging different prices for the same commodity according to different blocks or units consumed. For example, when we buy train tickets, there's often a discount for seniors aged 60 and above. Also, our electricity bills depend on how much

power we use, with different rates for different usage levels.

1.2.5.3 Third Degree Price Discrimination

Under third-degree Price discrimination, the entire market of the monopolist is divided into sub-markets based on the elasticity of demand. The monopolist charges different prices for the same product in different submarkets. Higher prices are charged in markets in which there is lesser elasticity of demand. The segmentation of the markets is strictly done on the assumption that resale of the commodity is not possible and there is no interaction between the two markets. The monopolist must also be able to assess the elasticity of demand in different sub-markets so that price discrimination is possible. Many colleges give financial assistance to students who are in need of funds. This is a typical case of price discrimination. By charging higher fees and selecting particular students eligible for financial help, colleges are actually charging students based on their willingness to pay for education.

Recap

- Imperfect competition is seen commonly around us
- Imperfect competition is characterised by product differentiation, market power, fighting for market share, and barriers to entry
- Monopoly- characterised by a single seller in the market - is a form of imperfect competition
- Single sellers, barriers to entry, and market power are important features of a monopoly
- They can be natural monopolies due to economies of scale or natural resource abundance and artificial barriers due to copyrights and patents
- The demand curve of a monopolist is downward sloping
- There are two approaches to analyse price and output determination under monopoly- the TR- TC approach and MC- MR approach
- Equilibrium in monopoly is determined when TC=TR or when MC= MR and MC cuts MR from below
- In the short-run monopolists can have super-normal profits, normal profits, and even loss

- In the long-run when all factors are variable the monopolist can earn super-normal profits
- Price discrimination is a characteristic feature of monopoly
- Under price discrimination- different prices are charged for the same good from different consumers
- First-degree price discrimination takes away the entire consumer surplus, second-degree price discrimination can be in the form of block pricing and third-degree price discrimination depends on elasticity of demand

Objective Questions

1. Write down two characteristic features of monopoly.
2. What is the equilibrium output and price under monopoly?
3. What is perfect price discrimination?
4. What are some of the natural reasons for monopoly?
5. Can the monopolist charge any price for the output he sells? Why?
6. What is second-degree price discrimination?
7. What are the two approaches used to determine equilibrium in monopoly markets?
8. What is the long-run equilibrium condition for a monopolist?
9. What is third-degree price discrimination?
10. Why are public utilities usually operated by a monopolist (government)?

Answers

1. Single seller, barriers to entry

2. MR=MC and MC cuts MR from below

3. In perfect price discrimination or first-degree price discrimination the monopolist charges the maximum price from the consumer, taking away the full consumer surplus.

4. The natural reasons for monopoly are- economies of scale, patents and licenses, or access to critical inputs can create entry barriers.

5. No. It depends on cost conditions and demand for the product in the market.

6. Second-degree price discrimination is charging consumers a different price for the amount or quantity of the good consumed. For e.g.: charging different prices for electricity for residential use and commercial use.

7. TR=TC approach and MR=MC approach

8. In the long-run, the firm earns supernormal profits under a monopoly.

9. Third-degree price discrimination refers to dividing markets into different subtypes. According to the elasticity of demand the monopolist charges a higher price for the same product in markets where the elasticity of demand is lower.

10. Due to the operation of economies of scale, it is more efficient and cost-effective for public utilities to be operated by the government.

Assignments

1. Identify and explain three key characteristics that differentiate imperfect competition from perfect competition. Use real-world examples from the soft drink market, and cosmetics market to illustrate your points.

2. Explain the concept of barriers to entry in a monopoly market. Describe two types of barriers and provide examples for each.

3. Define price discrimination and explain why a monopolist might use this strategy, Describe the three degrees of price discrimination and give an example of each.

4. Explain how a monopolist determines the equilibrium output and price using the TR-TC approach.

5. Describe the shape and characteristics of a monopolist's demand curve. Explain how this demand curve affects the monopolist's pricing and output decisions compared to a firm in a perfectly competitive market.

Suggested Reading

1. Samuelson, P. A., & W. D. Nordus (1998). *Economics*. New Delhi: Tata McGraw Hill.

2. Hal R Varian (2010), Intermediate *Microeconomics: A Modern Approach*, 8th Edition, W.W Norton and Company/ Affiliated east-West Press (India).

Reference

1. Koutsoyiannis, A. (1990), *Modern Microeconomics* (Second Edition), Macmillan Education

2. Pindyck, R.S., Rubinfeld, D. L., N Mehta, P. L. (2013) *Microeconomics* (Seventh edition). Pearson Education Prentice Hall.

UNIT 3

Monopolistic Competition

Learning Outcomes

After completing this unit, the learner will be able to:

- analyse monopolistic markets
- familiarise with the assumptions of monopolistic competition
- describe the short-run and long-run equilibrium conditions in monopolistic markets

Prerequisites

When you go to the market to buy toothpaste, there are many options in the market. Each tube of paste has almost the same content and serves the same purpose. But whenever you buy toothpaste, you have a particular preference or brand in mind. Again, when you go to the market to buy washing powder you have a lot of choices. The packaging and the offers with different detergents are not the same but they have the same use which is cleaning clothes. Our choices are so pre-determined by the market that often we go to a shop and ask for Colgate instead of any toothpaste and Surf instead of any other washing powder. How are these choices made? A monopolistic competitive market has many sellers and buyers, characterised by product differentiation. Even though as a consumer you are aware that any toothpaste serves the same purpose, you have a definite pattern of selecting a particular paste. Your choice has been made over years of usage, the taste of the paste or it has become a habit for the consumer's choice in

a monopolistic market is actually determined by the brand value, which is done through advertisements. In these markets, firms use a large part of their revenue as selling costs. This can include advertisements, hoardings, and building brand value by using celebrities. All these business moves require a lot of planning, and money and result in competition among the firms in the market. Imagine a situation when the producer decides to raise the price of Colgate. Even though consumers who are regular users of Colgate will be ready to pay more for it, most of them will not be ready to pay a huge additional amount for Colgate. For many of the consumers toothpaste is more or less similar to other toothpastes available in the market. The difference between brands is much less in this case. Even though the demand curve for Colgate toothpaste is downward sloping, it is very elastic. So, the toothpaste producer Proctor and Gamble will raise the prices but not much higher than the Marginal Cost. Given the presence of a large number of sellers in the monopolistic industry it has many interesting features.

Keywords

Monopolistic Competition, Product Differentiation, Selling Costs, Short-run Equilibrium, Long-run Equilibrium

Discussion

1.3.1 Monopolistic Competition

The monopolistic competition model was developed almost simultaneously by the American economist Edward Hastings Chamberlin in his *Theory of Monopolistic Competition* (1933) and by the British economist Joan Robinson in her *Economics of Imperfect Competition* (1933). Under the monopolistic competition there are large number of sellers. All sellers in the market are producing differentiated products. Product differentiation is a process used by a firm to distinguish a product or service from other similar ones available in the market. For example, Apple differentiates its iPhones by emphasising high build quality, premium materials, advanced technology, etc. As a result of product differentiation, the demand of the individual firm is a negative slope but the price elasticity of the demand is high due to the availability of close substitute goods.

A large number of competitors make the availability of close substitute goods in the market but the actions of one firm have minimal impact on others so each firm operates independently. Each firm

assumes that changes in their prices or output levels will not significantly affect their competitors' behaviour. The reason is that the firm believes that even if it increases its prices it can retain some customers and it may attract additional customers by lowering prices. New firms can easily enter the industry, leading to further competition and potentially eroding profits for existing firms over time.

The monopolistic market combines the basic characteristics of both perfect competition and monopoly. The monopolistic competitive market is similar to a perfectly competitive market in two crucial ways: There are many firms in the market, and there are no barriers to entry into the industry. Then, how is it different from perfect competition? In perfect competition, firms sell the same product and can no way influence the market price. Under monopolistic competition, each firm sells a brand or a particular version of the product that differs in quality and its appearance and each firm is the unique producer of its own brand. Every firm has market power, but its success depends on the advertising strategy of firms. Some examples of monopolistically competitive industries are toothpaste, detergent, cleaning liquids, soaps, and packaged tea.

The monopolistic firm holds the features of monopoly. The monopoly characteristics arise from the fact that each firm has an absolute right to produce and sell a branded or patented product. For example, several branded names are available in the car market, e.g. Maruti Suzuki, Hyundai, Toyota, Mahindra, Tata Motors, etc.… Maruti Udyog Limited has the monopoly power for producing and selling cars under the brand name Maruti. No other manufacturing company can produce and sell cars under this branded name.

1.3.2 Assumptions of Monopolistic Competition

As discussed earlier the monopolistic market shows the characteristics of perfect competition and monopoly. Therefore, the major features of monopolistic firms are the blend of the features of perfect competition and monopoly. Let us discuss one by one.

i. **Product Differentiation:** Different firms in a monopolistic industry fight for market share by selling differentiated products that can be easily substituted with each other. These products are not perfect substitutes. In other words, the cross-price elasticity of demand is very huge but not infinite.

ii. **Absence of barriers to entry and exit**: It is easier for new firms to enter the market, launch their own brands, and try to start a new firm in a monopolistic industry. It is also easy for existing firms to quit the industry if their products are not earning profits. Why is free entry an important requirement in monopolistic competition? We can compare the markets for soaps and automobiles. The soap market is monopolistically competitive, but the automobile market behaves like an oligopoly market. It is relatively easy for other firms to introduce new brands of soap, and this limits

the profitability of producing a Lux or Medimix. If the profits made by soap producers were very large, more firms would come up with investments (for production, innovation, and promotion) to launch new varieties of soaps. This would gradually erode the market share of the Lux and Medimix. When you take the car industry, we know that it also has product differentiation. Not all cars are the same. They differ in colour, shape, features, etc. But unlike the soap industry, the automobile industry requires huge investment making it difficult for new players to venture into manufacturing.

iii. **Large Number of Buyers and Sellers**: There are a large number of buyers and sellers in the market.

iv. **Uniform Cost and Demand Conditions for All Firms:** Chamberlin assumed that monopolistic firms act as a group and therefore both the demand and cost curves are the same for all the firms. This implies that the consumer's choices are equally distributed among firms and differences between products do not lead to different cost conditions.

v. **Selling Costs:** As there are many firms selling similar products it is important to create an impression in the minds of the consumer about the uniqueness of the product. Each firm tries to do this by using its resources for advertisements. Selling costs thus become a very important component of a monopolistic market.

1.3.3 Short-Run Equilibrium under Monopolistic Competition

We have seen earlier that under monopolistic competition demand is sensitive to price changes. The firm thus has a downward-sloping demand curve. This shows that they have some market power. Monopolistically competitive firms mostly earn large profits. Monopolistic competition is also similar to perfect competition. As there is free entry, the potential to earn profits will attract new firms with competing brands, driving economic profits down to zero. In the short-run , the firm maximises its profits where the firm's MR is equal to MC. The firm can collect a price based on the AR curve. The difference between the AR and AC, multiplied by the quantity gives the total profit. The monopolist maximises its short-run profits if the following two conditions are satisfied

i. MC = MR

ii. MC curve cuts MR from below.

In the short-run let us look into three situations, the first one is when the firm earns super normal profits; that is the AR (average revenue) of the firm is much more than the Average Cost (AC). The

second case is when the firm earns normal profit just enough to cover the average cost or AR is equal to AC. In the third case, firms continue production even with a fall in demand. As demand falls below AVC (Average Variable Cost) firms shut down, here the short-run average cost of the firm is more than average revenue (SAC > AR). These three situations of the monopolistic competitive firm can be explained with the help of the following figures:

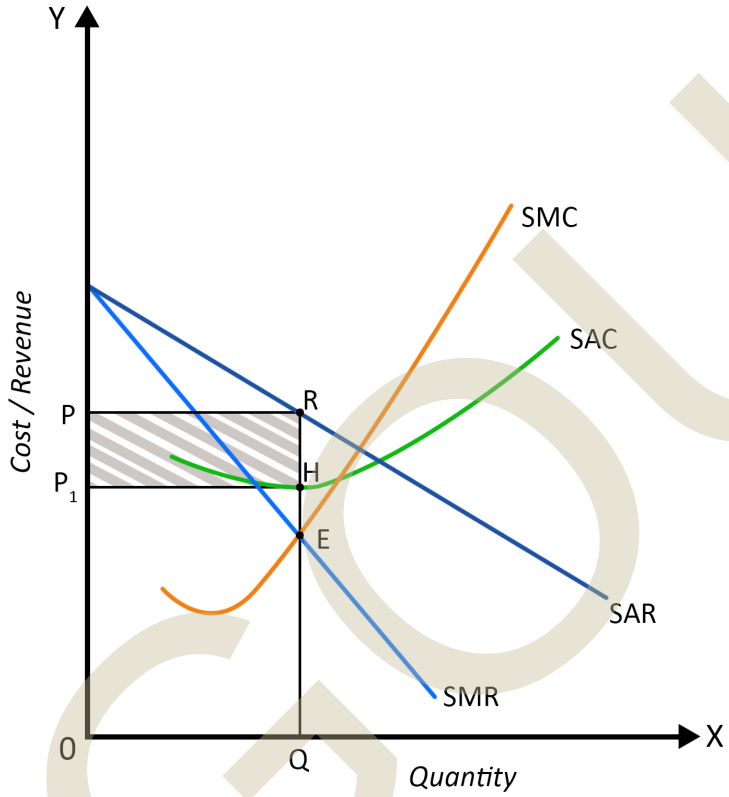


Fig 1.3.1 Short-run Equilibrium of the Firm - In the case of Super Normal Profits

The X-axis represents the quantity and the Y-axis represents the cost and revenue. The monopolist firm faces the downward slope revenue curves such as MR and AR like monopoly, this is because the firm can sell more at a lower price and vice versa. Point 'E' shows the equilibrium conditions of the firm where the two conditions of the equilibrium are fulfilled that is MC is equal to MR and also the marginal cost cuts the marginal revenue from below. When the firm produces the OQ level of output at OP price the firm's AR is greater than AC. That is in this situation the firm makes the super-normal profits. The supernormal profit situation shown in the figure is the shaded area $PRHP_1$.

In the short-run, the firm makes a normal profit. The normal profit condition of the firm is the AR is equal to AC. Let us explain with the help of the following figure:

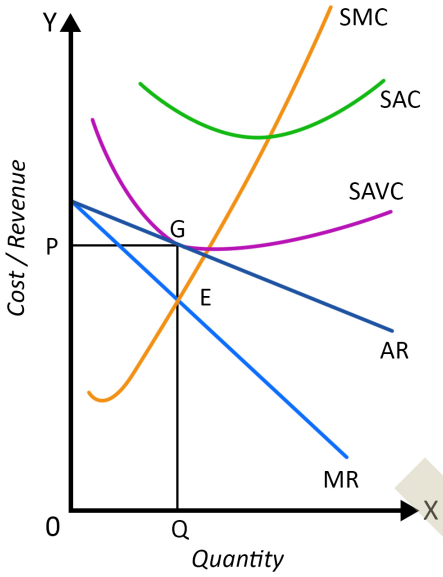


Fig 1.3.2 Short-Run Equilibrium of the Firm -In the case of Normal Profits

The above figure shows the short-run equilibrium of the firm at point E where the MC =MR. The equilibrium output is OQ and the equilibrium price is OP. The total revenue is OQGP and the total cost is $OQ \times QG = OQGP$. Here the firm earns average revenue just to cover its average cost and the firm secures a normal profit in the short-run.

In the short-run, the firm also makes a loss. If the price of the commodity falls below the AVC the monopolist would shut down even in the short-run due to the excess loss. Let us explain the loss situation of the firm with the help of the following figure:

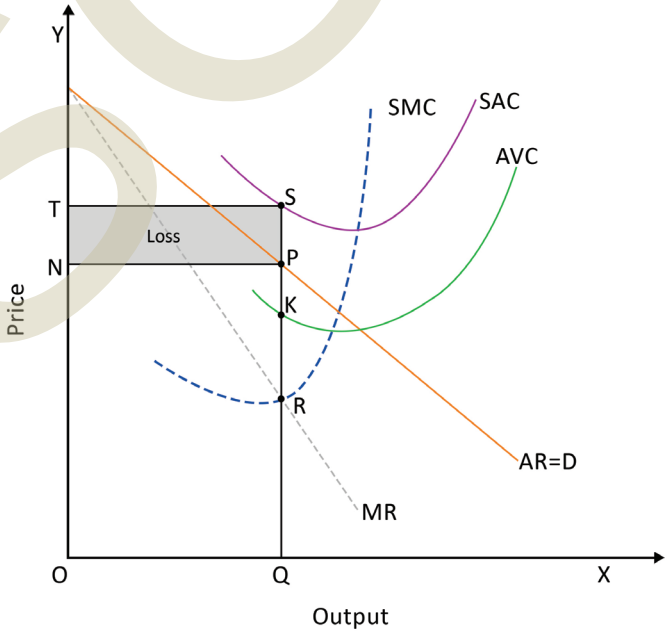


Fig 1.3.3 Short-Run Loss Condition of the Firm

The above figure shows the equilibrium at point R where the MC=MR. The equilibrium output is OQ and price QP or ON. The total revenue OQPN falls short of the total cost OQST. Therefore, the firm faced a loss which is OQST-OQPN=NPST. The price PQ covers the whole of the AVC which is KQ but it covers only the PK part of the AFC which is SK. Thus, the price of PQ is less than the average cost of SQ by SP. So, SP is the per unit loss and the total amount of loss is NPST.

1.3.4 Long-run Equilibrium under Monopolistic Competition

The market condition, in the long-run, is entirely different from the short-run because the following changes take place in the long-run, they are:

i. New firms enter the industry and growing competition takes place,

ii. Firms indulge in price competition,

iii. Firms advertise their products more vigorously.

We earlier discussed that the firms make super normal profits in the industry in the short-run. The result will be new firms being attracted and freely entering the market, leading to increased production of differentiated products. As a result of this, the existing firms lose a part of their market share. Their demand curve shifts down. This will go on till all the firms earn only normal profits and the economic profits come to zero. Let us explain this with the help of the following diagram.

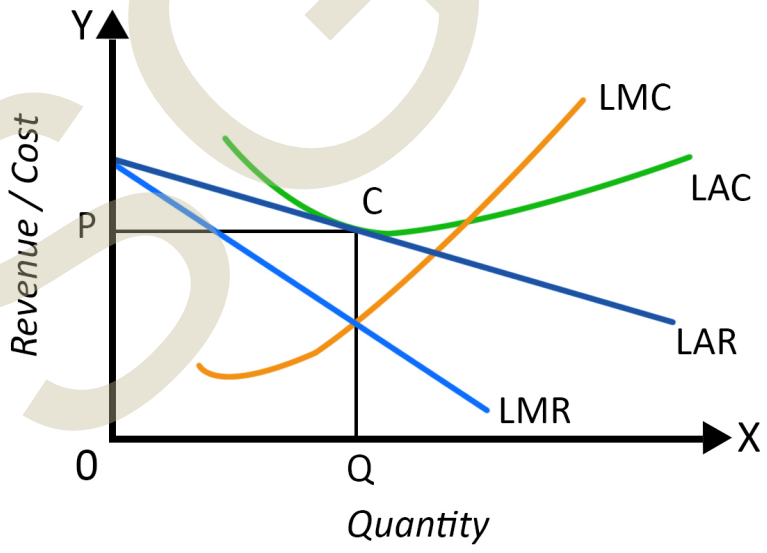


Fig 1.3.4 Long-run - Equilibrium of the Firm

The X-axis represents the quantity and Y axis represents the revenue and cost of the firm. In the figure equilibrium in the long-run is determined at the point where MC=MR, and the MC cuts MR from below. In the long-run firms earn only normal profits, the Long-run Average Cost is tangent to the AR curve at the profit maximising output Q. The firms can charge OP prices. In the long-run we can see for monopolistic markets that LAR is tangent to the LAC.

As the firm earns only normal profit in the long-run, there is no incentive for new firms to enter the market, nor is there a reason for existing firms to exit.

Recap

- Monopolistic competition has a large number of buyers and sellers selling differentiated products
- Products are close substitutes but not perfect substitutes
- This market is similar to a perfectly competitive market in two crucial ways: There are many firms in the market, and there are no barriers to entry into the industry
- Toothpaste, cosmetics, packaged items; toys are all examples for monopolistic competition
- Some of the assumptions of monopolistic competition are large number of buyers and sellers, product differentiation, selling costs, lack of barriers to entry and exit, perfect knowledge of the market and uniform demand and cost conditions for all firms
- In the short-run two equilibrium situations are possible, when AR> AC (firms earn super normal profits), AR= AC (firms earn normal profits) or AR<AC but greater than or equal to AVC. This actually reduces the loss the firms have to incur with shut down
- In the long-run firms only earn normal profits, as there are no barriers to entry

Objective Questions

1. Write down one similarity between monopolistic competition and perfect competition.
2. Give two examples of monopolistic competition.
3. Why is the demand curve elastic for monopolistic competition?
4. In the short-run is it possible to earn super-normal profits under monopolistic competition? Why?
5. What are normal profits?
6. What is the profit maximising output and price for monopolistic competition in the long-run?
7. Define product differentiation.
8. What are selling costs?
9. Write down the condition for earning super-normal profits.
10. Are there barriers to entry for firms in monopolistic competition? Why?

Answers

1. Both markets have a large number of buyers and sellers
2. Toothpaste, detergent
3. Firms sell close substitutes but not perfect substitutes.
4. Yes. In the short-run, firms can earn super-normal profits as their AR is more than AC
5. Normal profits or zero profits are earned when the firm just covers the cost of production

6. LMR= LMC, Normal Profits

7. Product Differentiation is a peculiar feature of monopolistic competition, where firms create some difference in shape, packaging or quality of the product

8. Selling costs are advertisement cost

9. AR > AC

10. No. There are a large number of firms, relatively easy to enter the industry, as cost of entry is less.

Assignments

1. Explain the key assumptions of monopolistic competition. How do these assumptions differentiate monopolistic competition from other market structures like perfect competition and monopoly?

2. Describe the concept of equilibrium in the short-run for a firm operating under monopolistic competition. What conditions must be met for a firm to be in short-run equilibrium? Illustrate your answer with the help of a diagram.

3. Discuss the long-run equilibrium for a monopolistically competitive firm with diagram.

4. Analyse the role of product differentiation in monopolistic competition. How does product differentiation affect a firm's pricing strategy, market share, and long-term sustainability?

Suggested Reading

1. Samuelson, P. A., & W. D. Nordus (1998). *Economics*. New Delhi: Tata McGraw Hill.

2. Hal R Varian (2010), Intermediate *Microeconomics: A Modern Approach*, 8th Edition, W.W Norton and Company/ Affiliated east-West Press (India).

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1. Koutsoyiannis, A. (1990), *Modern Microeconomics* (Second Edition), Macmillan Education

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Oligopoly Market

UNIT

Oligopoly

Learning Outcomes

After completing this unit, the learner will be able to:

- get introduced to the features and characteristics of oligopoly market
- get familiarised with the kinked demand curve
- differentiate between collusive and non-collusive oligopoly models

Prerequisites

Let us take a look at the Indian car market. The main players are Maruti-Suzuki, Hyundai, Tata Motors and Toyota. In the early 2020, Maruti – Suzuki offers discount to its employees for purchase of cars. Tata Motors quickly responds by following the same strategy as Maruti. Hyundai responds by not only giving discounts to employees but by extending the same discount to other customers too. Toyota, on the other hand, waits for the next move by Maruti till about mid- May and then responds by offering attractive finance to new car buyers and also by lowering its prices. The response of Hyundai, Tata and Toyota to Maruti's pricing strategy actually affected the outcome of that strategy. This is a typical example of oligopoly markets, where there are only few firms and each firm's pricing and output decisions influence the others in the market. The refrigerator industry, washing machines, cars, trucks are all oligopoly markets. Duopoly market is a limiting case of oligopoly with two firms. The best example would be Coca- Cola and Pepsi.

The firms in an oligopoly market are interdependent on each other. They definitely realise this as one firm's action affects the rival firms too. This feature of oligopoly markets is in contrast to perfect competition and monopolistic competition, where the share of each firm in the total market share is too little. Oligopoly markets can thus maximise its profits in two ways. The first one is called co-operative oligopoly or collusive oligopoly where oligopoly firms join together and take decisions about output and pricing collectively. OPEC is a famous example of a cartel, where firms actually behave like a monopolist. But cartels are very difficult to sustain as there is cut-throat competition in the market. The second way is therefore non-cooperative / non-collusive oligopoly or where decisions are made by a price leader, advertisement costs are increased or strategic moves are decided by each firm in the market. While studying equilibrium pricing and output in oligopoly markets, we look at Paul M. Sweezy's kinked demand curve model that is different from the ordinary demand curve in markets. As oligopoly markets are more close to the real world markets that we see, it will be interesting to familiarise ourselves with the features, characteristics and nature of oligopoly.

Keywords

Oligopoly, Rivals, Collusive Oligopoly, Non-collusive Oligopoly, Kinked Demand Curve

Discussion

2.1.1 Oligopoly Markets

The market for automobiles, home appliances, soft drinks, bottled water have certain common characteristics. In all these cases there are a few firms that recognise their strategic interdependence. These are typically called oligopoly markets. Oligopoly markets have only a few sellers and the market structure lie between the pure monopoly and monopolistic competition. In other words, oligopoly markets have few sellers producing homogenous or differentiated products, and have control over the market and make the pricing decisions of the product.

Referring to a few firms selling under oligopoly, if the number of firms under consideration are only two, the form of oligopoly is known as duopoly. We start analysing oligopoly market from considering duopoly models. The importance of strategic interdependence

among the oligopoly firms can be well understood from analysing duopoly models. With respect to type of products produced under oligopoly market, it can be either homogenous products or differentiated products. When dealing with homogenous products, it may be referred to as pure oligopoly, and with differentiated products, it is differentiated oligopoly.

With many firms selling homogenous products under perfect competition; a single firm selling a product with no close substitute under monopoly market; many firms selling differentiated products under monopolistic market; we are now discussing a few firms selling homogenous or differentiated products under oligopoly market. Given this nature of oligopoly markets, let us now look at certain characteristics of oligopoly markets.

2.1.1.1 Features of Oligopoly Market

Following are the feature of oligopoly market.

- **Differentiated or Homogenous Products:** The goods sold under oligopoly market are either homogeneous or differentiated products. Some of the important oligopoly markets are automobiles, aircrafts, soaps and detergents, steel and aluminum, and breakfast cereals. Here, steel and aluminum are homogenous whereas the breakfast cereals, soap and detergent are heterogenous in nature.

- **Few Players:** Only a few firms have a large share of the total production, therefore the firm is a price maker. The reason for having only few firms or the source of oligopoly can be explained similar to monopoly situations. Economies of scale happen at large range of output. The market may be large enough to absorb only this sufficiently large output produced by only a few firms. Also, huge investment or particular inputs may be needed for the production of goods under oligopoly market, especially automobiles, mineral industries etc. Having patents of production process or inputs, control over raw materials may also resort to few firms under oligopoly market. This can resort to barriers to entry into the oligopoly market.

- **Barriers to entry:** In the long-run as there are barriers to entry, most of the firms earn considerable profits. This is because as a result of economies of scale (costs go down as production increases), it is not profitable for many firms to exist in the market. Patents, copyrights and new technology may restrict other firms from joining the industry. The need to spend a lot of money on brand creation may discourage potential players to join oligopoly markets. All these factors are considered to be the natural factors particular to oligopoly market structure that restricts competition among a few firms in the industry. In addition to all, this existing firms may take strategic action to prevent entry of new firms. For example, they might threaten to flood the market and drive prices down

if entry occurs and therefore new players think twice before venturing into oligopoly markets. Managing an oligopolistic firm is a difficult task because pricing, output, advertising, and investment decisions are always dependent on the rival's reaction.

- **Price Rigidity:** The oligopolist tries to stick to the prevailing market prices to maintain his market share and not lose his customers by changing the prevailing prices.

- **Interdependence among the Firms:** One of the important features of the oligopoly market is that the decisions of the firms under the market are interdependent. Since there are only few firms in the market, decisions on fixing output, price, advertisement, and other strategies of one firm affect the profit conditions of others. So, the firms make their own decisions on fixing output, price, advertisement and other strategies based on the decisions of other firms in the market.

2.1.1.2 Collusive and Non-Collusive Oligopoly

Collusive and non-collusive oligopoly are two main distinctions of oligopoly market situation which can be explained in terms of cooperation among the rival firms. Under collusive oligopoly, firms cooperate among themselves while deciding the price and output in the market, whereas under non collusive oligopoly, firms do not cooperate but compete among the rivals in deciding the price and output.

Oligopolistic firms make decisions that are strategic in nature since their decision affects others and other's affects them. When firms cooperate each other to achieve common benefits, the joint profit may be maximised. While cooperating, firms can act as cartels where formal or informal agreement takes place among members to increase common profit by fixing price and total output to be produced. OPEC is a famous example of cartels where member countries, such as Indonesia, Iran, Kuwait, Libya, Nigeria, Saudi Arabia, UAE, etc. are colluded to increase the joint profit in supplying petroleum via restricting the supply of petroleum and rising its price.

Apart from cartels, there are market situations where firms under any oligopoly situations follow a single firm in deciding price and output to be produced. The firm may be a leader firm who understands the market demand and is able to fix price and output in the market. The firm may be an experienced early entrant who is well-versed in predicting the future of the market. The oligopoly market situations where oligopoly firms follow a single firm within the market is referred as Price Leadership Models. Cartels and Price Leadership Models come under Collusive oligopoly.

Under oligopoly, there are models referring to situations where firms do not cooperate each other nor understand the existence of the interrelation among the firms. These non-collusive oligopoly situations are unrealistic in one sense. However, analysing the features of these non-collusive markets reveals the importance of interdependence under oligopoly. Some of the important examples of non-collusive oligopoly models are Cournot and Bertrand models.

One of the important models under oligopoly market that shows the non-coorporation among firms, but revealing the importance of interdependence and existence of price rigidity in some of the oligopoly market is Kinked demand curve model. Let us explain the Kinked demand curve model.

2.1.1.3 Kinked Demand Curve Model

Due to a decrease in consumer demand for cars, post COVID 19 Maruti decides to cut its price by 15% to improve its sales. Some of its rivals may react to this strategy by slightly lowering the price say by 5%. In this case Maruti's sales will increase rapidly and profits too will rise. Other car manufacturers may follow the same strategy (lowering their price by 15%). This will increase all others sales, but will lower industry profit as cars are now sold at a lower price. Another possibility is that some other players may cut prices more than 15% leading to a price war in the industry. This leads to a sudden fall in prices in the industry.

From the above example it is evident that Maruti's pricing strategy, advertisement decisions, output decisions have to be taken considering how its rivals will react. For this a firm will imagine itself to be in its competitor's position and try to strategically understand what its reaction would be.

Based on the above example let us try to understand what a kinked demand curve under oligopoly means.

Firms in the oligopoly market always have the desire to maintain price stability. Prices are said to be rigid in oligopoly. What is price rigidity? Firms are not ready to change prices even when costs or demand change. The reason for this is that firms are worried that they might send the wrong message to their competitors and set off a price war. Logically, when cost or demand increases, firms are reluctant to increase prices, because they think that the rivals will not increase prices. This will make them lose the market share. The most popular explanation of this behaviour of oligopoly firms was given by Paul Sweezy, an American economist through his kinked demand curve analysis.

The demand curve facing an oligopolist, according to the kinked demand theory, has a kink at the level of the prevailing price. The kink is formed at the existing price level because the segment of the demand curve above the existing price level is highly elastic and the segment of the demand curve below the prevailing price level is inelastic.

The assumptions of the model are:

- There are only a few firms in the market
- They produce close-substitute products
- There are no selling costs/ advertisement costs.
- There is price rigidity in the market

The following diagram depicts the kinked demand curve model.

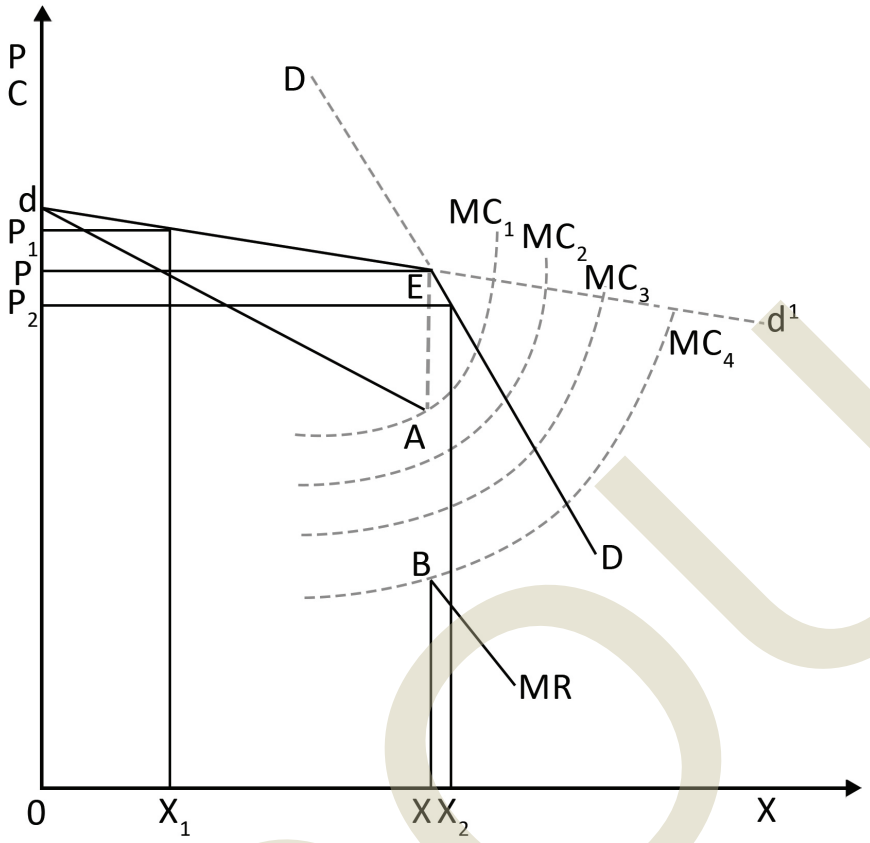

Fig 2.1.1 Kinked Demand Curve

X axis represents output and Y axis represents price and cost. The upper part of the demand curve, DE is relatively elastic and the lower part, ED is relatively inelastic. When price is P, the firm is on the demand curve at E. Corresponding to the kink in the demand curve, the MR curve is discontinuous shown by the discontinuation between A and B. dA portion in the MR represents MR corresponding the elastic dE and from B onwards, the MR is less elastic corresponding to inelastic demand curve ED. Here, the equilibrium MC equals MR is not at a single point. Along the discontinuation in MR, i.e., between the points A and B, many MCs pass. The equilibrium price and output are determined at the kink.

