# PRINCIPLES OF MICROECONOMICS II

**GE PAPER FOR ALL COURSES EXCEPT B.A. (HONS.) ECONOMICS**

**GE- ECONOMICS**

**SEMESTER-III**

**GENERIC ELECTIVE (GE)**

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# SYLLABUS

## Principles of Microeconomics II

| Syllabus | Mapping |
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| **Unit I: Market Structures**<br>Theory of a Monopoly Firm: Concept of imperfect competition; short run and long run price and output decisions of a monopoly firm; concept of a supply curve under monopoly; comparison of perfect competition and monopoly, social cost of monopoly, price discrimination; remedies for monopoly: Antitrust laws, natural monopoly mperfect Competition: Monopolistic competition: Assumptions, SR and LR price and output determinations under monopolistic competition, economic efficiency and resource allocation; oligopoly: assumptions, oligopoly models, game theory, contestable markets, role of government. | **Lesson 1:** Monopoly **(Pages 3-20);** **Lesson 2:** Some Applications of Monopoly **(Pages 23-38);** **Lesson 3:** Monopolistic Competition **(Pages 39-50);** **Lesson 4:** Oligopoly **(Pages 51-64);** **Lesson 5:** Collusive Oligopoly **(Pages 65-81)** |
| **Unit II: Consumer and Producer Theory**<br>Consumer and Producer Theory in Action: Externalities, marginal cost pricing, internalising externalities, public goods; imperfect information: adverse selection, moral hazard, social choice, government inefficiency. Markets and Market Failure: Market adjustment to changes in demand, efficiency of perfect competition; sources of market failure: imperfect markets, public goods, externalities, imperfect information; evaluating the market mechanism. | **Lesson 6:** Consumer and Producer Theory in Action **(Pages 85-102);** **Lesson 7:** Market Failure **(Pages 103-119)** |
| **Unit III: Income Distribution and Factor Pricing**<br>Input markets: demand for inputs; labour markets, land markets, profit maximisation condition in input markets, input demand curves, distribution of Income. | **Lesson 8:** Market for Factor Inputs Demand and Supply of Factors **(Pages 123-143);** **Lesson 9:** Factor Pricing **(Pages 145-164)** |

**Unit IV: International Trade**

Absolute advantage, comparative advantage, terms of trade, sources of comparative advantage, trade barriers, free trade/ protectionism.

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## UNIT II: CONSUMER AND PRODUCER THEORY

# UNIT III: INCOME DISTRIBUTION AND FACTOR PRICING

# UNIT IV: INTERNATIONAL TRADE

# UNIT I: MARKET STRUCTURES

NOTES

# LESSON 1
# MONOPOLY

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**Structure**



## 1.1 INTRODUCTION

Perfect competition, as discussed earlier, represents an extreme market situation wherein firms do not have any control over price determination. Besides this, free entry and exit of firms, perfect knowledge about market conditions, perfect mobility of factors and no government intervention make the competitive market efficient and welfare maximizing. Perfect competition implies a complete absence of monopoly power. But there could be another extreme market situation wherein there is a complete absence of competition which is called monopoly.

## 1.2 LEARNING OBJECTIVES

- To understand the concept of monopoly
- To differentiate between different kinds of monopolies
- To analyze the equilibrium of a monopolist firm

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- To comprehend the relationship between price and quantity supplied
- To explain and analyze the monopoly power

## 1.3 MEANING AND KINDS OF MONOPOLY

Monopoly has been derived from the combination of words 'Mono + Polein' where 'mono' means single and 'polein' means to sell. So, monopoly can be defined as a market structure where there is a single seller selling a product for which there is no close substitute available and there are barriers to enter the market. Presence of a single firm shows that there is no difference between a firm and an industry.

**Features of Monopoly**: The definition of monopoly mentioned above reveals the following characteristics of a monopolist:

1. **Single Seller –** In a monopoly there is just one seller of a product or service, so there is no difference between the firm and industry. The demand curve facing the monopolist is thus the market demand curve. The monopolist thus fixes the price and quantity where it maximizes its profits. However, out of the two variables that are price and quantity, a monopolist can fix either of the variables. If it fixes the price, the quantity is determined by the market and if it fixes the quantity to be sold then the price is determined by the market.
2. **No close Substitutes –** For a monopolist to retain its position in the long run, it is essential that the firm sells a unique product which cannot be substituted by any other product or service.
3. **No Entry –** A monopolist usually earns supernormal profits in the long run as there is no entry of the new firms in the industry. So, the profit earned by the monopolist is not wiped out as in the case of perfect competition where presence of supernormal profits attracts new firms in the industry.

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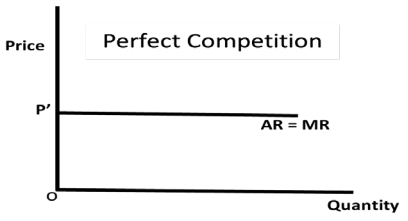
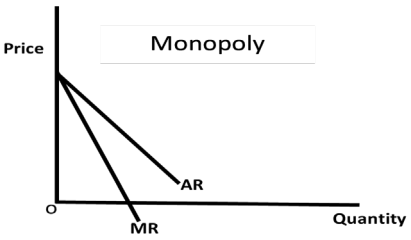
4. **Goal of Profit Maximization –** The goal of a monopolist firm is to maximize the profits. How it maximizes the profits would be discussed under the next heading.
5. **Absence of Supply Curve –** In perfect competition there is a one to one relation between price and quantity supplied. Such relation is absent in case of a monopoly as the quantity supplied is dependent upon the elasticity of the demand curve and shape of the marginal cost. Thus, the same quantity can be supplied at two different prices or two different quantities can be supplied at the same price showing that there is no supply curve in monopoly.

**Demand Curve under Monopoly**

In case of a monopoly, the firm itself is the industry which means it is both the price maker as well as price taker unlike perfect competition where industry sets the price and all the firms are just the price takers having no freedom of setting or changing the price. The market demand curve in case of a monopoly is therefore the demand curve that the monopolist firm faces whereas in perfect competition the demand curve of the firm is a straight line parallel to X axis as given in Figure 1.1.




Under Perfect Competition, both the demand curves AR and MR are horizontal and merge with each other at a given price P'. Demand is perfectly elastic, i.e ed = ∞ as products are perfect substitutes.




Under Monopoly, both the demand curves AR and MR are downward sloping. MR lies below AR curve. Demand is inelastic, i.e ed < 1 due to absence of close substitutes.

***Fig. 1.1*** *Demand curves under perfect competition and monopoly*

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## Total Revenue, Average Revenue and Marginal Revenue Under Monopoly

Take an imaginary revenue schedule of the monopolist as represented in Table 1.1.

***Table 1.1*** *An imaginary revenue schedule of the monopolist*

| Price or Average Revenue (AR) | Quantity | Total Revenue (TR) | Marginal Revenue (MR) |
|---|---|---|---|
| 100 | 1 | 100 | – |
| 90 | 2 | 180 | 80 |
| 80 | 3 | 240 | 60 |
| 70 | 4 | 280 | 40 |
| 60 | 5 | 300 | 20 |
| 50 | 6 | 300 | 0 |
| 40 | 7 | 280 | – 20 |
| 30 | 8 | 240 | – 40 |
| 20 | 9 | 180 | – 60 |
| 10 | 10 | 100 | – 80 |

This schedule shows the relation between price or average revenue and quantity in case of monopoly. It shows that as price falls quantity demanded increases, ceteris paribus. Total revenue thus first increases, reaches its maximum and then starts falling but it is always non-zero and positive. Average Revenue (AR) and Marginal Revenue (MR) are falling. AR remains higher than MR as quantity of output increases. MR is positive as long as total revenue (TR) is increasing, when TR reaches the maximum, MR becomes zero and when TR starts falling in absolute terms, MR becomes negative. The shapes of the TR, AR and MR curves should be understood prior to deriving the equilibrium. Figure 1.2 is based on the values of TR, AR and MR given in Table 1.1.

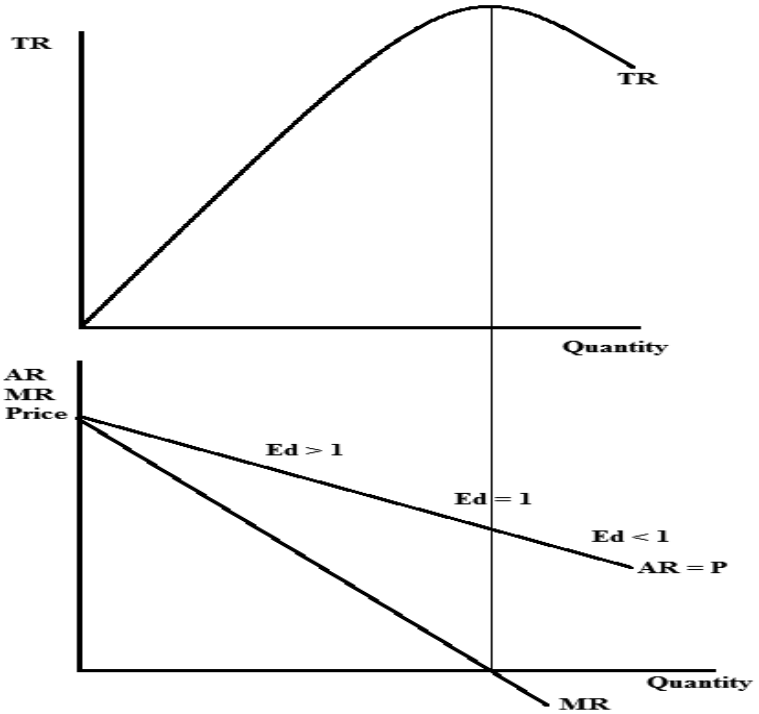


***Fig. 1.2*** *TR, AR and MR curves under Monopoly*

Based on the above discussion we can say that:

i. Both AR and MR curves start from the same point on the price (vertical) axis.

ii. Both the curves are downward sloping.

iii. Slope of MR is twice the slope of AR.

The relation between MR, AR and Elasticity of demand is mentioned in the results given below (Figure 1.2):

i. If demand curve has unit elasticity i.e. $E_d = 1$, MR = 0

ii. If demand curve is relatively elastic i.e. $E_d > 1$, MR = Positive

iii. If demand curve is relatively inelastic i.e. $E_d < 1$, MR = Negative

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## Equilibrium under Monopoly

The objective of a monopolist is to maximize profits. There are two approaches to maximize profits, as given below:

1) Total Approach
2) Marginal Approach

### TOTAL (REVENUE and COST) APPROACH

A monopolist earns maximum profits when the gap between Total Revenue (TR) and Total Cost (TC) is Maximum. The condition is depicted in the Figure 1.3. Here, TR curve starts from the origin as there is no revenue since the output is zero and TR is inverse 'U' shaped because of inverse relation between price and quantity. TC is inverse 'S' shaped because of Law of Variable Proportion. Total profits are derived by subtracting TC from TR. Initially TC being greater than TR, the firm is incurring losses. Points 'A' and 'B' are the breakeven points as here the firm has neither the profits nor the losses. Profit is maximum where the gap between TR and TC is the highest and it is the equilibrium quantity.

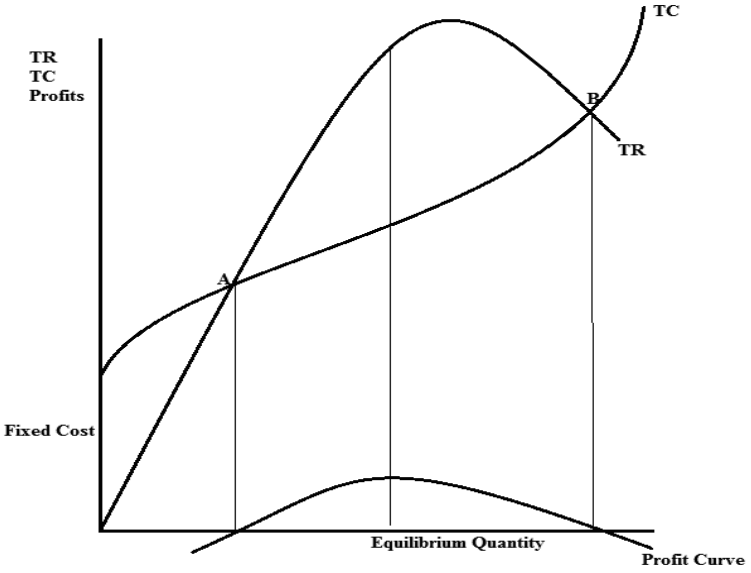


***Fig. 1.3*** *Maximum profit condition for a monopolist*

## MARGINAL APPROACH

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As per marginal approach there can be three cases of equilibrium that a monopolist faces depending upon the relation between per unit revenue and per unit cost. The two conditions that need to be satisfied to attain the equilibrium are as follows:

(1) MR = MC

(2) MC cuts MR from below or Slope of MR < Slope of MC at the point of equilibrium

Equilibrium of a monopolist can be derived under two time periods:

- Short Run – It is a time period where there are certain costs that are fixed in nature along with the variable costs and entry or exit of the firms is not possible. Here a monopolist can have supernormal profits; normal profits and can even incur losses.
- Long run – It is a time period where all costs become variable and entry or exit of firms is also possible. Here a monopolist usually gets supernormal profits.

### Equilibrium in the Short Run

In the short run, a monopolist may earn supernormal or abnormal profit or normal profit or even incur loss depending on the position of short run average cost curve.

### Case 1: Supernormal Profit

Figure 1.4 shows downward sloping Average revenue (AR) and Marginal revenue (MR) curves. Short run average cost curve (SAC) and Short run marginal cost curves (SMC) are also shown. Equilibrium is at point E where both the conditions of MR = MC and MC cutting MR from below are being satisfied. Equilibrium quantity is OQ* that monopolist would sell at a price of OP*. Total profits can thus be calculated as follows:

TP = TR – TC

= (Price * Quantity) – (Average Cost * Quantity)

= (OP*) * (OQ*) – (BQ*) * (OQ*) = OP*CQ* – OABQ* = AP*CB = Supernormal Profits

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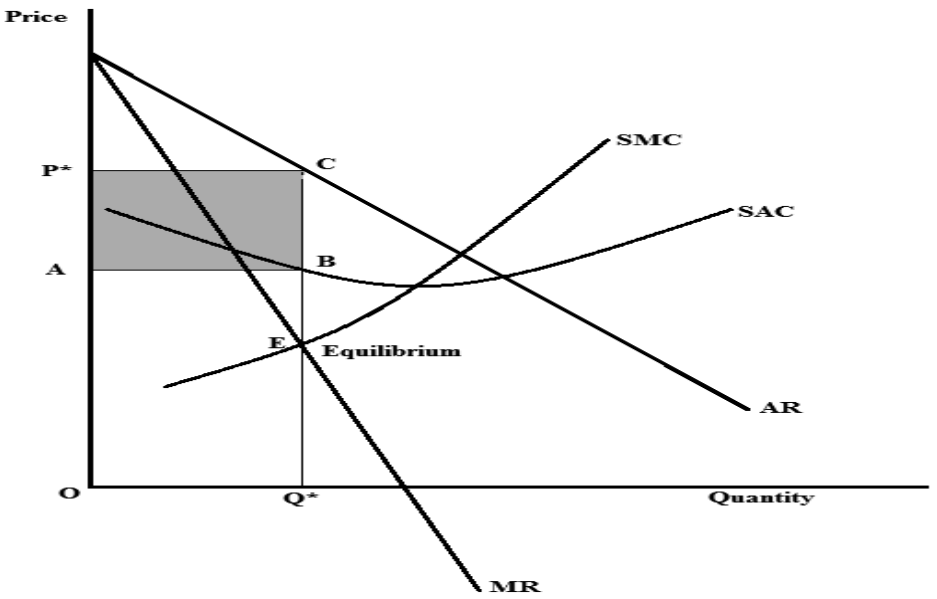


*Fig. 1.4 Supernormal Profit*

**Hence, condition for supernormal profits is that Price or AR > SAC.**

**Case 2: Normal Profit**

In Figure 1.5, equilibrium is at point E where both the conditions of MR = MC and MC cutting MR from below are being satisfied. Equilibrium quantity is OQ* that monopolist would sell at a price of OP*. See that in this case the SAC curve is tangent to AR curve at point B implying that both AR and SAC are equal to BQ* = OP*. Total profits can thus be calculated as follows:

TP = TR – TC

= (Price * Quantity) – (Average Cost * Quantity)

= (OP*) * (OQ*) – (BQ*) * (OQ*) = OP*BQ* – OP*BQ* = Zero = Normal Profits

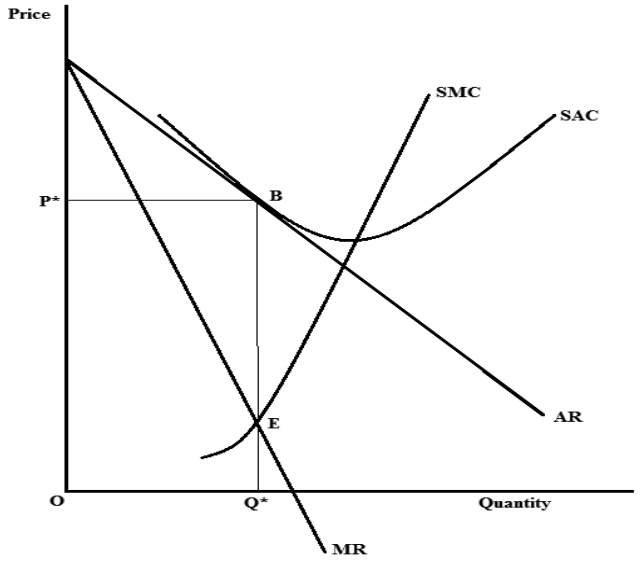


*Fig. 1.5*

**Hence, condition for Normal profits is given as Price or AR = SAC.**

**Case 3: Loss**

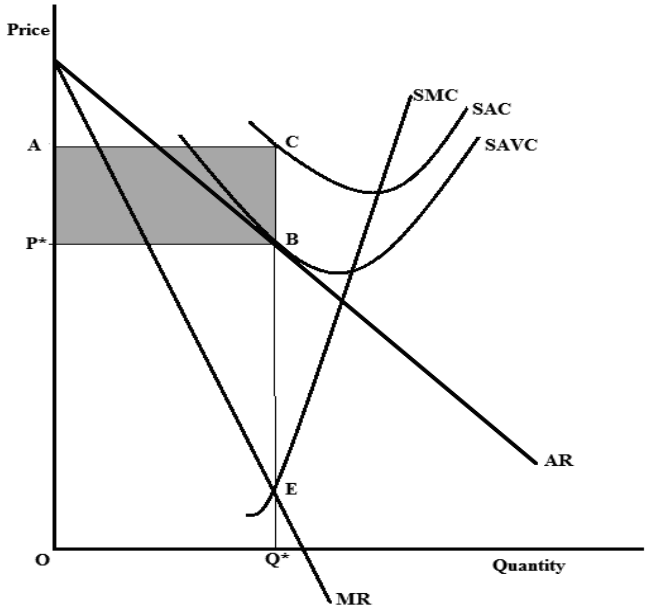


*Fig. 1.6*

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In Figure 1.6, equilibrium is at point E where both the conditions of MR = MC and MC cutting MR from below are being satisfied. Equilibrium quantity is OQ* that monopolist would sell at a price of OP*. However, in this case the SAC curve is positioned above the AR curve, thus implying that, SAC = CQ* which is more than AR = BQ* or OP*. Total profits or losses can thus be calculated as follows:

TP = TR – TC

= (Price * Quantity) – (Average Cost * Quantity)

= (OP*) * (OQ*) – (CQ*) * (OQ*) = OP*BQ* – OACQ* = – P*ACB = Loss.

**Hence, condition for loss is given as Price or AR < SAC**

A monopolist can continue to operate despite having losses as there is a chance of earning profits in the long run if the monopoly power is strong.

**(2) Equilibrium in the Long Run**

In the long run, a monopolist can bring changes in the level of output by changing any and/or all factors of production as there are no fixed factors in the long run. Here usually a monopolist earns supernormal profits because of the barrier to entry of new firms. The equilibrium is attained where long run marginal cost curve (LMC) is equal to marginal revenue (MR) and LMC cuts MR from below. It is shown in Figure 1.7. Figure 1.7 shows downward sloping Average revenue (AR) and Marginal revenue (MR) curves. Long run average cost curve (LAC) and Long run marginal cost curves (LMC) are also shown. Equilibrium is at point E where both the conditions of MR = LMC and LMC cutting MR from below are being satisfied. Equilibrium quantity is OQ* that monopolist would sell at a price of OP*. Total profits can thus be calculated as follows:

TP = TR – TC = (Price * Quantity) – (Average Cost * Quantity)

= (OP*) * (OQ*) – (BQ*) * (OQ*) = OP*CQ* – OABQ* = AP*CB = Supernormal Profits

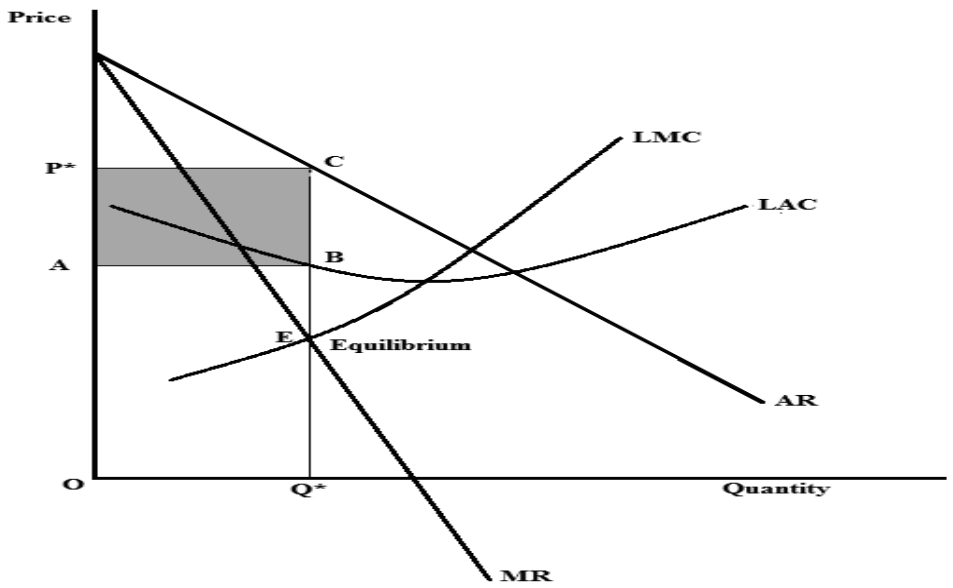


*Fig. 1.7*

## 1.4 ABSENCE OF SUPPLY CURVE IN MONOPOLY

In perfect competition the supply curve of a firm is the segment of marginal cost curve above the minimum point of short run average variable cost curve. This is because of the reason that the marginal revenue or the price curve is constant (parallel to x axis) and hence it is only the marginal cost curve that is required for determining the quantity that would be sold by a perfectly competitive firm at a particular price. Thus, it shows that there is one to one relation between price and quantity supplied in case of perfect competition as the firm is only the price taker as the price is set by the industry. This is however not the case in monopoly. A monopolist firm has no supply curve as there is no one to one relation between price and quantity supplied due to the fact that here demand curve is not constant but is downward sloping. So, the quantity supplied at different prices depend upon the shape of the demand curve (elasticity) and marginal cost curve as equilibrium is obtained by the intersection of marginal revenue and marginal cost curve. It

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can be shown by shifting the demand curves that two different quantities can be supplied at the same price and the same quantity can be supplied at two different prices depending upon the elasticity of the demand curve.

**Case 1: Same quantity being supplied at two different prices** – It is shown in Figure 1.8. Here, initially demand curve is shown by AR and corresponding marginal curve is MR. Equilibrium takes place at the intersection of MC and MR, and it is obtained at point E where the monopolist is selling OQ* units of commodity at a price of OP per unit. Now if the demand curve shifts to $AR_1$ with corresponding marginal revenue curve being $MR_1$, the new equilibrium is at the same point 'E' where monopolist is selling the same number of units that is OQ* but at a reduced price of $OP_1$ as the new demand curve is relatively more elastic. Thus, it shows how change in the elasticity can force the monopolist to sell the same quantity at different prices.

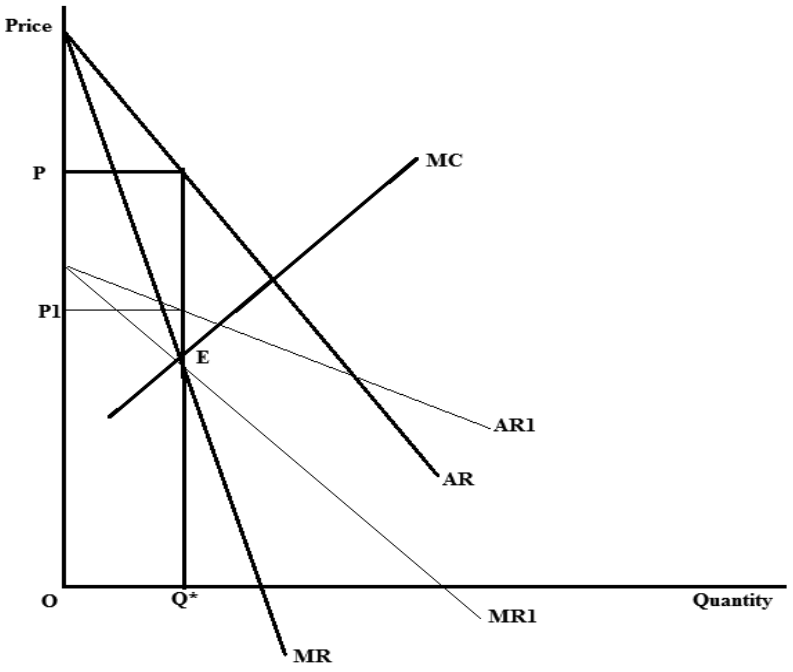


*Fig. 1.8*

**Case 2: Two different quantities can be sold at same price** – See Figure 1.9, where the initial demand curve is AR and corresponding marginal revenue

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curve is MR. Equilibrium is at a point where MR and MC intersect that is point E showing that monopolist is selling OQ units of commodity at a price of OP* per unit. Now if the demand curve shifts to $AR_1$ with corresponding marginal revenue curve being $MR_1$, then equilibrium shifts to $E_1$ where monopolist is selling a higher quantity but at the same price of OP*. Thus, it shows how monopolist cannot obtain any one to one relation between price and quantity supplied as here the demand curve is downward sloping and its elasticity and shape of marginal cost curve both have an impact on the equilibrium.

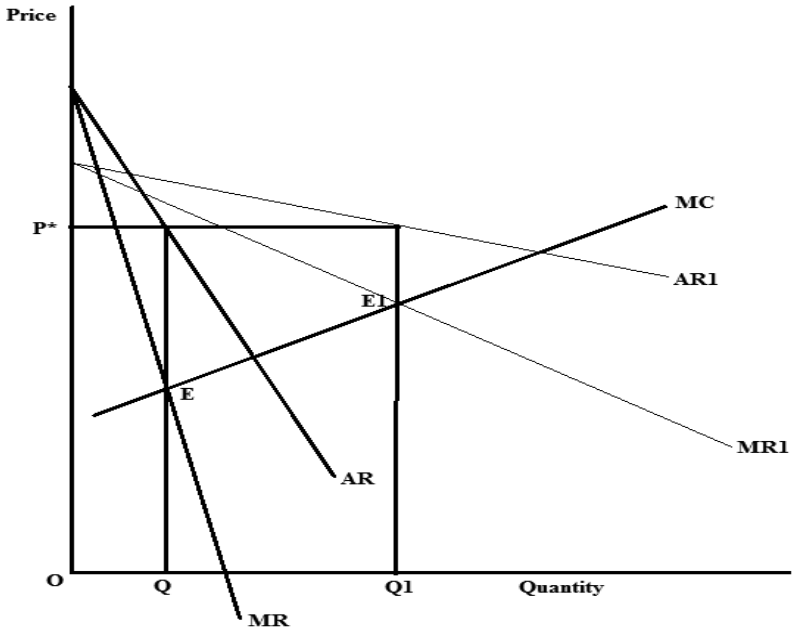


*Fig. 1.9*

**Degree of Monopoly Power**

Monopoly is a condition with only one seller having no close substitutes which gives monopolist the freedom to set the price. However, such pure monopoly rarely exists and what we have is the situation where several firms compete with one another. In perfect competition, each firm earns only normal profits in the long run because in the short run if there is any supernormal profit, new firms enter the market till all the excess profit is wiped out and all firms set their

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equilibrium quantity at a point where marginal revenue is equal to marginal cost. As in perfect competition the price is constant, it is equal to marginal revenue and hence the equilibrium is:

Price = MR = MC

But in case of monopoly demand curve is downward sloping, therefore P > MR and equilibrium condition being MR = MC, we get a difference between price and MC as P > MC. This gap between price and MC shows the extent of monopoly power that a firm possesses.

*Abba Lerner*, an economist, gave an index in 1934 to measure this monopoly power and it is called **Lerner's Index of Monopoly Power.**

**$L = (P–MC) / P = – 1/ E_d$ where $0 \leq L < 1$**

The more is the elasticity of the demand curve the lesser is the monopoly power and the lesser is the elasticity of the demand curve the more is the monopoly power.

For perfect competition as P = MC; L = 0, there being no monopoly power.

The closer the value of L to 1, the higher is the monopoly power.

## 1.5 LEARNING OUTCOME

Monopoly is a market structure characterized by a single seller where the firm itself is the industry. Monopolist firm thus faces a demand curve that is downward sloping and equal to the market demand curve giving it the freedom to determine its equilibrium. This however does not mean that the monopolist can charge any price and sell any quantity that it desires. Out of the two variables (price and quantity), it can set only one variable and the other is given by the market depending upon the shape of the demand and cost curves. Equilibrium is where the marginal revenue and marginal cost curves intersect. If a monopolist sells an output less than this, then marginal revenue being greater than marginal cost it loses profits and if it sets a quantity more than this, then MR being less than MC, the monopolist incurs losses. Thus the equilibrium takes place where MR becomes equal to MC as this is the situation where profits are maximum. Unlike perfect competition there is no supply curve of a monopolist firm, because there

**NOTES**

is no one to one relation between price and quantity supplied. A monopolist can sell two different quantities at the same price or same quantity at two different prices depending upon the elasticity of the demand curves.

## 1.6 SELF ASSESSMENT QUESTIONS

**Check your progress**

**Exercise 1: True and False**

1. In case of perfect competition there is no monopoly power.
2. Firms can easily enter in a monopoly market structure.
3. A monopoly firm always earns supernormal profits even in the short run.
4. A monopolist can determine the price at which it sells the commodity as well as the number of units it wants to sell.
5. The objective of a monopolist is to maximize profits.
6. The higher is the elasticity of demand curve the more is the monopoly power
7. There is no supply curve in case of monopoly

   **Ans.** 1(T), 2(F), 3(F), 4(F), 5(T), 6(F), 7(T)

**Exercise 2: Fill in the Blanks**

1. Lerner's Index is a tool to measure …….
2. In case of perfect competition, the gap between price and marginal cost is …….
3. A monopolist firm is the price …….
4. There is ……. of supply curve in case of monopoly

   **Ans** 1. Monopoly Power 2. Zero 3. Maker as well as taker 4. Absence

**Exercise 3: Questions**

1. Using shifting demand curves show that there is no supply curve in case of monopoly.
2. Explain the concept of Monopoly Power.

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3. How does a monopolist firm reach its equilibrium in the short run?
4. Explain the relation between Average revenue, Marginal revenue and Elasticity of demand.

**Mathematical Proof (Optional)**

**1. Relation between Total Revenue (TR), Average Revenue (AR) and Marginal Revenue (MR) under Monopoly**

Let demand function of a monopolist is given by

$$\mathbf{P = a - bQ} \quad \text{.... (1)}$$

Where P = Price, Q = Quantity, a = intercept and b = slope of the demand curve.

Now Total Revenue (TR) = P*Q, substituting Equation (1) in TR, we get:

$TR = (a - bQ) * Q = aQ - bQ^2$

$AR = TR / Q = (aQ - bQ^2)/Q = a - bQ = Price$ .... (2)

$MR = \partial TR/\partial Q = \partial (aQ - bQ^2)/ /\partial Q = a - 2bQ$ .... (3)

Comparing AR and MR, i.e., equation (2) and (3) we get the following results:

$AR = a - bQ$

$MR = a - 2bQ$

a. Intercept of both AR and MR is same = a, so both the curves start from the same point on the Y axis.
b. Both have a negative sign in between showing that both the curves are downward sloping.
c. Slope of AR is 'b' and MR is '2b', so slope of MR is twice the slope of AR.

**2. Relation between AR, MR and Elasticity of Demand in case of a Monopoly**

Total Revenue, TR = Price *Quantity = P*Q

Average Revenue, AR = TR/Q = P*Q)/Q = P

Marginal Revenue, $MR = \Delta TR/\Delta Q = \Delta (P*Q)/\Delta Q = P (\Delta Q/ \Delta Q) + Q (\Delta P/ \Delta Q)$

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$MR = P + Q\ (\Delta P/\ \Delta Q)$

Multiplying and dividing above by P we get following

$MR = P + Q/P\ (\Delta P/\ \Delta Q)*P$ .... (1)

Also, $E_d = (-)\frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$ $(-)\frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$, $(-)\ 1/\ E_d = \frac{\Delta P}{\Delta Q} \times \frac{Q\Delta P}{P\Delta Q} \times \frac{Q}{P}$

Substituting the value of $E_d$ in Equation (1) we get

$MR = P + P*[(-)\ 1/\ E_d]$, $MR = P\ [1 - 1/\ E_d]$, **$MR = AR\ [1 - 1/\ E_d]$**

Above result shows relation between MR, AR and Elasticity of demand in the below given results (Figure 1.1):

(a) If demand curve has unit elasticity i.e. $E_d = 1$, MR = 0

(b) If demand curve is relatively elastic i.e. $E_d > 1$, MR = Positive

(c) If demand curve is relatively inelastic i.e. $E_d < 1$, MR = Negative

### 3. Equilibrium Conditions

The objective of a monopolist is to earn profits and profits are maximized when the following conditions are satisfied:

Total Profit (TP) = Total Revenue (TR) – Total Cost (TC)

To maximize profits the gap between total revenue and total cost should be maximized, i.e., first differentiation is equated to zero

$\partial TP/\ \partial Q = \partial TR/\partial Q - \partial TC/\partial Q = 0$

$= MR - MC = 0,$

**MR = MC** .... 1st order condition

$\partial^2 TP/\ \partial Q^2 = \partial^2 TR/\partial Q^2 - \partial^2 TC/\partial Q^2 < 0$

**Slope of MR < Slope of MC** .... 2nd order condition

### 4. Rule of Thumb Pricing for Monopoly Power

As shown above the equilibrium of a monopolist is at a point where marginal revenue and marginal cost curves intersect but it is not always feasible for the monopolist to trace the marginal revenue and marginal cost curves for all the levels of output. Because of limited knowledge it is preferable to use a rule of thumb for pricing as derived below.

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MR = ΔTR/ΔQ = Δ(P*Q)/ ΔQ. Using Product rule, we get:

MR = P + Q(ΔP/ΔQ). Multiplying and dividing the second part by P we get:

MR = P + (Q/P) (ΔP/ΔQ) * P .... (1)

$E_d$ = (ΔQ/ΔP) * (P/Q) or 1/ $E_d$ = (Q/P) (ΔP/ΔQ) substituting this in Equation (1)

MR = P + (1/ $E_d$ ) * P, MR = P (1 + 1/ $E_d$ ) .... (2)

Equilibrium condition is that MR = MC, substituting this in Equation (2)

MC = P (1 + 1/ $E_d$ ) or **P = MC / (1 + 1/ $E_d$ ) or (P – MC)/P = – 1/ $E_d$**

This is the rule of thumb for pricing. From this we can also move to the concept of Monopoly Power.

## 1.7 RECOMMENDED READINGS


- Mankiw, N. G. (2018). Principles of Microeconomics 8th ed.
- Bernheim, B., Whinston, M. (2009). Microeconomics. Tata McGraw-Hill.

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# LESSON 2
# SOME APPLICATIONS OF MONOPOLY

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**Structure**



## 2.1 LEARNING OBJECTIVES

- To understand the concept of integration of firms
- To differentiate between perfect competition and monopoly
- To analyse different types of price discrimination
- To explain the concept of deadweight loss

## 2.2 INTRODUCTION

A monopolist derives its monopoly power because of the barriers to entry that prohibit new firms to enter the market. If the barriers are not there then monopoly situation cannot exist for long. The barriers can be natural barriers

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(raw material availability), economic barriers (economies of scale, cost advantage or technological superiority) or legal barriers (patents, copyrights, trademarks). Depending upon the monopoly power that a firm possesses, monopolist can even go for price discrimination where it charges different prices from different consumers for the same product. A pure monopoly situation can reduce the consumer surplus (benefit of the society) to a great extent and hence it is usually undesirable unless it is controlled by the state for welfare of the society at large or it is a natural monopoly (where it is more efficient to let it serve the entire market rather than to have several firms). This lesson discusses about the difference between perfect competition and monopoly, the costs that society has to bear because of monopoly and various types of price discrimination that a monopolist can exercise.

## 2.3 SOCIAL COSTS / ALLOCATIVE INEFFICIENCY OF MONOPOLY

In case of perfect competition, a firm sells a product at a point where Price (P) is equal to marginal cost (MC) and there being no cost to the society. A monopolist however sells at a price that is greater than its marginal cost as shown in Figure 2.1. Demand curve of a perfectly competitive industry is downward sloping and supply curve obtained from summation of the marginal cost curves is upward sloping. Equilibrium of the industry is where demand is equal to supply, it gives $OQ_{pc}$, i.e., quantity at $OP_{pc}$ price. If it would have been a monopoly then equilibrium would be at a point where marginal revenue and marginal cost are equal which is given by point A in the Figure 2.1, monopolist is selling $OQ_m$ quantity at a price of $OP_m$. It can be seen that a monopolist sells lesser quantity as compared to perfect competition and that too at a higher price. This leads to the cost that society has to bear and termed as allocative inefficiency of monopoly market.

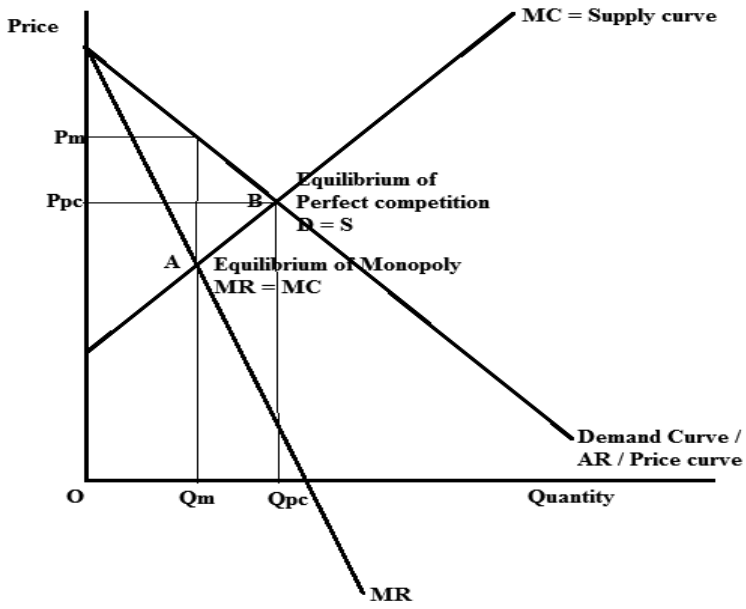


*Fig. 2.1*

There are two costs that arise because of monopoly:

1. Dead Weight Loss
2. Rent Seeking

**Dead Weight Loss:** It is net loss to the society that includes both producers and consumers. To understand the concept of dead weight loss we need to explain consumer surplus and producer surplus and see how these changes because of monopoly power.

Consumer Surplus – The difference between the price that consumer is willing to pay and what he actually pays is known as consumer surplus. Graphically it can be located as the difference between the demand curve and the equilibrium price

Producer Surplus – The difference between the price that producer actually gets and the price at which he is willing and able to sell is called producer surplus. Graphically it can be located as the difference between the equilibrium price and the marginal cost (supply) curve.

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To see how there is a change in the consumer and producer surplus on conversion of a perfectly competitive industry to monopoly assuming the same demand and cost conditions we make use of Figure 2.2.

*Table 2.1*

| | Consumer Surplus | Producer Surplus |
|---|---|---|
| **Perfect Competition (Before)** | A + B + C + D + E | F + G + H |
| **Monopoly (After)** | A + B | C + D + F + G |
| **Change (After – Before)** | – C – D – E | C + D – H |

Net Change = – C – D – E + C + D – H = – H – E = Dead weight loss

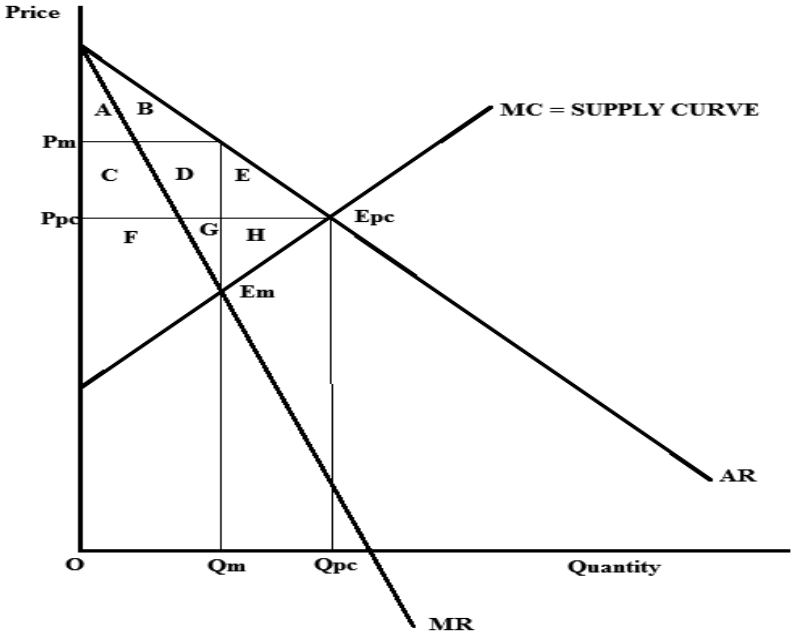


*Fig. 2.2*

Initially we assume that there is a perfect competition in the market. Here demand curve AR and supply curve are given by $M_c$, equilibrium is where demand and supply curve intersect which is given by $E_{pc}$. Equilibrium quantity

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is $Q_{pc}$ and price is $P_{pc}$. Here, the consumer surplus and producer surplus are given in Table 2.1. Now if all the firms under perfectly competitive industry are undertaken by a monopolist assuming that demand and cost conditions remain same, the equilibrium is obtained by the intersection of MR and MC which is at $E_m$ giving equilibrium quantity as $Q_m$ and price as $P_m$. It can be seen that Monopolist is selling a lesser quantity and that too at a higher price. The new consumer surplus and producer surplus are shown in the Table 2.1. To find out whether consumers or producers are at loss or gain, we calculate the change in consumer and producer surplus. It is seen that consumer surplus has reduced by C + D + E, the reduction of C + D is because of a higher price that consumers now have to pay while reduction in E is because of reduction in the quantity as now few consumers have to do without the commodity. Producer surplus on the other hand has increased by C + D but reduced by H. The increase of C + D is because of higher price that producers get now; it is actually just a transfer from consumers to producers (a zero sum game) and the loss in H is because of reduction in quantity that producers sell now. To find out whether society as a whole is at gain or loss, we add the change in consumer and producer surplus and find out that society at large is at a loss of H+E, this being the dead weight loss or cost to the society because of monopoly.

## 2.4 COMPARISON OF PERFECT COMPETITION WITH MONOPOLY

The following points discuss the comparison of perfect competition with monopoly.

1. Number of Sellers: Pure competition has many buyers and sellers whereas there is just one seller in the monopoly.
2. Substitute Products: In Pure competition all firms sell identical (homogeneous) products unlike monopoly where there are no close substitutes available.

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3. Entry and Exit of Firms: Pure competition provides free entry and exit to the firms though it is possible only in the long run while monopoly prevents entry of any new firm to the industry.
4. Profits in the Long run: In perfect competition firms earn normal profits in the long run while monopolist usually has supernormal profits because of barriers to entry and exit.
5. Demand curve of the firm: The firm in a perfect competition firm has no control over the price as it is the industry which fixes the price, the demand curve therefore is a straight line parallel to X axis at the price given by the industry. But in the case of monopoly there is only one firm and there is no difference between the firm and the industry and market demand curve which is downward sloping is the demand curve of the firm itself.
6. Social cost: A perfectly competitive industry sets its equilibrium at a point where demand and supply are equal; hence there is no cost to the society. Monopolist sets a price according to MR = MC where P > MC which brings cost to the society.
7. Price Discrimination: A perfectly competitive industry cannot discriminate on the basis of price whereas a monopolist can follow price discrimination.
8. Supply curve of the firm: A perfectly competitive firm has one to one relation between price and quantity supplied which is shown by the supply curve which is the segment of marginal cost over and above the minimum point of short run average variable cost curve. However, there is no supply curve in case of monopoly as same quantity can be sold at two different prices or two different quantities can be sold at the same price depending upon the shape of demand curve and marginal cost curve.
9. Price and output comparison: Perfectly competitive firm sells a larger output and that too at a lesser price as compared to a monopolist that sells less and at a higher price as shown in Figure 2.3.

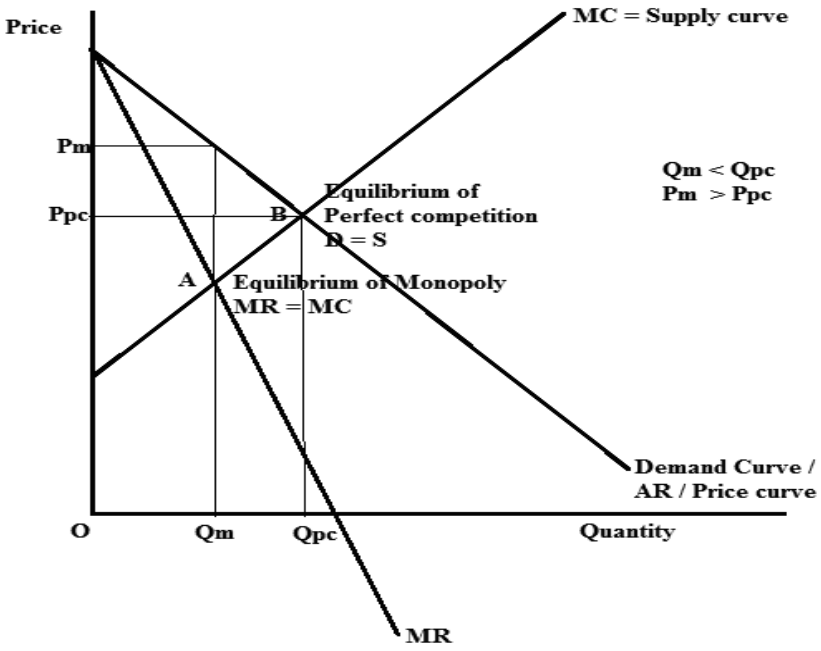


*Fig. 2.3*

## 2.5 PRICE DISCRIMINATION

Price discrimination refers to charging different price from different consumers for the same product. This is done by the monopolist to capture the consumer surplus that is there with the consumers as shown in Figure 2.4.