When the firm tries to increase price to point P_1, other firms will not follow it. The elastic part of the demand curve tells us that as price increases, the demand for the particular brand reduces greatly shown by the reduction of quantity from X to X_1 and consumers shift to the rival firms. Moreover, the price hike will not be followed by the rival firms. So, the firm faces a decrease in revenue when demand falls. If the firm decides to decrease price to point P_2, other firms also cut prices. As the lower part of the demand curve is inelastic, change in demand is too small i.e., X to X_2 to increase the revenue. Therefore, revenue falls. So even with changing demand or cost conditions, there is price rigidity under oligopoly and

price is fixed at the kink. The difference in the elasticity of demand is because of the competitive nature of firms under oligopoly.

An oligopolist who faces a kinked demand curve has no incentive to increase his price or lower the price. Each oligopolist will stick to the existing price as there are no gains in changing it. The oligopolist will maximise profits at the current price level. The kinked demand curve theory shows us that even when demand conditions change, the price will remain stable. As there are a number of MC curves fall in between the discontinued portion of MR, the equilibrium price and output reveal that there are wide range of costs that are compatible with this price and quantity.

Although the kinked demand curve model is simple, it does not really provide an explanation to oligopolistic pricing. It says nothing about how the position of kink is determined in the first place or how the height of the kink is determined and why they did not sell at some other price.

Recap

- Oligopoly – few sellers of homogenous or differentiated products
- Oligopoly lies between perfect competition and monopoly
- The market faces barriers to entry
- Source of oligopoly – economies of scale, patent on production process or input, control over raw material
- Features – interdependence among firms, price rigidity, barriers to entry
- Types of oligopoly – collusive and non-collusive
- Collusive – co-oporation among firms
- Non-collusive – non-co-oporation among firms
- Examples of Collusive – cartels and price leadership models
- Examples of non-collusive – Cournot and Bertrand model
- Kinked demand curve model – explains price rigidity under oligopoly
- Kinked demand curve has different elasticities in the portions separated by the kink

- MR is discontinuous corresponding the kink
- Above the kink is elastic and below is inelastic along the demand curve
- Kinked demand curve does not explain how the height of kink is determined

Objective Questions

1. What is oligopoly market?
2. Name two features of oligopoly market.
3. What are the two types of oligopoly?
4. How does the oligopoly market is differentiated between collusive and non-collusive market?
5. Give some of the reasons for the existence of only few firms under oligopoly.
6. Name the examples of collusive oligopoly.
7. Give one example for cartels.
8. What does the kinked demand curve model explain?
9. Where is the equilibrium price determined under kinked demand curve model?
10. What is state of elasticity along the kinked demand curve?
11. What is the shape of MR for kinked demand curve?
12. What is the state of MC under kinked demand curve mode?

Answers

1. It is a market situation referring to the existence of few firms selling homogenous or heterogenous products.
2. Interdependence among firms, barriers to entry
3. Collusive and non-collusive
4. Based on the interdependence among the firms
5. Presence of economies of scale, patent on production process or input, control over raw material
6. Cartels and Price Leadership Models
7. OPEC
8. Price rigidity
9. At the kink in demand curve
10. It is elastic above the kink and inelastic below the kink along the demand curve
11. MR is discontinues corresponding to the kink
12. There are many MC along the discontinuous MR corresponding to equilibrium price and output.

Assignments

1. Explain oligopoly market situation referring to its features.
2. List out the real life examples of oligopoly market. Critically examine the features of these markets in relation to the theory you learned.
3. What is kinked demand curve model? Elucidate the occurrence of kink and the determination of equilibrium under the model.

Suggested Reading

1. Salvatore, Dominick (2009), *Principles of Microeconomics.*

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UNIT 2

Non-Collusive Oligopoly

Learning Outcomes

After completing this unit, the learner will be able to:

- describe the concept of non-collusive oligopoly
- familiarise with how equilibrium is attained under Cournot model
- discuss the difference between attainment of equilibrium under Cournot and Bertrand model

Prerequisites

Some of the common oligopoly markets are automobiles, soap, detergents, aircrafts, etc. Firms under these markets take market decisions based on decisions of the rival firm. Consider the telecommunication industry. We have often seen that when an advertisement of any particular network provider comes, there will be a flow of advertisement of other brands of soap. The business decisions of firms under oligopoly market are interdependent and related. Each firm decides their output produced, price, marketing strategies based on the similar decisions of the rival. However, the non-collusive oligopoly market assumes that the firms take decisions independent of each other. This is unrealistic. But, the detailed study of non-collusive oligopoly market reveals the importance of interdependence by showing the issues under independent decision makings.

Let us explain the different models under non-collusive oligopoly market in detail.

Keywords

Non-collusive oligopoly, Duopoly, Naive behaviour, Isoprofit Curve, Reaction curve

Discussion

2.2.1 Non-Collusive Oligopoly

When there are only a few firms in the market, it is important to note that the market strategies of one firm affect the strategies of other. Then, the firms will be taking decisions or choosing strategies based on the strategy of the other. There is greater interdependence among firms when number of firms are few in the market. Let us suppose there are two firms named Firm A and B in the market. Like all other rational firms, they also try to maximise profits. They can understand the interdependence in their decisions and corporate among each other, or do not consider this interdependence and not corporate. What will be the firms doing? Collusion or corporating among firms may enhance the profit and the non-collusion may end up in loss? Rational Firms have to act in such a way that the profit is maximised. Will they do that? Will they accept the fellow firms as members of corporation or rivals? Under non-collusive oligopoly model, firms do not consider the interdependence. They do not corporate among each other and hence behave like rivals who do not learn from the past experience of interdependence. Two of the most important non- collusive models are Cournot Model and Bertrand Model. Let discuss these models.

2.2.1.1 Cournot Model

Cournot model is considered as one of the important non-collusive models. It is the earliest duopoly model. Duopoly model refer to the market situation where there are only two firms. The model is developed by the French Economist Augustin Cournot in 1838. The original version of the model is explained with the example of two firms selling mineral water. Let us see the assumptions of the original version of Cournot model.

- Duopolists have identical products and identical costs.
- The marginal cost of the firms is zero.
- Each firm assumes that the other will keep the output constant.

The demand curve faced by the duopolists is negatively sloped straight line. The following figure shows the Cournot demand curve for two firms, A and B.

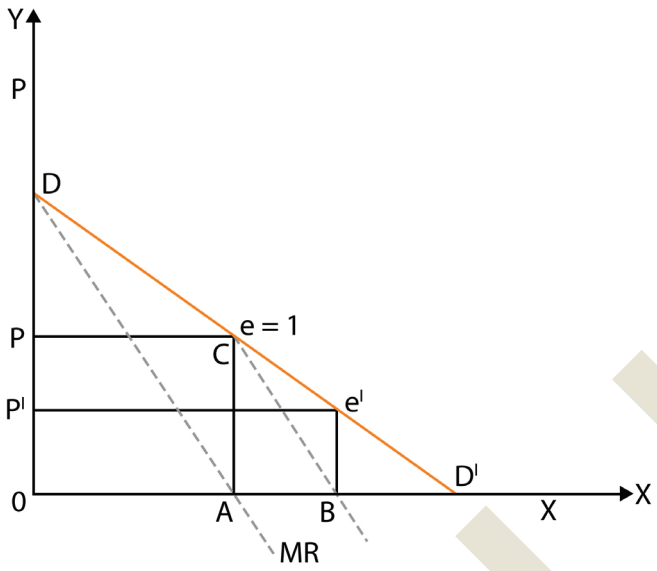

Fig 2.2.1 Cournot Demand Curve

X axis measures quantity and Y axis measures price and cost. Here, assume firm A as the first firm in the duopoly market. With DD^1 demand curve, firm A produces OA quantity of output at price equal to OP. OA is half the total market, OD^1. The equilibrium output and price are determined when MR is equal to the MC. Since MC is zero, it becomes equal to MR at A on horizontal axis. At equilibrium point, elasticity of demand is equal to unity shown by the point 'C'. With zero marginal cost, there is maximum revenue and hence maximum profit in the duopoly market. When firm B enter into the market, it considers that the Firm A will keep its output constant at OA level. So, the demand curve faced by the firm B is CD^1 and MR will be CB. At the point B, Firm B will be in equilibrium with MR equals to zero MC. Equilibrium output is AB and price is P^1. AB is half the market that is not dealt by Firm A (i.e., half of AD^1). Since AD^1 is half the total market, OD^1 (OD^1 = OA + AD^1), AB can be written as ½ of ½ the total market, i.e., ½. ½ = ¼ .

Considering B's position, Firm A believes that Firm B will keep the quantity constant. So, Firm A will produce half of the market that is not dealt by Firm B. So, A's supply equals ½ (1 – ¼). i.e., ½ . ¾ = 3/8 of the total market. Then, Firm B believes that A will keep its quantity constant and will produce half of what is not produced by Firm A, ½ (1 – 3/8) = 5/16.

As the firms under Cournot model have a naïve behaviour, they may not learn from the past experience and continue to assume that the other will keep their quantity constant. They continue to act and react. However, an equilibrium will be reached when each firm produces one third of the total market. So, together, they will produce two-third of the total market. Firms maximise their individual profit, but industry profit is not maximised. It is important to note that, the individual profits might have maximised if the firms have understood their interdependence. If there are 'n' number of firms, the individual firms may supply 1/(n+1) of the

market and together produce n/ (n+1).

The original model of duopoly can be extended with a greater number of firms. However, the model is a closed one leading to no entry into the industry after the original position. The model is criticized for the naïve behaviour of the firms and the assumption of zero cost. The reaction curve approach extends the duopoly model to analyse oligopoly market by eliminating some of the unrealistic assumptions of original model.

The reaction curve approach uses the concept of isoprofit curve to derive a reaction curve of firms and later the Cournot equilibrium. Here, the isoprofit curve is derived for both Firm A and Firm B. Isoprofit curve for Firm A is the locus of points of different levels of output of A and B which gives the same level of profit for Firm A. So, the isoprofit curve for Firm B is the locus of points of different levels of output of A and B which gives the same level of profit for Firm B. The above sentences reveal that isoprofit curves yields the shape of an indifference curve. The following figure shows the isoprofit curve of Firm A and Firm B.

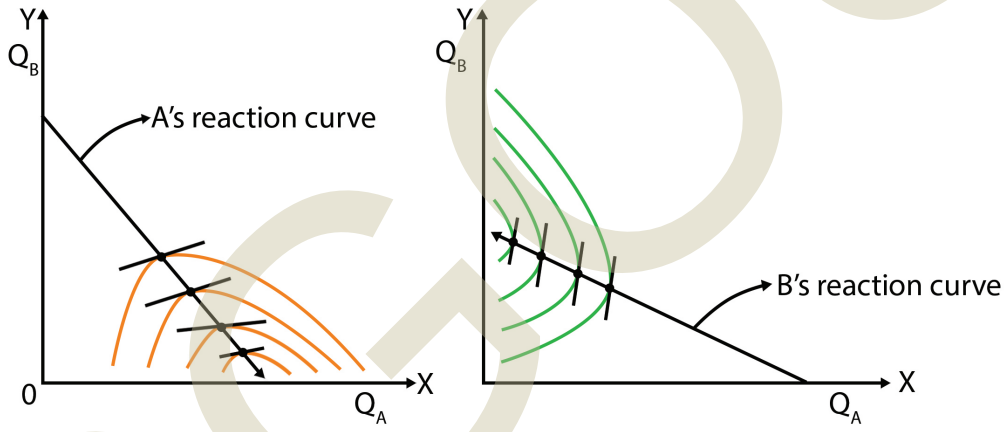

Fig 2.2.2 Isoprofit curves for Firm A and Firm B

The figure shows that the isoprofit curves are concave in shape. It is concave to the axes where the quantity is measured. In the figure, isoprofit curve of Firm A is concave to the X-axis where the quantity of A is measured whereas isoprofit curve of Firm B is concave to the Y-axis where the quantity of Y is measured. The concave shape shows the reaction of one firm to the other firm's output inorder to retain the particular profit.

In terms of level of profit, the higher the isoprofit curve, the lower will be the profit. So, when the concave isoprofit curve is farther away from the axis, profit is lower whereas when it is closer to the axis, the profit is higher. For each level of output for B, there will be a corresponding output for A that maximises A's profit. The level of profit maximising output will be determined by the point of tangency of the line through B's output and the lowest possible isoprofit curve of Firm A. Therefore, the profit maximising level of

output of A for given output of B is shown in the highest point of the lowest possible isoprofit curve of A.

Among the isoprofit curves, the highest points of each successive isoprofit curve of Firm A lies left of the previous isoprofit curve. In the case of Firm B,the highest points of each successive isoprofit curves lies to the right of the previous isoprofit curves. When joining the highest points of the isoprofit curves, the joining line represents the reaction curve. Joining the highest points of the isoprofit curves of Firm A gives the reaction curve for Firm A. The rection curve for Firm A is the locus of points of highest profits that Firm A earns given the output of Firm B. The line is named reaction curve since it represents the reaction of Firm A in terms of output, against the output decisions of Firm B. The same is the case for Firm B. The reaction curve for Firm B shows the reaction of Firm B in fixing output based on the output decision of the Firm A. The following figure shows the reaction curve for Firm A and Firm B.

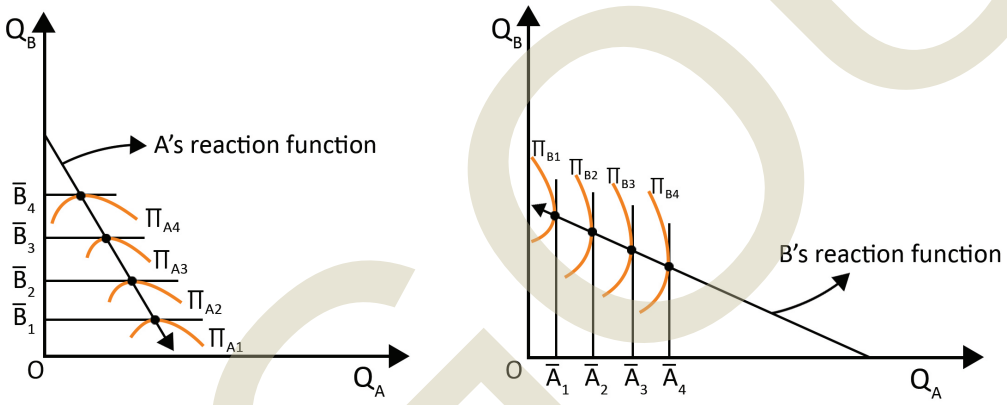

Fig 2.2.3 Reaction Curves for Firm A and Firm B

The first panel shows the reaction curve for Firm A. The highest points of each successive isoprofit curves lies left of the previous isoprofit curve. The profit maximising level of output for each isoprofit curve is shown by the tangency of line from the output of Firm B with the lowest possible isoprofit curve. Joining these points gives the reaction curve for Firm A. The second panel shows the reaction curve for Firm B. The highest points of each successive isoprofit curves lies right of the previous isoprofit curve. The profit maximising level of output under each isoprofit curve for Firm B is shown by the tangency of line from the output of Firm A with the lowest possible isoprofit curve. Joining the highest points gives the reaction curve for Firm B.

The equilibrium under Cournot model is determined by the intersection of reaction curves of Firm A and Firm B as shown below.

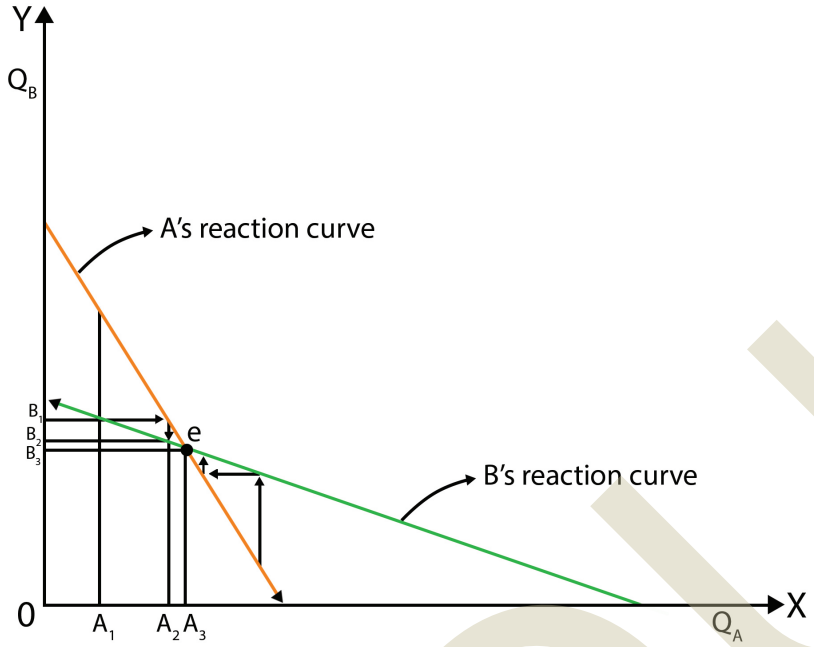

Fig 2.2.4 Cournot Equilibrium

Cournot equilibrium is a stable equilibrium determined at the intersection of reaction curves of Firm A and Firm B at the point 'e'. Here, the reaction curve for Firm A is steeper than the reaction curve for Firm B. When Firm A produces A_1 quantity of output, Firm B tries to produce B_1 as a reaction. A_1 is lower than the equilibrium output. Firm A reacts to B's production by increasing output to A_2 thinking that B will keep quantity constant. But, Firm B reacts by producing B_2. This action and reaction continue until the equilibrium point, 'e' is attained. At 'e', individual firms maximise their profit. However, the industry profit or joint profit is not maximised.

2.2.1.2 Bertrand Model

In Cournot Model, we assumed that the firms were choosing quantities and letting markets determine the price. Another way to study oligopoly firms is to think of firms as fixing their prices and letting markets determine the quantity of output to be sold. This is the Bertrand Model. So, in Bertrand Model, the duopolies think the rival will keep the price constant rather the quantity constant as in Cournot Model. Bertrand Model is developed in 1883.

The Bertrand Model can also be explained with the help of reaction curves. Here, the reaction curves for firms are derived from isoprofit curves which are convex in shape. The convex shape is associated with the measuring of price and its relation with profit. Each convex isoprofit curves of Firm A shows the single level of profit earned by Firm A considering the various levels of prices charged by Firm A and the rival Firm B. Isoprofit curve of Firm A is convex to the axis measuring price of A. Considering profit A_2, the firm A needs to reduce its price to considerable level to 'e' to meet the corresponding price of Firm B, so that A can maintain the profit A_2. If Firm B continues to reduce the price, Firm A has to lower its price too, leading to a lower

profit, profit A_1. This shows that lower isoprofit curves represent lower profit levels.

The following are the isoprofit curves and respective reaction curves under Bertrand Model

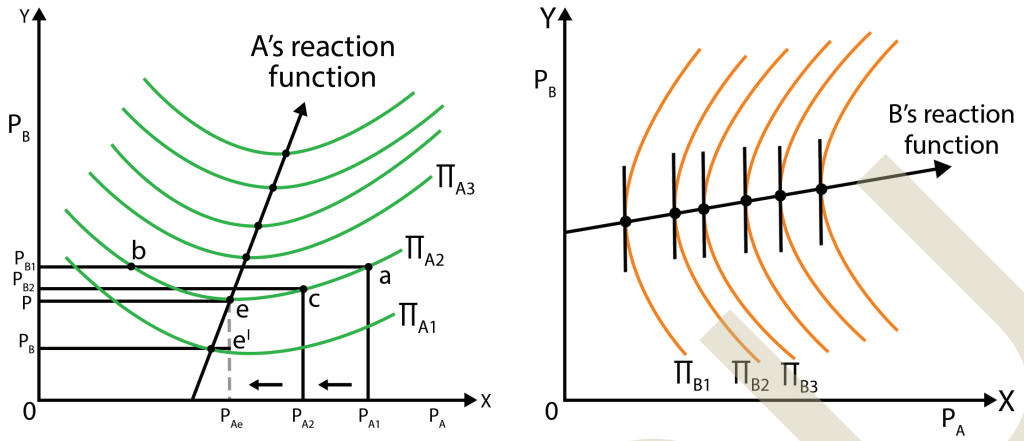

Fig 2.2.5 Isoprofit Curves and Reaction Curves Under Bertrand model

The figure shows that for each level of price fixed by Firm B, Firm A charges a respective price which maximises the A's profit. The profit maximising price is at the lowest point of the convex isoprofit curve. It is important to note that the profit maximising price of each successive convex isoprofit curve lies right of the previous convex isoprofit curve. This reveals that when Firm A attains higher profit with higher isoprofit curves, it also receives higher number of customers of Firm B than the previous time as Firm B increases the price. Here, Firm A also rises price. When joining the lowest points of the convex isoprofit curves, the reaction curve is obtained. Reaction curve of Firm A is the locus of points of maximum profits attained by Firm A by charging different prices considering the price of the rival firm, Firm B. Similarly, reaction curve of Firm B is the locus of points of maximum profits attained by Firm B by charging different prices considering the price of the rival firm, Firm A.

Like Cournot, Bertrand equilibrium is also determined at the intersection of reaction curves. The following is the Bertrand equilibrium.

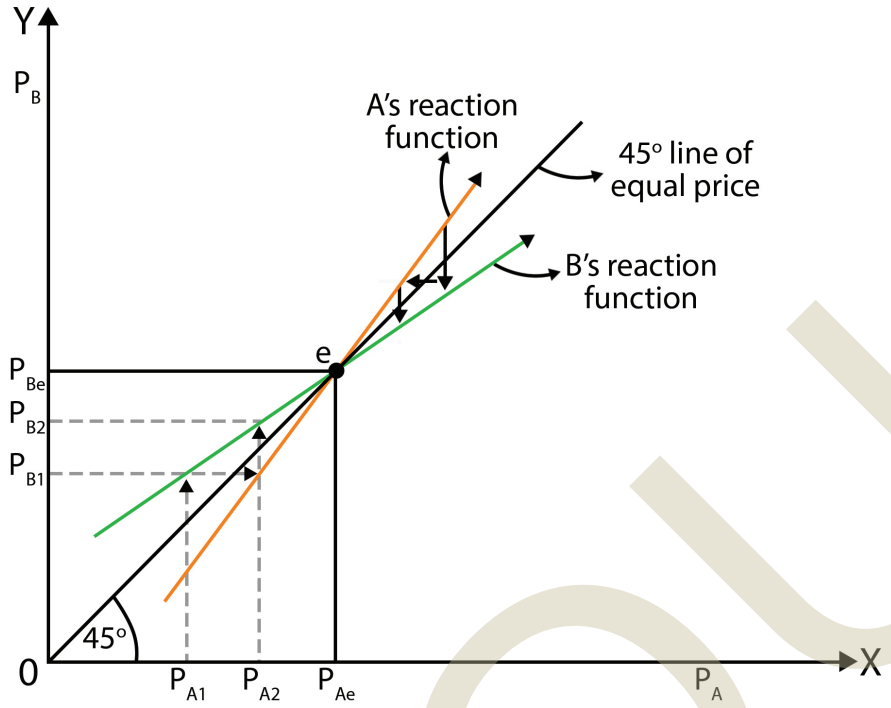

Fig 2.2.6 Bertrand Equilibrium

Bertrand stable equilibrium is at the point 'e' where the reaction curves of both the firms intersect. Like Cournot model, equilibrium in Bertrand too doesnot maximise industry's profit.

Both Cournot and Bertrand Model posses common assumptions. They do not refute each other but possess different behavioural assumption regarding the factor concerned by the firms. Cournot firms believe in keeping quantity constant, whereas Bertrand in keeping price constant. It can be viewed that fixing price is more realistic assumption.

Recap

- Non-collusive – no cooperation among firms in the market
- Models – Cournot and Bertrand
- Cournot – earliest duopoly model

- Duopoly – dealing with two firms
- Cournot assumptions – naïve behaviour, rival's keep quantity constant
- Maximise individual profit not industry profit
- Individual supply – 1/(n+1); market supply – n/(n+1)
- Isoprofit curve – same level of profit for various levels of output by Firm A and B
- Cournot isoprofit curve is concave to axis measuring quantity of the respective firm
- Highest point of successive isoprofit curve is to the left of previous one for Firm A and right for Firm B
- Lower concave isoprofit curves have higher profit and vice versa
- Reaction curve is locus of higher points of concave isoprofit curves
- Cournot equilibrium at intersection of reaction curves
- Bertrand Model – assumes rivals keep price constant
- Isoprofit curve is convex to origin under Bertrand Model
- Lower convex isoprofit curve shows the lower profit
- Lowest points of convex isoprofit curves are found right of the lowest point of previous one
- Reaction curve is locus of lowest points of convex isoprofit curves
- Bertrand equilibrium at the intersection of reaction curves

Objective Questions

1. Which is the earliest oligopoly model?
2. What are the two important assumptions of Cournot model?
3. What are the generalized forms for individual and industry supply under Cournot model?
4. What is isoprofit curve?
5. What is the shape of isoprofit curve under Cournot model?
6. Which isoprofit curve represents maximum profit under Cournot model?
7. What is reaction curve?
8. Name the difference in assumption between Cournot Model and Bertrand Model.
9. What is the shape of the isoprofit curve under Bertrand Model?
10. Which isoprofit curve represents maximum profit under Bertrand Model?

Answers

1. Cournot model
2. Naïve behaviour and rival will keep the quantity constant
3. 1/(n+1) and n/(n+1)
4. Curve showing same level of profit for various levels of output produced by a firm in response to the output produced by the rival.
5. Concave shape
6. Lowest isoprofit curve

7. Reaction curve is the locus of highest points of isoprofit curve
8. Under Cournot model, firms believe rival will keep quantity constant and under Bertrand, price constant
9. Convex
10. Highest isoprofit curve

Assignments

1. Explain Cournot model using reaction curve approach.
2. Compare the attainment of equilibrium under Cournot and Bertrand model.

Suggested Reading

1. Salvatore, Dominick (2009), *Principles of Microeconomics.* Oxford University Press.
2. Hal R Varian (2010), Intermediate *Microeconomics: A Modern Approach*, 8th Edition, W.W Norton and Company/ Affiliated east-West Press (India).

Reference

1. Koutsyiannis, A (2013), *Modern Microeconomics*, Macmillan Press, London
2. Pindyck, R.S., Rubinfeld, D. L., N Mehta, P. L. (2013) *Microeconomics* (Seventh edition). Pearson Education Prentice Hall.

UNIT 3

Collusive Oligopoly

Learning Outcomes

After completing this unit, the learner will be able to:

- understand collusive oligopoly markets
- familarise with the real-life examples of collusive oligopoly markets
- distinguish between different types of collusive oligopoly models

Prerequisites

During the 1970s, Saudi Arabia possessed the largest petroleum reserves globally, giving it significant influence over oil prices. However, it supplies the output only when others are not able to fulfill the market demand. Witnessing other petroleum exporting nations supplying oil well above their quota and selling oil at lower price. In response, Saudi Arabia threatened to increase its oil supply abnormally to reduce oil price. In 1986, Saudi Arabia did what it threatened and led to collapse of the world oil price. What was the status of Saudi Arabia here? It was a dominant firm price leader in the oil market. The model of dominant firm price leadership explains how collusive oligopoly work with a dominant firm fixing price and output in the market. There are many models under collusive oligopoly market which are dealt in this unit. We can relate these models with real examples in the economy.

Keywords

Collusive Oligopoly, Joint Profit Maximising Cartels, Market Sharing Cartels, Low-Cost Price Leader, Dominant Firm, Barometric Price Leadership

Discussion

2.3.1 Collusive Oligopoly

Discussion on non-collusive oligopoly models which we have done in previous unit reveals the importance of collusion among the firms under oligopoly. The interdependence among the firms is an important feature of oligopoly that needs to be considered by member firms to take a sound market strategy to maximise profit and reduce price war. Under collusive oligopoly, firms cooperate among the firms to avoid the situations that are detrimental to each other and resort to strategies that enhance the profit.

The two most important models of collusive oligopoly are cartels and price leadership models. Cartels are producer organisations colluded to act like a monopoly where they jointly decide the price and total quantity supply inorder to maximise their profit. In the case of price leadership models, there are leader firms who fixes prices in the market and others follow the price fixed by the leader. The following sections explain these models in detail.

2.3.1.1 Cartels

OPEC is an important example of cartels which is known to most of us. It is a formal organisation formed at first by eleven petroleum producing countries to increase petroleum price and earn profit out of it by controlling the supply of petroleum. The role of OPEC in controlling oil prices has been analysed through its interventions, mostly at times of regional wars. The actions of OPEC have led to increased storage of oil and research for other energy resources. Cartels are illegal in some countries and legal in some other countries.

There are mainly two types of cartels viz. joint profit maximising cartels and market sharing cartels.

A. Joint Profit Maximising Cartels

Under joint profit maximising cartels, firms collude to maximise their joint profit and reduce the uncertainties caused by neglecting the mutual interdependence. Under formal cartels, a central agency is appointed to decide on price, total output to be produced, output to be produced by each firm, and profit share of each firm, so that the joint profit of the members may be maximised. This agency is informed enough to know the market demand, derive MR from the demand curve, and derive market MC from individual MCs. Equilibrium point can be derived

from MC equals MR where total output to be produced and determined. This equilibrium point together with individual MC determines individual output to be produced. The following figure reflecting the situation of a multi-plant case also shows the working of a joint profit maximising cartel. The figure shows the case of joint profit maximising with two firms in the market.

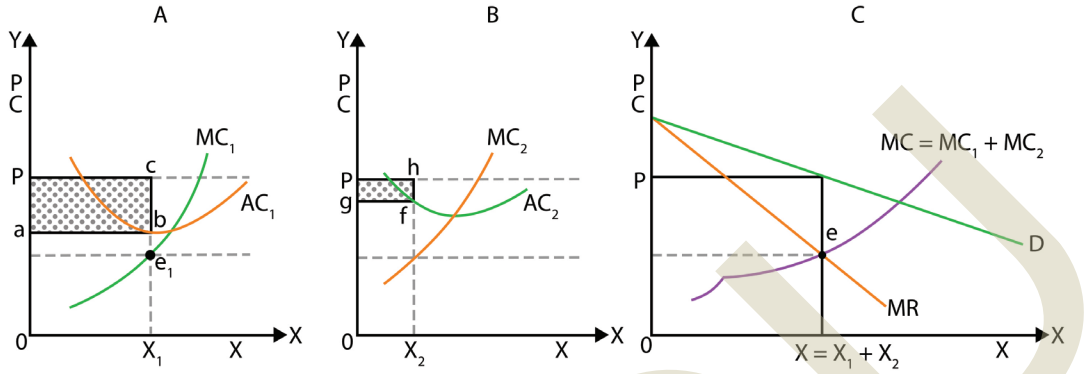

Fig 2.3.1 Joint Profit Maximising Cartels

Consider the two firms as Firm A and Firm B. See Panel C for joint market. The market demand is D and it is possible to derive MR from demand curve. The central agency knows the individual MCs. Cost of production is different for the two firms. Market MC is the horizontal summation of individual MCs. The market equilibrium is at 'e' where MR is equal to MC. The equilibrium price is P and output is X which is the sum of individual outputs. At P price and X output, the market is at joint profit maximising situation. Inorder to fix individual output to be produced, the market equilibrium position is extended to individual cases.

Panel A and B shows the individual market situation of Firm A and Firm B respectively. Interaction of market MR with individual MCs give individual output. For Firm A, MC_1 cuts total market equilibrium situation at e_1 and produce X_1 output. Here, price is P determined by the central agency. The cost is 0a. So, the total revenue is $0PcX_1$ and total cost is $0ab\ X_1$. Then, the individual profit for A is aPcb shown by shaded area. In the case of B, the profit is determined similarly and is equal to gPhf. In the figure, it is evident that A produces greater output than B. The reason is that, the individual cost of production for A is lesser than B leading greater production of output for A than B. The higher output for Firm A under common price gives greater profit. However, profit sharing is determined by the central agency.

Now, let us see the working of market sharing cartels.

B. Market Sharing Cartels

Market sharing cartels are more popular and common. Firms agree to share market but, keep the freedom to decide own style of the product, advertisement strategy and so on. There are two type of market sharing cartels viz. one concentrates on non-price

competition and other on determination of quotas.

Non-Price Competition Agreements

Cartels forming non-price competition agreements are more unstable and loose cartels. They agree on a common price with freedom to choose other decisions. Even though there is an agreement on a common price, low-cost firms always try to fix a lower price and high cost firm, a higher price. The common price may be high enough to have a profit for all. With the cost difference, the price fixed may be unstable in the sense that low cost firm try to reduce price and drive high cost firm out of the market. While understanding this move, the agreement may break. This shows the instability under non-price competition agreements. If there is a price war, one with higher cost will be driven out of the market.

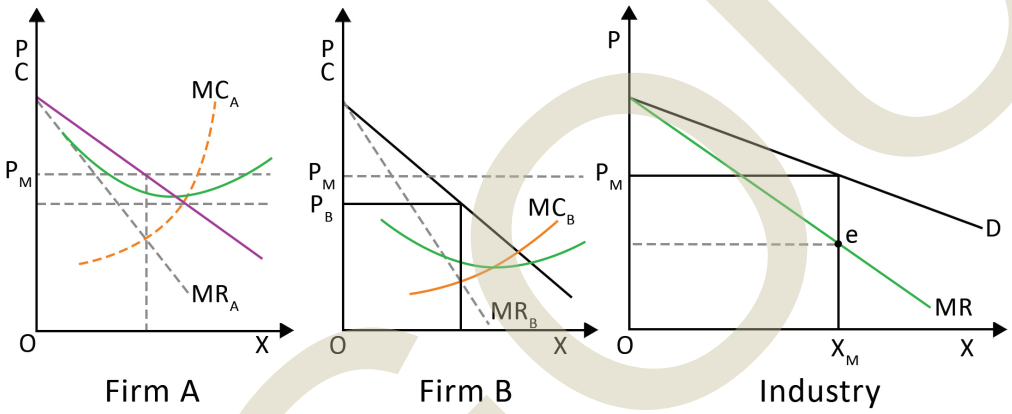

Fig 2.3.2 Non-Price Competition Agreements

The industry price is fixed at P_M showing monopoly price. First panel shows the situation of Firm A and second, Firm B. From the figure, it is clear that the cost of production is lower for Firm B and the price the firm B can offer is also low, P_B. There is always a chance to reduce price by low cost firm and high cost firm trying to get out the cartel. Since at most of the situations, forming cartels or collusions are illegal, exercise of tight agreements to withstand cartels are difficult leading to short lived cartels.