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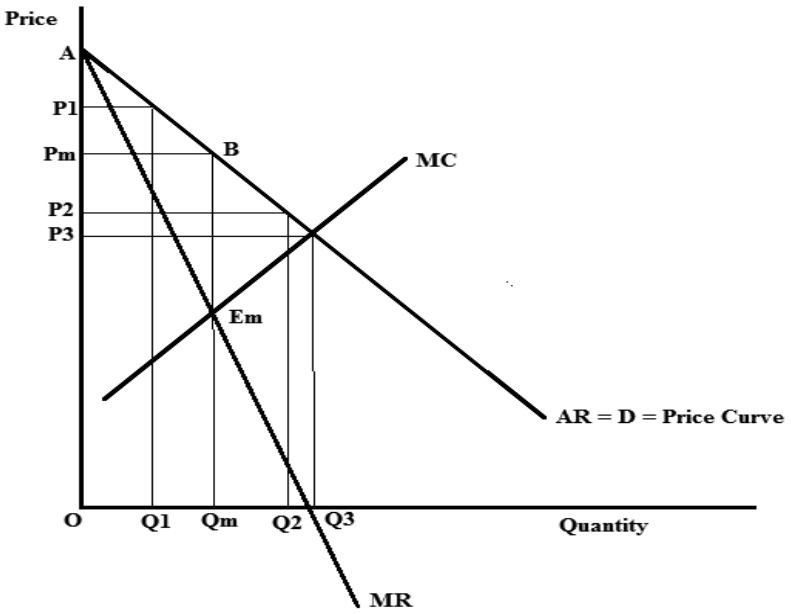


*Fig. 2.4*

A single price monopolist would maximize its profits by setting the equilibrium where MR=MC such that it sells $OQ_m$ quantity at a price of $OP_m$. Here the consumer surplus is $AP_mB$. Now if the monopolist wants to earn even higher profits then it can go for price discrimination such that it can charge different prices from different consumers like it can charge higher price $P_1$ from consumers who are willing to pay more and charge lower price $P_2$ and $P_3$ from the consumers who cannot afford $P_m$. This way the monopolist can earn even higher profits.

*Pigou* has described three degrees of price discrimination on the basis of how much consumer surplus the monopolist can take away from the consumers.

1. First Degree Price Discrimination
2. Second Degree Price Discrimination
3. Third Degree Price Discrimination

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**First Degree Price Discrimination:** There are two types of first-degree price discrimination:

***Case 1:*** The monopolist charges each consumer the maximum price that he is willing to give – known as the reservation price thereby taking away all the consumer surplus of the consumers. The demand curve here itself becomes the marginal revenue curve. Impact of first-degree price discrimination is shown in Figure 2.5.

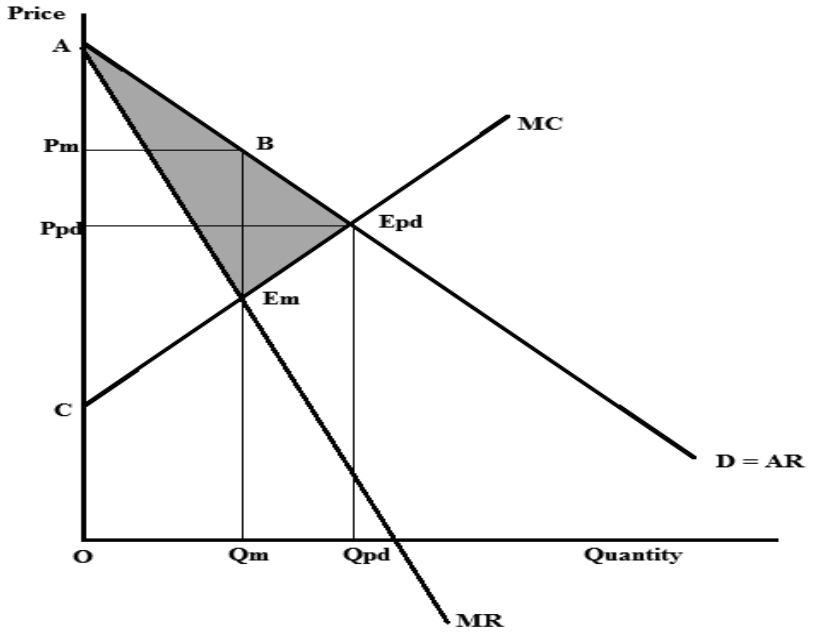


***Fig. 2.5***

A single price monopolist charges $OP_m$ and sells $OQ_m$ units of the commodity by equating marginal revenue with the marginal cost. The consumer surplus here is shown by the area $AP_mB$. Now if the monopolist goes for price discrimination, then he would charge the maximum price that a consumer is willing to give which is shown by the demand curve. Thus, here MR curve becomes irrelevant as demand curve itself is the MR curve for the discriminating monopolist. The consumer surplus is reduced to zero as whatever price the consumer is willing

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to give is charged by the monopolist. This is the highest form of discrimination as nothing is left for the consumers as surplus. To see how the monopolist is benefited by the price discrimination, we calculate incremental (variable) profits before and after the discrimination. Variable profits are calculated as the difference between Marginal revenue and marginal cost as it is the incremental profit and not the total profits.

Incremental profit before price discrimination is shown by the area of triangle $ACE_m$.

Incremental profit after price discrimination is shown by the area of triangle $ACE_{pd}$.

Thus, increase in the incremental profit = $ACE_{pd} - ACE_m$ = Area of triangle $AE_mE_{pd}$. It is shown by the shaded area in the Figure 2.5.

However, there is a limitation of perfect first-degree price discrimination, i.e., it is very difficult if not impossible to find out the reservation price for each and every consumer. This type of price discrimination is thus not found in real life, what we have is imperfect first-degree price discrimination.

***Case 2:*** In case 1 as discussed above, the monopolist charges different price from each consumer depending on how much he is willing to pay. There is an alternative method as well. The monopolist can also charge a few different prices based on the reservation prices of different groups of consumers. So here, there are certain ranges for different consumers which a monopolist can still identify. For example, a doctor can charge different fees depending upon the locality he is operating in. It is being explained in Figure 2.6.

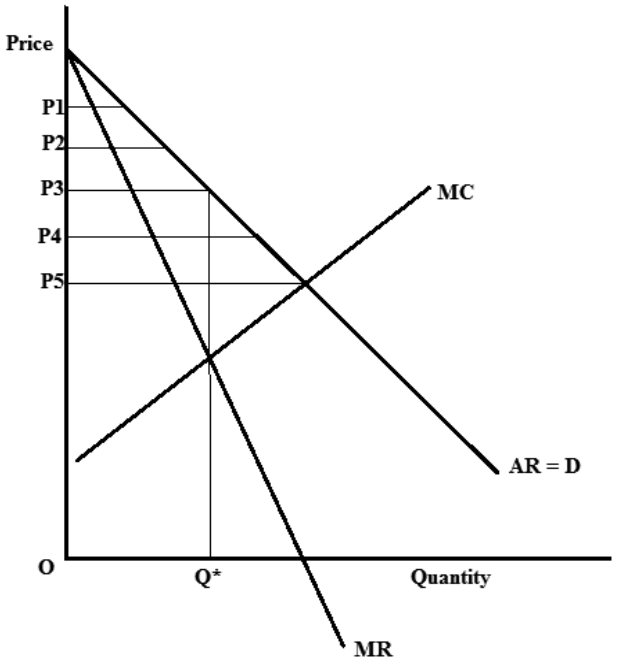


*Fig. 2.6*

A single price monopolist would have sold OQ* units and charged a single price of $OP_3$ from all the consumers. But in case of imperfect first-degree price discrimination, monopolist sets 5 different prices that is $P_1$, $P_2$, $P_3$, $P_4$ and $P_5$ which is being charged from different consumers on the basis of the price that they are willing to pay. This type of discrimination is called imperfect as there is still consumer surplus left with the consumers unlike perfect first-degree discrimination. The price is set by identifying what the marginal (last) consumer of that particular group is willing to pay. There can be various price bands and monopoly equilibrium price can be one of them.

**Second Degree Price Discrimination:** A form of price discrimination where different prices are charged from consumers on the basis of quantity being purchased. Thus, more are the units purchased lesser is the price. Block

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pricing is also an example of second-degree price discrimination where prices are different for different blocks (Figure 2.7).

With a single price to be followed a monopolist would set its output at $OQ_m$ at a price of $OP_m$. However, with price discrimination on the basis of quantity being purchased by the consumers there are three sets of prices that is $P_1$, $P_m$ and $P_2$ for $Q_1$, $Q_m$ and $Q_2$ quantities respectively. Here cost curves are not U shaped but downward sloping as it is the case of a natural monopoly. Thus, the last block is at a point where demand is equal to average cost and not where demand is equal to marginal cost as at the latter point firm would be incurring losses. Here also consumers are left with consumer surplus and all of it is not taken away by the monopolist as the price that the consumers have to pay is less than what they are willing to pay which is shown by the demand curve.

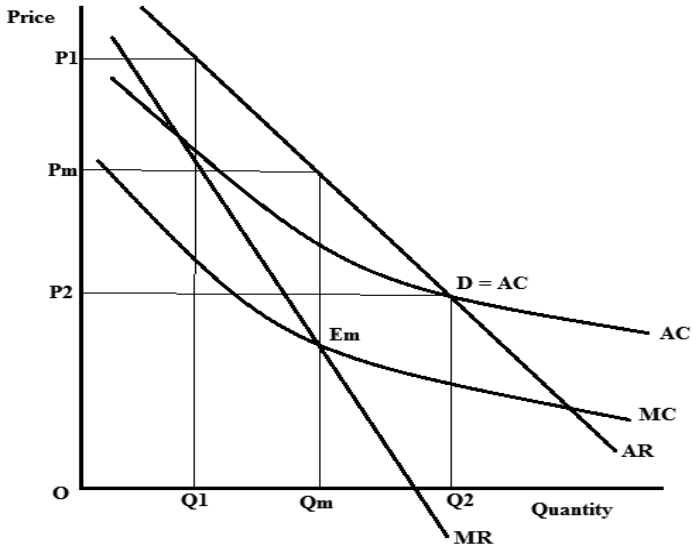


*Fig. 2.7*

**Third Degree Price Discrimination:** A discrimination that charges different prices from different subgroups of the market for the same product with different elasticities thereby charging a higher price in the subgroup that has lower elasticity and charging lower price in the subgroup that has higher elasticity. It

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is the most common type of price discrimination. For the firm to successfully follow third degree price discrimination, following conditions should be satisfied:

1. Firm is a monopolist.
2. The whole market is divided into sub-markets/subgroups. Let us assume that there are two sub-markets/sub-groups.
3. Price elasticity of demand is different in the different sub-markets.
4. Sub-markets should be kept separate, i.e., it should not be possible for the consumers to shift themselves from one submarket to the other.
5. It should not be possible to transfer goods from one sub-market to the other otherwise arbitrage opportunities would eliminate the price differential thereby making price discrimination infeasible.

Third degree price discrimination is explained with the help of Figure 2.8 wherein the total market of the monopolist is divided into two sub-markets. In sub-market 1 as shown in Panel 1 of the figure 2.8, $AR_1$ is the demand curve which is inelastic and hence it is steeper showing that this sub-market is not that responsive towards prices. $MR_1$ is the corresponding marginal revenue curve. In sub-market 2 as shown in Panel 2 of the same figure, $AR_2$ is the demand curve that has greater price elasticity and is therefore flatter showing higher responsiveness of the group towards price changes. $MR_2$ is the corresponding marginal revenue curve. The demand curves for the total market of the monopolist are derived by adding up the demand curves of these two sub-markets. Panel 3 of the figure shows the total AR and MR curves as $AR_{1+2}$ and $MR_{1+2}$ respectively where $AR_{1+2} = AR_1 + AR_2$ and $MR_{1+2} = MR_1 + MR_2$.

**Determining Equilibrium Condition**

The conditions for equilibrium are given below:

1. $MR_{1+2} = MR_1 = MR_2 = MC$ and
2. MC cuts $MR_{1+2}$ from below

Total Profits ($\Pi$) of the monopolist =

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Total Revenue from first sub-market + Total Revenue from second sub-market – Total cost

$\Pi = TR_1 + TR_2 - TC$

As per the marginal conditions stated above, first determine the equilibrium point at $E_0$ where $MR_{1+2} = MC$ as shown in Panel 3 of the figure 2.8. The rate of total quantity to be produced by the monopolist is given as $Q_0$ which corresponds to point $E_0$. The price for this rate of output should have been $P_0$ as per standard practice of price setting by a monopolist which is done on the $AR_{1+2}$ curve. However, under price discrimination, the monopolist does not charge $P_0$ price nor does it sell $Q_0$ quantity. Instead the monopolist divides the total market quantity in two sub-markets by following the condition $MR_{1+2} = MR_1 = MR_2 = MC$. Diagrammatically, this is done by drawing a horizontal line through the point $E_0$ such that the said line cuts $MR_1$ at point $E_1$ in sub-market 1 and $MR_2$ at point $E_2$ in sub-market 2. Accordingly, in sub-market 1, rate of quantity corresponding to equilibrium point $E_1$ will be $Q_1$ and price on its inelastic $AR_1$ curve will be set at $P_1$. Similarly, in sub-market 2, rate of quantity corresponding to equilibrium point $E_2$ will be $Q_2$ and price on its relatively elastic $AR_2$ curve will be set at $P_2$. See that $Q_0 = Q_1 + Q_2$. It can also be verified that $P_1$ and $P_2$ are not equal; rather $P_1 > P_2$ showing that a relatively elastic demand curve commands a lower price as compared to relatively inelastic one. So, for the same good the monopolist is charging two different prices in two different sub-markets which conforms to price discrimination which is mainly made possible due to different elasticities of demand in these two sub-markets.

**Determining Relative Prices**

In Lesson 1, we proved a relation between Average Revenue (AR), Marginal Revenue (MR) and Elasticity of demand as:

$MR = P (1 + 1/ E_{d)}$

Using above equation for the two subgroups with different marginal revenue curves and different elasticities, we get:

$MR_1 = P_1 (1 + 1/ E_{d1)}$ ..... (1)

$MR_2 = P_2 (1 + 1/ E_{d2)}$ .....(2)

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In the equilibrium $MR_1 = MR_2$, thus equating equations (1) and (2) we get:

$MR_1 = MR_2$

$P_1 (1 + 1/ E_{d1)} = P_2 (1 + 1/ E_{d2})$

$P_1/ P_2 = (1 + 1/ E_{d2)}/ (1 + 1/ E_{d1)}$ ..... (3)

From Equation (3) there can be two cases:

(a) If $E_{d1} = E_{d2,}$ then $P_1 = P_2$

(b) $E_{d1} | < | E_{d2} |$, $P_1 > P_2$

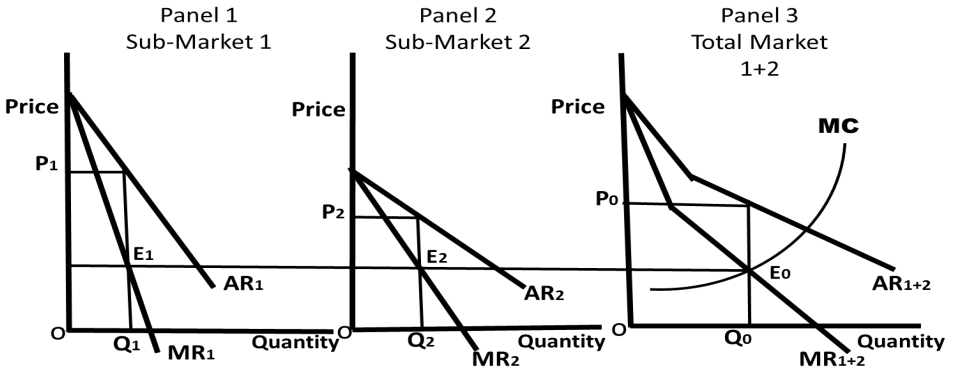


*Fig. 2.8*

## 2.6 NATURAL MONOPOLY

Natural Monopoly occurs in case of Public utilities like Electricity, water supply, telephone services, etc., where initial cost of the Plant remains higher but after that cost starts falling and output increases. That's why under Natural Monopoly Average Cost and Marginal Cost Curves are downward sloping and MC is always lower (below) Average Cost. When there are no regulations imposed on Natural Monopoly then they will Produce $Q_m$ quantity and sell at $P_m$ price. But if Natural Monopoly is regulated then the firm's Price go down to the competitive market level $P_c$ and quantity increases by $Q_c$. At the Price of $P_c$ firm would not cover average cost and firm will shut down or go out from business. So, the ideal option is to set the price $P_n$ where AC, and AR intersect each other. Here firms are not

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getting anormal monopoly profit but will produce large quantity of output $Q_n$ and without driving the firm out of business.