Sharing of Markets on Quotas

Under sharing markets based on quotas, agreement on quantity of output to be sold will be fixed for each firm. If cost is same for all firms, the ideal solution is sharing market based on equal quota for all. If costs are different, the quota for firms will also be different. In this situation, the bargaining power of firms decide the share.

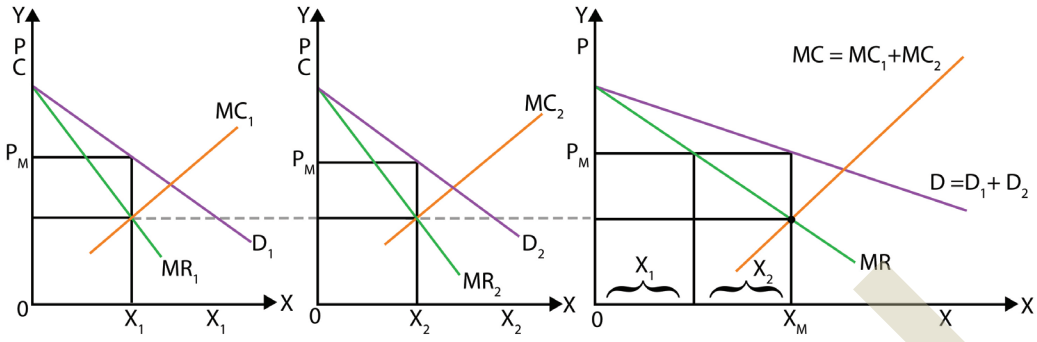

Fig 2.3.3 Market sharing Cartels under Quota System

With identical cost showing MC_1 equals to MC_2, the quantity of output sold by both firms are equal and price is equal to monopoly price.

There are other types of market sharing cartels where the region to sell is decided for each firms. Consider any type of cartels, they are mostly unstable. If there are free entry, the unstability is intensified. Now, let us see price leadership models.

2.3.1.2 Price Leadership Models

Under price leadership models, one firm fixes price and others follow the decisions of this firm. This helps in bringing certainity in the market. It is a common practice in businesses. Price leadership is considered better than cartel since the former allows other firms to have freedom to have own market strategies whereas later requires surrendering most of the decision making power to the common governing body. Price leadership models are classified into low-cost price leadership models, dominant firm price leadership model and barometric price leadership model.

A. Low-Cost Price Leadership Models

Under low-cost price leadership, the leader firm must be having a lower cost than others. The market sharing might be equal or not equal, but the price will be fixed by the leader firm based on the equilibrium of the firm's MC with MR. Here, other firms can charge higher price by producing less. But, they follow the decision of leader firm.

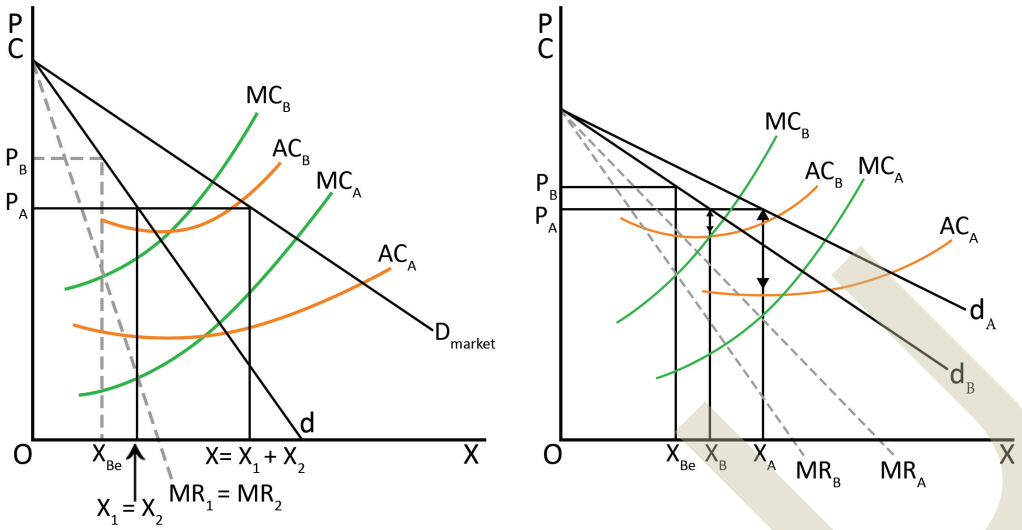

Fig 2.3.4 Low Cost Price Leadership

In both the panels, it is clear that the price is fixed by the leader firm, here Firm A. P_A is the price fixed by the leader at the point where MC = MR. This is similar for both situations of equal market sharing and unequal market sharing. This price will be followed by Firm B. Firm B can increase price by charging higher price, P_B by reducing output to X_{Be} in both the cases. But, follower accepts P_A price and produce X_B output under unequal market sharing situation and $X_1 = X_2$ output under equal market sharing situation.

B. Dominant Firm Price Leadership Model

Under dominant firm price leadership, the most dominant firm becomes the leader in the market and decides output and price. Small firms with smaller market share follows the decision of the leader.

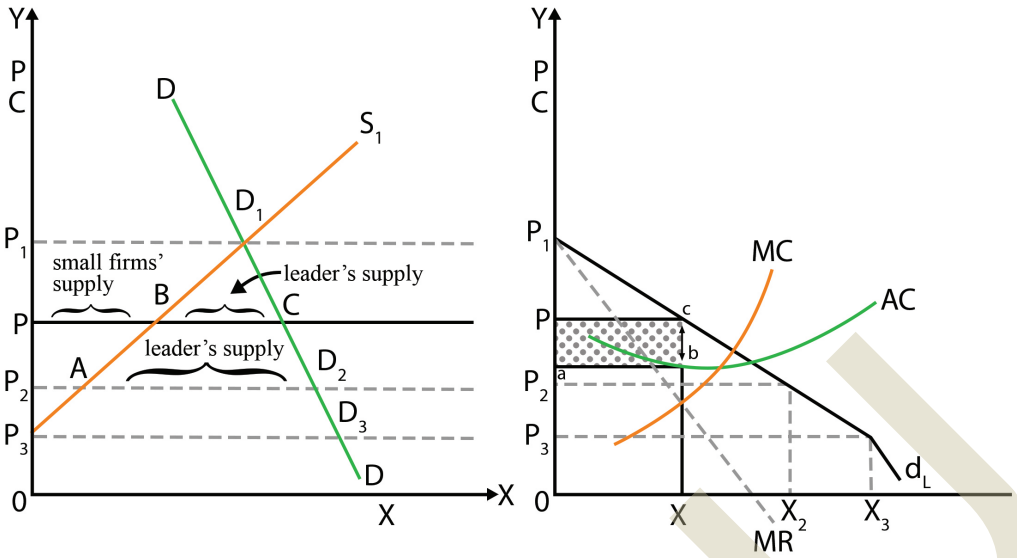

Fig 2.3.5 Dominant Price Leadership Model

The dominant firm knows the market demand and the MC curve of small firms. Hence it calculates the total output needed and total supply of small firms. Under this situation , the firm derives own demand curve. Consider left panel, DD is the market demand curve and S_1 is the total supply of small firms. The supply of dominant firm is total demand minus supply of small firms. When price is P_1, supply of dominant firm is zero since small firms are able to produce the entire market demand at higher price. When price falls, the total supply of firms started reducing leading to rise in supply of dominant firm. With fall in price, small firms having higher costs may be forced out of the market due to non-covering of their cost with the lower price. When price is P_3, the entire market is supplied by the dominant firm. The equilibrium price is determined by the equilibrium of MC and MR of the dominant firm. The equilibrium price is P. Here, PB is supplied by small firms and BC by the dominant firm.

C. Barometric Price Leadership Model

Here, a firm having the knowledge of market environment and able to predict future market situation will be considered a barometer. The firm may be an experienced one having the reputation of a better forecaster of the market situation. It may not be a low cost or dominant firm. Barometric price leadership may be established for different reasons. First, when there are many big companies in an industry, it is hard to pick just one to lead. Second, it saves time and effort for other companies by avoiding the need to constantly adjust their prices when economic conditions change. Third, the leading company is often good at predicting changes in costs and demand for the industry and the economy overall. Other companies feel confident following its lead because they trust it to set the right prices.

Recap

- Collusive oligopoly – understand interdependence among firms, corporation among firms
- Types of collusive models – cartels and price leadership models
- Cartels – formal and informal organisations of members to maximise profit by controlling supply
- Type of cartels – joint profit maximising and market sharing
- Joint profit maximising – high cost produce less and low cost produce more
- Types of market sharing cartels – non-price competition, market sharing on quota, geographical sharing
- Non-price competition – unstable model when cost is different
- Market sharing on quota – identical cost led to equal quota sharing
- Types of price leadership models – low-cost price leadership, dominant price leadership, barometric price leadership
- Low-cost price leadership – low-cost firm is the leader, fixes price and others follow
- Dominant price leadership – dominant firm produces total demand minus small firms supply
- Barometric price leader – able to predict market

Objective Questions

1. What is collusive oligopoly?
2. What are the two important collusive oligopoly models?
3. What are cartels?
4. Name an example of cartel.
5. Why does non-price competition is considered unstable?
6. What is the basic assumption of price leadership model?
7. What is low-cost price leadership model?
8. What is the condition for dominant firm's supply?
9. Give the relation between price and supply by dominant firm.
10. What are barometric firms?

Answers

1. Collusive oligopoly refers to corporation among firms under the market
2. Cartels and price leadership models
3. Formal or informal arrangements formed to maximise the profit via fixing price and controlling market supply
4. OPEC
5. Low-cost firm always tries to reduce price and drives high-cost firm out of the market

6. The leader fixes the price and others follow
7. The market situation where low-cost firm fixes price as per the equilibrium of its lower MC and MR
8. Total demand – Total supply of small firms
9. At higher prices, dominant firms supply less and vice versa
10. Firms having understanding of market environments and able to predict the market conditions

Assignments

1. Explain the working of cartels based on the real-life examples of cartels.
2. Discuss how price leadership models are better stable than cartels.
3. Elucidate the working of barometric price leadership using real examples.

Suggested Reading

1. Salvatore, Dominick (2009), *Principles of Microeconomics.* Oxford University Press
2. Hal R Varian (2010), Intermediate *Microeconomics: A Modern Approach*, 8th Edition, W.W Norton and Company/ Affiliated east-West Press (India).

Reference

1. Koutsyiannis, A (2013), *Modern Microeconomics*, Macmillan Press, London

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Factor Pricing I

Marginal Productivity Theory of Distribution

Learning Outcomes

After completing this unit, the learner will be able to:

- discuss the concept of income distribution
- analyse the marginal productivity theory of distribution
- examine profit maximisation conditions in input markets

Prerequisites

The production process is an act of combining inputs into outputs. Look around you, your cloths, books, phone, sandals, cooking wares, furniture, and vehicles are outputs of a production process. So, can you name some inputs which are common for the production of all the above-mentioned outputs?

Consider the production of cloth. A textile firm converts yarn to the cloth as a part of the production process. For this, the firm needs spinning and weaving machines; a space to install these machines; labour to operate the machines; an entrepreneur to look after the business. Likewise, for converting wood into furniture, the respective firm needs an entrepreneur to take care of the business; tools like saw, hand planes, and wood chisels; an indoor space to do work; skilled labour to make furniture.

For producing vehicles, the raw materials required are relevant metals, plastic materials, electronic parts and rubber. In addition to the raw materials, the vehicle manufacturing unit needs land for building the plant, machines to combine and process the inputs, labour to work in the plant, and an entrepreneur to organise

the production process. So, apart from the particular raw materials of the output, the production of all outputs needs four common inputs.

Land, labour, capital, and entrepreneurship are the four common factors of production. This unit deals with the pricing or reward for these factors for their participation in the production process as well as profit maximisation conditions in input markets.

Keywords

Land, Labour, Capital, Entrepreneur, Marginal Productivity, Marginal Revenue Product, Marginal Cost, Profit Maximisation, Demand Curve

Discussion

3.1.1 Distribution of Income

Factor pricing is generally known as the theory of distribution. The distribution of income may be functional distribution or personal distribution. Functional distribution refers to the distribution of income towards different factors of production for their functions in the production process whereas, personal distribution refers to the distribution of national income towards different individuals in a society.

The difference between functional and personal distribution arises from the fact that functional distribution explains only a part of the personal distribution. Suppose a landowner leases his land for cultivation. He receives rent for using the land for production. Here, the land is the factor of production and the rent he receives is the factor price or reward for the function, the land performs in the production process. The distribution of rent towards the landlord is the functional distribution.

The functional distribution only refers to the pricing of a particular unit of factor. In the above example, the landlord may have hectares of land. So, his income depends on the quantities of a factor he possesses. Also, if the landlord has entrepreneurial abilities to organise a business, he may receive profit as a reward. Then the income of the landlord is the sum of the rent times the amount of land and the profit. This shows the personal distribution of income. So, factor pricing explains a part of the personal distribution.

3.1.2 Marginal Productivity Theory of Distribution

The marginal productivity theory of distribution explains how factors of production are rewarded or what the price of factors of production is? The theory says that the factors are rewarded according to their marginal productivity. That is, a factor is rewarded according to the amount of output it adds up to the total product. Marginal productivity is the additional contribution made by additional employment of factors. Marginal Product is an important concept in the Theory of Production.

The origin of the theory can be traced back to the theories of Ricardo. The Ricardian Theory of Rent subtly explains the working of marginal productivity in determining rent. According to Ricardo, rent is determined in the marginal land, the last piece of land added to the production of corn. However, using marginal productivity in determining the price of factors is made popular with the works of Philip Wicksteed, J. B. Clark, Jevons, Walras, Marshall, and J.R. Hicks. The marginal productivity theory was first used to determine the price of labour. Later, it was extended to determining the price of other factors of production.

The marginal productivity theory has different versions related to different economists. The important versions of the theory were put forward by J. B. Clark, and Marshall. Let us go through Clark's Version of Marginal Productivity Theory.

3.1.2.1 Clark's Version of Marginal Productivity Theory

J. B. Clark presented the marginal productivity theory in his book, "The Distribution of Wealth". According to Clark, "under static conditions, every factor including entrepreneur would get a remuneration equal to its marginal product".

Assumptions

1. Static conditions prevail in the economy. It may be in the form of unchanged population, capital and technique of production.
2. Factor market experiences perfect competition. Under perfect market conditions, marginal product and average product are equal.
3. Perfect mobility of factors within the economy.
4. Labour is homogenous in quality. They do not differ in their skill, and hence marginal productivity is equal for each additional unit of input.

Suppose, labour and capital are the two factors employed in production. Here, labour is the variable factor and capital is the fixed factor. A rational firm under perfect competition tries to maximise the profit by employing more and more labourers with a given capital, as long as the marginal productivity of labour is higher than the wage rate given to the labour. When marginal productivity of labour is higher than the wage rate, the producer can increase the profit by employing more labourers to produce more output. The marginal productivity of labour is the marginal benefit of employing labourers

whereas, the wage rate is the marginal cost of employing the labourers. So, when the marginal benefit of employing labourers increases, the firm's demand for labour increases. It is important to note that, as demand for a factor increases in correspondence with the marginal product of the factor, then its marginal productivity curve forms the demand curve for the factor. The employer will demand and employ additional labourers until the marginal productivity of labour becomes equal to the wage offered to labour.

The equilibrium position of marginal productivity theory under Clark's version is reached when the marginal productivity of the factor is equal to the price of the factor. With labour as the variable factor, the equilibrium is achieved when the marginal productivity of labour is equal to the wage rate of labour. The following figure gives this equilibrium.

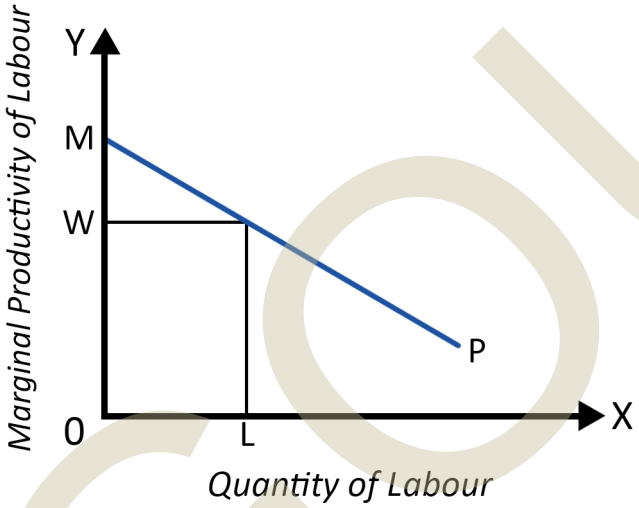

Fig 3.1.1 Clark's Version of Determination of wage under Marginal Productivity Theory

The X-axis measures the quantity of labour and the Y-axis measures the marginal productivity of labour. The marginal productivity curve, MP is negatively sloped representing diminishing returns to the variable factor with an increase in the quantity of variable factor, given the fixed factor. Since labour is the variable factor, MP represents the diminishing marginal productivity of labour with an increase in the quantity of labour, given the capital. The producer will increase the employment until the OL level when the wage rate OW is equal to the marginal productivity of labour. The employer will not employ more than the OL amount of labour. Because, beyond point L, the marginal productivity of labour is less than the wage offered to labourers. Then, the marginal cost will be higher than the marginal benefit. A rational employer will not choose a point beyond L. Therefore, the maximum profit for the employer will be reached when the marginal product of labour is equal to the wage rate.

Under the assumption of perfect competition, an individual employer or labourer cannot influence the wage rate. This is similar to the conditions of individual firms under perfect competition in a product market. So, the individual

employer in the labour market is a wage taker. Hence, employer can only determine the level of employment at the given wage rate. Therefore, marginal productivity theory can also be considered a theory of employment at the micro-level.

In Clark version of the theory, the overall supply of labour is constant. So, the corresponding supply curve of labour is perfectly inelastic showing a vertical line. This means the wage rate cannot change the total supply of labour. So, given the supply of labour, the price of labour or wage rate is determined by the marginal product of labour assuming all labourers are employed.

3.1.2.2 Marshall's Version of Marginal Productivity Theory

According to Marshall, the price of a factor is determined by the demand and supply of that factor. So, the main difference between Marshall and Clark is that Clark believed the factor price is determined by its marginal productivity whereas, Marshall considered the factor price to be determined by the demand and supply of labour. Alfred Marshall's analysis suggests that if the price of a factor of production (like labour) is determined solely by its marginal productivity, then ultimately, it is the demand for that factor (which is influenced by its marginal productivity) that dictates its price. So, in this scenario, the determination of factor price is primarily driven by the demand side of the factor market.

Like the determination of the price of a product, the price of a factor is also determined by its demand and supply. Marshall recognised the wage is determined at the equilibrium of demand and supply of labour. At this equilibrium point, the wage rate determined is equal to the marginal productivity of labour. Figure 3.1.2 gives Marshall's version of Marginal Productivity Theory.

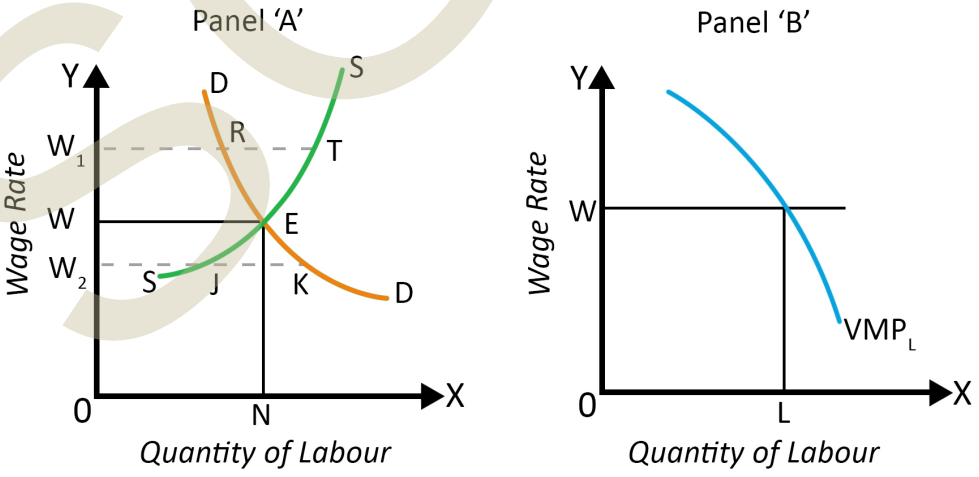

Fig 3.1.2 Marshall's Version of Determination of Wage under Marginal Productivity Theory

The demand curve is DD and the supply curve is SS. The demand curve is negatively sloped and derived from the marginal productivity curve. The supply curve is positively sloped showing that the wage rate can influence the supply of labour. In panel A, the equilibrium in the labour market is at E. Equilibrium wage rate is OW and the equilibrium level of employment is ON. If the wage rate is above the equilibrium point at OW_1, then employers demand less labour as they have to pay higher wages. But, with this higher wage, the supply of labour increases more than the demand for labour. So, there is an excess supply of labour equal to RT at OW_1. This creates unemployment in the market. With involuntary unemployment, labourers compete to get employed. The competition among the labourers reduces the wage rate from OW_1 to the equilibrium point, OW. If the wage rate is below the equilibrium point at OW_2, then the supply of labour which is a positive function of wage will be lower. However, the demand for labour will be higher as the employer can employ more labourers with this low wage rate. This generates excess demand equal to JK at OW_2. The excess demand in the labour market increases the wage rate from OW_2 to OW as employers compete among themselves to hire more workers to increase their production and reap benefits from higher production and lower wage rate.

In panel B, the equilibrium wage rate is equal to the value of the marginal product of labour, VMP_L. OL is the equilibrium amount of labour employed by each firm. Therefore, under Marshall's version of marginal productivity theory, the price of a factor is determined by the demand and supply of the factor, and at equilibrium, the price of the factor will be equal to its value of marginal product.

3.1.2.3 Difference between Clark's and Marshall's Version of Marginal Productivity Theory

1. Under Clark's version, the price of the factor is determined by the marginal productivity of the factor, whereas in Marshall's version, the price of the factor is determined at the equilibrium of demand and supply of the factor.

2. Clark's supply curve of labour is perfectly inelastic showing no influence of wage rate on the supply of labour. Marshall's supply curve of labour is positively sloped showing a positive relationship between wage rate and labour supply.

3. Clark believed in static society, whereas Marshall recognised the existence of dynamic features of the society.

3.1.2.4 Evaluation of Marginal Productivity Theory

The Marginal Productivity Theory is an important doctrine explaining the determination of the price of factors. The theory not only explains the price of factors in terms of marginal productivity of factor but generates an idea that the factors must be paid according to their contribution to production.

Given the popularity of the marginal productivity theory of distribution, it is criticised for several reasons. The following are the criticisms.

a. Unrealistic Assumptions of the Theory

Clark's version of Marginal Productivity Theory has many unrealistic assumptions, such as static conditions in the economy, perfect competition, perfect mobility of factors, perfect knowledge of market situations and homogenous labour. But these are not experienced in the real world. The real-world experiences many changes in the form of development, technology, taste and preferences and so on. So, the world is dynamic in nature, and not static. With respect to perfect competition, the real world is imperfect. The economy faces asymmetric information rather than perfect information. In the case of homogeneity of labour, the labourers are heterogeneous in their ability and skill, which makes the labour market more complex.

b. Price of Factors is not always equal to Value of Marginal Productivity

This criticism is common in both Clark's and Marshall's versions of the theory. Under perfect competition, the price of factors is equal to the Value of Marginal Product (VMP). But, in the real world, the market situations are more imperfect. Under imperfect competition, factor price is equal to the Marginal Revenue Product of the factor which is lesser than the Value of Marginal Product.

c. The Theory cannot explain the price of Entrepreneur

The price or reward for the entrepreneur is profit. The concept of profit is difficult to determine under marginal productivity theory. The marginal productivity of a factor measures how much extra output we get when we add one more unit of that factor. But, the entrepreneur is a fixed factor. One cannot add more entrepreneurs to calculate the marginal productivity of an entrepreneur. The reward for the entrepreneur is determined on the basis of functions undertaken by the entrepreneur.

3.1.3 Profit Maximisation Conditions in Input Markets

This section deals with the conditions for maximising the profit of a firm while employing inputs. The conditions for maximum profit provide the optimal employment of inputs which in turn leads to the derivation of the demand curve for inputs in the input markets. The section discusses the profit maximisation condition using labour and capital as inputs.

Before moving into the profit maximisation in the input market, try to remember the profit maximisation condition for the producer's equilibrium. You have learnt the producer's equilibrium in the theory of production. The producer's equilibrium is

$$MRTS_{LK} = MP_L \div MP_K = w \div r \text{ -----(1)}$$

The least cost combination of input is

$$\frac{MP_L}{MP_K} = \frac{w}{r}$$

$$\frac{MP_L}{w} = \frac{MP_K}{r} \text{ ---------- (2)}$$

Here, MP_L is the marginal product of

labour; MP_K is the marginal product of capital; w is the wage rate and r is interest return on capital.

The least-cost combination shown in equation (2) expresses that in order to minimise the cost of production, the addition to total output or marginal product per rupee cost on labour should be equal to the addition to total output or marginal product per rupee cost on capital. The cost of labour is the wage rate and the cost of capital is the interest rate.

Suppose, $MP_L = 4$; $MP_K = 5$ and w = r. Since $MP_K > MP_L$, the firm is not in equilibrium. With a higher marginal product of capital, the firm will employ more capital instead of labour. When the stock of capital increases, as per the law of diminishing marginal returns, the marginal product of capital falls and the marginal product of labour increases. Then, $\frac{MP_L}{w} = \frac{MP_K}{r}$ is reached. Therefore, for a least-cost combination of inputs, the marginal product from one rupee spent on each input should be equal for all the inputs considered for the production process.

Now, take the reciprocal of the equation (2). The reciprocal is $\frac{w}{MP_L} = \frac{r}{MP_K}$. For deriving conditions of profit maximisation, we need to equate the right and left hand of the equation to marginal cost.

First, take the case of labour. When a firm or employer wants to employ one more additional labourer, the new labourer must be paid a wage rate. This payment of wage is considered as an addition to the total cost due to additional labour input. The additional labour input creates an addition to the total output. MP_L is the addition to total output. Hence, $\frac{w}{MP_L}$ is the addition to total cost due to addition to total output. You have already learnt that marginal cost refers to a change in total cost due to a change in inputs. Since this change in inputs changes the total output, we can refer to $\frac{w}{MP_L}$ as the marginal cost of labour.

$$\frac{w}{MP_L} = MC \text{----------(3)}$$

Similarly, in the case of capital, the interest rate is the addition to the total cost due to additional output produced using additional capital. So, $\frac{r}{MP_K}$ can be considered the marginal cost of capital.

$$\frac{r}{MP_K} = MC \text{ ----------(4)}$$

In order to maximise the profit from production, the firm needs to follow the least cost or optimal input combination to produce its profit-maximising output. You have already learnt the profit maximisation condition of a firm under perfect competition. The condition is

$$MC = MR = P\text{----------(5)}$$

Taking equations (3) and (5) together.

Since $\frac{w}{MP_L} = MC$

Then, $\frac{w}{MP_L} = MR = P$ ---------- (6)

Rearranging the equation,

$w = MP_L \times MR$ or $w = MP_L \times P$ ---- (7)

Taking equations (4) and (5) together.

Since, $\frac{r}{MP_K} = MC$

Then, $\frac{r}{MP_K} = MR = P$----------(8)

Rearranging the equation,

$r = MP_K \times MR$ or $r = MP_K \times P$ -----(9)

Reiterating equations (7) and (9),

$w = MP_L \times MR$ or

$w = MP_L \times P$ ----------(7)

$r = MP_K \times MR$ or

$r = MP_K \times P$ ---------- (9)

It is important to note that,

1. w and r are the additional cost of employing inputs.
2. $MP_L \times MR$ or $MP_L \times P$ is the additional revenue from employing the labour.
3. $MP_K \times MR$ or $MP_K \times P$ is the additional revenue from employing the capital.
4. For inputs as general, $MP \times MR$ or $MP \times P$ is the additional revenue of employing the inputs.

The profit-maximising condition is that the firm should employ labourers till the wage rate offered to the labourers become equal to the marginal product of labour times the price or marginal revenue of the commodity produced by the labourers, and hire the capital till the interest rate on capital becomes equal to the marginal product of capital times the price or marginal revenue of the commodity produced using the capital. This condition can be extended when more inputs other than labour and capital are used for production. Therefore, the profit maximisation in an input market is reached when the additional cost of employing the inputs is equal to the additional revenue from employing the inputs.

Recap

- Land, labour, capital, and entrepreneurship are the four factors of production
- Factor prices determined by the demand and supply of factors
- Functional distribution - Distribution of income towards the factors of production
- Factor pricing is generally referred to as the theory of distribution
- Marginal Productivity Theory of distribution explains how the price of factors of production is determined
- Clark's version of the Marginal Productivity Theory of distribution gives the price of factors equal to the marginal productivity of factors
- Marshall's version of the Marginal Productivity Theory of distribution gives the price of factors equal to their demand and supply, and at the equilibrium of demand and supply, the price of a factor is equal to the marginal productivity of the factor.
- Marginal Productivity Theory has some unrealistic assumptions like the static economy and prevalence of perfect market conditions in the economy.
- Marginal Productivity Theory cannot explain the price of an entrepreneur.
- Profit is maximised when the additional cost of employing the input is equal to additional revenue from employing the unit.

Objective Questions

1. Name the factors of production and their prices
2. Who are the advocates of the Marginal Productivity Theory of Distribution?
3. Give two assumptions of Clark's version of Marginal Productivity Theory of Distribution.

4. What determines the price of factors according to the Marginal Productivity Theory of Distribution?

5. What is the profit maximisation condition in the factor market?

6. Express Least Cost Combination of Input mathematically.

7. Give the relationship between the elasticity of the demand curve for a factor and the number of variable factors in the production.

Answers

1. Land – Rent; Labour – Wage; Capital – Interest, Entrepreneurship – Profit.

2. Philip Wicksteed, Clark, Walras, Marshall, Jevons, Hicks.

3. Static conditions in the economy and prevalence of perfect competition in the factor market.

4. The marginal productivity of factors determines their price.

5. Price of Factors = MRP or VMP

6. $\frac{MP_L}{MP_K} = \frac{w}{r}$

7. The demand curve for a factor is more elastic when there are more number of variable factors in the production process.

Assignments

1. What is the Marginal Productivity Theory of Distribution, and how does it explain the distribution of income in an economy?
2. How does Clark's version of the Marginal Productivity Theory explain the distribution of income among factors of production?
3. What are the key components of Marshall's version of the Marginal Productivity Theory?
4. Discuss the conditions that firms seek to maximise profits in input markets.

Suggested Reading

1. Christopher Snyder and Walter Nicholson (2017), *Microeconomic Theory-Basic Principles and Extensions*, Cengage Learning.
2. Pindyck, R.S., Rubinfeld, D.L., & Mehta, P. L. (2017). *Microeconomics* (Eighth edition). Pearson Education Prentice Hall.

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2. Koutsoyiannis, A. (1990), *Modern Microeconomics* (Second Edition), Macmillan Education.

UNIT 2

Theories of Rent

Learning Outcomes

After completing this unit, the learner will be able to:

- analyse the concept of economic rent
- explain various theories of rent
- compare Ricardian theory of rent with modern theories of rent

Prerequisites

The word 'land' brings different visuals to different persons. For me, the first image is the green patch of land behind my house. For you, it may be an agricultural field; residential area; barren land; industrial land; desert; or even a cricket stadium. The land has different uses and different functions.

In economic terms, the land is an important factor of production. Traditionally, land as a factor is mainly considered for the production in agriculture. The land is used for cropping, rearing cattle and growing cattle feeds. The land is used for establishing industrial units and building public infrastructures. In modern times, land has many uses.

We know the major purpose of economics is to find a solution to choose between various wants. The land is a fixed factor while considering the entire area of land in the society. With many uses and fixed supply, rent is the price or reward for using the land. The price of land or rent, in different economic situations, is dealt with in detail in this unit.

Keywords

Land, Rent, Law of Diminishing Marginal Returns, Fertility of Land, Elasticity of Supply of Factors, Transfer Earnings, Economic Rent, Quasi Rent

Discussion

3.2.1 Land and Rent

The land is a gift of nature. Like other factors of production, the land is not produced by human beings. They have made improvements to the land to make it suitable for production. Improvements to the land are made considering the demand for land. Demand for land depends on the demand for the product that the land produces.

Suppose, bananas are produced on an acre of land. If the demand for bananas increases, farmers demand more land from landlords to increase the cultivation of bananas. Rent is the price paid by farmers to landlords for using land for production. When demand for land increases, rent also increases, given the supply of land.

Diminishing marginal returns is an important concept explaining the demand for land. Classical economists recognised the existence of diminishing marginal returns in the agricultural sector. You have already learned it in the theory of production. In our example, the continuous use of land for producing bananas reduces the marginal productivity of the land.

With respect to the supply of land, it is fixed for the society as a whole. But, for a particular commodity, say, banana, the supply of land can be added by purchasing the land from other uses. Classical economists, especially Ricardo, considered rent to be determined by the supply and demand for land. However, there are other models where rent is determined by the elasticity of the supply of factors. Let us see how rent is determined in different models.

3.2.2 Ricardian Theory of Rent

One of the most important classical theories of rent is the Ricardian Theory of Rent. Ricardo's theory explains rent on the basis of findings of the Malthusian theory of Population. When an economy grows and the population increases, demand for food increases. Intensive and extensive cultivation of land is done to produce enough food to keep up with the increased demand for food. This results in diminishing marginal returns on the land.

According to Ricardo, farmers cultivate more fertile land during the initial period.

When demand for land increases to produce more food, farmers move to low fertile land. The marginal or last plot of land used in cultivation will be the least productive.

Ricardo defines, "Rent is that portion of the produce of the earth which is paid to landlords for the use of the original and indestructible powers of the soil". He formulated the theory of rent on the basis of some fundamental assumptions. They are given below.

Assumptions:

- Land is fixed in supply. Ricardo has considered the entire land owned by the society while measuring the quantity of land.
- Land is used only for the cultivation of corn. So, Ricardo recognised no alternative use of land.
- Land differs in its quality. The quality of land can be measured in terms of its fertility and location. Location considers the proximity to marketplaces.
- Existence of perfect competition in the land market. There are a large number of farmers and landowners in society. So, a single farmer or landowner cannot change the rent.

Under the Ricardian theory, the rent is classified into scarcity rent and differential rent. Scarcity rent arises when the land is homogenous in quality, and the demand for land is higher than the supply of land. The differentiated rent arises as a result of the existence of differences in the quality of land available in society.

3.2.2.1 Scarcity Rent

The Scarcity rent can be determined in terms of supply and demand for land. Under the assumptions of the Ricardian theory of rent, the supply of land is fixed. As land is used only for the cultivation of corn, the demand for land arises only for cultivating corn.

When the population increases in a society, the demand for food increases, in the Ricardian model, resulting in the increased demand for corn. An increase in the demand for corn increases the price of corn. Attracted by this rise in the price of corn, more farmers will enter into the production of corn. Farmers demand more land from landlords. With the rise in demand for land, all idle land will be used. If there is a continuous increase in the demand for corn in the society with the rise in population, the demand for land becomes higher than the supply of land. Then, the economy experiences a scarcity of land. Therefore, scarcity rent is paid to land when the demand for land is higher than the supply. The following figure shows the determination of scarcity rent.

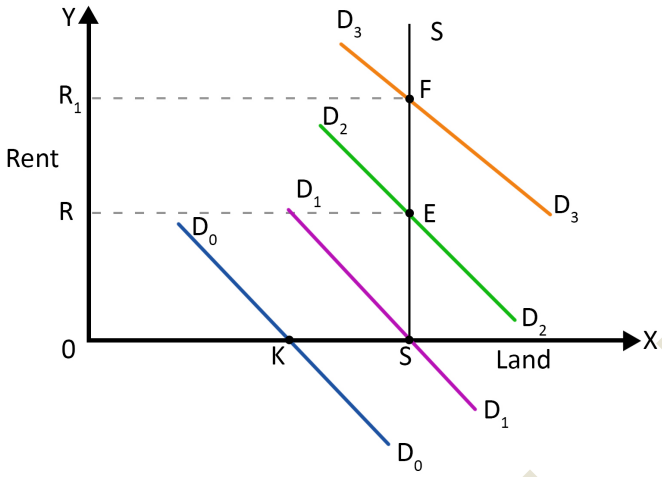

Fig 3.2.1 Determination of Rent through the Intersection of Demand for and Supply of Land

Here, D_0D_0 is the demand curve for land when there is idle land in the society. When the population increases, demand for corn increases which in turn increases the demand for land for cultivating corn. Demand curve shifts to D_1D_1. At point S, the demand for and supply of land are equal. But, when the population increases continuously as per the Malthusian Theory, demand for land increases to D_2D_2. Scarcity rent is generated equal to OR. An increase in demand for land above the point E will result in higher scarcity rent.

Apart from determining rent in terms of demand and supply of land, there are other ways of explaining the rent. Let us see another method of determining rent.

3.2.2.2 Rent is a Surplus above the Cost of Production

During the initial phase of production of corn, there exists idle land in the society. Hence, there is no rent. The cost of production of corn is equal to the sum of the average cost of employing capital and labour. The cost of employing labour is the wage paid to labourers, and the cost of employing a capital is the rate of return on capital.

Under perfect competition conditions, equilibrium in the production of corn is reached when farmers produce at the minimum point of their long-run average cost curve. You have already learned, the long-run equilibrium condition in perfect competition is when LAC = LMC = P = AR. In figure 3.2.2, this equilibrium condition is at the point, E.

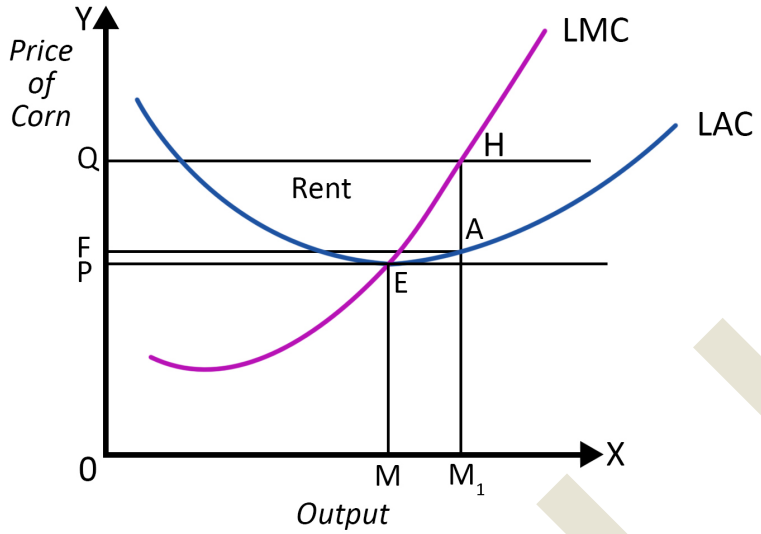

Fig 3.2.2 Determination of Rent above the Cost of Production

Price is OP, equilibrium output is OM, and the price is equal to the sum of the cost of employing labour and capital. Hence, there is no rent in the economy. When the population and demand for corn increase, the price of corn increases to OQ. When the price increases, a profit is generated. In order to reap the benefit of increased prices, more farmers enter the corn industry. Supply of corn increases in the market, leading to a fall in the price of corn to the original level, OP. When the population increases continuously, the demand for land increases in excess of the supply of land. The price of corn increases to OQ. So, the LMC curve will be equal to the price line at H. Equilibrium output increases to OM_1. With the rise in output, the sum of the average cost of capital and labour is M_1A. The new price is OQ = M_1H. The difference between price and the total cost is rent. AH is the rent per unit of corn which is given by farmers to landlords.

Therefore, under Ricardian theory, rent is not a part of the cost of production, but a surplus measured above the cost of production.

Therefore, as land is fixed in supply, growth in the economy will generate a higher demand for land over the supply. This generates rent. Hence, the scarcity of land generates rent. This explains the fact that unlike other factors where the supply of the factors increases with the rise in the price of the factor, the quantity or supply of land cannot increase with the price or rent of land. So, land receives rent in the long-run.

3.2.2.3 Differential Rent

Differential rent arises due to the difference in the quality of the land. In reality, lands are not homogenous, but heterogeneous. The heterogeneity in the fertility of the land is caused by the type of soil, rainfall, temperature, and altitude of the place. More fertile land produces higher output than the low fertile land. But, the cost of production is lower for the more fertile land than the less fertile land.

Rent is calculated as the difference between the output and the cost of producing the output. Since more fertile land has higher output and lower cost of production, the rent is higher. For a low fertile land, the rent is very low or negligible.

Determination of rent in different types of fertile land can be explained with the help of an illustration. Suppose there are four types of fertile lands named A, B, C and D. The fertility is the lowest in land A, and the highest in land D. Let us consider the cost of cultivation per acre of land per labourer (Marginal Cost) is equal to the value of eight bushels of corn. The marginal return on land for employment of various amounts of labourers are given below.

Table 3.2.1 Marginal Return on Different Types of Fertile Land under Ricardian Theory of Rent

Number of Labourers	Marginal Returns on Land			
	D	C	B	A
1	18	14	11	8
2	14	11	8	4
3	11	8	4	0
4	8	5	0	-3

Ricardo believes that cultivation happens from high fertile land to low fertile land. The economy starts with land D, which is highly fertile. Land D employs four labourers. At the point of employing the fourth labourer, the marginal return on land becomes equal to the marginal cost. We have already assumed the cost of producing corn per acre of land per labourer. It is the value of eight bushels of corn. Rent is the difference between output and cost.

In land D, the marginal return on land becomes equal to cost when the fourth labourer is employed.

Output = 18+14+11+8 = 51;

Cost = 8x4 = 32;

Rent = 51-32 = 19

In land C, when the third labourer is employed, the marginal return on land becomes equal to the cost.

Output = 14+11+8 = 33;

Cost = 8x3 = 24;

Rent = 33-24 = 9

In land B, when a second labourer is employed, the marginal return on land becomes equal to the cost.

Output = 11+8 = 19;

Cost = 8x2 = 16;

Rent = 19-16 = 3

In land A, the marginal returns and cost of production are equal when a single labourer is employed.

Output = 8;

Cost = 8;

Rent = 8- 8 = 0

Here, land D has higher rent followed by land C and B. Land A has no rent. This shows that the economy experiences differentiated rent. The rent is higher for high fertile land and is lower for the low fertile land.

The differentiated rent can be portrayed in the below figure.

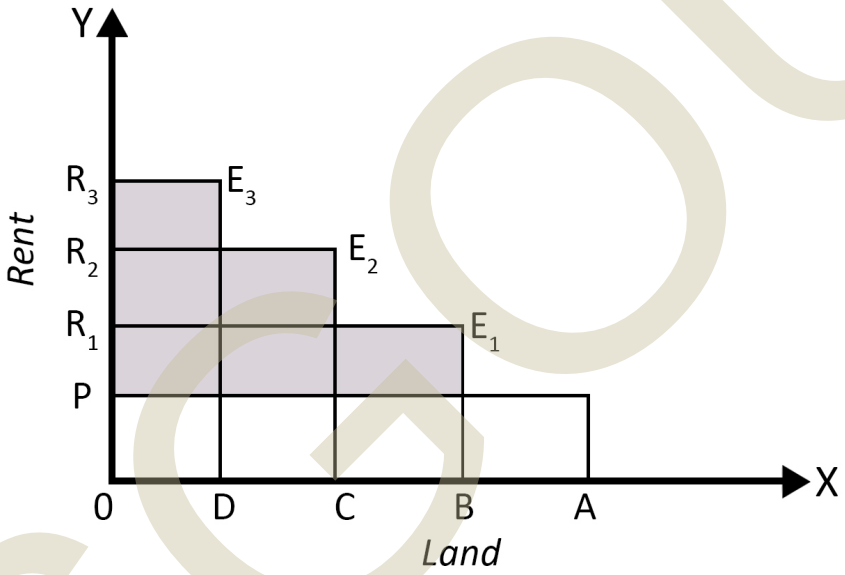

Fig 3.2.3 Differentiated Rent in Ricardian Theory of Rent

In the figure, the shaded portion shows the total rent in the economy. Rent is higher for land D and lower for land B. There is no rent for land A.

The Ricardian Theory of Rent is explained in terms of the average and marginal product of variable factors in modern economics. This is explained in Figure 3.2.4.

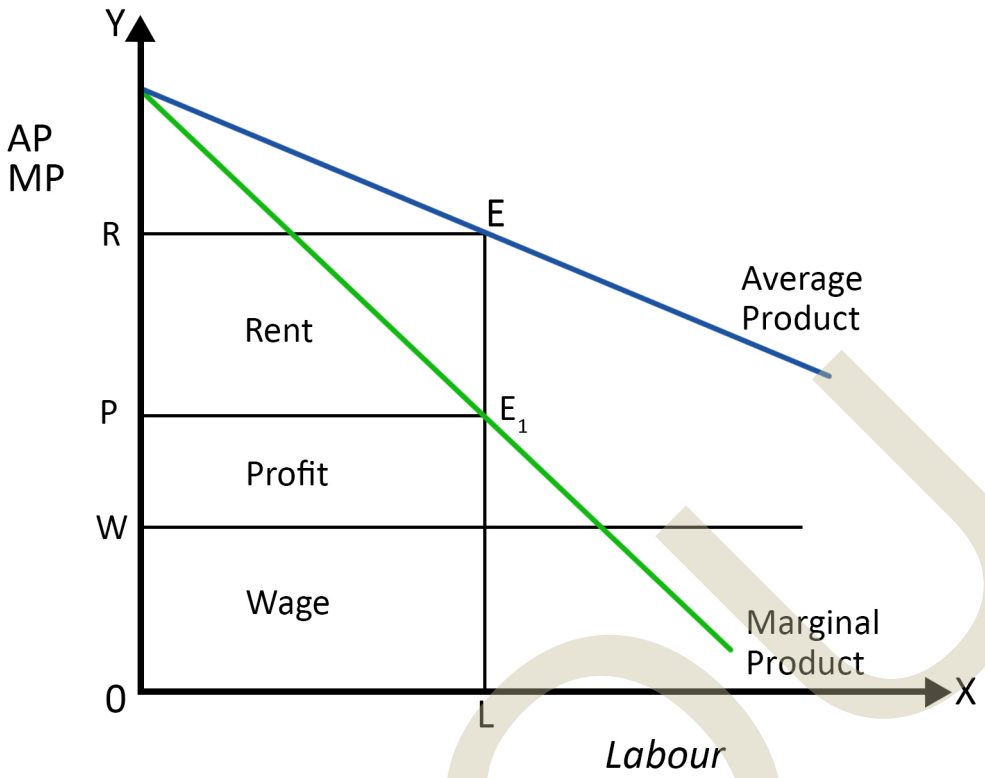

Figure 3.2.4 Ricardo's Economy

When OL is the total quantity of variable factor, that is labour, the total output is OLER. Here, rent is the difference between average product and marginal product. So, the rent is PE_1ER. Subsistence wage is OW. The profit is the residue after distributing wages and rent. The rent is price determined, and not price determining.

Critical Appraisal of Ricardian Theory of Rent

- The order of cultivation explained in the Ricardian theory is not empirically proven.

According to Ricardo, farmers choose to cultivate fertile land when they start the production of corn. They will choose less fertile lands only when the more fertile lands are already in production. However, this exercise of choice is not possible. It is difficult to understand the fertility of land before starting cultivation.

- The concept of indestructible power of land is not true

The fertility of a land may be destroyed by the continuous use of the land. Moreover, it is possible to enhance the fertility of land by introducing irrigation or using organic fertilisers.

- No rent for marginal land is flawed

In our illustration, land A is the marginal land and it possesses zero rent. However, this is not true. Since land is scarce in supply, all types of land earn rent.

- Rent is price determined is wrong

According to Ricardo, the rise in the

price of corn increases the rent for the land. But critics argue that rent is a cost of production. Hence, rent determines the price and not conversely.

- The theory ignored the alternative uses of Land

Under the Ricardian Theory of Rent, the land is used only for the cultivation of corn. However, land has many uses. These alternative uses of land lead to the concept of transfer earning which is the basis of the modern theory of rent.

3.2.3 Modern Theory of Rent

Contributions to the modern theory of rent are given mainly by Miss Joan Robinson. According to Robinson, rent is a reward extended not just to land, but to all factors of production. Rent in terms of modern theory is a surplus generated over the transfer earning of a factor. This surplus above the transfer earning is called economic rent.

Transfer earning is the level of income a factor receives in its next best alternative use. The concept is similar to the opportunity cost or alternative cost. The opportunity cost of input shows what a factor can earn if it is used for an alternative purpose. In a real economy, all the factors of production face alternative use. Consider the case of capital. A printing press took a loan of one lakh rupees to purchase a new machine. If the owner of the press decides not to purchase the machine, the one lakh rupee loan might have been taken by a farmer to cultivate the land. Likewise, an entrepreneur has many business options to use her/his own skill. A worker can be employed in one or another firm. In the case of land, it can be used for the cultivation of any crop.

Miss Joan Robinson defined, "transfer earning is the price which is necessary to retain a given unit of a factor in a certain industry", and "the essence of conception of rent is the conception of a surplus earned by a particular part of a factor of production over and above the minimum earning necessary to induce it to do work".

Let us explain transfer earning with respect to land. Suppose an acre of land is used for the production of rice. The rent received for producing rice is ten thousand rupees. The next best alternative use of this acre of land is producing pulses. The rent given to an acre of land producing pulses is eight thousand rupees. So, the transfer earning or opportunity cost of the one acre of land is eight thousand rupees. That is, at least eight thousand rupees must be given to a landlord for an acre of land to be used for the production of rice. If the landlord receives less than eight thousand, the person will shift to the production of pulses. Here, while the landlord receives ten thousand rupees instead of eight thousand rupees, two thousand rupees is the surplus of money earned by land over its transfer earnings. So, two thousand rupees is the economic rent, and eight thousand rupees is the transfer earning.

The generation of economic rent can be shown graphically with the help of the price elasticity of the supply of factors. Supply of any factor can be seen as perfectly inelastic, partially elastic or inelastic, and perfectly elastic to the price of the factor.

a) Economic Rent under Perfectly Inelastic Supply of Factor

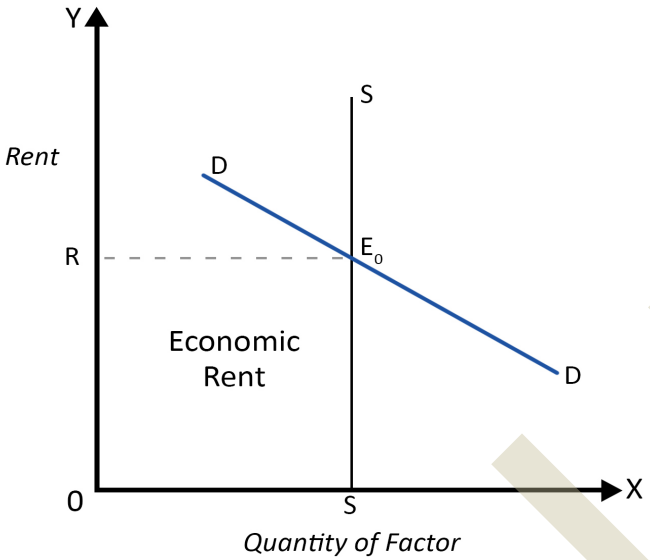

Fig 3.2.5 Economic Rent under Perfectly Inelastic Supply of Factor

Figure 3.2.5 shows that when the supply of factor is perfectly inelastic or fixed in its quantity, the supply curve will be vertical to X-axis as SS. The factor cannot be used for any alternative uses. Since there is no alternative use, the transfer earning is zero. So, the entire earnings is a surplus. This surplus is the economic rent. In the figure, the economic rent is equal to OSE_0R. Therefore, when the supply of a factor is perfectly inelastic, all earnings are economic rent, and there are no transfer earnings.

b) Economic Rent under Partially Inelastic/Elastic Supply of Factor

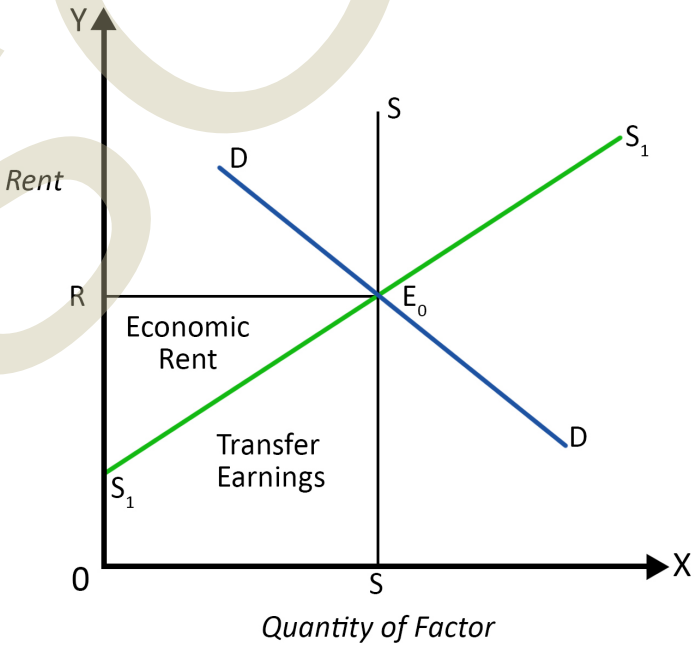

Fig 3.2.6 Economic Rent under Partially Inelastic/Elastic Supply of Factor

In figure 3.2.6, S_1S_1 is the partially inelastic supply curve of the factor. The supply curve is positively sloped showing the change in the supply of factor in response to the change in the price of the factor. The total earnings from the present employment are OSE_0R. Since the supply curve is positively related to price, there is transfer earning. Here, the transfer earning is measured below the positively sloped supply curve, S_1 S_1. OSE_0S_1 measures the transfer earning. The difference between total earning and transfer earning gives the economic rent. In the figure, economic rent is S_1E_0R. Therefore, when the supply of factors is partially inelastic, there is both transfer earning and economic rent.

c) Economic Rent under Perfectly Elastic Supply of Factors

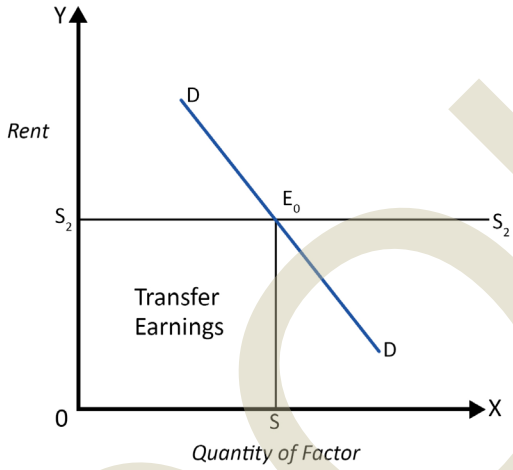

Fig 3.2.7 Economic Rent under Perfectly Elastic Supply of Factors

When the supply of factors is perfectly elastic, the supply curve is horizontal to X-axis like S_2S_2 in the figure 3.2.7. The total earning from the present utilisation of the factor is OSE_0S_2. Since the factor responds highly to the changes in its price, the factor will be used where its reward is the highest. For example, the worker in the printing press is ready to take a job in any other press that gives a higher remuneration. So, the earnings of the worker are transfer earnings. Hence, when the supply of factors is perfectly elastic, there is no economic rent and all earnings are transfer earnings.

The Modern Theory of Rent is applicable in determining the remuneration of all factors of production such as wage, interest, profit, and land rent. In the real world, there exists alternative use for all the factors of production. This generates transfer earnings and economic rent.

Recap

- Land is the gift of nature
- Land is fixed in supply for the society as a whole
- Ricardo believes in the original and indestructible power of soil
- For Ricardo, rent is the result of scarcity of land
- Cultivation takes place from high fertile land to low fertile land
- Ricardo recognised no alternative use for the land
- Rent is higher for high fertile land and lower for the low fertile land
- According to Ricardo, marginal land has no rent
- In a real economy, there are alternative uses for all the factors of production
- The concept of rent can be extended to other factors
- A factor with alternative uses receives transfer earning
- Economic rent is a surplus above the transfer earning
- When the supply of factors is perfectly elastic, all earnings received are transfer earnings
- All earnings are economic rent for a factor having perfectly inelastic supply

Objective Questions

1. Name the theory that forms the basis for the Ricardian Theory of Rent.
2. Give three assumptions of the Ricardian Theory of Rent.
3. What are the classifications of Ricardian rent?
4. What is the assumption for the existence of scarcity rent?
5. Give the pattern of cultivation of land in terms of fertility for Ricardo.
6. What is economic rent?
7. Give the transfer earning for a perfectly inelastic factor.

Answers

1. Malthusian Theory of Population
2. Land is fixed in supply for society as a whole; there is no alternative use for land and land differs in quality.
3. Scarcity rent and differential rent
4. Land is homogenous
5. Land is cultivated initially in high fertile land and later in low fertile land.
6. It is the surplus above the transfer earnings.
7. Zero.

Assignments

1. Define rent in economics and explain how it is determined according to the Ricardian theory.
2. Discuss the concept of scarcity rent as explained in the Ricardian theory of rent. How does the theory illustrate the relationship between demand, supply, and rent for land?
3. Explain the difference between scarcity rent and differential rent in the context of the Ricardian theory of rent. Provide examples to illustrate each type of rent.
4. Compare Ricardian theory of rent with the modern theory of rent proposed by Joan Robinson. Highlight the key differences in their approaches to explaining rent.
5. Explain the concept of economic rent according to the modern theory of rent. How does this theory define and calculate economic rent for factors of production, including land?

Suggested Reading

1. Thirlwall A. P. (2006), *Growth and Development with Special Reference to Developing Economies* (Eighth Edition), Palgrave Macmillan, New York

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UNIT 3

Wage Determination

Learning Outcomes

After completing this unit, the learner will be able to:

- analyse the concept of economic rent
- explain various theories of rent
- compare Ricardian theory of rent with modern theories of rent

Prerequisites

The world is never going to forget the experiences and hardships faced during the Covid -19 Pandemic. The concept of lock-down was new for many of us. Before and after the lockdown, we saw a lot of migration especially, from the place of work to the native place. The largest group of people who migrated was labourers. You might have seen it on TV that migrant labourers walked home in villages of Uttar Pradesh and Bihar from the cities like Delhi, Gurgaon and Faridabad.

These labourers migrated to their homeland, as production on a very large scale was stopped as part of the lockdown. The labourers are an essential factor of production and are closely linked to the production process. They work in agricultural fields, various industrial units, construction sites, mining sites, tourism sector, transport sector and so on.

We saw many state governments taking actions to protect labourers at the time of Lockdown. Better working conditions and welfare of labourers are important concepts of the welfare state. The welfare of labourers is directly related to the

wage the labourers receive. The wage is the reward for labour. This unit explains the determination of wage rates in the economy.

Keywords

Labourers, Wage Rate, Value of Marginal Product of Labour, Marginal Revenue Product of Labour, Average Revenue Product of Labour, Marginal Factor Cost of Labour, Monopsony

Discussion

3.3.1 Labour and Wage

Labour refers to the work done by human beings in return for money. The money that is received for rendering the service in terms of work is wage. So, the wage is the price or reward for labour. Here, the one who does the work or renders the service of work is called a worker or labourer.

Depending upon the type of work one does, the labour is divided into manual or physical labour, skilled labour, unskilled labour, organised labour, unorganised labour, productive labour, unproductive labour and so on. The wage rate also changes in respect of the type of labour one does.

Labour is a key factor of production in many fields, such as agriculture, industries, constructions, hotels, mining and quarrying, tourism, etc. Though technological innovations have reduced the number of labourers required in many fields, labour is still a vital factor without which production cannot take place.

Generally, the wage rate in the labour market is determined by the demand and supply of labour. Demand for labour comes from employers who operate firms in the above-mentioned fields. The supply of labour comes from the population who are able and willing to do work. In market terms, these employers can be referred to as buyers of labour, and those who are willing to do work can be referred to as sellers of labour.

Even though wage is determined at the equilibrium point of demand and supply of labour, considering the different types of market conditions prevailing in the economy, there exist different ways of determining wage. The following sections explain the determination of wage rates under different market conditions.

3.3.2 Determination of Wage under Perfectly Competitive Labour Market

You have already learned what a perfectly competitive market is. Let us try to recollect the assumptions of perfect market conditions. The foremost assumption of the perfect market condition is the presence of a large number of buyers and sellers of a product. We know the buyers of labour are the employers and sellers of labour are the workers. So, under perfect competition in the labour market, there are a large number of employers and workers. The construction industry is an important sector that functions closely with the labour market. Let us try to explain the construction industry in India in terms of assumptions of a perfectly competitive labour market.

Have a look at the images of cities like Delhi, Bangalore, Mumbai, and Chennai. The first thing you will notice would be the big buildings there. How are these buildings built? We know these buildings are constructed by different construction companies and all these construction companies require workers. There are many construction companies in big cities. The construction of big buildings requires a large number of workers or labourers. So, there are a large number of employers and labourers in the labour market in the construction sector. Hence, a single employer or a single labourer cannot influence the price of labour which is the wage rate. Here, we have not taken the case of the construction industry in Kerala as the State faces a scarcity of labourers. We will use the particular case of Kerala in later sessions of this unit.

Another assumption of perfect competition is that the market sells homogenous products. With respect to the labour market in the construction sector, the labourers are mostly homogenous with their skills. The profit maximisation condition can be seen in the construction sector since workers try to maximise their wage rate and employers try to maximise their profit by reducing their costs. In the labour market, employers try to reduce the cost of employing labourers by reducing the wage rate.

Concerning other assumptions like no government regulation, perfect mobility of labour and perfect knowledge about the labour market, it is difficult to hold these assumptions even in the construction sector.

Under a perfectly competitive labour market, the wage rate is determined by the demand for and supply of labour. The marginal productivity theory of distribution is directly followed to fix the equilibrium wage. Marshall introduced the view that the general theory of pricing can be extended to the factor market to fix the price of factors. Hence, at the intersection of demand and supply of labour, the equilibrium wage rate is equal to the value of the marginal product of labour, VMP_L. The following figure shows the determination of the equilibrium wage rate under a perfectly competitive labour market.

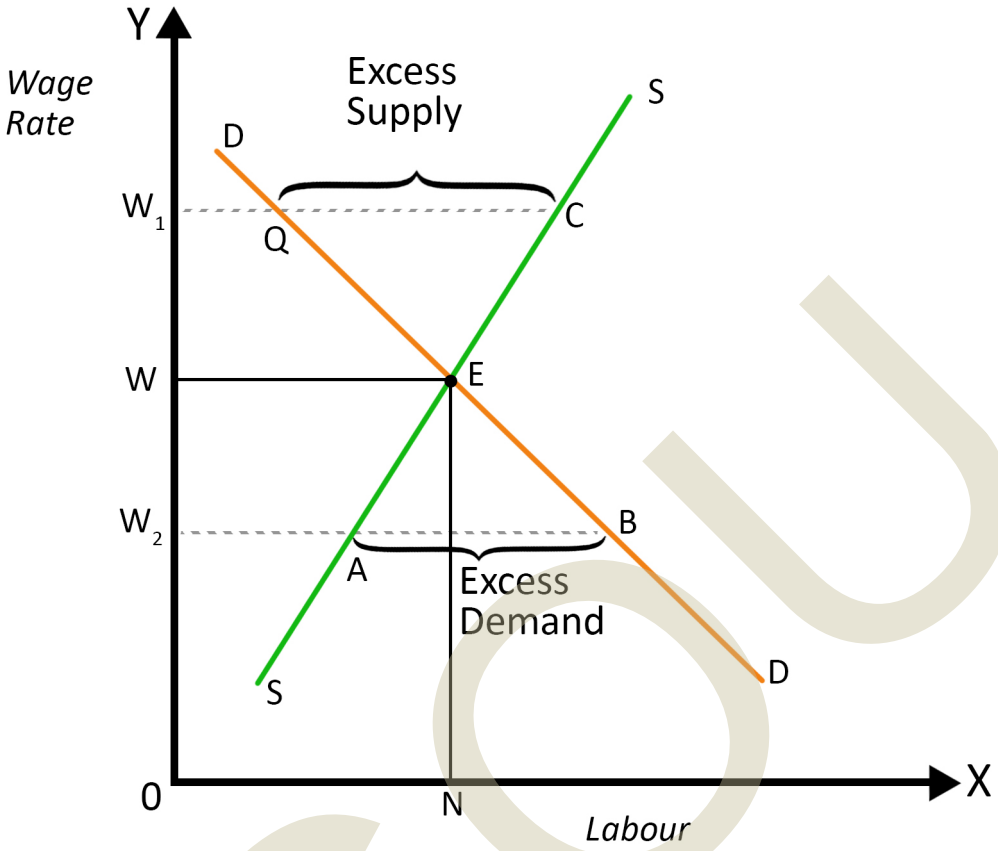

Fig 3.3.1 Determination of Equilibrium Wage Rate in Perfectly Competitive Labour Market

In figure 3.3.1, SS is the supply of labour and DD is the demand for labour. The equilibrium wage rate is determined at the intersection of the SS and DD curves. E is the equilibrium point. OW is the equilibrium wage rate and ON is the equilibrium level of employment in a perfectly competitive labour market.

Consider a rise in wage rate to OW_1. At OW_1, the supply of labour exceeds the demand for labour. QC is the excess supply. This means QC number of labourers is left out of employment. Hence, there will competition among the unemployed workers to get into employment. This competition reduces the wage rate from OW_1 to the equilibrium wage rate, OW.

Now suppose a fall in wage rate to OW_2. At OW_2, demand for labour exceeds the supply of labour. AB is the excess demand. The firm's demand for AB number of labourers is not met. So, there will be competition among the firms to attract the labourers to their own business. To attract labourers, firms increase wage rates. When one firm increases the wage rate, others follow leading to an overall increase in the wage rate in the industry to the equilibrium wage rate, OW.

Therefore, the equilibrium wage rate in the perfectly competitive labour market is determined by the demand and supply of labour. This equilibrium wage rate is equal to the value of marginal product of labour.

This is shown in the following short-run and long-runequilibrium conditions in the perfectly competitive labour market.

3.3.2.1 Short-Run Equilibrium in the Labour Market

The equilibrium wage rate is equal to the value of the marginal product of labour, VMP_L, as shown in the figure, 3.3.2.