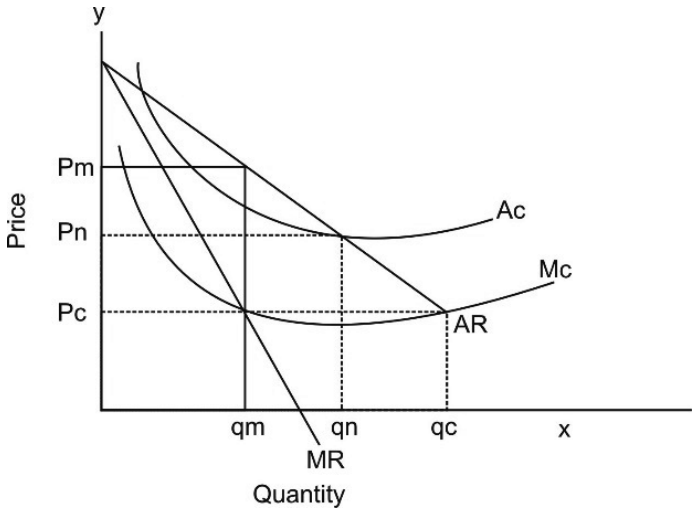


*Fig. 2.9*

## 2.7 ANTITRUST LAWS

Antitrust laws reduce market power and promote competition in market as we know that monopoly power creates social cost due to inefficient allocation of resources. Antitrust laws vary from nation to nation. But the action of these laws is generally to promote competitiveness in the business world and restrict Monopoly Power and to give (provide) protection to the consumers. Antitrust laws prohibit those actions which create monopoly or restrict competition.

Sherman Act, passed in 1890, prohibits contracts, combinations, or conspiracies in restraint of trade.

The Clayton Act (1914) prohibits mergers and acquisitions which create monopoly power.

The antitrust laws also limit possible anticompetitive behaviour of the firm.

Federal Trade commission Act (1914, amended in 1938, 1973, 1995) supplements the Sherman and the Clayton acts by increasing competition. It

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puts restrictions on unfair trade practices, and anti-competitive practices such as fraudulent advertising and labelling, agreements with retailers to exclude competing brands, and so on. Because these prohibitions are interpreted and enforced in administrative proceedings before the FTC, the act provides broad powers that reach further than those of other antitrust laws.

## 2.8 LEARNING OUTCOME

Monopoly is a market structure characterized by a single seller possessing monopoly power that it can exploit to take away the surplus from the consumers. Since the producer is gaining at the cost of consumers, there is a social cost which is known as Deadweight loss of monopoly power due to which total surplus in the market is not maximized as compared to the same under perfect competition.

The practice of capturing consumer surplus is studied under price discrimination that includes first degree price discrimination which is not that common as it involves knowledge of reservation price of the customers that is not easy to know. It is the worst form of discrimination as it takes away the entire surplus from the consumers. Then there is second degree price discrimination which is suitable in case of natural monopoly where different prices are charged for different blocks of commodities. There is also third-degree price discrimination which is the most common form of discrimination that divides the whole market into subgroups with different elasticities such that each group is homogeneous amongst itself.

Since, monopoly is not desirable for the society, the government has created Anti-trust laws to regulate such a market so that consumers can get the product at competitive price.

Natural monopoly is a market where size of the plant is bigger than size of the market. Here, the average cost is so high that regulating such a monopoly will create loss and drive it away from the market. Public utility services such as electricity generation and supply, etc., come under this category. Hence, such enterprises are normally owned by government.

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## 2.9 SELF ASSESSMENT QUESTIONS

**Check your progress**

**Exercise 1: True and False**

1. In monopoly there is no dead weight loss.
2. Second degree price discrimination is applicable in case of Natural monopoly.
3. There is no loss to the producer surplus in conversion of perfect competition to monopoly.
4. Perfect First degree price discrimination is the most common form of discrimination by the monopolist.
5. In third degree price discrimination elasticity of two sub markets should be different.
6. Peak load pricing and inter temporal pricing are one and the same thing.

**Ans.** 1(F), 2(T), 3(F), 4(F), 5(T), 6(F)

**Exercise 2: Fill in the Blanks**

1. Perfect first degree price discrimination uses ...…….. to differentiate between different types of consumers.
2. The net loss to the society because of monopoly is called ...……..
3. A simple monopoly charges ...…….. price for its product from all consumers.
4. Producer surplus is the difference between equilibrium price and ...……..

**Ans** 1. Reservation Price 2. Deadweight loss 3. Same 4. Marginal cost curve

**Exercise 3: Questions**

1. Explain the differences between perfect competition and monopoly.
2. Explain third degree price discrimination. When is it successful?
3. What is the cost that society has to bear because of monopoly?

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# LESSON 3
# MONOPOLISTIC COMPETITION

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**Structure**



## 3.1 INTRODUCTION

Perfect competition and monopoly are far removed from the real world market situations. These two extremes are only theoretical constructs made to simplify analysis. Competition and monopoly are matters of degree rather than of monopoly and competition in different degrees. Price taking (i.e., complete absence of individual influence on the market price) and full freedom of entry and exit of capital from the industry are the two basic features of perfect competition. The conditions necessary to ensure the above-mentioned features have already been explained in sufficient detail. Whenever, one or more of the conditions necessary for perfect competition are violated, competition becomes imperfect. For example, the number of buyers and sellers may not be very large and as a result an individual buyer or seller may be able to exercise some "influence over the market price of the product by increasing or decreasing his sales or

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purchases. Number of producers may be small due to a variety of reasons such as economies of scale, initial cost disadvantage, difficulties in mobilizing the required quantum of capital, and so on. Secondly, the products of different sellers may not be identical in the eyes of the buyers (i.e., there may be real or imaginary differences between the products of different producer). Thirdly, buyers may not have perfect knowledge about the price offers of different producers. Or they may be aware of the price offers of different sellers but because of transport costs involved due to the locations of different sellers or simply because of inertia or irrational preferences), they may be reluctant to shift their purchases from one seller to another. Finally, quite apart from inertia ignorance, customers have a number of good reasons for preferring one seller to another. Different customers are affected differently by factors such as the guarantee of quality provided by a well-known name or brand, difference in facilities provided by different sellers' quickness of service, good manners of salesmen, length of credit, attention paid to individual wants, advertisement, etc. Thus, there can be several reasons for imperfection of competition.

## 3.2 LEARNING OBJECTIVES

- To explain the features of monopolistic competition
- To differentiate between perfect competition, monopoly and monopolistic competition
- To explain the slope of AR and MR curves under monopolistic competition
- To understand the existence of normal profit in the long run under monopolistic competition
- To find out the inefficiency of monopolistic market
- To measure excess capacity of firm under monopolistic competition

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## 3.3 FEATURES OF MONOPOLISTIC COMPETITION

Let us discuss the features of monopolistic competition.

1. There are large number of buyers and sellers in the market.
2. Product Differentiation and Close Substitutes: Unlike perfect competition, the firms under monopolistic competition sell differentiated products which are close substitutes of each other. Close substitute products are those products whose uses, production technology and respective prices are almost similar. However, these products can be different in terms of presentation, style, packaging, colour and branding, etc. For example, take the product toothpaste. There are several varieties of toothpastes available in the market whose use is same. The prices and production technologies are also not very different. However, two different toothpastes differ in terms of style, taste, colour and branding.
3. Selling Cost: Firms under monopolistic competition incur selling cost besides production cost in the form of advertising, dealership or for adoption of other marketing strategies. The aim is to create an edge over other firms in the market with respect to profit making, having larger market share, etc.

   Both product differentiation and selling cost give a particular firm some degree of monopoly power in the market to compete with other firms, hence the name monopolistic competition.
4. There is free entry and exit from the market.
5. Price and Non-price competition: Firms under monopolistic competition are seen to be indulging in both Price and Non-price competition. Price competition takes the form of price cutting or offering discounts while non-price competition can take the form of attracting customers by offering gifts, buy one get one offers, giving more of free quantity, etc.
6. There is lack of perfect knowledge about cost of product, demand and other market conditions.

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7. There is absence of perfect mobility of factors in the market due to lack of perfect knowledge.

## 3.4 AVERAGE AND MARGINAL REVENUE CURVES UNDER MONOPOLISTIC COMPETITION

The essential feature of imperfect competition is that an individual producer exercises some control over the market price of his product but this control is not as much as under monopoly. In other words, the elasticity of demand for the product of an individual producer at any price is higher compared to the elasticity of market demand. The entry and exit of firms into and out of the industry is assumed to be free under imperfect competition, but because of various reasons explained earlier the number of firms cannot be large enough to eliminate completely an individual firm's control over price. Thus, as under monopoly, under imperfect competition also the AR curve of firm will be downward sloping and the MR curve will lie below it. However, compared to a monopolist's AR and MR curves, the AR and MR curves of a firm under imperfect competition will slope downwards less steeply for the simple reason that by lowering its price the firm can always attract some customers from its rivals, whereas, by definition, a monopolist has no rival sellers at all. Freedom of entry and exit of firms under imperfect competition implies that in the long run price of the product will equal average cost and the firms in the industry will earn only normal profits, i.e., normal earnings of management already included in average (total) cost as an element of fixed costs. The AR and MR curves of a firm under imperfect competition are shown in Figure 3.1.

In the Figure 3.1, the AR curve shows the different quantities that can be sold in the market at different prices. The MR curve on the other hand shows the additional revenue that the firm gets by selling an additional unit of the commodity. Due to product differentiation and close substitute products, the AR and MR curves are price elastic or flatter under monopolistic competition as against the inelastic demands seen under monopoly (Figure 3.1).

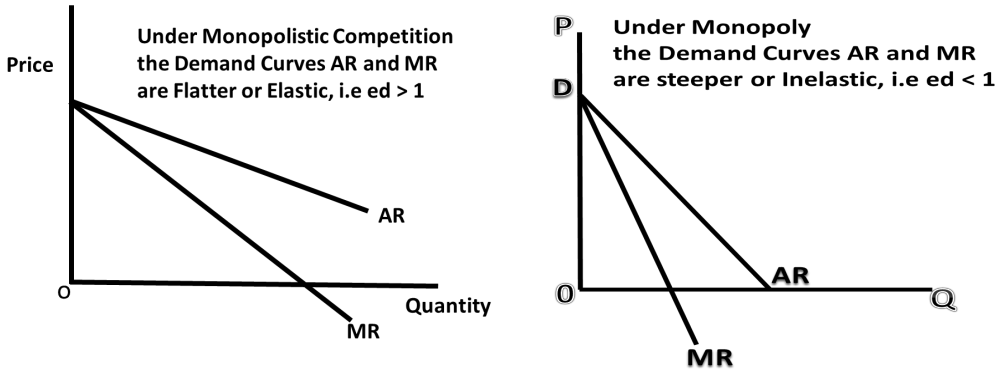


*Fig. 3.1*

**In-Text Questions**

Choose the right answer.

A. Demand curves under monopolistic competition are Elastic/Inelastic.

B. Monopolistic competition is identified with close substitutes / no substitutes.

## 3.5 EQUILIBRIUM OF A FIRM UNDER MONOPOLISTIC COMPETITION

Monopoly and perfect competition are two extreme market forms. As pointed out earlier, pure monopoly and perfect competition do not represent the real world market situations. Real world market situations are characterized by a blend of monopoly and competition in different degrees. Like monopoly, imperfect competition also is typically characterized by a downward sloping AR curve. The corresponding MR curve lies below the AR curve.

We have the same set of cost curves whatever the market situation.

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## Short Run Equilibrium

Given the cost and revenue curves, equilibrium requires the satisfaction of the same condition, that is:

(1) MC = MR

(2) MO > MR beyond the point of their equality

Figures 3.2 and 3.3 below depict two possible short-run equilibrium positions of a firm under imperfect competition.

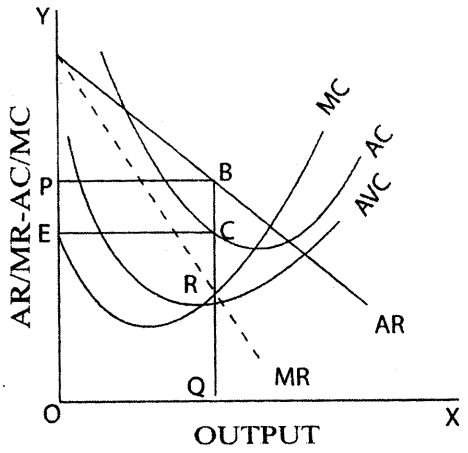


*Fig. 3.2*

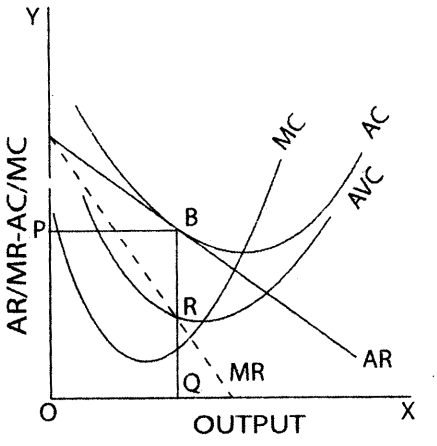


*Fig. 3.3*

In the Figures 3.2 and 3.3, the intersection of MC and MR curves determines the firm's equilibrium at point R. Figure 3.2 depicts an equilibrium position in which the firm is earning abnormal profits equal to the area of the rectangle PEBC because price OP = (QC) is higher than average cost (=QB). Figure 3.3, on the other hand depict an equilibrium position in which the firm is incurring losses equal to the area of the rectangle PEBC because price OP (=QC) falls short of the average cost (= QB) by BC. BC represents the loss per unit. Price being greater than the average variable cost provides justification for continuing production in this case. Equilibrium with abnormal profits or losses are possible in short-run situations.

**Long Run Equilibrium**

**NOTES**

Unlike monopoly freedom of entry and exit of firms from the industry is the distinguishing feature of imperfect competition. Therefore, equilibrium positions with abnormal profits or losses are sustainable only in the short run but not in the long run. If the firms in the industry are earning abnormal profits and if this situation is expected to persist in the long run, this will attract new firms into the industry. As more firms enter the industry, the given market demand for the product will be shared by a larger number of firms so that each will have a smaller share of the market demand. As a result, at any given price an individual firm will be able to sell less than before. In other words, as a result of the influx of new firms into the industry, each firm's AR curve (i.e., the demand curve) will shift leftward. This process will continue so long as there are any abnormal profits to be earned in the industry. Ultimately the firm's AR curve becomes tangential to the U-shaped average cost curve at some point on its falling portion. When AR curve becomes tangential to the average cost curve, price equals cost and thus, abnormal profits are completely wiped out. Figure 3.4 shows how, because of the influx of new firms into the industry firm's AR curve is pushed leftward and ultimately becomes tangential to the average cost curve.

Figure 3.2 depicts a possible short run equilibrium position in which the firm is earning abnormal profits equal to the area of the rectangle PECB. Because of the influx of new firms into the industry, the firm's AR curve is pushed leftward and ultimately (as shown in Figure 3.4) becomes tangential to the average cost curve at B. At B price average cost and the firm earns only normal profits. When firms in the industry earn only normal profits, there is no incentive left for new firms to enter into the industry.

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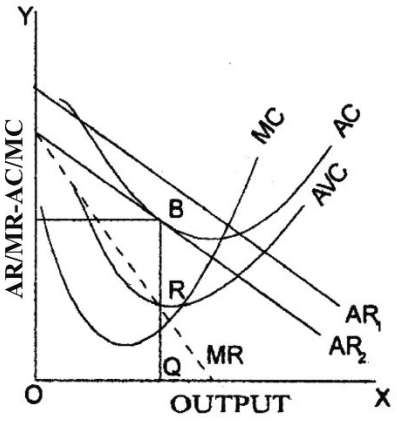


*Fig. 3.4*

On the other hand, if firms in the industry are incurring losses, and when this situation is expected to persist in the long run, firms start leaving the industry for better prospects elsewhere. With the exit of some of the firms from the industry, the given market demand for the product comes to be shared by fewer firms and their AR curves shift rightward. The process of the exit of firms from the industry and the resulting rightward shift of the AR and MR curves continues till the AR curves ultimately becomes tangential to the U-shaped average cost curves on their falling portions. When AR curve becomes tangential to the average cost curve and a firm earns only normal profits, it is said to be in its long run equilibrium. When all firms in the industry earn only normal profits, there is no incentive for firms to leave the industry and the number of firms neither tends to increase nor tends to decrease. When this situation takes place, the industry is said to be in its long run equilibrium.