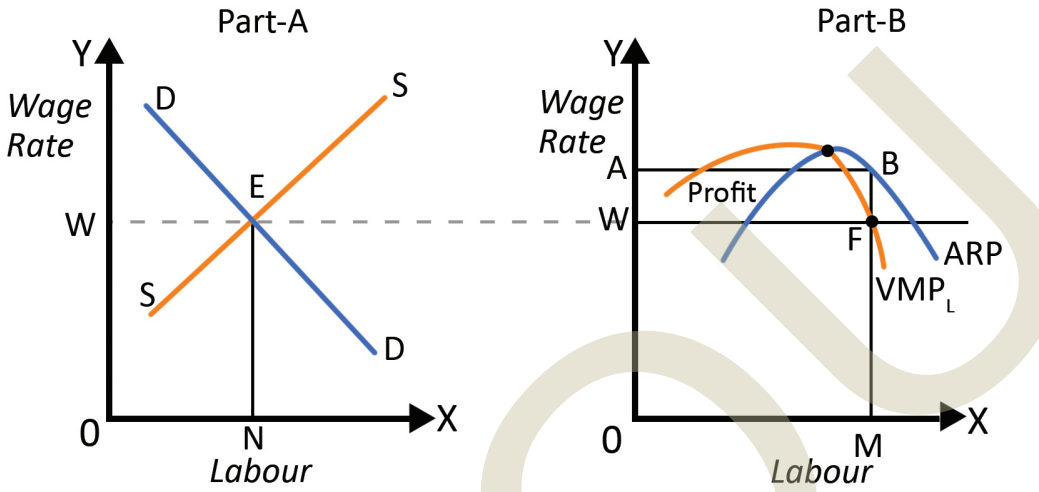

Fig 3.3.2 Determination of Equilibrium Wage Rate for a Firm in the Short-run

The figure portrays the equilibrium wage rate of a firm with supernormal profit. Part A of the figure shows the intersection of demand and supply of labour. OW is the equilibrium wage rate. Under perfect competition, a firm is a wage taker. With OW wage, the firm employs OM labour when the wage rate is equal to the VMP.

Suppose the firm hires smaller number of labourers than OM quantity, part B shows that the VMP will be higher than the wage rate. With a higher value of the marginal product, the firm can expand the production to reap more profit. The expansion of production is done by hiring more labourers. This ensures the equilibrium employment of labour with a wage rate equal to VMP.

In another situation, consider the firm hiring more labourers than the OM amount. Then the value of the marginal product, VMP, of labour is lower than the wage rate given to the labour. This results in incurring loss to the marginal unit of the firm. So, the firm reduces employment until the wage rate is equal to the value of the marginal product of labour.

In the short-run, a firm can reap profit. The firm earns a supernormal profit, WFBA, in the short-run as the Average Revenue Product, ARP of labour is higher than the wage rate offered to labour under the equilibrium point.

A firm may incur a loss in the short-run if the Average Revenue Product is less than the equilibrium wage rate. Similarly, a firm may earn a normal profit when the Average Revenue Product of labour is equal to the equilibrium wage rate.

In a perfectly competitive labour market, the equilibrium wage rate is equal to the value of marginal product of labour, and the wage rate is determined at the intersection of demand and supply of labour.

Therefore, in a short-run perfectly competitive labour market, equilibrium Wage Rate = VMP_L.

Let us see the equilibrium wage rate in the long-run.

3.3.2.2 Long-run Equilibrium in the Perfectly Competitive Labour Market

We have seen in the short-run analysis that the firm can generate a profit at the equilibrium point. Since the entry of new firms is free in the perfectly competitive labour market, new firms enter the labour market to hire more labourers to reap profit by expanding the production. The entry of new firms leads to an increase in demand for labour. Wage rate increases. In the long-run, the equilibrium point is achieved when the wage rate is equal to both the Average Revenue Product and the Value of Marginal Product of labour. Figure 3.3.3 shows the long-run equilibrium in a perfectly competitive labour market.

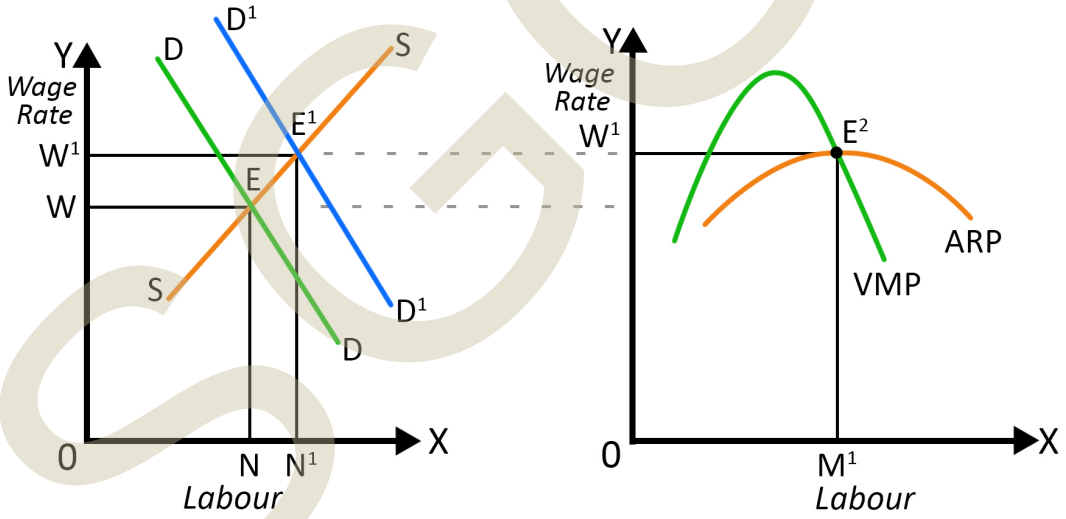

Fig 3.3.3 Determination of Long-run Equilibrium in Perfectly Competitive Labour Market

The figure shows the entry of new firms and the increase in the demand for labour by the shift in the demand curve from DD to D^1D^1. Wage rate increases to OW^1. Equilibrium in the long-run is at the point E^2, the level of employment is OM^1, and the wage rate is OW^1. At equilibrium, the wage rate is equal to VMP and ARP. The firm makes a normal profit in the long-run.

Like the changes in the demand for labour, changes in the supply of labour to change the equilibrium wage rate. If the supply of labour increases, the supply curve shifts to right. Then the new intersection will make the wage rate lower. Conversely, if the supply of labour falls, the wage rate increases. At equilibrium, the wage rate will be equal to the VMP and ARP of labour.

Therefore, in a long-run perfectly competitive labour market, the equilibrium Wage Rate = $VMP_L = ARP_L$.

3.3.3 Determination of Wage under Imperfectly Competitive Labour Market

The existence of imperfections in the market is a reality. Perfect competition is more of a theoretical concept with very few practical applicability. You have seen the practicability of assumptions of the perfectly competitive market in the previous section. The existence of imperfect competition is explained mainly by Miss Joan Robinson.

Like the determination of wages under a perfectly competitive market, wage determination under an imperfectly competitive market is done by the intersection of the demand and supply curve of the labour. The only difference is the determinants of demand and supply are different for these markets.

There are two models of wage determination under an imperfectly competitive labour market. They are the determination of wage with monopsony in the labour market and perfect competition in the product market; and the determination of wage with monopsony in the labour market and monopoly in the product market. Let us discuss the first case.

3.3.3.1 Determination of Wage under Monopsony in the Labour Market and Perfect Competition in the Product Market

You have already dealt with the characteristics of perfect competition. Monopsony is an interesting concept. We know monopoly means a market with a single seller. Conversely, monopsony means a market with a single buyer. It means the existence of a single buyer, for a product or for a factor. Since we are dealing in this module about the factor pricing, especially the factor, labour. In this unit, the monopsony here means the existence of a single buyer in the labour market.

Monopsony is prevalent in factor markets. The monopsony in the labour market can be explained by using the example of the migration of labourers to the State of Kerala from northern States especially, Jharkhand, West Bengal, Bihar, and Orissa. In the State, these migrant labourers are supplied by agents.

The agents are interconnected to facilitate an uninterrupted supply of labourers to sectors, including construction, hotel and agriculture. Suppose, instead of these agents dealing with labourers, an association is formed by all the employers of the above-mentioned sector to hire labourers. Then, this association acts as a single in the State.

The situation of monopsony can exist only when the employer has a large pool of labourers at hand. Like the monopolist influencing the price of the product, a monopsonist can influence the price of a factor with a huge number of labourers at hand.

Take the case of the migrant workers. They are largely unorganised. Hence, they cannot bargain for wage hike. With a trade union, the workers association can act as a single seller of labour. A combination of a single buyer and a single seller forms the bilateral monopoly. However, a bilateral monopoly does not happen all the time. Also, the migrant workers face immobility in terms of shifting jobs. The identity details and work cards of the workers are held by the employers' association. This prevents workers from shifting jobs by themselves. Therefore, there are two conditions for the existence of monopsony in the labour market.

a. Existence of unorganised labour.

b. Restricted mobility from one job to another.

Since the determinants of supply of labour in a monopsony market are different from perfect competition, let us see the supply and marginal factor cost curves in the monopsony labour market.

Supply Curve and Marginal Factor Cost Curves in Monopsony Market

The supply curve in the monopsony market is an upward sloping curve. The upward-sloping supply curve means the monopsonist influences the wage rate by altering the level of employment. A lower wage rate can be achieved by restricting employment whereas, a higher wage rate is needed to have higher levels of employment. This is shown in figure 3.3.4 below.

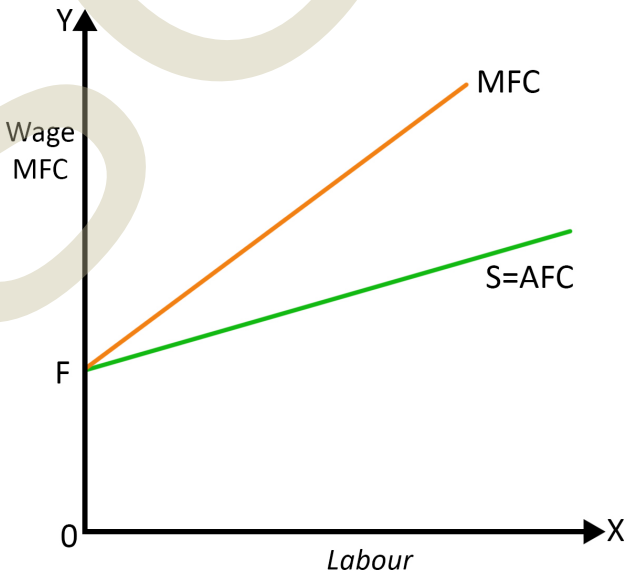

Fig 3.3.4 Supply and Marginal Factor Cost Curve in Monopsony Market

The Average Factor Cost Curve (AFC) is the supply curve (S_L) in a monopsony market. In the labour market, the AFC curve can also be called as Average Labour Cost Curve. Both the Average Factor Cost Curve and Marginal Factor Cost Curve (MFC) are positively sloped. The positive slope of the supply curve shows that, to employ more labourers, a higher wage must be paid. This means that each additional cost to the Total Factor Cost of employing an additional labourer is higher than the wage rate. The additional cost to the total factor cost by employing an additional factor is the marginal factor cost. Hence, MFC lies above the AFC or supply curve.

Marginal Factor Cost and Average Factor Cost are related to the supply of labour whereas the Value of Marginal Product of Labour is related to the demand for labour. The equilibrium wage is determined at the intersection of demand and supply of labour. But, before determining the equilibrium wage rate, let us see the relationship between MFC and VMP of labour.

Suppose the market has only one variable factor, the labour. Then, the total factor cost,

$TFC = w \times L$; where w is the wage rate and L is the number of labourers employed.

An addition to employment can be represented as $\frac{\Delta TFC}{\Delta L} = w + L.\frac{\Delta w}{\Delta L}$; here, $\frac{\Delta TFC}{\Delta L}$ is MFC

Then, multiplying $\frac{w}{w}$ on the right-hand side,

$$MFC = w + L\frac{\Delta w}{\Delta L} \times \frac{w}{w}$$

$$= w(1 + L\frac{\Delta w}{\Delta L} \times w)$$

$= w(1 + \frac{L}{w} \times \frac{\Delta w}{\Delta L})$; $\frac{L}{w} \times \frac{\Delta w}{\Delta L}$ is the reciprocal of elasticity of supply. (Elasticity of supply = $\frac{\Delta L}{\Delta w} \times \frac{w}{L}$

Hence, $MFC = W(1 + \frac{1}{e_s})$; e_s is the elasticity of supply related to the changes in the wage rate.

At equilibrium, $VMP = MFC$. So, $VMP = MFC = w(1 + \frac{1}{e_s})$.

The above equation shows that the value of the marginal product (VMP) and marginal factor cost (MFC) of labour are related to the elasticity of the supply of labour.

Under monopsony conditions in the labour market, the extent of difference between VMP/ MFC of labour and wage rate depend on the elasticity of labour supply. Higher the elasticity of the supply of labour, lower will be the reciprocal of elasticity and lower will be the difference between the VMP of labour and wage rate. Hence, the wage rate will be closer to the value of the marginal product of labour (VMP). However, when the elasticity of the supply of labour is lesser, the difference between VMP and wage rate will be higher. That is wage rate is fixed far from the value of marginal product of labour (VMP_L). This shows the existence of exploitation of labour in the monopsony labour market.

Wage rate determination under monopsony labour market and perfectly competitive product market is portrayed below.

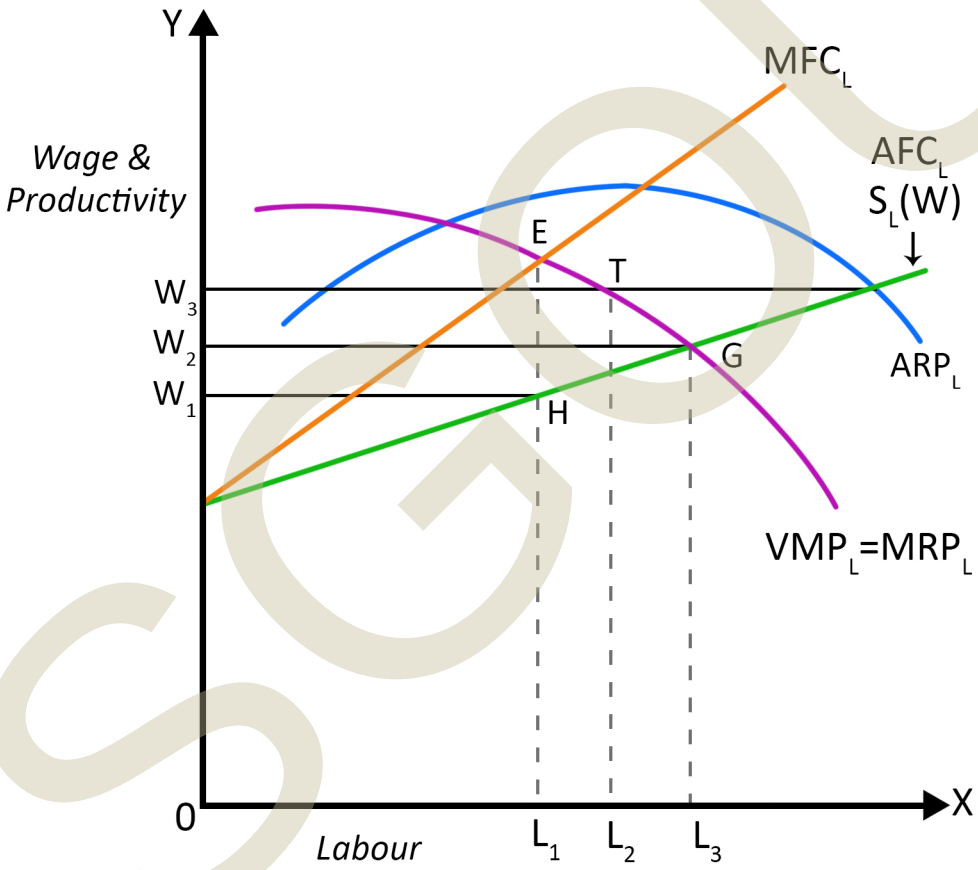

Figure 3.3.5 Determination of Wage under Monopsony Labour Market and Perfectly Competitive Product Market

The monopsonist demand curve is given as MRP. Since there is perfect competition in the product market, MRP is equal to VMP. The supply curve of monopsonist is AFC where the wage rate is fixed. MFC lies above AFC, as discussed earlier. The equilibrium in the monopsonist market is at the intersection of MRP with MFC at E. At the equilibrium point, OL_1 labour is employed. The equilibrium wage rate is OW_1. The wage rate is determined at the AFC curve. The vertical line from the equilibrium point, E to the level of employment, OL_1 intersects the AFC at H. This determines the equilibrium wage rate as OW_1. From the figure, it is clear that the monopsony equilibrium wage rate, OW_1 is lower than the Marginal Revenue Product. MRP is L_1E in the figure, wage rate, OW_1 is L_1H. The difference between MRP and Wage rate is EH. So, what labourers receive as a wage rate is less than their Marginal Revenue Product. Paying a wage rate lesser than the marginal revenue product is exploitation of labourers. Since there is a single buyer, the buyer or monopsonist can exploit the labourers. EH is the level of exploitation and is called monopsonist exploitation.

Suppose the labour market has perfect competition, equilibrium will be at the intersection of VMP and AFC at G. The equilibrium wage rate is OW_2 and the level of employment is OL_3. So, the wage rate and level of employment under a monopsony market are lesser than under perfect competition.

It is important to note that, with a trade union in the market, the equilibrium is at the point, T. The wage rate is OW_3 and the level of employment is OL_2.

3.3.3.2 Determination of Wage under Monopsony in the Labour Market and Monopoly in the Product Market

Under monopsony in the labour market, the supply curve of labour is the Average Factor Cost Curve (AFC) where the wage rate is fixed. The Marginal Factor Cost lies above the AFC. Unlike the case of perfect competition, under monopoly in the product market, the Value of Marginal Product (VMP) and Marginal Revenue Product (MRP) are different. Figure 3.3.6 displays the positions of these curves.

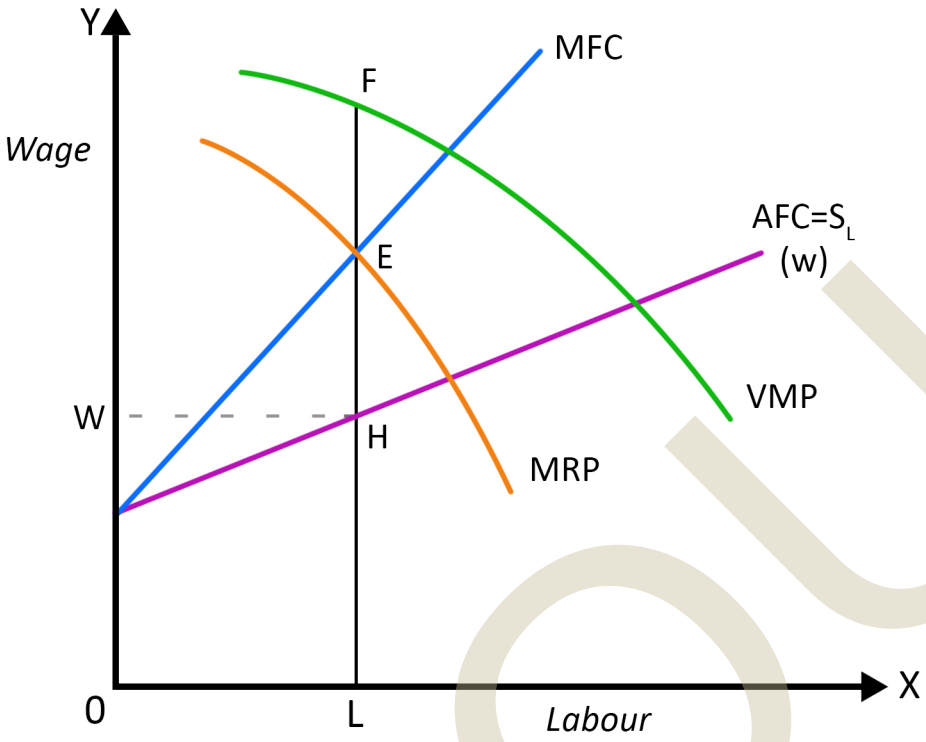

Fig 3.3.6 Determination of Equilibrium Wage Rate under Monopsony in the Labour Market and Monopoly in the Product Market

Equilibrium in the monopsony labour market is at E, where MRP intersects with MFC. The equilibrium wage rate is OW. As explained earlier, the wage rate is determined at AFC or supply curve. OW wage rate is equal to LH in the figure. Under monopsony conditions, the wage rate paid, LH, is lesser than the marginal revenue product of labour, LE. EH is the monopsonist exploitation.

Under monopoly in the product market, the value of the marginal product is not equal to the marginal revenue product. In the figure, VMP is LF and MRP is LE. The difference between VMP and MRP is FE. So, under monopoly, labourers are paid an FE amount lesser than their value of marginal product. This is called monopolistic exploitation.

Under monopsony in the labour market, labourers are paid lesser than their marginal revenue product whereas, under monopoly in the product market, they are paid lesser than their value of marginal product. Therefore, labourers experience double exploitation when the labour market has a single buyer of labour and the product market has a single seller of a product.

Recap

- Wage is the price of labour
- Wage is determined at the equilibrium of demand and supply of labour under a perfectly competitive labour market
- At the equilibrium, the wage rate is equal to the value of marginal product of labour, (VMP_L)
- Profit in the short-run equilibrium is materialised when the Average Revenue Product of labour is higher than the wage rate offered
- In the long-run, firms reap only normal profit
- Monopsony refers to a single buyer of a product or factor
- Monopsony prevails when there is unorganised labour, restricted in their mobility from one job to another
- Marginal Factor Cost of labour is higher than the Average Factor Cost or Supply Curve of Monopsonist
- The relationship between the value of marginal product of labour and the wage rate depends on the elasticity of supply of labour to wage rate
- The equilibrium in the monopsony market is at the intersection of the Marginal Factor Cost of labour and Value of Marginal Product of Labour
- Under imperfect competition in the product market, the value of marginal product of labour is not equal to marginal revenue product of labour
- Monopsonist exploitation happens when the wage is fixed lesser than the marginal revenue product of labour
- Monopolist exploitation happens when the wage is fixed lesser than the value of the marginal product of labour

Objective Questions

1. Name the theory which is followed while determining the wage rate under perfect competition.
2. Write the equilibrium condition in the short-run and long-rununder a perfectly competitive labour market.
3. Who is the advocate of an imperfectly competitive labour market?
4. Define monopsony.
5. What are the assumptions of monopsony?
6. What is the relationship between the value of marginal product of labour and wage rate under monopsony in labour market?
7. Give the conditions of monopsonistic and monopolistic exploitation.

Answers

1. Marginal Productivity Theory of Distribution.
2. In short-run, Wage Rate $=VMP_L$ and in long-run, Wage Rate $= VMP_L = ARP_L$.
3. Miss Joan Robinson.
4. Monopsony refers to a single buyer of a product or a factor.
5. The assumptions of monopsony are that labour is unorganised, and the mobility of labour from one job to another is restricted.
6. The difference between the value of marginal product of labour and wage rate is related to the wage elasticity of supply of labour.
7. Under Monopsonistic exploitation, the wage is lesser than the marginal revenue product of labour; under Monopolistic explaoitation, the wage is lesser than the value of marginal product of labour.

Assignments

1. Explain the determination of the equilibrium wage rate in a perfectly competitive labour market using the marginal productivity theory of distribution. Illustrate this concept with the help of a diagram.

2. Explain graphically the concept of short-run equilibrium in the labour market under perfect competition, focusing on the determination of the equilibrium wage rate using the marginal productivity theory.

3. Discuss the determination of wages under imperfectly competitive labour markets, specifically focusing on the scenario of monopsony in the labour market.

Suggested Reading

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BLOCK

Factor Pricing - 2

UNIT 1

Theories of Interest

Learning Outcomes

After completing this unit, the learner will be able to:

- analyse various concepts related to capital and interest
- familiarise with the theories of interest
- get exposed to the critical evaluation of various theories of interest

Prerequisites

Nakshatra was an ambitious girl who lived in Kerala. Her dream was to create a world-renowned brand in the textile industry. After completing her graduation in Economics, she began to set up her firm. Within a year, she took up land for lease; built a production plant on the leased land; purchased machines for weaving and stitching; hired skilled labourers to do weaving, stitching, and designing clothes; brought vehicles for transportation of raw materials and final textile goods from the market to plant and vice-versa. Is it possible to build a plant; purchase machines, vehicles, and raw materials; hire labourers without having money? Nakshatra had the money or capital to set up all these facilities for her firm. Hence, capital is one of the four important factors of production.

Do you have any idea of the source of Nakshatra's capital? Either she had taken a loan from a bank or had received her family's savings to source the capital for her textile business. The loans are money advanced by a bank to a person in need using the savings of people deposited in the bank. Both the sources of capital, loans, and savings are made at a price.

Therefore, like all the factors of production we discussed in earlier units, the capital also has a price. The price of capital is interest. We have heard of the rate of interest related to the banking system. Saving earns interest, whereas investment through loans has to pay interest. This is the simpler version of the generation of interest. We shall familiarise ourselves with the capital and interest in detail.

Keywords

Capital, Interest, Financial Capital, Physical Capital, Savings, Present Consumption, Investment, Loanable Funds, Liquidity, Transaction Motive, Speculative Motive.

Discussion

4.1.1 Capital and Interest

Capital can be referred to as assets used in a production process. Capital can be classified into financial capital and physical capital. Financial capital refers to money that is used for acquiring physical capital and maintaining the day-to-day activities of production. In our example, the money Nakshatra used to acquire the leased land; purchase machines and vehicles; pay wages for labourers, purchase raw materials; and invest in bonds collectively formed the financial capital. Physical capital refers to fixed capital such as buildings, and vehicles used in the production process. In Nakshatra's textile plant, fixed capital included the production plant; machines for weaving and stitching; and vehicles for transportation.

There are two concepts related to interest viz. real rate of interest and monetary rate of interest. The real rate of interest is the rate of return on physical capital measured in terms of the marginal productivity of the capital. The marginal productivity of capital is measured in terms of returns from the capital. It explains how much extra output a firm gets when it adds one unit of capital. For example, the marginal productivity of the weaving machine can be measured by the value of the textile output it produces. The monetary rate of interest is related to interest on loans.

Real and monetary rates of interest are interrelated. When the real rate of interest is higher than the monetary rate of interest, the marginal return on using physical capital will be higher, that is, the value of textile output produced by weaving machines will be higher. So, investment in weaving machines which is a physical capital will increase. The increase in the stock of physical capital reduces the marginal productivity of capital as per the

law of diminishing marginal productivity of Factors. Hence, the real rate of interest measured in terms of marginal productivity of physical capital falls. Thus, equilibrium is achieved between the real and monetary rate of interest.

4.1.2 Accumulation of Capital

The stock of Capital is an important measure affecting the return on capital. In the case of Nakshatra's textile firm, the stock of capital is the sum of quantities of weaving and stitching machines; production plants, and vehicles available at a particular point in time. The stock of capital gives the accumulation of capital, which depends on the level of saving. At any point, the level of saving in an economy is determined by the ability and willingness to save. The ability to save is a function of income and the willingness to save is a function of the rate of return on capital. The rate of growth of capital accumulation can be written as,

$$\frac{dk}{dt} = f(r - rf, Y - wL)$$

Where r is the actual rate of return on capital; $\bar{r}$ is the minimum rate necessary for saving; Y is the national income and $\bar{w}L$ is the wage share of national income. The rate of saving and accumulation of capital will be higher if the difference between r and $\bar{r}$; Y and $\bar{w}L$ are positive. We have discussed different concepts of capital and interest. Let us discuss the theories of interest.

4.1.3 Theories of Interest

We have already seen that the rate of interest is classified into the real rate of interest and money or monetary rate of interest. So, the theories of interest can also be classified into the real theory of interest, and the monetary theory of interest, based on the nature of capital considered in each theory. The important theories discussed in this section are the Classical Theory of Interest, Neoclassical Loanable Fund Theory, and Keynesian Liquidity Preference Theory of Interest.

The classical theory of interest is a real theory of interest. They gave importance to the role of real factors in determining the interest. For Classical economists, the interest rate is the reward for saving. They connect this saving to physical capital. Saving is invested by entrepreneurs in physical capital. The rate of return on physical capital is the marginal productivity of the physical capital. Since the money used for physical capital comes from savings, the rate of return on physical capital is linked to the rate of return on savings. There are different versions of explaining the origin of the interest rate under the Classical theory. Some economists consider the origin of interest rates solely from the saving side or the supply side. Another version is from the point of view of the role of the productivity of capital in determining the interest rate. The synthesis of both versions is done by Irving Fisher.

Neoclassical theory of interest is known as the Loanable Fund Theory. Here, the rate of interest is determined

by the demand for and supply of loanable funds. For Neoclassical economists, both monetary and real factors explain the rate of interest. However, most of the factors that compose the supply of funds and demand for funds are monetary in nature. Hence, the theory is largely a monetary theory of interest.

One of the most important monetary theories of interest is the Keynesian theory of interest. For Keynes, the interest rate is purely a monetary phenomenon and is determined by the supply and demand for money. Keynes considered interest rates as a reward for parting with liquidity. Have you heard of using the word, liquid, and other calling water an example of liquid? Liquidity in economic terms refers to the availability of ready cash or how quickly an asset is converted into ready cash. For example, compare the liquid state of a ten-lakh-worth piece of land and a ten-lakh deposit in your savings account. If you require ten lakh rupees immediately, it would be difficult to sell the land and get the money quickly. But it is possible to withdraw the money from the savings account without much delay. The Keynesian theory of interest rate stresses the importance of liquidity preference. Hence, the theory is also known as the Liquidity Preference Theory of Interest.

The rate of interest is determined by the demand for and supply of factors. The answer to what is the demand for and supply of factors that determine the interest rate is different for these three theories. The origin of interest rates and the factors of demand and supply that determine interest rates under these theories are discussed in detail below.

4.1.3.1 Classical Theory of Interest

In classical theory, the rate of interest is determined by the supply and demand for savings. Though there are different versions of explaining the origin of interest under the Classical school of thought, the full employment of resources is the common assumption carried forward by all classical theories. Views on the origin of interest are given here.

A. Rate of Interest is a Reward for Waiting or Abstaining

We know the supply of savings comes from individuals who save. People save a portion of their income by reducing their less important consumption in the present time (current period). Saving is made for materialising consumption in the future. These savings of individuals are made available for investment for entrepreneurs through the banking system. Here, savers abstain from their current consumption and wait for the time they get back the money invested by entrepreneurs.

Investment is important for increasing production in any economy. As saving is the source of investment, to push people to save more, the interest rate available for saving is increased in the system. Think about the source of capital for the production of textiles in Nakshatra's plant. Let us suppose the source is her family's savings. Then, the family must have reduced their present consumption and saved the money for future consumption. The Family must have received an interest on the savings they have made by reducing their consumption. So, the interest rate is the reward for sacrifice in terms of postponing the current consumption for future consumption. Nassau William Senior introduced the idea that the interest

rate is the reward for the sacrifice made by the people who save. Individuals must be compensated for their sacrifice, and the Interest rate is the reward for or compensation for the sacrifice.

B. Rate of Interest Explained by Bohm-Bawerk

According to Bohm-Bawerk, an Australian economist, people desire to consume in the current period rather than in the future, given the same variety and quantity of goods. Present consumption is preferred over future consumption, and people value present consumption more. As a part of saving, since the present consumption is deferred, those who save lack this value they assign to their present consumption. So, the rate of interest is the compensation for the loss of value. Bawerk finds three reasons for the origin of interest rates.

- There is a greater need for present wants than future wants.
- Underestimation of Future wants: People underestimate future wants as they possess low imagination of future demand; low willpower to control the temptation to consume in the present period; and low expectations about the certainty of the future.
- Technical Superiority of Present Wants over Future Wants: Present goods can be used to make capital that can give a future flow of goods.
- Hence, since present consumption is valued more, a postponement of present consumption is rewarded. The reward is the rate of interest.

C. Time Preference Theory of Interest

Irving Fisher introduced the time preference theory of interest. He accepted most of the views of Bawerk except for the technical superiority of present goods over future goods. Fisher used both time preference and marginal productivity of capital in determining the rate of interest.

In terms of time preference, Irving Fisher, like Bawerk, claimed that people prefer present satisfaction to future satisfaction. They have a temptation to spend their income in the present period. Greater their temptation to spend, the greater their preference for present satisfaction. The higher value placed for present consumption relative to future consumption is referred to as time preference. Therefore, to force people away from spending their income at present, a higher rate of interest must be offered.

The degree of temptation to spend the income in the present period depends on

- **Size of present income:** People having a high income can both spend in the present period and save for the future, without making any sacrifice. So, with a large size of income, the time preference is low. Hence, a low rate of interest is required to make people save.
- **Long-term distribution of income:** The distribution of income in a lifetime can be in three ways. It may be uniform, increasing, or decreasing throughout the lifetime. Under uniform distribution of income, the temptation to spend and time preference depends on the size of income and character of the person. With

the increasing distribution of income, a person is financed with a higher future flow of income. So, there is no need to part money for the future. This leads to greater consumption and time preference. Hence, a higher interest rate is needed to attract people to save. With a decreasing distribution of income, the opposite happens. People part money for future consumption. So, the time preference and the rate of interest will be low.

- **Level of certainty concerning future enjoyment**: If an individual is certain of her/his future and future wants, there would be less temptation to spend in the present period. Then, the time preference will be low leading to a low rate of interest.

- **Character of an individual:** A foresighted individual gives importance to consumption in present and future periods. Under this situation, spending in the present period will be low. This reduces the interest rate.

In terms of marginal productivity of capital, Fischer used the term, 'rate of return over cost' as a contributing factor to the rate of interest. Since capital has different uses to put on, it may contribute to different streams of income. Given a particular use of capital, the higher the yield from using the capital, the higher will be the rate of interest.

Determination of Rate of Interest in Classical Theory

Under the Classical theory, the rate of interest is determined by the intersection of supply and demand for saving, which is the intersection of saving and investment functions. Saving is interest elastic. Also, it is positively related to the interest rate. The investment function too is interest elastic. However, investment is a negative function of interest rate that is, investment reduces with an increase in interest rate. The equilibrium of the saving and investment function is shown in the figure.