## 3.6 EXCESS CAPACITY UNDER MONOPOLISTIC COMPETITION

We saw that the firms under both perfect as well as imperfect competitions earn normal profits in the long run by selling at a price equal to the long run average cost (LAC). However, the difference is that while price under perfect

**NOTES**

competition equals minimum of LAC where output is larger, the price under imperfect competition is determined at a point where LAC is still falling. This means that the LAC is not minimized under imperfect competition at equilibrium. Minimization of LAC is called productive efficiency. So, by not minimizing LAC and producing on the falling portion of LAC the imperfectly competitive firm produces less than competitive output by not utilizing its plant capacity. So imperfectly competitive firm is productive inefficient while competitive firm is productive efficient. This is also referred to as excess capacity of imperfect competition which is measured as the difference between output produced at the minimum point of LAC, i.e., competitive output and the output produced at some point on the falling portion of LAC even though it corresponds to equilibrium between MR and MC under imperfect competition.

Figure 3.5 shows the situation of excess capacity.

In the Figure 3.5, the long run average cost curve is shown as LAC. A firm under imperfect competition produces at point A on LAC where LAC is still falling and tangent to its demand curve ARM. The output of imperfectly competitive firm is $Q_1$. On the other hand, a competitive firm produces $Q_0$ at the minimum of LAC curve. The range AB on LAC curve showing the difference in output as $Q_0 – Q_1$ is the measure of excess capacity.

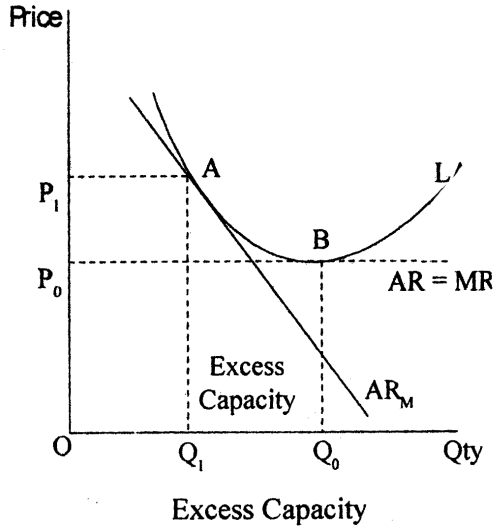


***Fig. 3.5***

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## 3.7 PERFECT VS MONOPOLISTIC COMPETITION: A COMPARISON

A horizontal AR/MR curve of an individual firm may be said to be the hallmark of perfect competition. On the other hand, a downward sloping AR curve of an individual firm characterizes all other market forms. The MR curve corresponding to a downward sloping AR curve is also downward sloping and lies below the former throughout. The differences in the equilibrium quantities (prices, output, MC/price relationship, etc.) under perfect competition and under other market forms arise because of the differences in the shapes of the AR and MR curves. The differences are given briefly below:

(1) Equality of MC and MR determines the equilibrium of a firm under all market conditions. However, under perfect competition, by definition, AR always equals MR. By implications, therefore, MC = MR = AR (price) in equilibrium. Thus, under perfect competition, price equals MC. On the other hand, under imperfect competition, MR being always less than AR (price), price is necessarily higher than MC as well as MR.

(2) Under perfect competition, a single price prevails in the market and all firms equate their MCs with the market price. By implication, the MCs of all firms in the industry are equal. Equality of MCs ensures efficiency in the industry. However, under imperfect competition there is no single price ruling in the market and the AR and MR curves of different firms differ in their shapes and locations. Therefore, MCs of different firms are normally different. This is said to be an indicator of inefficient use of resources.

(3) Under perfect competition as well as under imperfect competition, long-run equilibrium of a firm requires (i) MC = MR and (ii) AC = AR. However, under perfect competition, by virtue of the identity between AR and MR, in long run equilibrium MC = MR (= AR) and AC = AR (=MR) necessarily implies that MC = MR = AR = AC. Thus, in long run equilibrium under perfect competition price (AR) equals MC as well as AC. MC equals AC only at the lowest point of the AC curve, therefore, under perfect competition in long-run equilibrium

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price of a commodity equals its minimum average cost. (You may recall under perfect competition in long run equilibrium the horizontal AR/MR curve becomes tangential to the U-shaped AC curve necessarily at its lowest point).

Even though under imperfect competition (as under perfect competition) long-run equilibrium requires MC = MR and AC = AR. By virtue of the MR curve always lying below the AR curve, MC will necessarily be less than AC. MC is less than AC when the latter is falling. This implies that under imperfect competition long-run equilibrium will take place on the falling portion of the AC curve, in other words, in long run equilibrium under imperfect competition price will necessarily be higher than the minimum average cost.

(4) As explained above, under perfect competition long-run equilibrium takes place necessarily at the lowest point on the AC curve whereas under imperfect competition it takes place to the left of the lowest point on the AC curves. From this, it follows that level of output under perfect competition will be optimum while under imperfect competition it will be less than optimum. In other words, under imperfect competition productive capacity is underutilized.

## 3.8 LEARNING OUTCOMES

In this lesson you have learned the following:

1. Monopolistic competition is a market structure wherein large number of firms sell differentiated products which are close substitutes.
2. Due to above point, AR and MR curves are elastic or flatter in shape.
3. Firms incur selling cost in the form of advertising etc.
4. In the short run firms under monopolistic competition may earn normal or abnormal profits, even loss. But in the long run there is normal profit.
5. There is existence of excess capacity under monopolistic competition as firms operate on the falling portion of long run cost curve and do not utilize full capacity as seen under perfect competition.

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**Terminal Questions**

1. What are the features of monopolistic competition? How are they different from perfect competition?
2. Explain determination of short run and long run equilibrium of firm under monopolistic competition.
3. Write a short note on excess capacity under monopolistic competition.

## 3.9 RECOMMENDED READINGS


- Mankiw, N. G. (2018). Principles of Microeconomics 8th ed.
- Bernheim, B., Whinston, M. (2009). Microeconomics. Tata McGraw-Hill.

NOTES

# LESSON 4
# OLIGOPOLY

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Professor
School of Open Learning
University of Delhi

**Structure**



## 4.1 LEARNING OBJECTIVES

- To understand the concept of oligopoly
- To differentiate between different types of oligopoly
- To determine the nature of demand curve in case of oligopoly
- To comprehend various models of non-collusive and collusive oligopoly

## 4.2 INTRODUCTION

Monopoly and perfect competition are those types of market structures which are at the two ends of a market continuum and do not really exist except in case of monopolies that are owned and regulated by the state. The types of markets that actually exist consist of firms that belong to either monopolistic competition

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or oligopoly. While in monopolistic competition there are many firms selling products that are differentiated but are close substitutes of each other and there is no barrier to entry or exit, but in case of oligopoly there are few large firms that sell products which can be homogeneous or differentiated and there are strong barriers to entry and exit. Both monopolistic and oligopoly firms have monopoly power that enables them to be the price makers unlike the firms in perfect competition that are just the price takers. This lesson would talk about oligopoly and its different types that are actually seen in the market along with deriving equilibrium in case of collusive as well as non-collusive oligopolies.

## 4.3 FEATURES OF OLIGOPOLY

Oligopoly has been derived from Oligo + Polein, Oligo meaning few and polein means to sell. Oligopoly can thus be defined as: "A market structure characterized by few large sellers selling homogeneous or differentiated products, having strong barriers to entry and exit and firms recognize their mutual interdependence." When oligopolist firms are selling homogeneous products, it is called pure oligopoly and if they are selling differentiated products then it is called impure oligopoly. In case there are just two sellers in the oligopolist market structure then it is a special case called Duopoly.

**Characteristics of Oligopoly**

1. **Few Large Sellers**: Oligopoly consists of just few sellers that control the whole market and hence the market share of each seller is quite large.
2. **Homogeneous or Differentiated Products:** Oligopoly can be pure oligopoly where the sellers are selling homogeneous products like in the case of LPG cylinders or it can be impure oligopoly where sellers are selling differentiated products like in case of automobile industry. An important point to note here is that differentiation can be real (where the composition of the products is actually different) or perceived (where there is no actual difference between the products, but consumers perceive it to be different because of aggressive advertisement, etc.)

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3. **Strong Barriers to Entry and Exit:** New firms are not prohibited from entering the market though there are strong barriers that hinder their entry, it can be because of the cost advantage of the existing firms, economies of scale that existing firms enjoy or huge capital requirements or any such reason.
4. **Interdependence:** This is one of the most significant and distinguishing features of oligopoly firms, that arises because of the fact that there are few firms and share of each firm is quite significant, thus if any firm changes its strategy with respect to price, promotion or any such variable it is bound to impact the other firms and they would retaliate. Therefore, each firm before bringing a change in any of its variables should consider the possible reaction of the rival firms.
5. **Advertisement:** It is one of the instruments that the oligopoly firms frequently use and it is one of the most powerful weapons that they can use against the rivals. Instead of changing the prices often, firms go for this as prices are usually rigid because of the fear that price changes can lead to a price war.

## 4.4 BEHAVIOUR OF OLIGOPOLY FIRMS

There are instances of both co-operation and competition among firms under oligopoly. They are explained below. There could be distinctive behavioural pattern in the long run as well.

**Co-operation: Types of co-operative behaviour**

In order to avoid uncertainty arising out of interdependence and to avoid price war and cutthroat competition, firms under oligopoly often enter into some agreement about determining uniform price and output. The agreement can be of the following two types.

**Explicit Collusion:** It is a situation when firms under oligopoly do formal (explicit) agreement to determine uniform price and output and maximize their

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joint profit. Such agreements at international level is called Cartel, many such agreements have taken place in the past. The best example of a cartel in the past is that of OPEC - Oil Producing and Exporting Countries. Saudi Arabia and other countries after 1973 formed a cartel. An individual firm always has incentive to cheat. Possibility of cheating is larger if the number of firms is large. Cheating by a small firm has negligible effect on the market price.

**Tacit Co-operation:** When firms co-operate without any explicit agreement is called tacit co-operation. For example, if firm A produces one-half of monopoly output hoping that firm B will do the same and firm B does so then they achieve the co-operative equilibrium without any formal agreement.

**Competition: Types of competitive behaviour**

In the absence of formal or informal agreements about co-operation, firms under oligopoly compete with each other. Competitive behaviour under oligopoly can be of following types:

- **Competition for market share:** Firms under oligopoly always compete with each other for market share. They use various forms of non-price competition such as advertising, quality products, etc., to increase their market share. For example in Delhi major mobile service providers like Airtel, Vodafone and Reliance Jio compete for increasing their mobile connections.
- **Covert Cheating:** In oligopoly, because of huge market share, firms sell their products through contract. Large scale production and distribution is done through contracts. When firms provide secret discounts and rebates to their buyers to increase sales is called covert cheating.
- **Very long-run competition:** Under oligopoly, firms often change the characteristics of their products. They keep innovating to improve the quality of their products and try to capture majority of market share. It can be possible only when a firm decides to compete for a long period. Firms sometimes cut their prices in the short-run to capture market share, it helps them to enjoy exclusive market power and profit in the long-run.

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**Long-Run Behaviour: the Importance of Entry Barriers**

In the long run, when oligopolistic firms earn abnormal profits by increasing their prices over and above total average cost, new firms are attracted to this industry. In such a situation, entry barriers become important for the existing firms to sustain the abnormal profits. In the absence of natural oligopolists do create barriers to restrict the new firms.

Some of the firm-created barriers are as follows:

(a) **Brand Proliferation –** It is a situation when the existing firms under oligopoly produce multiple products with differentiated features and capture major share in the market due to their brand image. For example in the automobile industry all existing branded companies produce various models of cars with different features. It becomes difficult for a new firm to compete with the existing multi product branded firms. New firms entering the market with single product can fetch very share in the market. Through advertisement and innovative marketing strategies consumers are made so brand savvy that they do not want to buy non-branded (local) products. Branded products are considered superior than the non-branded products.

(b) **Set-up Costs –** Oligopolistic firms can restrict entry of new firms by imposing high fixed cost. This becomes possible in an industry where sales are promoted by huge advertisement. Oligopolistic firms spend a huge amount on advertisement to shift the demand in their favour. New firms can not afford to spend such a huge amount in the beginning with a little share in the market. Chances of loss always keep the new firms away in such a situation.

(c) **Predatory Pricing –** It is a situation when the existing firms in oligopolistic market cut their prices below costs when they expect that new firms will enter the market. A new firm will not enter the market if it expects losses after entry. New firms are often discouraged by the existing firms through predatory pricing. This strategy may be costly since the existing firms need to cut the price below the average variable cost in the short run but it creates profit as well as good reputation in the long run for the existing firms.

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## 4.5 EQUILIBRIUM IN OLIGOPOLY

Equilibrium is a position of rest where there is no tendency to change on the part of the firms. The price and quantity are determined in such a manner that the profits are maximized, and it is set where the marginal revenue and marginal cost curves intersect. However, in case of oligopoly the situation is not that easy because of the fact that there is no one to one relation between price and quantity demanded as when a firm changes its price because of the characteristic of interdependence, the rival firms are bound to react but how they would react remains uncertain and therefore how much would be the impact of their decision on the quantity demanded of the firm that changed its price also remains uncertain. Thus, the demand curve of an oligopolist firm is indeterminate which makes the equilibrium determination a tedious task. To solve this problem various economists have given models based on different set of assumptions that determine the equilibrium of an oligopolist firm. It can be broadly divided into:

1. Non-Collusive Oligopoly
   (a) Cournot Nash Equilibrium Model
   (b) Stackelberg Model
   (c) Sweezy's Kinked Demand Curve Model
2. Collusive Oligopoly
   (a) Cartels
   (b) Price Leadership Models

First let us talk about the non-collusive oligopoly models.

## 4.6 MODELS OF NON-COLLUSIVE OLIGOPOLY

### Cournot Model

The model was given by Augustin Cournot in 1838 based on only two firms that were selling homogeneous products (spring water). It is based on the following assumptions:

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1. It is a duopoly model, i.e., there are only two firms.
2. Firms do not recognize their interdependence or rivalry and act independently.
3. The marginal cost of production of both the firms is zero, that is MC = 0.
4. Straight Linear demand curves.
5. Objective of the firms is profit maximization.
6. Both the firms decide simultaneously how much to produce.
7. *Each firm treats the output level of its competitor as fixed when deciding how much to produce*. – Most important assumption of Cournot model

Based on these assumptions we can find out how both the firms decide about their equilibrium. This model makes use of the reaction curves to find out the simultaneous equilibrium of the firms under duopoly. In Figure 4.1, D is the market demand curve that the two firms are facing and its corresponding marginal revenue curve is MR. MC is the marginal cost that is a horizontal straight line parallel to x axis showing that MC is constant. Now to find out the reaction schedule of the two firms, we assume that Firm 2 is not producing anything, so the entire market demand is the demand that firm 1 is facing. Firm 1 can produce and sell 200 units, that is where market demand curve and supply curve given by MC intersect each other but this would not be the profit maximizing output as profits would be maximum when MR = MC which occurs if the firm is producing and selling 100 units. Similarly, if we assume that firm 2 is producing and selling 100 units then the demand curve of the firm 1 becomes $D_1$ as maximum market demand that it can cater now is 100 units the remaining 100 is already taken by firm 2. The corresponding marginal revenue curve is $MR_1$ and profit maximizing output is 50 units. If Firm 2 is producing and selling 150 units then firm can sell maximum of 50 units (200– 150) and so its demand curve now is $D_2$ with corresponding marginal revenue curve being $MR_2$. Profit maximizing output is 25 units where $MR_2$ intersects MC. Thus, the above situation can be plotted in the form of a graph and reaction schedule as shown in Figure 4.1and Table 4.1, respectively.