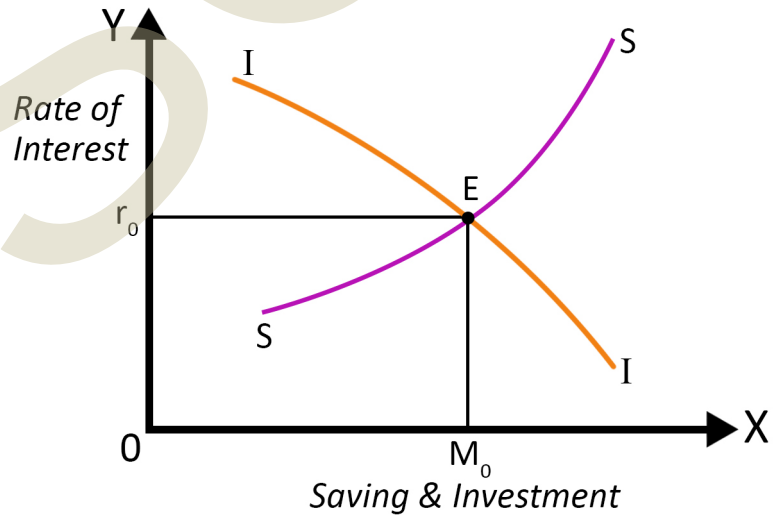

Fig 4.1.1 Determination of Equilibrium Interest Rate in Classical Theory

Here, I I is the investment function and SS is the saving function. The investment function is downward sloped showing the inverse relation of investment and interest rate. The saving function is upward sloped showing a positive relation with interest rate. 'E' is the equilibrium point, 'Or_0' is the equilibrium interest rate, and 'OM_0' is the equilibrium saving and investment level. Any change in the supply or demand for saving changes the equilibrium rate of interest.

Critical Evaluation of Classical Theory of Interest

The theory is criticised for several reasons. Let us consider them.

i. **Theory ignored the role of income in determining the equilibrium saving and investment**:

The classical theory showed a direct relationship between the rate of interest and the level of saving. When the interest rate increases, the level of saving also increases. However, the investment is inversely related to the interest rate, that is, when the interest rate increases, investment falls. If investment falls in an economy, the capital formation will be lesser leading to a fall in income. Since saving is a function of income, the fall in income reduces the savings. Therefore, a fall in investment ultimately leads to a fall in saving. Hence, equilibrium in saving and investment is brought about through the changes in income and not by the changes in the rate of interest as prescribed by the classical theory.

ii. **Theory has ignored the negative effect of a fall in consumption on investment**

Classical economists believed that more investment can take place with less consumption. In a simple economic model, income is used for consumption and savings. If overall consumption in the economy falls, there will be low demand for goods produced in the market. With low demand for goods, inducement to investment will be low. So, low consumption ends up in low investment. Keynes pointed out that this shortcoming in the classical theory is due to the assumption of full employment. With underemployed resources, an increase in investment increases the income which in turn increases the consumption. So, the existence of underemployed or unemployed resources causes investment and consumption to move together.

iii. **Theory ignored the sources of funding other than savings**

Classical theory advocated savings as the only source of supply of funds. However, there are other sources of funds such as bank credit, and dishoarding which are dealt with in the Loanable Fund Theory of Interest.

4.1.3.2 Neoclassical Theory of Interest

Neoclassical theory of interest is referred to as Loanable Fund Theory. The theory was developed by Wicksell, Bertil Ohlin, Robertson, and Viner. For them, the demand for saving is not just for investment from entrepreneurs. In an economy, demand for funds arises also from people other than entrepreneurs. Individuals demand funds for consumption and hoarding money. Likewise, the supply of funds in the economy also has sources other than savings. Credit created in the banking system, and dishoarding by individuals form important sources of supply of funds in an economy.

i. Supply of Loanable Funds

The supply of loanable funds consists of savings, bank credit, dishoarding, and disinvestment.

- **Saving**: Saving by households and individuals forms an important part of the supply of loanable funds. Individuals save more with higher interest rates. As saving is a function of income, saving changes with the interest rate, given the income. Hence, the supply of savings slopes upwards. Saving is done by business enterprises too. Higher the interest rate, corporates substitute their saving for loans to reduce the cost of borrowing. Though corporate savings do not form the market supply of funds, it affects the market rate of interest by acting as a substitute for market borrowing and reducing the market demand for funds.

- **Dishoarding**: Hoarding is the accumulated savings of an individual from the past. People keep idle cash balances since they prefer liquidity. However, when interest rate increases or bond prices fall, people dishoard their past savings. The reason is people see interest rate as the money forgone as a result of or cost of keeping idle cash balances. So, a high interest rate is viewed as a high cost of holding money. With the high rate of interest, people dishoard money, and it forms the source of supply of loanable funds. Conversely, a low rate of interest reduces the cost of holding idle cash balances. People will be reluctant to part with money. This reduces the supply of loanable funds.

- **Bank Credit**: Now-a-days, bank credit forms an important source of supply of loanable funds. Banks create credit through the generation of secondary deposits in the way of advancing loans. Moreover, the banking system influences the supply of loanable funds through the purchase and sale of securities.

- **Disinvestment**: Investment creates fixed and working capital. When there are structural changes in the economy, entrepreneurs reduce investment in industries that have low business expectations. The rate of return from physical capital may be lower than the existing monetary interest rate. So, the money reserved for funding inventories will be diverted to the supply of

loanable funds. Moreover, with a higher interest rate, entrepreneurs usually resort to more disinvestment. So, disinvestment is also a positive function of the rate of interest.

ii. Demand for Loanable Funds

Unlike the classical theory of interest, the theory of loanable funds recognised the demand for funds for consumption and hoarding money as a major part of the demand for loanable funds in addition to the demand for investment.

- **Investment**: Here, investment refers to the borrowings of business enterprises to create inventories and new capital. Inventories are kept to address the wear and tear or depreciation of the existing physical capital. Investment increases when the rate of interest or cost of borrowing falls. Investment is interest elastic. However, it is inversely related to changes in the rate of interest.

- **Consumption or Dissaving**: Classical theory stressed only the demand for investment while addressing the demand for funds. In real life, there are instances when people borrow money for consumption. They borrow when the actual expenditure is expected to rise above the disposable income. Usually, demand for funds arises to meet expenditures on residential construction, vehicles, refrigerators, etc. People also borrow money to meet health and educational expenditures. The rate of interest is the price of borrowing. Individuals increase their consumption through borrowing under a low rate of interest and discourage borrowing when the rate of interest is low. Therefore, consumption demand for loanable funds is downward sloping showing a negative relation with the rate of interest.

- **Hoarding**: Individuals demand loanable funds to hoard. They keep idle cash balances to invest in securities or deposit in a bank by taking advantage of the movements in the rate of interest. When the interest rate increases, a rational individual deposits the cash in a bank to receive a high return. In terms of securities or bonds, the bond price is inversely related to the rate of interest. The higher interest rate makes the bond price falls to a lower level. A rational individual responds to the high interest rate by purchasing a bond so that a capital gain can be reaped while selling the bond when the bond price reaches its peak.

iii. Determination of Rate of Interest

We have explained the demand for and supply of loanable funds in detail. The aggregate demand for loanable funds, DL is derived by the horizontal summation of factors of demand for loanable funds, the investment (I), dissaving (DS), and the hoarding (H). The aggregate supply of loanable funds, SL is derived by the

lateral summation of factors of supply of loanable funds, the saving (S), bank credit (BC), dishoarding (DH), disinvestment (DI). The rate of interest is determined by the intersection of aggregate demand for and supply of loanable funds.

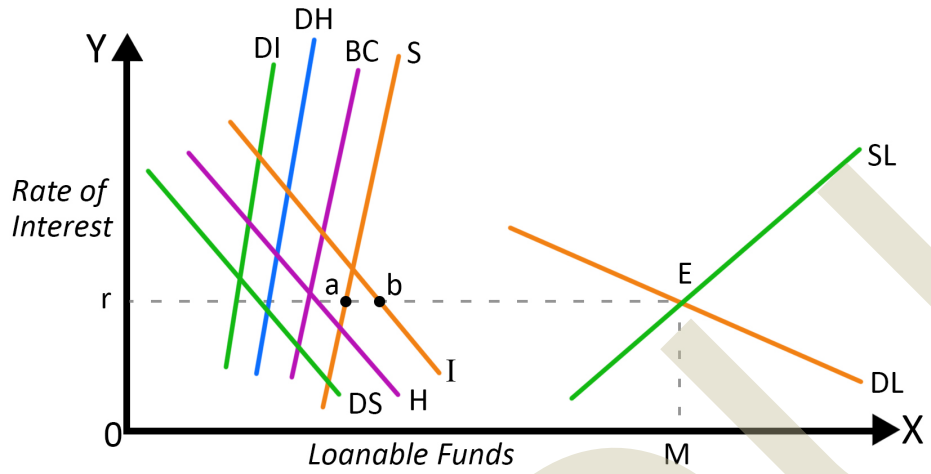

Fig 4.1.2 Determination of Equilibrium Demand for and Supply of Loanable Funds

The equilibrium point is E. The Equilibrium interest rate is 'Or' and the equilibrium loanable fund is 'OM'. From the figure, it is clear that, at the equilibrium interest rate, saving, ra is not equal to the investment, rb. Investment is greater than saving. Hence, income increases. With the increase in income, the savings and aggregate supply of loanable funds increase. This will change the equilibrium rate of interest. Therefore, a stable rate of interest will be achieved only when the equilibrium rate of interest derived by the intersection of aggregate demand for and supply of loanable funds equates the savings and investment.

Critical Appraisal of Loanable Funds Theory

The loanable fund theory of interest has taken into consideration many relevant factors that determine an equilibrium rate of interest. The theory is an improvement upon the classical theory of interest. But Keynesian economists have criticised the theory for many reasons. They are:

- **The role of hoarding in generating demand for the loanable fund is unsure:**

Keynesians believe that as long as the quantity of money remains the same, the overall hoarding cannot be increased or decreased in the economy. The reason is, that since the money is constant, the hoarding of one person will be offset by dishoarding on another person.

- **Interest rate is indeterminate:**

Saving is a positive function of income. In loanable fund theory, saving forms the important source of supply of loanable funds. Since saving changes with changes in income, the supply of loanable funds also changes. So, every time a change in income is experienced in the economy, the supply of loanable funds changes which makes the rate of interest indeterminant.

The loanable fund theory is an integration of the Classical and Keynesian theories of interest. The theory adopted the concept of saving and investment of classical theory; hoarding and dishoarding leading to the liquidity preference of Keynesian theory in determining the rate of interest.

4.1.3.3 Keynesian Theory of Interest

The Keynesian theory of interest is also known as the Liquidity Preference theory. An important aspect of Keynesian theory is that it gives importance to the store of value function or asset function of money. The store of value function of money refers to an individual's demand for keeping idle money with them. In another way, individuals prefer liquidity. Hence, the interest rate is the reward for parting with or giving up the liquidity.

Liquidity Preference or Demand for Money

According to Keynes, people keep money with them for three reasons or motives. Before going through the three reasons, try to figure out your reasons for keeping cash in your hand. We keep cash to meet daily purchases of food items, travel expenses, etc. You might be thinking about Paytm and Google Pay and how we can purchase items without having a penny in our hands. These payment methods have indeed penetrated even small chat shops in our rural places. However, people still keep the cash. The three motives for people to hold money as per Keynes are transaction motive, precautionary motive, and speculative motive.

- **Transaction Motive**: Individuals and business firms demand money to meet their daily expenses. They desire to bridge the interval between the receipt of income and daily expenditures. The amount of money that people keep for transaction motives depends on factors such as interval of income receipt, size of income and available payment mechanisms. The transaction demand for money is a direct function of income.

- **Precautionary Motive**: Individuals keep money for security purposes. It is done to cover the uncertainty. The uncertainties may arise in the form of sickness, unemployment, and so on. A rational individual will keep some money to face such situations. The precautionary motive is also a direct function of income.

- **Speculative Motive**: This demand for money arises from the asset function of money. According to Keynes, money is considered an asset along with other financial assets. People keep idle money to spend it on bonds. They purchase bonds when the bond price is low and sell the bonds when the bond price is at its peak. This generates a capital gain. The bond price and rate of interest are inversely related. When the rate of interest is high,

bond prices will be low. Then, individuals purchase the bond and sell it when the interest rate is low or the bond price is high. People keep the money until the bond price falls the next time. Hence, the speculative motive is an inverse function of the rate of interest. The total demand for money or liquidity preference can be written as,

$$L = f(Y, r)$$

where L is Liquidity Preference; Y is income and 'r' is the rate of interest. The transaction demand for money is given for a particular period. Hence, the liquidity preference is an inverse function of the rate of interest. The demand for money or liquidity preference is graphically represented below.

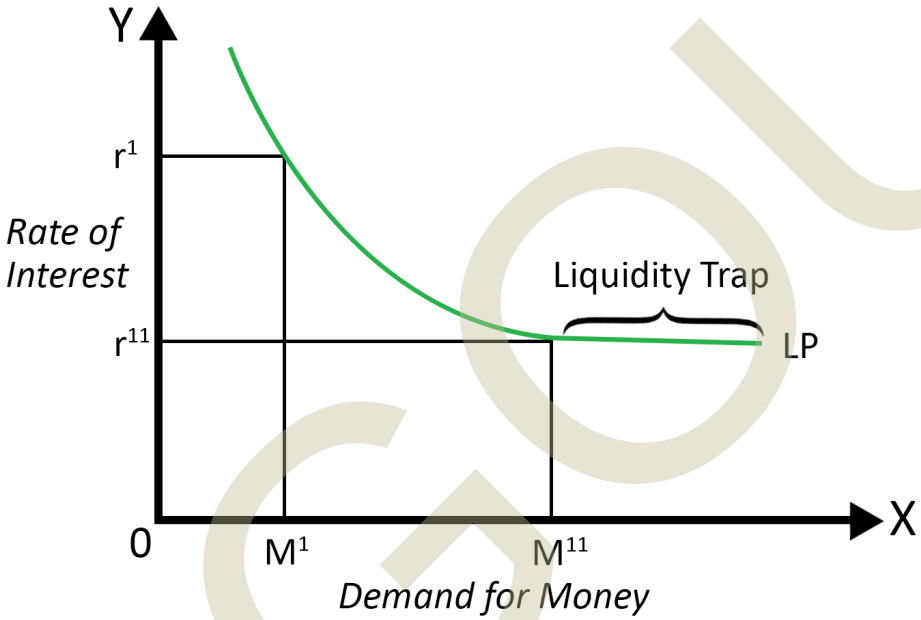

Fig 4.1.3 Liquidity Preference Trap

The demand for money curve or the Liquidity Preference Curve is negatively sloped showing the inverse function of demand for money and the rate of interest. LP is the liquidity preference curve. When the rate of interest is high, that is Or^{1}, the bond price is low. So, individuals spend their money on bonds. So, the demand for money or idle cash with the hand will be low shown by OM^{1}. When the rate of interest is low, Or^{11}, the bond price will be high. Individuals sell their bonds to reap the capital gain. This money from the sale of bonds will be kept by people until a further fall in bond price or a rise in the rate of interest. So, the demand for money becomes high, OM^{11} at a low rate of interest, Or^{11}.

It is important to note that at the lowest rate of interest, Or^{11}, the demand for money or liquidity preference is a hundred percent. This is shown as a liquidity trap. At the lowest possible interest rate, people keep all the cash. Money remaining idle is referred to as a liquidity trap.

Determination of Rate of Interest in Liquidity Preference Theory

Since the supply of money is determined exogenously by the Central Bank of a nation, the equilibrium rate of interest is determined by the intersection of demand for and supply of money. Figure 4.1.4 shows the equilibrium rate of interest in the Keynesian theory of Liquidity preference.

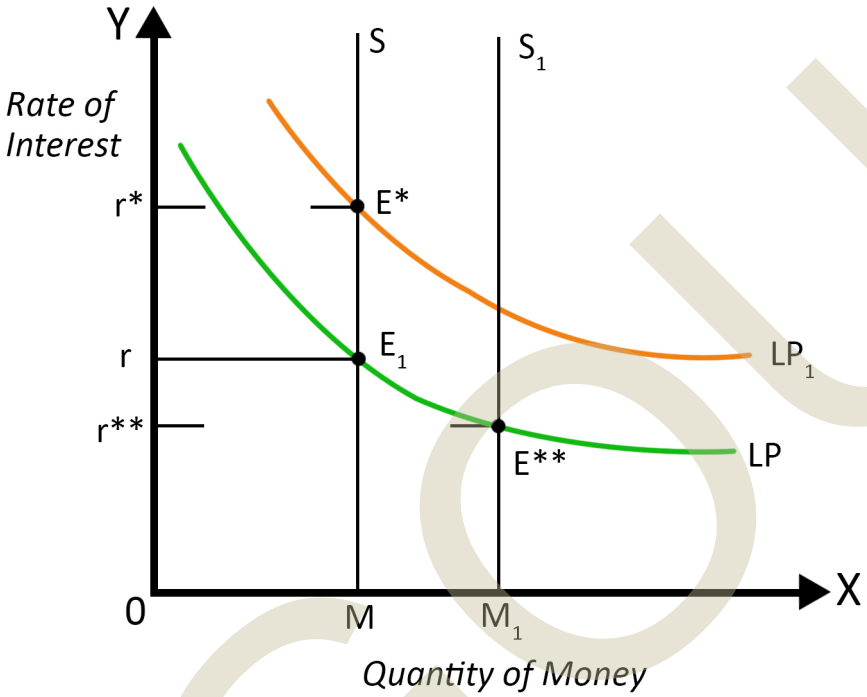

Fig 4.1.4 Determination of Equilibrium Rate of Interest under Theory of Liquidity Preference

LP is the demand for money and S is the supply of money. The equilibrium rate of interest is r the amount of money is OM, and the equilibrium is at E_1. Given the supply of money, an increase in demand for money to LP_1 shifts equilibrium to E_* and the rate of interest to a higher point, r_*. Note that there will be no change in the equilibrium amount of money with a constant supply of money. Given the demand for money, a change in the supply of money to S_1 shifts equilibrium to a lower level, E_{**}. The rate of interest falls to r_{**} and the amount of money increases to M_1.

The Keynesian Theory of interest is explained in terms of monetary factors such as the rate of interest and money. Hence, the theory is a monetary theory of interest.

Critical Evaluation of Liquidity Preference Theory

- **The Theory Ignored the Role of Saving:**

Keynes argued that interest is the reward for parting with liquidity, and not for saving. Keynes did not consider

the fact that the liquid cash at hand is a result of saving for which a reward must be given. The rate of interest is linked to saving.

- **The Theory Ignores the Role of Money in Generating Instabilities**

The equilibrium rate of interest is determined by the demand and supply of money. Given the supply of money, the transaction demand for money is a function of income. So, the indeterminate concept in the Classical and the Loanable Fund Theory of Interest applies to the Keynes Liquidity Preference Theory of Interest.

Keynesian theory is not free of any criticism. However, the theory is superior in terms of adding store of value function of money which was not recognised by the Classical economists.

Recap

- Capital is an asset related to the process of production
- In terms of financial and physical capital, interest is classified into monetary and real interest rates, respectively
- The real and monetary rates of interest are interrelated
- Accumulation of capital is determined by the ability and willingness to save
- Classical theory of interest is a real theory
- For Classicals, interest is a reward for savings
- People prefer present consumption to future consumption
- Supply of Loanable Funds consists of savings, bank credit, disinvestment, and dishoarding
- Demand for Loanable Funds includes investment, dissaving and hoarding
- There are three motives for liquidity preference - transaction, precautionary, speculative
- For Keynesians, interest is the reward for giving up liquidity

Objective Questions

1. What are the two important concepts of capital?
2. Name the determinants of the accumulation of capital.
3. What is the assumption of the Classical Theory of Interest?
4. What are the reasons for the origin of interest rates under Bawerk's theory of interest?
5. How does a character of an individual affect the time preference?
6. Mention the type of relationship of interest rate with savings and investments.
7. Give the names of the supply of Loanable Funds.
8. Name the three motives under Liquidity Preference Theory.

Answers

1. Financial capital and physical capital.
2. Ability to save and willingness to save.
3. Existence of full employment in the economy.
4. Need for present wants higher than future wants, underestimation of future wants, and technical superiority of present wants.
5. A foresighted person spends less in the present period leading to low time preference.
6. Saving is positively related to interest rate and investment is inversely related to the interest rate.
7. Savings, bank credit, disinvestment and dishoarding.
8. Transaction motive, precautionary motive and speculative motive.

Assignments

1. Define interest and explain its role in the accumulation of capital according to classical economic theory.

2. Discuss the Neoclassical theory of interest.

3. What are the main points of divergence between Classical and Neo classical theories of interest regarding the determinants and functions of interest rates?

4. Explain the factors that contribute to the demand for loanable funds according to the theory of loanable funds.

5. Explain the three motives for holding money according to Keynesian theory and illustrate the concept of liquidity trap.

Suggested Reading

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UNIT 2

Profit, Risk and Uncertainty

Learning Outcomes

After completing this unit, the learner will be able to:

- familiarise with the concept of entrepreneur and profit
- assess various theories of profit
- describe the relationship between innovations and profit generation
- analyse the role of risk and uncertainty in generating profit

Prerequisites

We have already discussed the remuneration of factors like land, labour, and capital in the previous units. Try to recollect the reward for these factors. Rent is the reward for land, the wage is the reward for labour, and interest for capital. Now, let us move on to the fourth factor, entrepreneurship.

We know the goods we purchase from the market are the outcome of a production process. Think about the processes involved in the manufacturing of your phone. Link the above discussed factors with the processes. Your phone is produced in a manufacturing unit located in a piece of land. Capital is used to purchase electronic parts, machines, and other inputs for the production of the phone. Labour is used to operate machines. So, land, capital, and labour are involved in the production of your phone. However, the production process explained here is incomplete. An entrepreneur is required to link all the above-mentioned factors and organise the production process of manufacturing the phone.

In the previous unit, we have seen how Nakshatra had set up a textile producing firm. She took up land for lease; purchased machines and vehicles needed for the production; hired labour for operating the machines. She organised the entire production process of making garments. Hence, we can call Nakshatra, an entrepreneur. So, an entrepreneur is a person who organises the production process by hiring all the other factors of production. The practice of organising the production process is called entrepreneurship. Profit is the reward for this entrepreneurship.

An entrepreneur faces many hurdles on his/her journey. There are chances of making incorrect policy decisions. Also, uncertain incidents like Covid-19, general recession, war etc. pose disruptions in the production process. So, entrepreneurs are tasked to face many risks and uncertainties. Profit is considered a reward for taking such tasks. There are many theories explaining the relationship between the functions of an entrepreneur and profit.

Keywords

Entrepreneur, Profit, Production, Innovation, Dynamic Changes, Risk, Exogenous Factors, Uncertainty

Discussion

4.2.1 Theories of Profit

An entrepreneur has many functions to perform while facilitating a production process. So, profit or reward for entrepreneurship is connected in terms of the particular function they perform.

Some economists believe the function of an entrepreneur is to hire and organise all other factors of production. So, for them, profit is the reward for arranging the factors of production. Here, profit forms a type of wage earned by the entrepreneur.

Entrepreneur undertakes responsibility for taking decisions regarding the level of output to produce, price of goods, and stock of inventories to keep. There are risks associated with such decisions. Profit is considered the reward for taking such risks.

Innovation is an important activity carried out by entrepreneurs. Schumpeter believed profit is the reward for doing innovation.

According to F. H. Knight, profit is connected with the function an

entrepreneur takes in terms of dealing with the uncertainties of the economy.

Some theories see no connection between profit and the functions of an entrepreneur. For them, profit is non-functional income.

According to J.M. Keynes, profit is related to changes in the general price level. However, Kalecki, Joan Robinson, and Chamberlin believed profit is a positive function of the level of imperfect competition.

Therefore, profit is determined by many factors. Let us go through some of the important theories of profit.

4.2.1.1 Profit as a Dynamic Surplus

The Dynamic Theory of Profit is introduced by J. B. Clark. According to him, profit is generated as a result of changes in the economy. So, profit is present only in a dynamic economy, and not in a static economy. The changes in the economy may be either from the demand side or the supply side. In both cases, the price of the good or the cost of production deviates from the other leading to disequilibrium. Suppose, a change from the supply-side of the economy increases the price with cost remaining the same, there will be profit. But, if the change in the economy reduces the prices, there will be a loss.

So, profit is generated as a result of disequilibrium arising out of the differences between supply and demand conditions in the economy. An economy experiences profit as long as there is no or slow entry of new firms into the industry.

Clark identified some important changes that convert a static economy to a dynamic economy. They are:

1. Changes in the demand for goods due to changes in population.
2. Changes in taste and preference of the economy.
3. Changes in the method of production.
4. Changes in the stock of capital.
5. Changes in the forms of business organisation.
6. Changes in the spending habits of people.
7. Changes in the level of substitution between income and leisure.

Some of the changes mentioned above are a result of innovation in the economy. They are changes in the method of production, and changes in the form of business organisation. Innovations bring profit to the entrepreneurs. For example, a new method of production reduces the cost of producing a good. When the cost of production falls with a constant price level, profit increases. Again, suppose a new advertising strategy is introduced for a commodity; this increases the demand for a particular commodity. An increase in demand increases the price of the commodity which in turn increases the profit.

The list of changes mentioned above contains exogenous changes too. Exogenous changes are changes happening outside the concerned firm or the industry. Changes in the population, spending habits of people, and availability of substitutes are among the exogenous changes. Take the case of change in population. Generally, an increase in

population increases the demand for goods. With a rise in price due to a rise in demand for goods, the profit also rises.

Changes in the fiscal and monetary policies of the Government, modification of environmental legislations, events of boom and recession, the spread of pandemics, and breaking out of wars are other exogenous changes that create a dynamic environment in the economy. These changes can initiate or reduce profit.

According to F. H. Knight, there will be profit from dynamic changes, only when the outcome of such changes is non-predictable. He used this concept to explain his version of the theory of profit.

Though Knight opined that changes in the economy simply cannot lead to profit, there is indeed no profit without any changes in the economy. Only a dynamic economy can generate profit.

4.2.1.2 Innovations and Profits

The innovation theory of profit was developed by Joseph A. Schumpeter. This theory explains the importance of innovation as a cause for generating profit for entrepreneurs. According to Schumpeter, the introduction of innovation into the economy is an important function of an entrepreneur. Profit is the reward for this innovation in the economy.

Innovation means applying a scientific discovery or invention for economic purposes. Have you seen the new Samsung Galaxy Z Fold 3 and Samsung Galaxy Z Flip 3 ?. These are two recent breakthrough innovations in the mobile field. It is curious to see a phone folding and opening like a book. It is the innovation that makes the display of this phone work both in an opened and folded position.

Innovation can be considered as a policy adopted by entrepreneurs to either increase the demand for goods or reduce the cost of production. Let us list the different forms of innovation into these categories.

The innovations which increase the demand for goods are:

- Introduction of a new product.
- Discovery of a new market.
- Introduction of new design or variety of the product.
- Finding out a new method of advertising.

When demand for goods increases, the price of the goods also increases. Given the cost, this rise in price leads to profit.

The innovations which reduce the cost of production are:

- Discovery of a new or cheap method of production.
- Introduction of new machinery.
- Finding out a new source of energy.
- Formation of a new method of organising the firm.
- Discovery of new sources of raw materials.

Given the price of goods, a fall in the cost of production leads to the generation of profit.

It is important to know that profit is not received by the financiers or conceivers of the innovation, but by the introducers of the innovation. Moreover, innovation always pays the way for the reallocation of resources or a new combination of resources.

It may be noted that profit is generated as long as the innovation is not imitated by other firms. The profit generation out of a particular innovation is a temporary process. However, an entrepreneur can sustain the profit as long as she can protect the content of innovation through Intellectual Property Rights (IPR). In this globalised era, innovations are introduced continuously with the help of Research and Development (R&D).

4.2.1.3 Risk, Uncertainty and Profits

F. H. Knight introduced the uncertainty theory of profit in his famous book, '*The Risk, Uncertainty, and Profit*'. The uncertainty theory of profit is accepted as the most satisfactory explanation of profit. Earlier to the publication of the uncertainty theory of profit, F. B. Hawley pointed out that, profit is the reward for taking risks in the production process. But Knight saw the risk-bearing theory as insufficient in explaining the origin of profit. He separated risk and uncertainty; predictable and non-predictable changes in the economy to explain the origin of profit.

To Knight, dynamic changes in the economy generate profit only when the outcome of these changes is unknown. Whenever the future is predictable, there is no uncertainty in the economy. Hence, there is no profit. When the future is known, it is possible to adjust the competitive conditions in such a way that the price of the good is equivalent to the cost of producing the good. As pointed out by A. K. Das Gupta, 'Uncertainty is a permanent feature of an economic system. It is one of the limitations of human ingenuity that it cannot unearth the content of the future'.

The entrepreneurs undertake the production process under situations of uncertainty. The reason for the uncertainty is that the entrepreneurs have to make decisions regarding the level of output to be produced in advance. Also, they have to formulate a contract with the factors of production regarding the remuneration. The contract must be prepared before the goods are sold in the market and the actual value of the goods is known. Therefore, entrepreneurs are forced to make decisions under uncertainties.

This process of taking decisions in an uncertain situation pays profit. There is a time gap between the formation of the contract and the sale of the output. Dynamic changes may be experienced in between this time leading to the generation of profit. An entrepreneur experiences profit when they anticipate the future accurately. However, they may taste loss when they fail to predict the future.

We see profit as a residual income. Because profit is earned after distributing the remuneration of all other factors. Since the prices are fixed as per a contract, the profit could be called non-contractual income.

Consider the factors affecting uncertainty. Dynamic changes in the economy create uncertainty. We have already gone through a list of dynamic changes in the Dynamic Theory of Profit. Different forms of innovation and external factors cause dynamic changes in the economy.

Knight has distinguished risk and uncertainty based on insurable and non-insurable risks. The dynamic changes generate risk in the economy. However, all risks do not form uncertainty and generate profit. Only non-insurable risks form uncertainty and profit. An

entrepreneur faces risks such as issues with making decisions with a level of output, price of goods, etc. in advance; events of recession and boom; fire, theft, accident. Here, fire, theft, and accident are insurable risks. One can solve the issue by paying a premium, and the premium will be added to the cost of production. Insurable risks do not create uncertainty. The issues with decision-making in advance, events of recession and boom are non-insurable risks that create uncertainty and profit. So, uninsurable risks involving uncertainty lead to profit. Therefore, profit is a functional income that is earned by the entrepreneur for performing the function of bearing uncertainty.

Recap

- Profit is the reward for doing innovation
- Profit is the reward for entrepreneurship
- Profit is considered a reward for organising other factors of production
- Profit is the incentive for bearing risk
- Innovation is carried out by entrepreneurs
- Profit often arises when there are uncertainties or risks involved
- Sometimes, profit is taken as a non-functional income
- Profit arises due to dynamic changes in the economy
- Different innovations and exogenous factors give rise to dynamic changes in the economy
- Innovation is carried out to either reduce the cost of production or increase the demand for goods
- Only non-insurable risks can create uncertainty and profit
- Non-predictable changes may bring profit

Objective Questions

1. Name three functions of an entrepreneur.
2. Define profit.
3. What are the two important categories of dynamic changes in the economy?
4. Give two examples of exogenous changes in the economy?
5. What do you mean by innovation?
6. Name three innovations that increase the demand for goods.
7. What are the ways of sustaining profit?
8. What are the two types of risks explained in the Uncertainty Theory of Profit?

Answers

1. Organise, undertake risk, and carry out innovation.
2. Profit is the reward for bearing uncertainty.
3. Innovations and exogenous changes
4. Changes in the spending habits of people, and tastes and preferences in the economy.
5. Innovation means applying a scientific discovery for economic purposes.
6. Introduction of a new product, finding superior ways of advertising, the introduction of the new design of the product.
7. Profit can be sustained by adhering to Intellectual Property Rights and conducting Research & Development.
8. Insurable risk and non-insurable risk

Assignments

1. Discuss the various theories of profit given by different economists. How do these theories differ in their explanations of the relationship between profit and entrepreneurial activities?

2. Describe the Dynamic Theory of Profit according to J.B. Clark. How does Clark explain the generation of profit in a dynamic economy?

3. Explain the innovation theory of profit given by Schumpeter. How does Schumpeter categorise innovations based on their impact on demand and production costs?

4. How does Knight differentiate between risk and uncertainty, and why does he consider uncertainty as the primary driver of profit?

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BLOCK

Welfare Economics

UNIT 1

Introduction to Welfare Economics

Learning Outcomes

After completing this unit, the learner will be able to:

- discuss the fundamental concepts of welfare economics
- analyse Bentham's Criterion and its utilitarian principles
- descibe the Cardinalist Criterion, Cardinal Utility, and its application in predicting consumer choices

Prerequisites

Welfare economics is a branch of economics that studies the impact of factors like resource allocation and economic policies on human and social well-being. The study was introduced in the 20th century as an essential part of economic theory. A. C. Pigou, an English economist, is the father of welfare economics.

In practical terms, welfare economists aim to develop tools that can guide public policy to promote positive social and economic outcomes for the entire society. It's essential to acknowledge that welfare economics is a subjective study, relying heavily on specific assumptions regarding the definition, measurement, and comparison of welfare for both individuals and society as a whole.

Furthermore, welfare economics is dedicated to maximising welfare by considering utility or satisfaction derived from various economic activities, including consumption, resource allocation, trade, and distribution. Human welfare lies at the core of this field, and while terms like utility and satisfaction may seem theoretical, welfare economics encourages us to interpret them as individual preferences that can be measured or at least ranked.

Keywords

Welfare Economics, Bentham Criterion, Cardinalist Criterion, Public Policy, Greatest Happiness Principle, Consumer Theory, Cardinal Utility

Discussion

5.1.1 Definition and Scope of Welfare Economics

Welfare economics is a specialised field within economics that explores the structure of the economy and its markets, aiming at achieve an optimal allocation of goods and resources in society. This branch focuses on understanding how the distribution of resources and goods impacts social welfare, specifically addressing economic efficiency and income distribution and their collective influence on overall well-being.

The concept of welfare in this context is divided into social and individual welfare, with the former being the sum of the latter. Individual welfare revolves around the economic well-being of individuals, while social welfare centers on economic efficiency and general equilibrium. By examining these aspects, welfare economics aims to provide a holistic understanding of how resources are allocated to enhance overall welfare.

Welfare economics originates from the application of utility theory within microeconomics, where utility represents the perceived value associated with a specific good or service. In conventional microeconomic theory, individuals aim to maximise their utility through their actions and consumption choices. The interactions between buyers and sellers, governed by the laws of supply and demand in competitive markets, result in consumer and producer surplus.

In simpler terms, welfare economics is a branch of economics concerned with human welfare, defining wealth, and establishing guidelines for social policies that aim to maximise the total well-being of individuals. The primary goal is to assess economic policies for the greater good of society. Tools such as cost-benefit analysis and social welfare functions are employed in the study of welfare economics. This field operates on the assumption that social welfare can be measured and compared across different segments of society. Additionally, ethical and philosophical considerations about social well-being support the study. The application of utility theory in economics involves understanding how consumers seek to maximise their utility in their roles as buyers, engaging with sellers through the principles of demand and supply.