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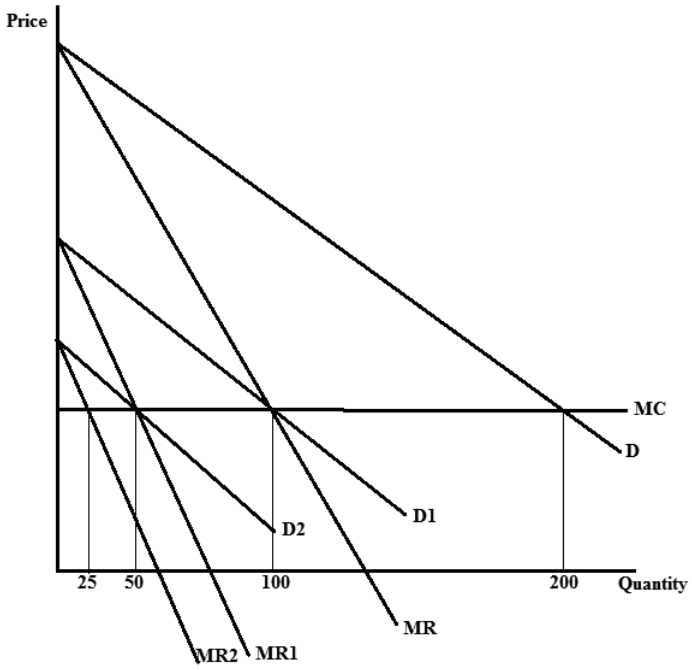


*Fig. 4.1*

***Table 4.1*** *Reaction Schedule of Firm 1*

| Assumed Output of Firm 2 | Profit Maximizing Output of Firm 1 |
|---|---|
| 0 | 100 |
| 100 | 50 |
| 150 | 25 |
| 200 | 0 |

Similarly, we can have the reaction schedule for Firm 2 and when the reaction schedules are plotted on a graph, we will get the reaction curves. The point of intersection of the two reaction curves is the Cournot Equilibrium determining the output of the two firms as is shown in Figure 4.2.

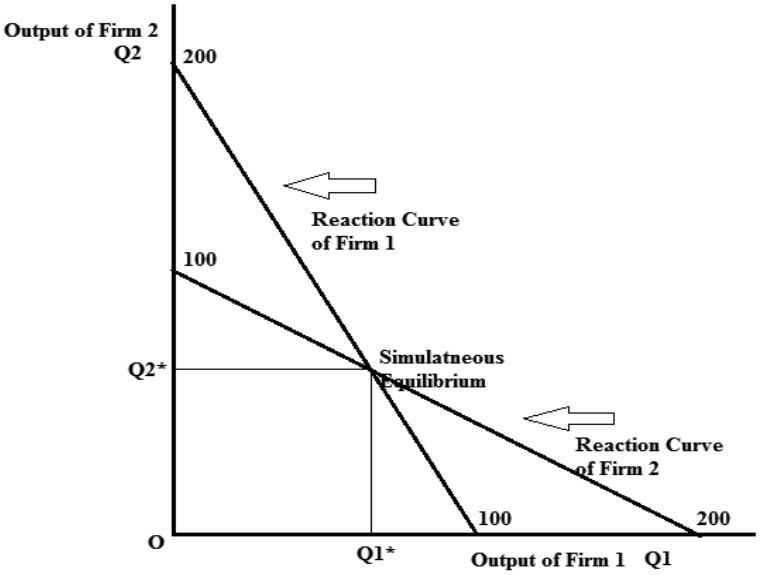


***Fig. 4.2***

Limitations of the Cournot Model:

1. The basic and most important assumption that both the firms of the model set their output independently is quite unrealistic.
2. The firms compete only on the basis of quantity as they keep the variable price outside the competition but how long this can continue is questionable.
3. The length of the adjustment process that is how much time the firms would take to reach the final equilibrium has not been discussed anywhere in the model.

## STACKELBERG MODEL – FIRST MOVER ADVANTAGE

Cournot model assumed that both the firms set their output simultaneously however Stackelberg model assumes that the firms do not take their decision

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simultaneously. There are two firms in this model where one sets its output first and then the second firm enters. This model is based on the following assumptions:

1. Duopoly model– Two firms A and B
2. Straight linear demand curves
3. There is zero marginal cost for both the firms.
4. One firm is the leader that sets its output first and the second is the follower who is behaving as per Cournot assumption (assumes that the leader would keep its output constant). A firm can act as the leader because of its knowledge, experience or sophistication.
5. There is no collusion between the firms, both the firms act independently.
6. Both the firms are selling homogeneous products.

The model is thus an attempt to find answer to two questions:

1. Is it advantageous to enter the market first?
2. How much output would each firm produce?

**Cournot vs Stackelberg:** A question now arises is that out of the two models both of which belong to non-collusive oligopoly, which one is more suitable. The answer depends on whether the industry comprises of the firms that are similar, of equal size and none having a leadership position, Cournot model is more suitable, whereas in an industry where one firm has a sophisticated (leadership) position over the others, Stackelberg model should be preferred.

## SWEEZY'S KINKED DEMAND MODEL

Paul Sweezy gave the kinked demand curve model in 1939 based on the great Depression of US that showed that the prices in an oligopoly market structure are sticky (rigid), firms here recognize their interdependence but act without collusion. The model lays more emphasis on explaining the stickiness of prices rather than to determine the equilibrium price and quantity. Sweezy showed that during depression if any firm increased its price, no other firm would follow and hence the reduction in the quantity of the firm that raised the price would be huge as majority of the customers would shift to the competitors whereas if firm reduced its price, all the other firms would follow and hence change in the

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quantity would be little. This is the reason behind the kinked demand curve as it consists of two segments – one that is relatively elastic (with price increase) and the other relatively inelastic (with price decrease). The kink is at the existing price and that is where the prices remain stuck. This can be explained using the Figure 4.3.

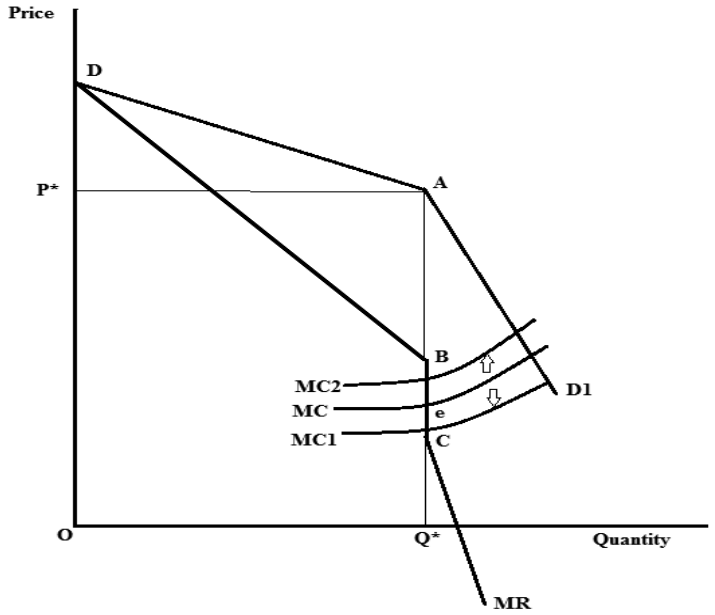


***Fig. 4.3***

Figure 4.3 shows that demand curve consists of two segments – one that is relatively elastic which is above the equilibrium price of OP* showing that if the firm increases its price above OP* then none of the other firms would follow it and hence only its quantity would reduce. It is represented by segment 'DA' of the demand curve. However, the other segment is '$AD_1$' which is relatively inelastic showing that if firm reduces its price all other firms would follow and hence the change in its quantity would be little. Thus, combining both the demand curves we get a kinked demand curve $DAD_1$ where kink is at the prevailing price. The corresponding marginal revenue curve (MR) is actually a combination of three segments:

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1. DB, which is the marginal revenue corresponding to DA segment of the demand curve.
2. CMR, which is the marginal revenue corresponding to $AD_1$ segment of the demand curve.
3. The gap between the two segments of the marginal revenue curves is joined by drawing a vertical straight line that is BC and it is below the kink. It is because of this vertical stretch of the marginal revenue curve that the prices are rigid, as even if the marginal costs shift up or down but is within this stretch, the equilibrium does not change making the prices sticky.

The profit maximizing output is obtained by equating the marginal revenue with marginal cost (MR = MC), equilibrium is at point 'e' where the price is OP* and quantity is OQ*. If marginal cost increases to $MC_2$ then also the equilibrium price and the quantity are same. If marginal cost reduces to $MC_1$ then also there is no change in equilibrium price and quantity. This shows that why prices are sticky in an oligopoly market structure.

**Limitations of the model**

1. The model is applicable in the times of depression and does not talk about the boom period.
2. The model said that kink is at the prevailing price but how that prevailing price is obtained is not clear.
3. Economist Stigler found the model to be empirically unfit to be tested.
4. The model talks about movement of marginal cost within the vertical stretch, it does not talk about what would be the change in the equilibrium if marginal cost moves beyond the vertical segment.

## 4.7 SUMMARY

Oligopoly is a market structure with the presence of few sellers and each seller having a large market share. The most distinguishing feature of oligopoly is the

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recognition of mutual interdependence. Firms know that their actions would not go unnoticed by the competitors and hence the counter strategy that the rivals take have to be considered before bringing any changes in the existing variables. The demand curve of an oligopolist is indeterminate because of the inability to predict the rival's behaviour and its impact on the firm itself. Economists however have given various models which are based on certain assumptions about the rival's reaction. All these models can be broadly divided into collusive and non-collusive. This lesson has talked about the non-collusive model in which firms recognize their interdependence but do not collude. There are three models under this category namely, Cournot Duopoly model, Stackelberg first mover advantage model and Paul Sweezy's Kinked demand curve model. All these models talk about how firms reach their equilibrium position after taking into consideration the rival's action. Cournot suggested that in case there are two firms selling identical products with zero cost of production, both firms would simultaneously decide to produce an output that would be ultimately equal. Stackelberg however showed that the first mover to the market is benefited as it is able to sell an output that is double as compared to the follower. Paul Sweezy did not only talk about the equilibrium determination but also showed that during the times of recession, firms usually keep their prices fixed and compete on the basis of non-price variables as frequent price changes may lead to price war which is not beneficial for the market as a whole.

## 4.8 SELF ASSESSMENT QUESTIONS

**Check your progress**

**Exercise 1: True and False**

1. Cournot model makes use of the reaction curves to obtain its equilibrium.
2. The demand curve of an oligopolist firm is downward sloping.
3. Sweezy model is applicable during Depression as well as Boom periods.
4. Stackelberg shows that the first mover has an advantage over the followers in terms of higher output and profits.

**Ans.** 1(T), 2(F), 3(F), 4(T)

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**Exercise 2: Fill in the Blanks**

1. Sweezy model assumes that the shape of the demand curve is …….
2. Cournot assumes the marginal cost of the firms to be …….
3. The demand curve of a firm in oligopoly is ……..
4. Oligopoly that sells perfectly homogeneous products is known as ……. oligopoly.

**Ans.** 1. Kinked 2. Zero 3. Indeterminate 4. Pure

**Exercise 3: Questions**

1. Explain the difference between monopoly and Oligopoly.
2. If P = 20 – Q where Q = total output $Q_1 + Q_2$ and marginal cost is zero. Calculate Cournot equilibrium and compare it with the Stackelberg model.
3. Explain what is meant by Oligopoly and how it is different from other market structures.
4. What is the shape of the demand curve in case of Oligopoly?
5. What is the difference between Cournot and Stackelberg model?
6. Why are prices sticky in an Oligopoly?

## 4.9 RECOMMENDED READINGS


- Mankiw, N. G. (2018). Principles of Microeconomics 8th ed.
- Bernheim, B., Whinstton, M. (2009). Microeconomics. Tata McGraw-Hill.

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# LESSON 5
# COLLUSIVE OLIGOPOLY

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**Structure**



## 5.1 OBJECTIVE

- To differentiate between different types of Collusions possible in case of Oligopoly
- To understand various models of Collusive Oligopoly
- To comprehend Sales Revenue Maximization model of Baumol

## 5.2 INTRODUCTION

Oligopoly, a market structure having few sellers with each having a large market share, provides the firm with the power to set their prices depending upon the monopoly power that each firm enjoys. Here the firms have the option to compete with one another as they recognize that they are mutually interdependent, or

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they can collude and enjoy monopoly benefits. The former known as non-collusive oligopoly models have been discussed in the previous lesson and this lesson would talk about the models of collusive oligopoly. This collusion can be explicit or implicit. Explicit collusion is where firms have proper written, formal agreement amongst themselves to collude, though these types of collusions are usually not permitted by the countries. Implicit collusion on the other hand is said to be where there is no written formal agreement between the firms but they implicitly collude and work in tandem to avoid the costs of competition and reap the benefits of monopoly.

## 5.3 MODELS OF COLLUSIVE OLIGOPOLY

Collusive Oligopoly can be divided into two parts:

1. Implicit collusion
   (a) Price Leadership by a Dominant Firm
2. Explicit Collusion – Here we have the following models:
   (a) Cartels : OPEC and CIPEC
   (b) Centralized Cartel

**Implicit Collusion – Price Leadership Model**

A form of collusion where the firms try to avoid the uncertainty related to the rival's action is Price Leadership model where one firm sets the price and others follow it not because it is obligatory but because it is implicit, as otherwise it would create unnecessary competition and reduce the combined profits. There can be various types of price leadership, the most common are as follows:

1. **Price Leadership by a Low cost firm –** Here the firm that has the least cost act as a leader and the other firms follow the price changes.
2. **Barometric Price Leadership –** A firm, that is considered to be the barometer of the economy as it can gauge the economic environment in a better way as compared to other firms because of its learning or experience, is considered a price leader which is then followed by the other firms for the price changes.

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3. **Price Leadership by a Dominant Firm –** A firm having the dominant (largest) market share acts as the price leader and other small (fringe) firms accept the price that it sets. A dominant firm is the one that has the largest market share in terms of total sales. Here, the dominant firm sets the price according to its profit maximizing criteria but after taking into consideration the supply response of the fringe firms at different prices. Thus, dominant firm is the price maker and the other smaller firms are just the price takers.

**Explicit collusion**

From Implicit collusion, now we move to the Explicit collusion and the most common one is Cartels. Cartels would be studied under three heads as given below:

1. **OPEC –** Organization of Petroleum Exporting Countries. It was formed in 1960 and presently has 14 countries that are part of this cartel.
2. **CIPEC –** Intergovernmental Council of Countries Exporters of Copper. It was formed in 1967 and presently has 8 members.
3. **Centralized Cartel –** When all the firms in an oligopoly join the explicit cartel, it is known as centralized cartel.

**OPEC: Organization of Petroleum Exporting Countries**

OPEC is a cartel of oil and captures majority of the oil reserves of the world. It is an explicit cartel where there is a written formal agreement between the countries to abide by the price set and other regulations. It is an example of a cartel that has been successful in raising the prices for the firms than what would have been there if there was pure competition. It can be explained using Figure 5.1:

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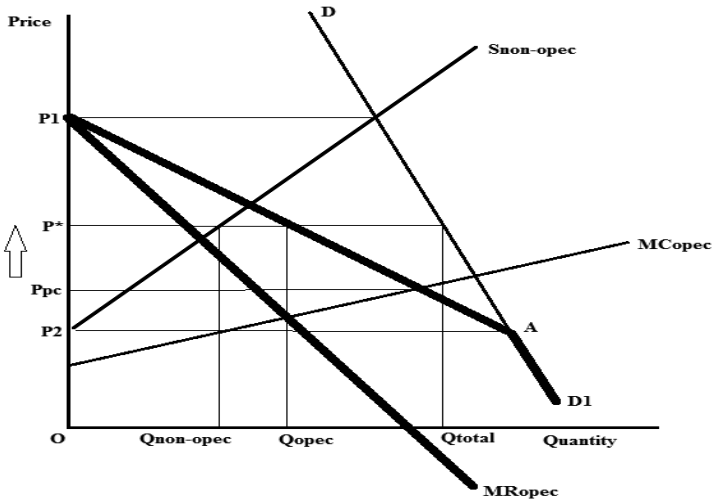


*Fig. 5.1*

$DD_1$ is the market demand curve of oil which is relatively inelastic as there is no substitute of oil; $S_{non-opec}$ is the supply curve of all those countries (firms) combined together that have not joined the cartel and hence are competing with each other and the cartel. It is also relatively inelastic as the supply of oil is also limited as it being a natural resource. It is obtained by the summation of the marginal cost of these firms and can be seen that the cost of non-OPEC firms is quite high. Now the first step is to locate the demand curve of the OPEC which is obtained by setting different prices and finding out how much of the market demand would be left for the OPEC after the rest has been supplied by the non-OPEC firms combined together. If OPEC sets the price as $P_1$ which is obtained from the intersection of market demand curve and supply curve of the non-OPEC then the whole market demand can be satisfied by them and hence nothing would be left for the OPEC to supply. Thus here the demand from the OPEC is zero. If however it sets the price at $P_2$ which is so low that the non-OPEC firms would not supply anything then the whole market demand is to be fulfilled by the OPEC. It is shown by point A on the market demand curve. Thus the demand curve of the OPEC is kinked '$P_1AD_1$' and the corresponding marginal revenue curve is $MR_{opec.}$, marginal cost curve is $MC_{opec.}$ The equilibrium price that would prevail in the market is given by $MR_{opec} = MC_{opec}$ which is the profit maximizing

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condition for OPEC that is the price maker. Thus the equilibrium price is OP* at which the OPEC sells $OQ_{opec}$ units and all the competitive firms combined sells $OQ_{non-opec}$ such that

$$\mathbf{OQ_{opec} + OQ_{non-opec} = OQ_{total}} \text{ and}$$

$$\mathbf{OQ_{opec} > OQ_{non-opec}}$$

To see whether OPEC has been successful or not we compare the price difference between what OPEC has set and what would have been there if there was no cartelization and all firms would have competed freely. In the latter case, price would have been where demand curve of OPEC and $MC_{opec}$ intersect. Thus, the difference is huge as shown by the difference between P* and $P^{pc}$ which shows significant monopoly power that OPEC enjoys.