Various criteria are used to measure whether the gains in welfare resulting from an economic change would outweigh any potential losses. When assessed in terms of Pareto efficiency, resources cannot be allocated to benefit one individual without making one or more individuals worse

off. The underlying assumption for cost-benefit analysis in this context is that utility gains and losses can be quantified in monetary terms. Ultimately, welfare economics aims to achieve a state that maximises overall satisfaction for society, optimising both producer and consumer surplus across various markets within the community.

Welfare economics faces significant criticism, particularly regarding the feasibility of maximising social utility. Critics argue that engaging in interpersonal utility comparisons, a crucial aspect of formulating policies for social well-being, is inherently impractical. Lionel Robbins, highlighted the difficulty of accurately comparing the value different consumers place on a set of goods, emphasising the lack of objective units for measuring utility among diverse market participants. Kenneth Arrow's "Impossibility Theorem" in the early 1950s added a formidable blow to welfare economics. This theorem suggests that deducing social preferences by aggregating individual rankings is fundamentally flawed. The example of preferences for outcomes X, Y, and Z demonstrates the cyclic nature of preferences, making it challenging to arrive at a genuine social ordering.

Despite these challenges, welfare economics persists, attracting adherents who view economics as a "moral science," echoing the words of Keynes. The field, however, has faced criticism such as:

a. **Normative Assumptions:** Welfare economics often relies on normative judgments about "good" or "desirable" outcomes, raising concerns about subjectivity and biases.

b. **Impossibility Theorems:** Arrow's theorem questions the creation of a perfect social welfare function, casting doubt on the accurate aggregation of individual preferences.

c. **Interpersonal Comparisons of Utility:** Comparisons of individual utilities pose challenges, challenging utility as a universal measure of well-being.

d. **Ethical and Value Differences:** Assumptions of a utilitarian perspective may not accurately reflect diverse societal preferences.

e. **Distributional Concerns:** Critics argue that welfare economics may not adequately address income distribution, poverty, and inequality.

f. **Public Goods and Free Riders:** Market-based solutions may struggle with providing public goods efficiently due to free rider problems.

g. **Behavioural Realism:** Traditional assumptions of rational behavior may not align with behavioural economics, affecting policy outcomes.

h. **Dynamic Considerations:** Welfare economics might overlook intergenerational concerns and long-term policy impacts.

i. **Political and Regulatory Capture:** Special interests influencing political processes may compromise optimal outcomes.

j. **Complexity and Externalities:** Real-world complexities might lead to oversimplification and inaccurate policy recommendations.

k. **Incomplete Information:** Assumptions of perfect information may not align with the reality of incomplete or asymmetric information.

l. **Cultural Diversity:** Welfare economics may struggle to accommodate diverse cultural values.

m. **Trade-offs and Value Pluralism:** Conflicting values such as liberty vs. equality may be downplayed.

n. **Technological and Social Change:** Rapid advancements may challenge the relevance of traditional welfare frameworks.

In conclusion, while welfare economics seeks to maximise overall satisfaction for society, acknowledging and addressing these criticisms is crucial for developing more refinement and effective approaches to societal well-being.

5.1.2 Bentham's Criterion

Bentham's Criterion, developed by English economist Jeremy Bentham, advocates for the improvement of welfare through the pursuit of 'the greatest good for the greatest number.' Also known as the Greatest Happiness Principle, this concept is foundational in utilitarian philosophy and guides the evaluation of actions, policies, and decisions from a utilitarian standpoint.

Implicit in this principle is the idea that total welfare is the sum of individual utilities within society. However, applying Bentham's ethical system to economics has shortcomings. For instance, when considering a society with individuals X, Y, and Z, where the total welfare (W) is the sum of their utilities (UX, UY, UZ), Bentham's criterion suggests an improvement if the sum of individual utility changes is positive.

A challenge arises when, due to a change, the utilities of X and Y increase, while Z's decreases, leading to an overall positive sum ($\Delta UX + \Delta UY + \Delta UZ) > 0$. This implies that X and Y are considered more 'worthy' than Z, introducing an interpersonal comparison of deservingness.

Another difficulty lies in the inability of Bentham's criterion to compare situations where 'the greatest good' and the 'greatest numbers' do not coexist. For instance, a situation with a higher total utility may be considered less preferable if it involves a more even distribution of a smaller 'total good' among the 'greatest number.'

Key aspects of Bentham's Criterion include:

1. **Utility as the Measure of Good**: Bentham's utilitarianism asserts that utility, representing pleasure or happiness, is the ultimate measure of what is good or desirable. Actions are evaluated based on their consequences in terms of increasing overall utility.

2. **Quantitative Calculus**: Bentham proposed a quantitative calculus of pleasure

and pain, aiming to compare and assess different actions. Pleasures and pains were suggested to be quantifiable based on factors like intensity, duration, certainty, proximity (how soon they occur), fecundity (how likely they are to lead to more pleasures), and purity (the absence of pain).

3. **The Greatest Happiness Principle**: At its core, Bentham's Criterion emphasises that the right action or policy is the one generating the greatest net happiness for the greatest number. This involves weighing positive and negative consequences to determine overall utility.

4. **Universal and Impersonal**: Bentham's utilitarianism is universal and impartial, treating every person's happiness as equally valuable without favouring one individual over another.

5. **Policy and Decision-Making**: Bentham's Criterion offers a framework for evaluating policies, laws, and actions by estimating their likely effects on overall happiness. Morally preferable options are those producing the highest net utility.

Bentham's utilitarianism faces criticism, including difficulties in quantifying and comparing pleasures and pains, challenges in accounting for higher and lower pleasures, and concerns about the majority sacrificing minority interests for the greater good.

5.1.3 Cardinalist Criterion

The Cardinalist Criterion is a specific approach within economics, particularly in consumer theory, where cardinal utility functions are employed to analyse individual preferences and predict consumer behavior. This concept aligns with the neoclassical approach to utility theory.

To illustrate this approach, economists have proposed using the 'law of diminishing marginal utility' as a criterion for assessing welfare. Consider a society with three individuals: X has an income of Rs.2000, while Y and Z each have an income of Rs.1000. Even though X can purchase double the quantity of goods compared to Y and Z, the diminishing marginal utility suggests that X's total utility is not double that of either Y or Z. This leads to the conclusion that to enhance social welfare, income should be redistributed among the three individuals, ideally achieving equal distribution.

However, critics of the cardinalist approach point out a significant flaw - the assumption that all individuals have identical utility functions for money. This assumption oversimplifies the diverse attitudes people have towards money. For instance, a wealthy person might derive more utility from money than a poor individual. Consequently, a blanket redistribution of income may not necessarily increase total welfare and could lead to Pareto inefficiency.

The Cardinalist Criterion includes several key elements:

1. **Cardinal Utility:** This term in economics refers to a measure of satisfaction or pleasure an individual derives from consuming goods and services. In the cardinal utility approach, numerical values are assigned to utility, allowing for quantitative comparisons.

2. **Utility Functions:** These are mathematical representations of an individual's preferences over different consumption bundles, assigning numerical values to each combination of goods and services.

3. **Ordinal vs. Cardinal Utility:** While ordinal utility only ranks preferences, cardinal utility assigns specific numerical values, enabling quantitative comparisons.

4. **Consumer Choice:** The cardinalist criterion predicts consumer choices by assuming individuals seek to maximise their total utility within budget constraints, allocating resources to maximise overall well-being.

5. **Marginal Utility:** This concept represents the additional satisfaction gained from consuming one more unit of a good, and diminishing marginal utility suggests a decrease in additional satisfaction as consumption increases.

6. **Indifference Curves:** Graphical representations illustrating combinations of two goods providing the same level of utility, helping to visualise preferences and trade-offs.

7. **Budget Constraint:** Reflecting spending limitations based on income and prices, the optimal consumption bundle lies where the indifference curve is tangent to the budget constraint.

8. **Challenges and Critiques:** The cardinalist approach faces criticism for assuming precise measurement and consistency of utility across individuals, considering the subjective and psychological nature of utility.

9. **Subjective Nature:** Cardinal utility functions may challenge consumers to assign precise numerical values to preferences, potentially overlooking the subtleties of human decision-making.

10. **Economic Models:** The cardinalist criterion contributes to constructing economic models such as the utility maximisation model and the theory of demand, offering insights into consumer behavior and market equilibrium.

The Cardinalist Criterion provides a lens through which economists analyse individual preferences and predict consumer behavior by employing cardinal utility functions. The approach, rooted in neoclassical utility theory, utilises concepts such as diminishing marginal utility to advocate for income redistribution to achieve social welfare maximisation. However, this approach is not without its challenges. Critics

highlight the oversimplified assumption of identical utility functions for all individuals, overlooking the diversity in attitudes towards money. Moreover, the subjective nature of assigning numerical values to preferences poses practical and conceptual challenges. Despite these criticisms, the Cardinalist Criterion remains a significant tool in constructing economic models, contributing valuable insights into consumer behavior, market equilibrium, and the intricate interplay between utility, welfare, and economic decision-making. As economists continue to refine and adapt these models, acknowledging the complexities inherent in human preferences will be essential for a more comprehensive understanding of welfare economics.

Recap

- Welfare economics explores optimal resource allocation and economic efficiency for societal well-being.
- Welfare economics aims to maximise overall satisfaction by considering individual and social welfare, using tools like cost-benefit analysis and social welfare functions.
- Bentham's Criterion advocates for maximising overall happiness through utilitarian principle.
- Bentham's utilitarianism faces criticism for challenges in quantifying pleasures and pains and potential issues with interpersonal comparisons.
- Cardinalist Criterion uses cardinal utility functions to analyse individual preferences, predicting consumer behavior and advocating for income redistribution.
- Cardinalist Criterion contributes to constructing economic models and provides insights into consumer behavior and market equilibrium.
- The approach emphasises the subjective nature of cardinal utility functions, posing challenges in assigning numerical values to preferences.

Objective Questions

1. What is the primary focus of welfare economics?
2. According to Bentham's Criterion, what is the right action?
3. What is welfare economics concerned with?
4. What does the term "welfare" refer to in the context of welfare economics?
5. What does welfare economics seek to achieve?
6. What distinguishes welfare economics from traditional economics?
7. What does Bentham's Criterion focus on?
8. What idea does Bentham's Criterion emphasise?
9. What does the Cardinalist Criterion refer to in economics?
10. What is the primary focus of the Cardinalist Criterion?

Answers

1. Evaluating the well-being of individuals and society
2. Action that maximises overall happiness or pleasure
3. Evaluating the well-being and quality of life of individuals and society
4. The collective happiness and well-being of individuals
5. Equity in income distribution across society
6. Welfare economics prioritises societal well-being
7. Maximising overall happiness or pleasure

8. Maximising utility or well-being for society
9. The use of numerical values to measure consumer satisfaction or utility
10. Evaluating individual preferences using numerical values

Assignments

1. Discuss welfare economics
2. How does dynamic welfare analysis expand the scope of welfare economics?
3. Explain the basic principle behind the Bentham Criterion.
4. What is the Cardinalist Criterion in welfare economics, and how does it differ from other criteria?
5. Conduct a critical analysis of the effectiveness of the AYUSH scheme since its inception.

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UNIT 2

Efficiency And Social Welfare

Learning Outcomes

After completing this unit, the learner will be able to:

- asses Pareto's optimality criterion
- analyse the Kaldor - Hicks criterion in assessing changes in social welfare
- describe the concept of the social welfare function by Bergson

Prerequisites

Welfare economics, a branch of economics, focuses on increasing social well-being within communities. It acts as a guide for evaluating how resources are allocated and goods and services distributed to achieve the best possible outcomes for everyone. Welfare economics deals with: How can we efficiently use limited resources to meet people's needs? How do we ensure fairness and equality in distributing goods and services? What policies can we adopt to uplift society as a whole?

Understanding welfare economics is pivotal for a few key reasons. Firstly, it offers a structured approach to assessing economic policies and choices. By carefully considering how different actions affect people's well-being, decision-makers can make wiser choices that benefit society. For instance, welfare economics aids in determining the right level of taxation to support public services without placing undue burden on individuals or distorting market dynamics. Secondly, welfare economics deals with issues of fairness and equitable distribution. While efficiency matters, it is just as important to examine

how the gains and losses from economic activities are spread across different segments of society. Thirdly, welfare economics is instrumental in controlling market failures and externalities. Markets often fall short in allocating resources efficiently or accounting for the wider social and environmental costs of production and consumption. Welfare economics introduces frameworks like Pareto efficiency and Kaldor-Hicks efficiency to pinpoint these shortcomings and suggest remedies, such as implementing taxes or subsidies to address externalities.

Keywords

Pareto Efficiency, Market Failure, Efficiency, Production, Perfect Competition, Exchange, Compensation, Social Welfare

Discussion

5.2.1 Pareto Optimality Criterion

The well-being of a society depends on the overall satisfaction of its members. However, any change in the economic environment is bound to yield positive outcomes for some individuals while adversely affecting others. Assessing such societal shifts is challenging unless economists are willing to engage in interpersonal utility comparisons, a task they may find ethically complex. Alternatively, economists may opt for evaluations where at least one person has an improvement without causing harm to anyone else. Vilfredo Pareto proposed a criterion suggesting that if an economic change makes at least one individual better off without making anyone worse off, it signifies an increase in social welfare, making the change desirable. Conversely, a change that fails to improve anyone's situation while worsening at least one individual's position is a decrease in social wellfare. While Pareto optimality serves as a theoretical benchmark, its applicability in real-world scenarios, particularly those involving government policies that affect different segments of society, is limited.

In simplifying the analysis, a 2 x 2 x 2 model is assumed with two consumers (I and II), two factors of production (X_1 and X_2), and two commodities (Q_1 and Q_2). This assumption sets the stage for understanding the intricate relationships within the Pareto optimality framework.

To achieve Pareto efficiency within an economy, three essential marginal conditions need to be met:

i. Effective distribution of commodities among consumers, promoting efficient consumption.

ii. Efficient allocation of factors among firms, ensuring optimal production.

iii. Efficient allocation of factors among commodities, enhancing the overall product mix or output composition.

1. The Optimal Allocation of Goods among Consumers: Efficiency in Exchange:

The first condition is about the optimal distribution of goods among the various individuals within a society at a given point in time. This condition states: "The marginal rate of substitution between any two goods must be the same for every individual who consumes them both." The marginal rate of substitution (MRS) shows how much of one item is needed to offset the loss of a marginal unit of another item while maintaining the same level of satisfaction. When the MRS differs between two individuals for two goods, they tend to exchange goods to improve satisfaction for both parties, or at least one, without diminishing satisfaction for the other.

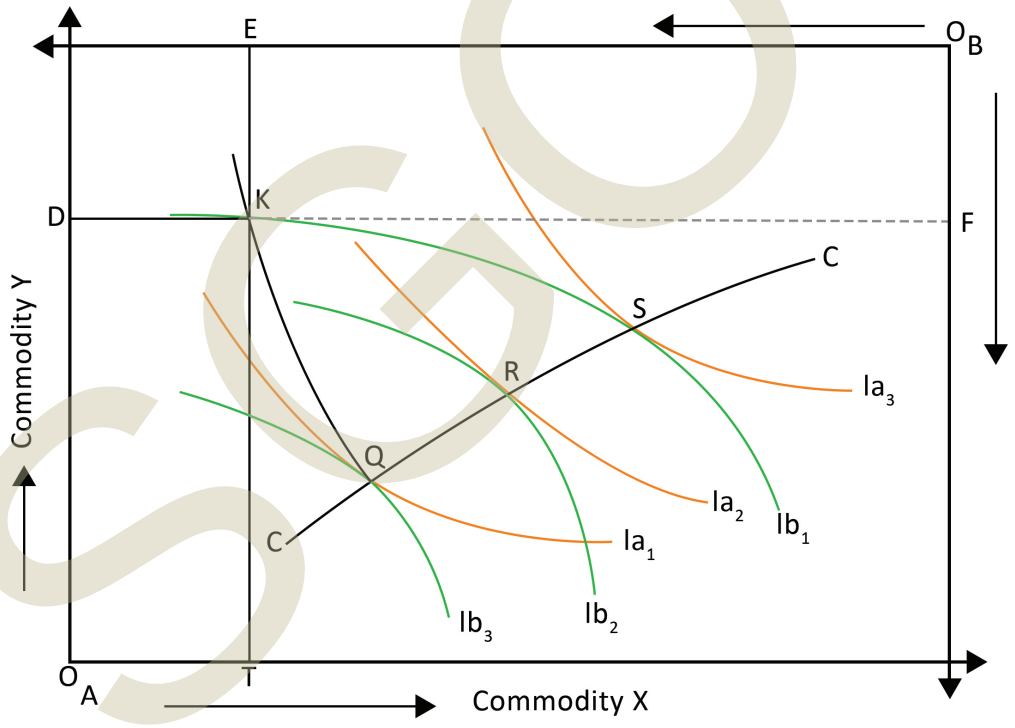

Fig 5.2. 1 The Optimum Distribution of Goods

To illustrate this condition, we can refer to the Edgeworth Box diagram in the above figure. In this diagram, goods X and Y, consumed by two individuals, A and B, are represented on the X and Y axes respectively. The indifference curves of A and B, denoted by Ia_1, Ia_2, Ia_3 and Ib_1, Ib_2, Ib_3 respectively, show increasing levels of satisfaction. The contract curve, CC, passes through various tangency points such as Q, R, S, where the indifference curves of A and B intersect. At these points, the marginal rates of substitution (MRS) between the two goods for individuals A and B are equal. Any point outside the contract curve does not represent equality in MRS between the two goods for individuals A and B.

For instance, let us consider point K where the indifference curves of A and B intersect instead of being tangential. At point K, the marginal rate of substitution between goods X and Y for individual A is not equal to that of B. With the initial distribution of goods represented by point K, it is possible to increase the satisfaction of one individual without decreasing the satisfaction of the other, or to increase the satisfaction of both by redistributing goods X and Y between them. Movements from K to S or Q increase the satisfaction of one individual without decreasing the other's satisfaction. Similarly, a movement from K to R increases the satisfaction of both individuals as they move to higher indifference curves. Thus, according to the Pareto criterion, movements from K to Q, S, or any other point on the segment SQ of the contract curve will increase social welfare. Points on the contract curve represent maximum social welfare since they indicate equal MRS between individuals. However, movements along the contract curve in either direction may improve the welfare of one individual while decreasing that of the other. Therefore, while every point on the contract curve denotes maximum social welfare in the Paretian sense, determining the best point requires considerations beyond the Pareto criterion.

2. The Optimum Allocation of Factors: Pareto Efficiency in Production:

The second condition for Pareto optimality shows that factors of production should be allocated efficiently in such a way that increasing the output of one firm requires a decrease in the output of another, or increasing the output of both goods requires reallocating factors of production. This condition implies that the marginal rate of technical substitution between any pair of factors must be consistent across firms producing different products and utilising these factors. The marginal rate of technical substitution is the rate at which one factor must be reduced to maintain a constant level of productivity when another factor is increased.

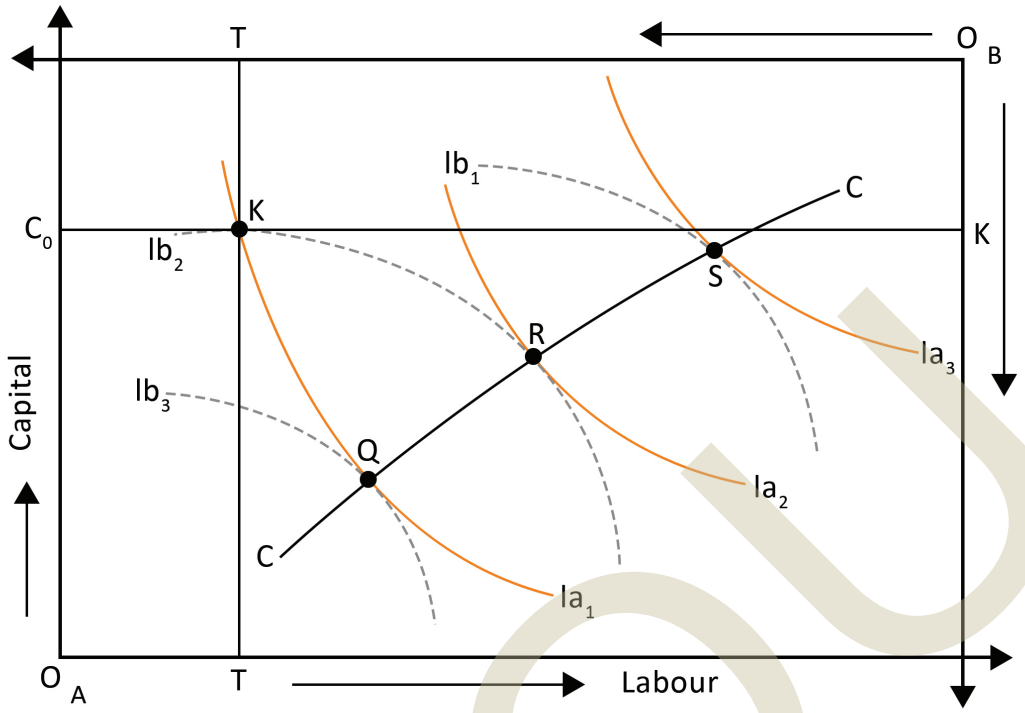

Fig 5.2. 2 The Optimum Allocation of Factors

To illustrate this condition, we can refer to the Edgeworth Box diagram for production. Let us consider two firms, A and B, both producing the same product using labour and capital. The quantities of labour and capital available to each firm are represented on the X and Y axes respectively. The isoquants of firms A and B, denoted by Ia_1, Ia_2, Ia_3, and Ib_1, Ib_2, Ib_3 respectively, represent various combinations of labour and capital resulting in different levels of output. The slope of these isoquants represents the marginal rate of technical substitution (MRTS) between the two factors.

If the MRTS between two factors for two firms is not equal, it suggests that the total output of a product can be increased by reallocating factors between the firms. Movements from point K to S or Q increase the output of one firm without reducing the other's output. Similarly, a shift from K to R on the contract curve increases the output of both firms individually and collectively.

Since the contract curve represents the points where the isoquants of the two firms are tangent, implying equal MRTS, it signifies the optimal allocation of factors between them. When the firms operate at a point on the contract curve, reallocating factors will not increase the total output of both firms. However, determining the best point on the contract curve is challenging using the Pareto criterion, as movements along the curve in either direction involve reallocating factors that increase the output of one firm while reducing that of another. Therefore, while the contract curve represents optimal

factor allocation, selecting the best point requires considerations beyond the Pareto criterion.

3. Optimum Direction of Production: Efficiency in Product Mix:

This condition relates to the production structure and determines the optimal quantities of various commodities to be produced given the available factor endowments. It states that "the marginal rate of substitution between any pair of products for any individual consuming both must equal the marginal rate of transformation between them." According to this condition, maximising social welfare requires producing goods according to consumer preferences.

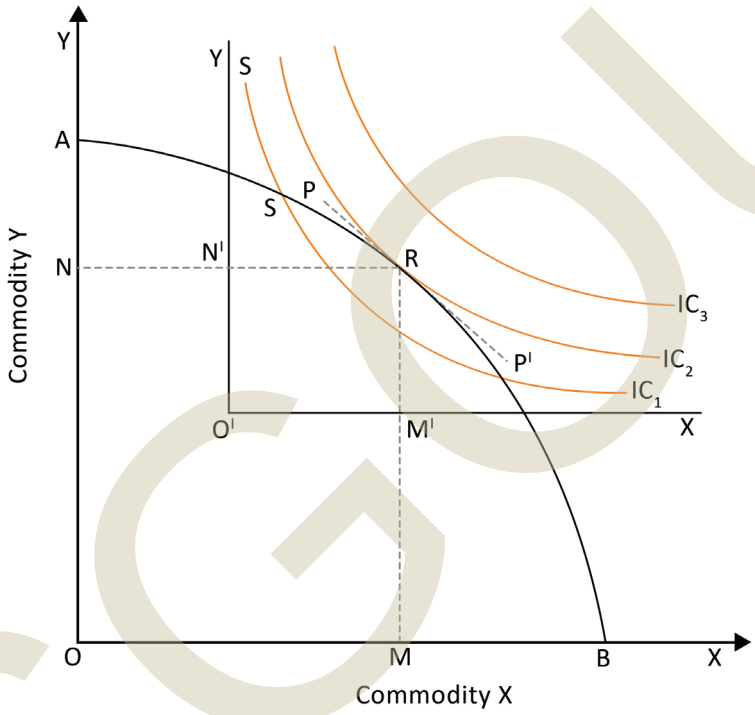

Fig 5.2. 3 The Optimum Direction of Production: Optimum Product Mix

To illustrate this , consider Figure above, where commodities X and Y are represented on the X and Y axis respectively. AB depicts the community's transformation curve between X and Y, indicating the maximum amount of X producible for any given quantity of Y, considering fixed resource supplies. IC_1, IC_2, and IC_3 represent the indifference curves of a consumer, where the slope at a point signifies the marginal rate of substitution between the two goods. At point R, where the community's transformation curve tangentially intersects the indifference curve IC_2, the marginal rate of transformation (MRT) of the community equals the marginal rate of substitution (MRS) of the consumer. This shows an optimal production composition where commodities X and Y are produced

and consumed in quantities OM and ON respectively.

Point R represents the highest possible indifference curve IC_2 of the consumer among all points on the community's transformation curve. Conversely, if goods X and Y are produced and consumed at point S, the consumer's welfare would be lower as S lies on a lower indifference curve IC_1 intersecting the community's transformation curve rather than being tangent to it. At point S, the consumer's MRS_{XY} is unequal to the community's MRT_{XY}. Thus, by shifting production direction—such as increasing X and decreasing Y—the consumers can be moved to a higher indifference curve, ultimately establishing the optimal production direction at point R, where the community's transformation curve is tangential to the consumer's indifference curve.

A Pareto-optimal state in the economy can be attained if the following three marginal conditions are fulfilled:

1. The MRS_{XY} between any two goods be equal for all consumers.
2. The $MRTS_{LK}$ between any two inputs be equal in the production of all commodities.
3. The $MRPT_{XY}$ be equal to the MRS_{XY} for any two goods.

5.2.2 Bergson's Social Welfare Function

A. Bergson introduced the concept of the 'Social Welfare Function' in his 1938 article, 'A Reformulation of Certain Aspects of Welfare Economics.' Prior to this, various welfare theorists proposed different ideas of social welfare, but none provided a satisfactory solution to the challenges of maximising social welfare and its measurement. Early discussions, including Bentham's emphasis on the 'greatest happiness of the greatest number,' and Neo-classical welfare theorists focusing on cardinal measurability and interpersonal comparison of utility, faced limitations in addressing the complexities of economic efficiency.

Bergson and Samuelson contributed a new approach to welfare economics through the concept of the social welfare function, focusing on ordinal preferences. Acknowledging the inevitability of value judgments in welfare economics, they argued that evaluating the impact of economic policy changes on social welfare necessitates such judgments. Despite the normative nature of welfare economics, they emphasised a scientific approach while acknowledging the unavoidable role of value judgments. Value judgments are personal assessments or opinions that individuals or groups form based on their beliefs, principles, or ethical views. These assessments express preferences, attitudes, and moral viewpoints regarding what is perceived as good, desirable, or morally correct in a specific context.

The Bergson-Samuelson Social Welfare Function serves as an ordinal index of society's welfare, expressed as $W = W(U_1, U_2, U_3,..., U_n)$, where $U_1, U_2, U_3,..., U_n$ represent the ordinal utility indices of different individuals. This function introduces explicit value judgments in its construction, shaping its form. The

formulation of a social welfare function for society involves challenging tasks due to the subjective nature of utility and the difficulty in accurately measuring or estimating it.

Value judgments regarding social welfare at the societal level are relevant for the social welfare function. Constructing such a function requires unbiased value judgments, which may be established through democratic processes, imposed by dictation, or determined by a selected authority. The form of the social welfare function depends on the value judgments of the authorised person or institution, expressing their views on how individual utility levels influence social welfare. The social welfare function's form is influenced by external value judgments, and despite claims of solving the basic problem of welfare economics, the function remains dependent on external value judgments.

The concept of a "Superman," proposed by Bergson and Samuelson, is an attempt to address the challenges associated with constructing a social welfare function. This hypothetical figure is an unbiased authority capable of providing value judgments about changes in social welfare. While acknowledging the difficulty in finding an authority free from bias, Bergson and Samuelson argue that such a figure is essential for resolving the problems of welfare economics. In contemporary democratic governments, elected representatives formulate policies based on value judgments to maximise social welfare. The majority-rule government aims to make policy decisions aligned with societal well-being, emphasising the importance of maximising social welfare over individual or sectional interests. The complex questions surrounding economic decisions, including production patterns, resource allocation, and income distribution, are expected to be addressed by governments with a focus on achieving maximum social welfare.

Bergson and Samuelson have emphasised the necessity for consistency in value judgments when constructing the social welfare function. This implies that if in a given scenario A is preferred to B and B is preferred to C, then A must be preferred to C. This aligns with the well-known economic assumption of transitivity in social choice among various alternatives. To illustrate the concept of the social welfare function, we can turn to social indifference curves or welfare frontiers. Let us consider a hypothetical society with two individuals, A and B.

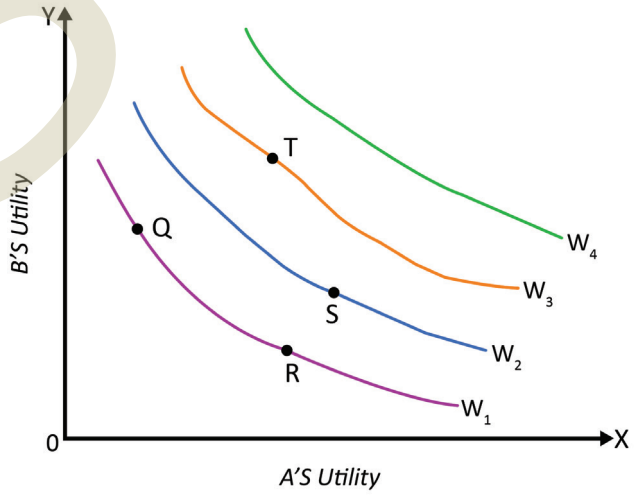

Fig 5 .2. 4 Social Indifference Curve

In Figure given above, the horizontal and vertical axes represent the utilities of individuals A and B, respectively. W_1, W_2, and W_3 depict social indifference curves, each representing progressively higher levels of social welfare. A social indifference curve reflects various combinations of A and B's utilities resulting in an equal level of social welfare.

The properties of social indifference curves is similar to those of individual consumer indifference curves. Evaluating the impact of a proposed policy change on social welfare is facilitated by analysing a family of social indifference curves. In the figure given above, any policy change that shifts the economy from Q to T is considered an improvement. Similarly, movements from Q to S or from R to S signify improvements in social welfare, while shifts from T to Q or T to S represent a decrease.

By incorporating the grand utility possibility frontier alongside the Bergson-Samuelson social welfare function, we can pinpoint this unique optimum position or the peak of social welfare. This approach unravels a more nuanced understanding of how to navigate the complexities of social choice and welfare optimisation. The Grand Utility Possibility Frontier shows the optimal positions for product allocation, factor allocation, and production direction, with each point on the curve representing a Pareto optimum. As one moves along this frontier, the utility for one individual increases while that of another decreases.

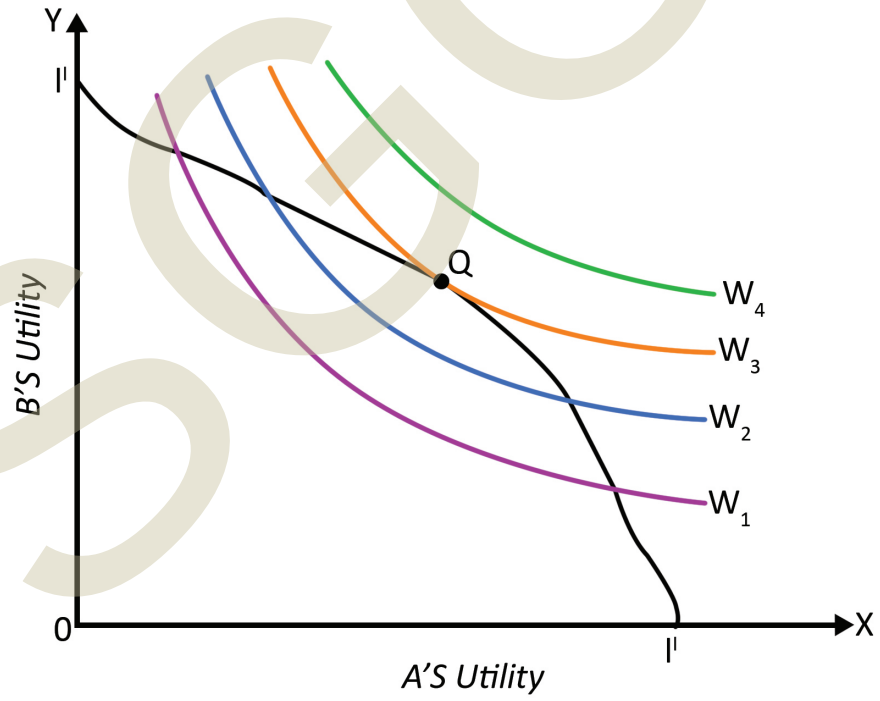

Fig 5.2.5 Social Welfare Function

To determine a unique optimum position for social welfare, the Grand Utility Possibility Curve I'I' is placed with social indifference curves W_1, W_2, W_3, and W_4. At point Q, social indifference curve W_3 tangentially intersects the Grand Utility Possibility Curve. This point signifies the maximum attainable social welfare considering the given constraints of factor endowments, technological capabilities, and individual preference scales. Referred to as the "point of constrained bliss," Q represents the highest achievable state of social welfare within these limitations.

While social welfare represented by the social indifference curve W_4 may surpass that of W_3 at point Q, it remains unattainable due to technological and factor endowment constraints. Therefore, among numerous Pareto optimum points along the Grand Utility Possibility Curve, point Q emerges as a unique optimum point where social welfare reaches its maximum. This point of constrained bliss reflects a unique pattern of goods production, the distribution of goods between individuals, and the combination of factors utilised in production.

The features of Bergson-Samuelson Social Welfare function are:

1. **Value-Based Judgements and Interpersonal Comparisons:** The foundation of the Bergson-Samuelson social welfare function rests on explicit value judgments, involving interpersonal comparisons of utility in ordinal terms.

2. **Determination of Maximum Social Welfare:** Within this framework, the maximum social welfare position is entirely determined through value judgements concerning the distribution of welfare among individuals.

3. **Flexibility in Value Judgements:** The social welfare function does not rely on a singular set of value judgements. Rather, any set of value judgements can be employed by welfare economists to construct a social welfare function, making it adaptable to diverse perspectives.

4. **Optimisation Through Maximisation Technique:** Once the social welfare function is established through value judgements, the maximisation technique is utilised. This ensures achieving the Pareto optimum, where resource allocation is efficient, and the distribution of goods and services is equitable, concurrently optimising both efficiency and equity for the maximisation of social welfare.

5. **Pareto Optimality and Social Welfare:** Through a conjunction of the social welfare function and Pareto optimality analysis, a unique optimum solution is derived. This solution combines economic efficiency with distributive justice, offering a comprehensive approach to societal well-being.

Critical Examination of the Bergson-Samuelson Social Welfare Function

Welfare economics aims to discover an acceptable social welfare function, with Bergson and Samuelson contributing

by formulating a function grounded in explicit value judgements. This function comprehensively incorporates economic and non-economic determinants affecting individual welfare, measuring utility in ordinal terms. Despite this, critics point out several drawbacks such as:

1. **Limited Practical Significance:** Scholars like Little, Streeten, and Baumol argue that the social welfare function holds limited practical significance. Little suggests that it lacks applicability in both democratic and totalitarian states, emphasising its formal nature lacking of practical implications.

2. **Practical Challenges in Construction:** The concept of social welfare function, according to Paul Streeten and Baumol, faces challenges in practical application, lacking guidance on how to acquire the necessary value judgements required for its construction.

3. **Utility-Centric Approach:** Welfare, as emphasised by Amartya Sen, extends beyond utility. The utility-centric approach, based on psychological reactions to consumed goods and services, has limitations in capturing the true well-being of individuals.

4. **Intransitivity of Social Choices:** Arrow's Impossibility Theorem exposes a fundamental flaw - the intransitivity of social choices. The democratic process of majority rule in group decision-making cannot construct a social welfare function based on ordinal preferences.

5. **Shift Towards Positive Freedoms:** Amartya Sen critiques the utility-focused welfare economics and advocates for a shift towards promoting positive freedoms of individuals. He defines freedom as 'capabilities to function,' reflecting a more holistic approach to well-being.

In conclusion, while the Bergson-Samuelson Social Welfare function offers a valuable theoretical framework, addressing the practical challenges and expanding the focus beyond utility is essential for a more comprehensive understanding and application of welfare economics.

Recap

- The Pareto Optimality Criterion - an economic change is desirable if it benefits at least one individual without harming others
- Pareto Optimality Criterion avoids complex interpersonal utility comparisons
- Pareto Optimality Criterion requires conditions in production, consumption, and allocation to achieve efficient resource allocation in an economy
- Efficiency in production is achieved by maximising the output of one consumer good while keeping the output level of another constant
- Efficiency in consumption relates to distributing two commodities among two consumers, aiming for Pareto efficiency
- Efficiency in allocation of factors ensures that reallocation of factors among commodities aligns with individual preferences
- Kaldor Hicks Compensation Criterion is introduced to address the indeterminacy in Pareto optimality
- Utilises the compensation principle, suggesting a change is an improvement if winners can compensate losers and still be better off
- Kaldor Hicks Compensation Criterion emphasises that changes increasing real income can benefit everyone, even if some individuals are adversely affected
- Bergson's Social Welfare Function is introduced as an ordinal index of society's welfare
- Bergson's Social Welfare Function challenges Pareto optimality in capturing changes in welfare due to economic shifts benefiting one group at another's expense
- Value judgments in the social welfare function rely on explicit value judgments
- Bergson's Social Welfare Function acknowledges that the social welfare function is normative, requiring consistency in value judgments
- Elected representatives, through majority-rule governments, aim to make policy decisions aligned with societal well-being
- The Superman concept in the social welfare function is proposed by Bergson and Samuelson to address challenges in constructing an unbiased social welfare function

Objective Questions

1. What is the central idea behind the Pareto optimality criterion?
2. What does Pareto optimality refer to?
3. What is the condition for resource allocation in a Pareto optimal state?
4. Which statement accurately describes Pareto optimality?
5. What does Pareto optimality not take into account?
6. What characterises a Pareto optimal allocation?
7. What is the primary focus of the Kaldor-Hicks compensation criterion?
8. Which statement best describes the Kaldor-Hicks compensation criterion?
9. What does the Bergson Social Welfare Function aim to determine?
10. What is the purpose of the Bergson Social Welfare Function?

Answers

1. Achieving a situation where no one can be made better off without making someone worse off
2. A situation where no one can be made better off without making someone worse off
3. No individual can be made better off without making someone else worse off
4. It reflects a situation where no one can be made better off without harming others
5. The level of government regulation
6. The inability to improve one person's situation without worsening another's
7. Evaluating policy changes based on potential net gains
8. It assesses policy changes based on potential net gains but allows compensation
9. The overall well-being of society based on individual utilities
10. Assess the overall welfare of society by summing individual utilities

Assignments

1. Explain the concept of Pareto optimality in welfare economics.
2. What does it mean for an allocation to be Pareto optimal? Provide an example to illustrate this concept.
3. Define the Kaldor-Hicks Compensation Criterion and its purpose in welfare analysis.
4. What is a social welfare function, and how does the Bergson Social Welfare Function differ from other approaches?
5. Evaluate the challenges and criticisms faced by Bergson's approach

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Externalities

Public and Private Good

Learning Outcomes

After completing this unit, the learner will be able to:

- understand the characteristics of public good
- know the features of private goods
- distinguish the difference between Public and Private goods

Prerequisites

We live in a world with an abundance of goods and services that fulfill human wants and needs. Goods are tangible commodities that we can possess and consume. They range from basic necessities like bread and water to the latest technological advancements like smartphones and automobiles. Goods directly address our needs by providing the means for survival and sustenance. Services, on the other hand, are intangible activities that benefit us in some way. They involve the application of knowledge and skills by others to cater to our needs and wants. From haircuts and healthcare to education and transportation, services improve our lives and fulfill our diverse desires.

But in our world resources, land, labour, and raw materials are limited. This limitation forces us to make choices about how we allocate these scarce resources. Every decision made has an opportunity cost, that is, the benefit we give up by choosing one alternative over another. If we decide to spend our resources on building luxury homes, we may have fewer resources left over for hospitals or education. Understanding scarcity is essential as it forces us to prioritise and

weigh costs and benefits, which are inevitable parts of life. Without scarcity, the need to make choices would not exist. In this chapter, we will discuss the fundamental concepts of public goods and private goods, which are essential in understanding how economies function and how resources are allocated.

Keywords

Public Good, Private Good, Excludable, Non-excludable, Rival, Non -rival

Discussion

6.1.1 Public and Private Good

Drinking a cup of tea can benefit the drinker, and the tea consumed by one person cannot be consumed by anyone else. Thus, a private good yields satisfaction only to the person who consumes it. Many goods have a public element but are not pure public goods. An example is a motorway. A motorway can be used by any person until it becomes congested. For example, one more car on the Delhi Ring Road with plenty of space does not reduce the consumption of road services of anyone else. But once the motorway becomes congested, one extra vehicle lowers the quality of the service available for everyone else and it becomes rival like a private good. Also, users can be excluded from a motorway by toll gates. Another example is fish in the ocean. Ocean fish are rival in consumption because a fish taken by one person is not available for anyone else. But ocean fish are non-excludable because it is difficult to stop other countries taking them if they are outside a country's territorial limits.

6.1.1.1 Public Good

A pure public good is a good or service that can be consumed simultaneously by everyone and from which no one can be excluded. A pure public good is one for which consumption is non-rival and from which it is impossible to exclude a consumer. Therefore, the two important characteristics of pure public goods are its non-rival and non-excludable nature. Pure public goods pose a free-rider problem. Let us explain these characteristics of public good.

Non-rival: A good is non-rival if the consumption of one unit of the good by a person does not decrease the availability of units for consumption by another person. Here, the greater availability of the good to one person does not cause reduction in availability of good to another person. So, there is no marginal cost in making the good available to any number of persons. An example of non-rival consumption is watching a television show. Watching a television show by one person does not

prevent another person from watching the same television show. If both the persons have paid for the particular connection, the consumption of the show by any number of persons may be possible and watching the show does not reduce the availability of the show to other persons. Another common example of non-rival nature of a good is light from the light house. The light from the light house can be used by any number of ships in the vicinity. There is no additional cost required to give light to another ship in the area.

Non-excludable: The second feature of a public good is that it is non-excludable. A good is non-excludable if it is impossible, or extremely costly, to prevent someone from benefitting from a good who has not paid for it. An example of a non-excludable good is national defense. It would be difficult to exclude a foreign visitor from being defended. Another example of non-excludable good is light from light house. It is not possible to exclude ships from benefitting from the light given from the light house. We have seen that light house is non-rival too. National defense is also non-rival. As earlier said, public goods are both nonrival and nonexcludable. It provides benefits to people at zero marginal cost and no one can be excluded from enjoying them.

The list of public goods is much smaller than the list of goods that governments provide. Many publically provided goods are either rival in consumption or excludable. For example, high school education is rival in consumption. Because, when number of children increases, children get less attention as class size increases. There is a positive marginal cost of providing education to one more child. Likewise charging tuition fee can exclude some children from enjoying education. So, there are goods that are either rival and non-excludable or non-rival and excludable. Let us consider the case of goods that are excludable but non-rival.

For example, in period of low traffic, travel on a bridge is non rival because an additional car on the bridge does not lower the speed of other cars. But the bridge travel is excludable because bridge authorities can keep people from using it. Another example for non-rival excludable good is TV show. There is no marginal cost in providing the good to additional consumers. Consumption of TV show by one person does not lead less consumption of it by another person. But, a TV show is excludable for some people since it can be viewed by only those who paid the subscription. So, it is possible to exclude people via subscription or payment system. On the contrary, some goods are nonexcludable but rival. For example, air, which is nonexcludable and often nonrival. But it can be rival if the emissions of one firm adversely affect the quality of the air and the ability of others to enjoy fresh air. Goods that are commonly available are mostly non -excludable but rival in nature. Take the case of timber goods, minerals, etc. the consumption of these goods allow only single person or single use for a particular unit. Once used, it cannot be used by another person. Club goods are example of excludable but non-rival goods.

Public goods create a free-rider problem. A free rider is a person who consumes a good without paying for it. Public goods create a free rider problem because the quantity of the good that the person is able to consume is not influenced by the amount the person pays for the good. Since most of the public goods have common resource property, some persons can remain not part of protecting

it, but benefitting from the resource. The most important example is pollution abatement. Air is a common property. No one can be excluded from consuming it. Air pollution prevents people from having fresh air. Inorder to reduce the problem of air pollution, authorities usually charge pollution abatement fees. Here, people can remain not paying the fees but enjoy the fresh air via abatement measures implemented by others paying for it. These people can remain not paying since the good is non-excludable. Markets fail to supply a public good because no one has an incentive to pay for it.

6.1.1.2 Private Good

A pure private good is one for which consumption is rival and from which consumers can be excluded. So, private goods are rival and excludable. Private good is not shared usually. It can only be shared by sharing or transferring ownership of the good.

The first feature of a private good is rival. A good is rival if consumption of one unit by one person does decrease available units for consumption by another person. An example of rival consumption is eating a burger. A private good thus refers to those which are used by one person at a time. Most of the durable goods which can be used only by those having access to them are private goods. Those items that are destroyed after the use also comes under private good. Examples are toilet products. The second feature of a private good is its excludable nature. A good is excludable if it is possible to prevent a person from enjoying the benefits of a good if they have not paid. An example of an excludable - non rival good is cable television. Cable companies can ensure that only those people who have paid the fee receive programmes. These goods are also called as club goods.

Let us compare public and private good.

Table 6.1.1 Public Good Vs Private Good

	Excludable	Non-excludable
Rival	**Private Goods** Eg: Ice cream, Cheese, Houses, Cars	**Common Resources** Eg: Fresh water, fish, timber, pasture
Non-rival	**Club Goods** Eg: Cable television, Cinemas, Wifi, Tollroads	**Public Goods** Eg: Fresh air, Knowledge, National Defense

Table 6.1.1 classifies goods by these two criteria (excludable and non-rival, non-excludable and rival). Examples of goods are given under each category. Goods like Light house, National defence are known as pure public goods. One person's consumption of the security provided by our national defence system does not decrease the amount available for someone else — defence is non-rival. The army cannot select those whom it will protect and those whom it will leave exposed to threats — defence is non-excludable. Goods such as food, car, house are private goods. They can used only by the owner of the good or those who are allowed by the owner. People cannot be excluded from using air. But greater the use may pose marginal cost especially when using it creates pollution. Motor road have no extra cost to bear to allow extra vehicles. However, authorities can exclude vehicles by imposing toll. This may be done to reduce the tariff congestion in the way.

6.1.1.3 Public Goods and Market Failure

Suppose the Municipality offers a mosquito abatement programme for our community. It will worth more to the community than its cost. Municipalities can charge a fee to each of the households in that community. But cannot force them to pay the fee, rather devise a system in which those households that value mosquito abatement most highly pays the highest fees.

Since mosquito abatement is nonexcludable, there is no way to exclude anyone from benefiting this. As a result, households have no incentive to pay for this. Instead, they understate the value of the programme so that they can enjoy the benefit of the good without paying for it. This situation is called the free rider problem.

Due to the presence of free riders, it is difficult for market to provide public goods efficiently. Perhaps if a few people were involved and the programme were relatively inexpensive, all households might agree voluntarily to share costs. However, when many households are involved, voluntary private arrangements are usually ineffective. The public good must therefore be provided by governments if it is to be produced effectively.

Recap

- Public good is non-rival and non excludable
- Public goods create a free-rider problem
- A free rider is a person who consumes a good without paying for it
- Private good is rival and excludable

- National defence is an example for pure public goods
- Example of non-rival and excludable – TV show
- Example of non-excludable and rival - Air

Objective Questions

1. What are public goods?
2. Name the goods which are non-excludable and non-rival in character.
3. Give two examples of public goods.
4. Write any two features of public goods.
5. Name the goods which are rival in character
6. Write any two features of Private goods
7. Give any three examples of Private goods.
8. What is the free rider problem?

Answers

1. Public good is one for which consumption is non-revival and from which it is impossible to exclude a consumer
2. Public goods

3. Defense, light house
4. Non- excludable, Non rival
5. Private goods
6. Excludable, rival
7. Car, food, clothing
8. When people enjoy the benefit of a public good without paying for it, causes free rider problem

Assignments

1. Differentiate between public goods and private goods. Provide examples of each and explain why they exhibit different characteristics.
2. Explain the concept of non-excludability and non-rivalry in the context of public goods.

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UNIT 2

Externalities

Learning Outcomes

After completing this unit, the learner will be able to:

- understand the concept of externalities
- analyse externalities in production and consumption
- explore market failures due to externalities

Prerequisites

Externalities occur when the actions of producers or consumers impose costs or benefits on others who are not involved in the transaction. For example, pollution from a factory imposes costs on nearby residents. Because these costs are not reflected in the price of the product, markets may produce too much of goods with negative externalities and too little of goods with positive externalities.

We have already studied that public goods are non-excludable and non-rivalrous. This means that individuals cannot be excluded from using them, and one person's use does not diminish their availability to others. Because individuals can benefit from public goods without paying for them, there is a tendency for under-provision by the market. Market power occurs when a firm or a small group of firms has the ability to influence the market price by controlling the quantity supplied. Monopolies and oligopolies are examples of market structures that can result in market power. In such cases, firms may restrict output and charge higher prices, leading to inefficiencies and reduced

consumer surplus. In many transactions, buyers and sellers may not have access to all relevant information about the quality, price, or characteristics of the goods or services being exchanged. This can lead to market failures where one party takes advantage of information imbalances to the detriment of the other party.

Keywords

Externalities, Marginal Social Cost, Marginal Social Benefit, Marginal Private Cost, Production, Consumption, Market Failure

Discussion

6.2.1 Externalities

An externality is a cost or benefit of an economic activity experienced by an unrelated third party. The external cost or benefit is not reflected in the final cost or benefit of a good or service. Therefore, economists generally view externalities as a serious problem that makes markets inefficient, leading to market failures. The externalities are the main catalysts that lead to the tragedy of the commons. The tragedy of commons is an economic problem where the individuals consume a resource at the expense of the society. The primary cause of externalities is poorly defined property rights. The ambiguous ownership of certain things may create a situation when some market agents start to consume or produce more while the part of the cost or benefit is inherited or received by an unrelated party. Environmental items, including air, water, and wildlife, are the most common examples of things with poorly defined property rights.

6.2.1.1 Types of Externalities

Externalities can either be positive or negative. They can also occur from production or consumption.

1. Negative Externality

A negative externality is a negative consequence of an economic activity experienced by an unrelated third party. The majority of externalities are negative. Some negative externalities, such as the different kinds of environmental pollution, are especially harmful due to their significant adverse effects. Negative externalities are divided into production and consumption externalities.

Examples of Negative Production Externalities

Air pollution: a factory burns fossil fuels to produce goods. The people living in the nearby area and the workers of the

factory suffer from the deteriorating air quality.

Water pollution: a tanker spills oil, destroying the wildlife in the sea and affecting the people living in coastal areas.

Noise pollution: People living near a large airport suffer from high noise levels.

Examples of negative consumption externalities:

Passive smoking: Smoking results in negative effects not only on the health of a smoker but on the health of other people.

Traffic congestion: The more people that use cars on roads, the heavier the traffic congestion becomes.

2. Positive Externality

Positive externality is a benefit from an economic activity experienced by an unrelated third party. Despite the benefits of economic activities that involve positive externalities, the externality also creates market inefficiencies. Positive externalities can also be distinguished as production and consumption externalities.

Examples of positive Production Externalities

Infrastructure development: Building a subway station in a remote neighborhood may benefit real estate agents who transact properties in the area. Real estate prices would likely increase due to better accessibility, and the agents would be able to earn higher commissions.

R&D activities: A company that discovers a new technology as a result of research and development (R&D) activities creates benefits that help society as a whole.

Examples of Positive Consumption Externalities

Individual education: The increased levels of an individual's education can also raise economic productivity and reduce unemployment levels.

Vaccination: Benefits not only the person vaccinated but other people in the community because the probability of being infected decreases.

6.2.2 Externalities in Production

Production externalities refers to benefit or cost arising due to the production of a good or a service. It can be positive or negative.

6.2.2.1 Positive Externality in Production

The positive externality in production occurs when producing a good cause a benefit to a third party not directly involved. For example, as the honey producer expands his operations, the production of apples increases in the nearby apple orchards because bees help pollinate apples. This is the case of positive externality in production.

The essence of externalities in production is that they create divergence between private and social benefit and costs. In the case of a positive production externality, the social cost of producing a good or service (MSC) is less than the Marginal Private Cost (MPC)

experienced by the producer. This means that the cost to society as a whole is less than the cost to the individual producer. In such a situation, the actual output will fall short of socially optimum output. For example, when a farmer grows crops using sustainable farming methods, they benefit from increased crop yield and profitability. However, the wider community also benefits from improved soil quality, reduced water pollution, and a more sustainable environment. This positive impact on others is the positive externality. The case of positive externality in production is explained with the help of the figure given below.

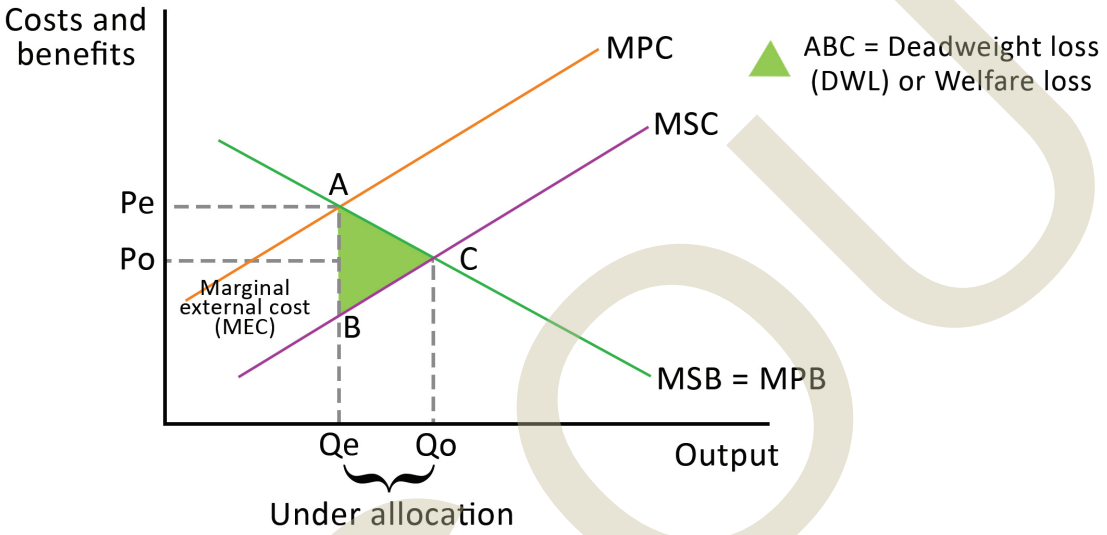

Fig 6.2.1 Positive Externality in Production

In the diagram, the MSC curve is lower than the MPC curve, representing the fact that the social cost is less than the private cost. We assume the Marginal Social Benefit (MSB) of consuming the good or service is equal to the Marginal Private Benefit (MPB), which is shown by the MSB curve coinciding with the MPB curve. In a market with a positive production externality, the market equilibrium (Qe) is below the socially optimal level of production (Qo) because the private producer only takes into account their own benefit and not the positive impact on society. This leads to a deadweight loss (shaded area in the diagram) which represents the loss of social welfare due to the under-production of the good or service.

6.2.2.2 Negative Externality in Production

The expansion in scale of production by one firm may have negative effects on other firms. Such externalities in production signifies negative externality in production. There can be pollution of air by the emission of smoke and poisonous gases by the factories resulting in serious health hazards. The release of factory wastes by the firms in nearby streams, lakes, rivers, and ocean can cause destruction of fish and adversely affect the fishing industry.

In the case of a negative production externality, the social cost

of producing a good or service (MSC) is greater than the private cost (MPC) experienced by the producer. This means that the cost to society as a whole is greater than the cost to the individual producer. The case of negative externality in production explains with the help of the figure given below.

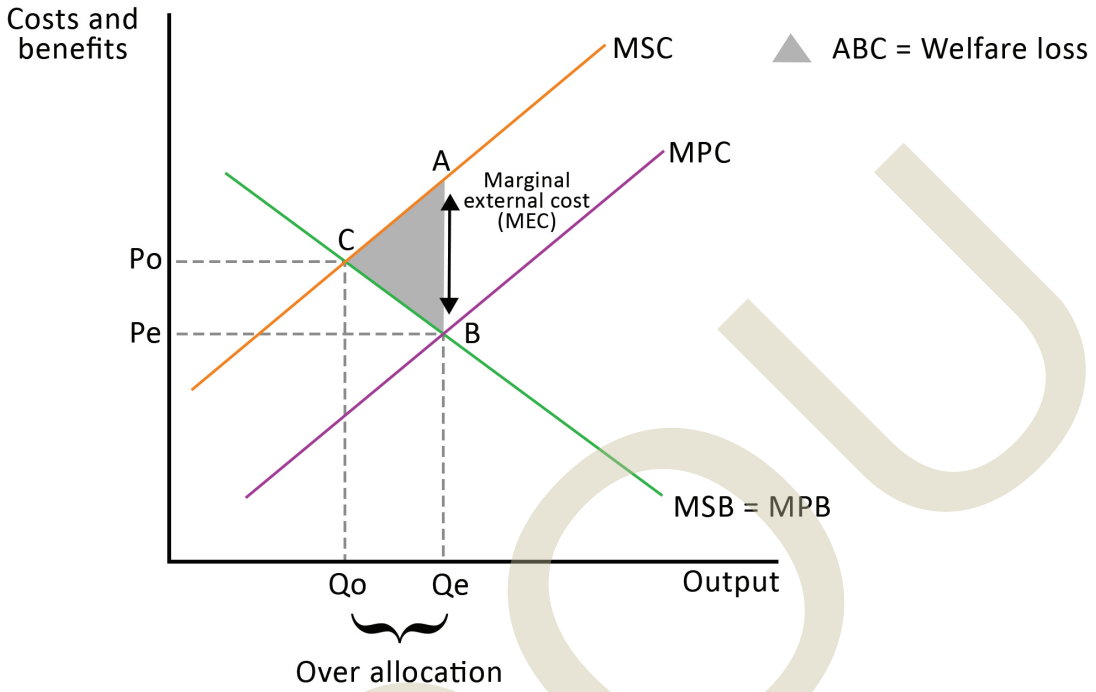

Fig 6.2.2 Negative Externalities in Production

In the diagram, the MSC curve is higher than the MPC curve, representing the fact that the social cost is greater than the private cost. We assume the Marginal Social Benefit (MSB) of consuming the good or service is equal to the Marginal Private Benefit (MPB), which is shown by the MSB curve coinciding with the MPB curve. In a market with a negative production externality, the market equilibrium (Qe) is above the socially optimal level of production (Qo) because the private producer only takes into account his/her own cost and not the negative impact on society. This leads to a deadweight loss (shaded area in the diagram) which represents the loss of social welfare due to the over-production of the good or service.

6.2.3 Externality in Consumption

Externality in consumption refers to cost or benefit arising due to consumption of goods or services. Externality in consumption can also be a positive or negative one.

6.2.3.1 Positive Externality in Consumption

A positive consumption externality occurs when consuming a good cause,

a positive externality to a third party. This means that the social benefits of consumption exceed the private benefits. The Social Marginal Benefit curve (SMB) is greater than Private Marginal Benefit (PMB). In a free market without government intervention, there will be under-consumption of goods with positive consumption externalities. This leads to market failure. If the market price ignores positive externalities, then there will be under-consumption.

Some examples of positive externality of consumption are illustrated below:

Fig 6.2.3 Positive Externalities in Production

6.2.3.2 Negative Externality in Consumption

Negative consumption externalities arise during consumption and result in a situation where the social cost of consuming the good or service is more than the private benefit. Private benefits refer to the positive factors rewarded to the consumer involved in a transaction. Social costs are negative factors impacting third parties. For example, when a person consumes alcohol and becomes drunk, the person causes social disorder, disturbing the peace of non-drinkers.

Some examples of negative consumption externalities include:

1. **Passive smoking**

Passive smoking refers to the inhalation of smoke exhaled by an active smoker. Inhaling other people's smoke, can cause diseases in the non-smoking population.

Some of the smoking-related health complications include stroke, lung cancer, heart disease, and chronic obstructive pulmonary disease. High-risk populations such as children and the elderly are at a higher risk of respiratory infections such as asthma and bacterial meningitis.

2. Traffic congestion

When too many drivers use a road, it causes delays and slower commuting times for all motorists. It also creates increased smog from higher idling times and increases the likelihood of accidents.

3. Noise pollution

Noise pollution caused by loud music from a casino or nightclub may also affect third parties who are not part of the revelers dancing to the music. Loud music may be mentally and psychologically disruptive, especially to children who are yet to adapt to the surrounding environment. Also, noise pollution may cause sleep deprivation and affect the productivity of nearby residents and businesses.

6.2.4 Externalities and Market Failure

Market failure refers to the inefficient distribution of goods and services in the free market. In a typical free market, the prices of goods and services are determined by the forces of supply and demand, and any change in one of the forces results in a price change and a corresponding change in the other force. The changes lead to a price equilibrium. Market failure occurs when there is a state of disequilibrium in the market due to market distortion. It takes place when the quantity of goods or services supplied is not equal to the quantity of goods or services demanded. Some of the distortions that may affect the free market may include monopoly power, price limits, minimum wage requirements, and government regulations.

Causes of Market Failures

Market failure may occur for several reasons, including:

A. Externality

An externality refers to a cost or benefit resulting from a transaction that affects a third party that has not decide to be associated with the benefit or cost. It can be positive or negative. A positive externality provides a positive effect on the third party. For example, providing good public education mainly benefits the students, but the benefits of this public good will spill over to the whole society.

On the other hand, a negative externality is a negative effect resulting from the consumption of a product, and that results in a negative impact on a third party. For example, even though cigarette smoking is primarily harmful to a smoker, it also causes a negative health impact on people around the smoker.

B. Public goods

Public goods are goods that are consumed by a large number of the population, and their cost does not increase with the increase in the number of consumers. Public goods are both non-rivalrous as well as non-excludable. Non-rivalrous consumption means that the goods are allocated efficiently to the whole population without any marginal cost associated with providing the good to additional consumer, while non-excludable consumption means that the public goods cannot exclude non-payers from its consumption.

Public goods create market failures if a section of the population that consumes the goods fails to pay but continues using the good as actual payers. For example, police service is a public good that every citizen is entitled to enjoy, regardless of whether or not they pay taxes to the government.

C. Market control

Market control occurs when either the buyer or the seller possesses the power to determine the price of goods or services in a market. The power prevents the natural forces of demand and supply from setting the prices of goods in the market. On the supply side, the sellers may control the prices of goods and services if there are only a few large sellers (oligopoly) or a single large seller (monopoly). The sellers may collude to set higher prices to maximise their returns. The sellers may also control the quantity of goods produced in the market and may collude to create scarcity and increase the prices of commodities. On the demand side, the buyers possess the power to control the prices of goods if the market only comprises a single large buyer (monopsony) or a few large buyers (oligopsony). If there is only a single or a handful of large buyers, the buyers may exercise their dominance by colluding to set the price at which they are willing to buy the products from the producers. The practice prevents the market from equating the supply of goods and services to their demand.

D. Imperfect information in the market

Market failure may also result from the lack of appropriate information among the buyers or sellers. This means that the price of demand or supply does not reflect all the benefits or opportunity cost of a good. The lack of information on the buyer's side may mean that the buyer may be willing to pay a higher or lower price for the product because they do not know its actual benefits.

On the other hand, inadequate information on the seller's side may mean that they may be willing to accept a higher or lower price for the product than the actual opportunity cost of producing it.

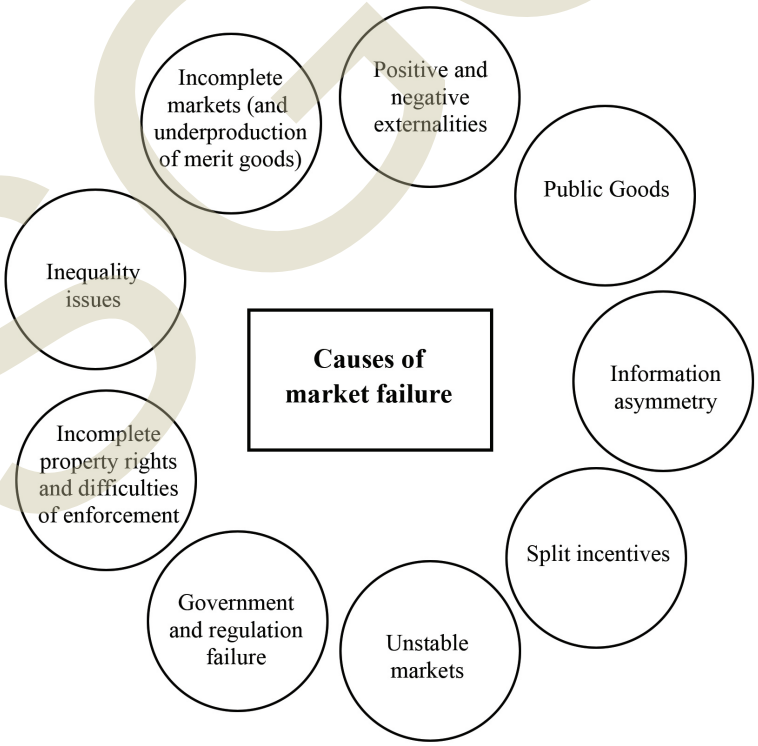

Fig 6.2.4 Causes of Market Failure

Recap

- Externality - cost or benefit imposed onto a third party, not factored into the final price
- Four main types of externalities – positive consumption externalities, positive production externalities, negative consumption externalities, and negative production externalities
- Externalities create a social cost where goods are undersupplied or create damage to the environment
- An externality is a cost or benefit of an economic activity experienced by an unrelated third party
- Positive Production Externality – Production benefits third party
- Positive Externality – MSC less than MPC
- Negative Production Externality – Production causes loss to third party
- Positive Production Externality – Consumption benefits third party
- Market failure - inefficient distribution of goods and services in the free market
- Causes of market failures - Externality, Public goods, Market control, and Imperfect information in the market

Objective Questions

1. What are externalities in economics?
2. What are the important types of externalities?
3. What is positive externality?
4. What is negative externality?
5. Give an example of a positive externality
6. Give an example for negative externality

7. What are externalities in consumption?
8. Give the relationship between MSC and MPC during positive and negative externalities.
9. What is market failure?
10. What are the causes of market failure?

Answers

1. Unintended side effects of economic activities on third parties
2. Positive and Negative externalities
3. Positive externality is a benefit from an economic activity experienced by an unrelated third party.
4. A negative externality is a negative consequence of an economic activity experienced by an unrelated third party.
5. Vaccination program, reducing the spread of disease
6. Passive smoking
7. Externality in consumption refers to cost or benefit arising due to consumption of goods or services.
8. Positive externality – MSC less than MPC; Negative externality – MSC greater than MPC
9. Inefficient distribution of goods and services in the free market
10. Externalities and information asymmetry

Assignments

1. Explain how externalities cause market failures
2. Discuss different types of externalities in production and consumption
3. Explain how externalities create market inefficiencies. Graphically illustrate how negative externalities lead to overproduction and underconsumption compared to the socially optimal level.

Suggested Reading

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ISBN 978-81-971189-4-4