**Long Run Effect of OPEC Action**

(i) OPEC action of restricting its output caused increase in supply of oil by non-OPEC countries because of increase in price. This caused shift in supply curve of these countries to the right. The share of OPEC declined. By 1985, it reduced to 30 percent. The price fell and in order to maintain the price OPEC had to further reduce its output.

(ii) Secondly, the long run demand curve becomes more elastic as compared to the short-run demand curve in above diagram. This is because people have to spend their money more on insulation of oil heated buildings, economical diesel engines, etc. In the very long run more money was diverted for research to develop more petroleum efficient and alternative technologies such as solar technology, etc. All these resulted in fall of OPEC exports. Production limitations continued to maintain the price at high level.

(iii) Because of heavy reduction in output to maintain price, OPEC started experiencing fall in income. Disturbed by this development, members started violating their quotas and had to meet frequently to settle things. Ultimately OPEC had to eliminate quotas by 1985. The price fluctuated before settling down in the 1990s.

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OPEC experience tells that:

(i) It is highly profitable for competitive firms to form a cartel and behave like monopoly in the short run by restricting output given inelastic demand curve.

(ii) In the long-run however, it becomes increasingly difficult to retain the monopoly power and the firms have to choose between short run and long run profits.

(iii) Also, in the long run it is not possible to continue output restrictions due to loss in revenues and threat of breaking down of cartel.

**CIPEC: Intergovernmental Council of Countries Exporters of Copper**

CIPEC is a cartel of copper and captures only 30% of the copper producing countries of the world. It is also an explicit cartel like OPEC where there is a written formal agreement between the countries to abide by the price set and other regulations. As against OPEC, it is an example of a cartel that has been unsuccessful in raising the prices of copper in the international market. It can be explained using Figure 5.2.

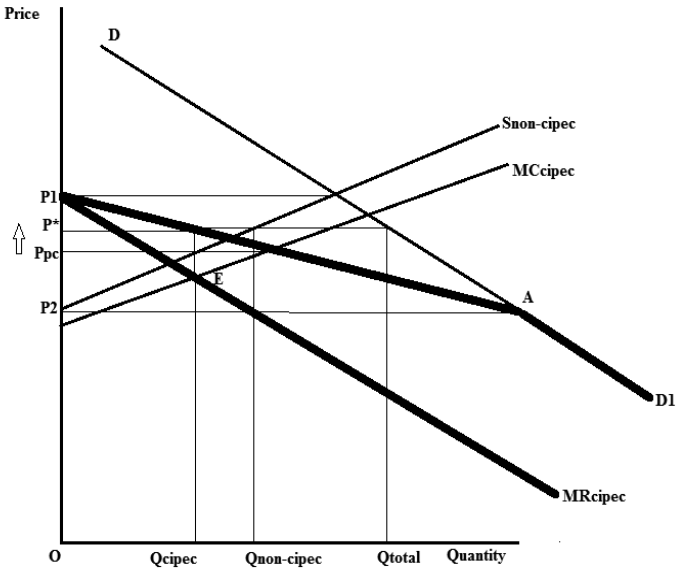


*Fig. 5.2*

**NOTES**

$DD_1$ is the market demand curve of copper which is relatively elastic because of the fact that there are substitutes of copper like aluminium, etc. Supply curve of the non-CIPEC countries (firms) is $S_{cipec}$ that is also relatively elastic because of the fact that supply of copper can be easily obtained from scrap, etc. Demand curve and marginal revenue curve of the CIPEC is obtained in the same manner as done for OPEC taking into consideration the non-collusive countries. The equilibrium price is set by CIPEC which is obtained from equating marginal revenue and marginal cost of the CIPEC. It is point E where price is set at OP* and quantity sold by CIPEC is $OQ_{cipec}$ and by non-CIPEC is $OQ_{non-cipec}$. Here it can be noted that the quantity sold by non-CIPEC is more than that of CIPEC as CIPEC is a minority cartel where only 8 countries have joined the cooperation. The monopoly power here is also very less as there is very small difference between the price that would have prevailed in case of pure competition shown by $P_{pc}$ and cartel price OP*.

So, we can conclude by saying that though OPEC has been successful in raising the prices of oil in the international market but CIPEC has been unsuccessful at doing so. It can be because of the following reasons:

1. OPEC is a big cartel that consists of majority of countries that produce oil whereas CIPEC is a minority cartel where only few firms have joined the cartel.
2. OPEC is a cartel of oil whose demand and supply both are relatively inelastic providing it a better scope for exploiting its monopoly power whereas CIPEC is a cartel of copper whose demand and supply both are relatively elastic thus providing lesser monopoly power.
3. The difference between the cost of the cartel firms and the competitive firms (those which have not joined the cartel) is quite large as OPEC firms produce at a much lesser cost whereas in CIPEC this difference is not quite significant.

These reasons have led to the success of OPEC and the failure of CIPEC and from this we can summarize a few conditions that are required for successful functioning of a cartel:

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1. The demand for the commodity for which cartel has been made should be relatively inelastic.
2. The firms that join cartel should be able to control majority of the world's supply.

**Centralized Cartel**

This is an extreme form of cartel and rarely visible in real life as it assumes that all the firms join the cooperation and none of the firms is outside the cartel. This cartel thus acts as a monopoly where there is a centralized body that sets the price and quantity that is equal to the monopoly and then allocates the total output and total profits amongst different cartel members. If we assume that there are four firms in the market, and all have same costs of production then the output and price determination can be shown using Figure 5.3.

$D_{market}$ is the total demand curve of the market and MR is the corresponding marginal revenue curve. $MC_{total}$ is the summation of the marginal cost curves of the four firms combined together. Equilibrium is obtained by the intersection of marginal revenue and marginal cost curves and it is at point E where the price is OP* and the quantity is $OQ^t$. The centralized authority would distribute the output equally between the four firms such that each firm sells $OQ^{t/4}$ output at a price of OP* per unit.

Above three cases of cartel showed that it is very difficult if not impossible for a cartel to be successful as there is incentive for a firm to cheat on the cartel and earn even higher profits than what it could have earned by being a member of the cartel. This has been explained by a model of Game Theory known as Prisoner's Dilemma.

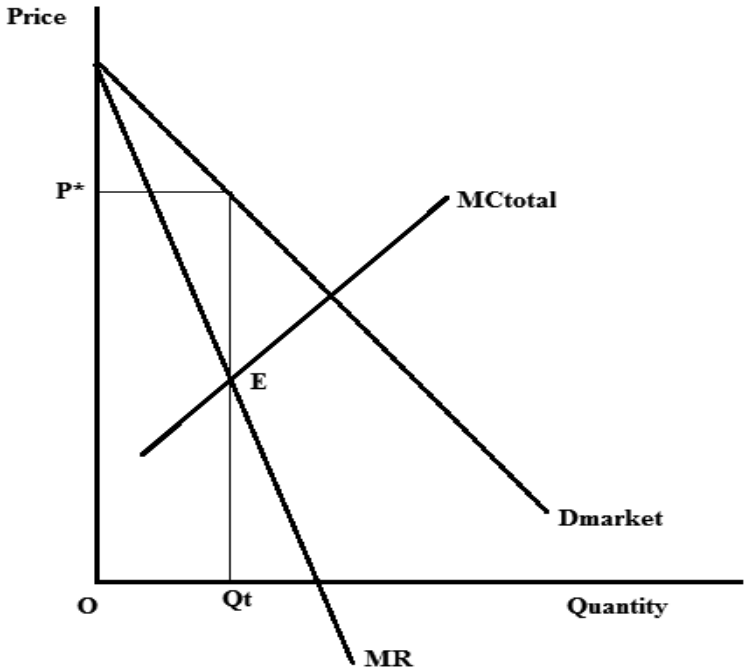


***Fig. 5.3***

## 5.4 PRISONER'S DILEMMA

Prisoner's Dilemma is a model that explains how oligopolist firms could act to their mutual disadvantage. The prisoner's dilemma is a paradox in decision analysis in which two individuals acting in their own best interest pursue a course of action that does not result in the ideal outcome. It shows why firms cheat and get a worse result than what would have been if they would have cooperated. It is based on the concept of Game Theory, a mathematical technique that helps in understanding the nature of interdependence among rival firms that are faced with uncertainty in their pricing and output decision. A game is described by its payoffs, strategies, number of players and information available. Prisoner's Dilemma can be explained with the help of following case:

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There are two friends A and B, who are suspects in a crime and are being interrogated in separate rooms such that they cannot communicate with each other. The two strategies available with them (to confess the crime or to not confess) with their respective payoffs are given in the matrix below:

| | | B | |
|---|---|---|---|
| | | Confess | Do not Confess |
| A | Confess | **B = 10 years**<br>**A = 10 years** | B = 20 years<br>A = 2 years |
| | Do not Confess | B = 2 years<br>A = 20 years | B = 4 years<br>A = 4 years |

Thus the matrix above reveals why A and B both have an incentive to cheat (confess) while it would have been best for both of them to have cooperated by not confessing. If both A and B confessed then both would get 10 years imprisonment. The best however would have been where both do not confess and get away with 4 years of imprisonment. If however one of them confesses while the other does not confess then the one who confesses gets away with a lesser imprisonment of just 2 years. Thus both think that it is best for them to confess thinking that the other would not confess and both get away with 10 years of imprisonment. This shows how prisoners thinking for their individual best bring an outcome that is worse for them as well as for the group. The same can be applied to the oligopoly where firms try to maximize their individual gains by cheating on the other and hence get away with the profits that are worse for the group as a whole. The above matrix can be modified to show the situation for oligopoly as well if we assume that there are just two firms C and D with the strategies available to them being that of to cheat or not to cheat on the price being decided collectively.

| | | D | |
|---|---|---|---|
| | | Cheat | Do not Cheat |
| C | Cheat | **D = Low Profits**<br>**C = Low Profits** | D = Very Low Profits<br>C = Very High Profits |
| | Do not Cheat | D = Very High Profits<br>C = Very Low Profits | D = High Profits<br>C = Highs Profits |

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The matrix above revealed that if two firms C and D colluded, they could have fixed up monopoly price and earned monopoly profits or high profits. If however a firm tries to cheat on the cartel by charging a lower price assuming that the other firm would not cheat and keep the price high as set by the collusion then the firm which cheats or lowers the price earns very high profits and the firm that does not cheat earns very low profits. This makes both the firms to cheat on the cartel and both the firms reduce the price and hence they end up earning low profits.

The prisoner's dilemma shows that oligopolists always follow a strategy that leads to competition amongst firms and leads to lower profit. But if the game is repeated again and again the outcome can change as firms may learn from their past outcome.

## 5.5 SELF ASSESSMENT QUESTIONS

**Check your progress**

**Exercise 1: True and False**

1. Prisoner's dilemma is a model based on Game Theory of mathematics.
2. Both OPEC and CIPEC are examples of implicit cartels.

**Ans.** 1(T), 2(F)

**Exercise 2: Fill in the Blanks**

1. Prisoner's dilemma shows why firms ……. when it is beneficial for them to ……. .
2. OPEC is a cartel of…….
3. For a cartel to be successful the demand of the product should not be perfectly …….

**Ans** 1. Cheat, Cooperate 2. Oil 3. Elastic.

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**Exercise 3: Questions**

1. Why OPEC has been successful in raising the prices while CIPEC has been unsuccessful?
2. How Prisoner's Dilemma can be applied to Oligopoly to show the non-cooperative behaviour of the rival firms?

## 5.6 GAME THEORY: EXAMPLE

Co-operative behaviour in oligopoly is a situation when firms jointly decide the prices and output and maximizes their joint profit. This situation is called collusion, in this situation it becomes profitable for one firm if it defects and cuts the prices and rises output, as long as other do not do so. Non-cooperative behaviour is a situation when they do not co-operate and decide their prices and output separately and compete with each other. When firms in oligopoly do not co-operate, it is called non-cooperative equilibrium or Nash equilibrium (Named after US mathematician John Nash).

In oligopoly the basic dilemma the firms face is whether to co-operate or to compete. If they co-operate, profit will be maximum and if they do not, profit for all will decrease. Now we will see the behaviour of an oligopolistc firm through an example of game theory. Game theory is the study of decision making in situations where strategic interaction (moves and countermoves) between rival firms occurs. We will assume a case of only two firms in the market, called Duopoly. The case is as follow:

***Table 5.1*** *The Oligopolist's dilemma: to co-operate or to compete*

| | Firm B's Output | | | |
|---|---|---|---|---|
| | One-half Monopoly output | | Two-third Monopoly output | |
| One-half Monopoly output | 20 | 20 | 15 | 22 |
| Firm B's Output Two-third Monopoly output | 22 | 15 | 17 | 17 |

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The Table 5.1 above explains the dilemma faced by oligopolists of whether to co-operate or to compete. It is called Payoff Matrix for a two firm duopoly game. The right-side figures on each cell shows the profits of firm A and left side figures on each cell show the profits of firm B (in Rs. Crores). It can be explained that if the two firms co-operate and produce one half of market share each, they will earn Rs. 20 crores of profit. In case of co-operation they can maximize their profits. If firm A defects and produces two thirds of output and firm B produces half of monopoly output, then firm A will earn Rs. 22 crores and firm B Rs. 15 crores. Similarly, if firm B defects and produces two-third and firm A produces one-half then firm B will earn Rs. 22 crores and firm A will earn only Rs. 15 crores. If both decide to compete and produce two-third of monopoly output each then profits for both will fall to Rs. 17 crores. This type of game, where they reach a non-cooperative solution when they could co-operate, is called Prisoner's Dilemma. Prisoner's Dilemma is shown in Table 5.2.

***Table 5.2*** *The Prisoner's Dilemma*

| | | **Mr. Ram** | | | |
|---|---|---|---|---|---|
| | | Confess | | Not confess | |
| Mr. Shyam | Confess | 6 | 6 | 0 | 9 |
| | Not confess | 9 | 0 | 1 | 1 |

Two prisoners Mr. Ram and Mr. Shyam are arrested for committing a crime and interrogated separately. They are told the following:

(a) If both are claimed to be innocent, they will get a light sentence that is 1 year in jail.

(b) If one confesses and the other does not, then who confesses will be released free and the other will be punished for 9 year in jail, and

(c) If both confess, then both of them will get a-punishment of 6 years in jail.

The payoff matrix presented in Table 5.2 shows the dilemma of the prisoners about whether to confess or not to confess. If none of them confesses then both will get 1 year of jail, but if Ram confesses and Shyam does not then

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Ram will be left free and Shyam will get 9 year of imprisonment and the vice-versa. And if both of them confess then both will get 6 years of imprisonment. Not confessing is the best solution in this game (Pareto efficient solution) but this leaves one always in uncertainty. This solution is not a stable solution as one gets an imprisonment of 9 years if he/she does not confess and the other does. Therefore, confession dominates in the mind of both the prisoners. If both of them confess then they end up with 6 years jail each. This kind of equilibrium is called Nash equilibrium. From both the figures above it is clear that if they co-operate, they will earn the maximum profit than if they compete.

## 5.7 OLIGOPOLY AND THE FUNCTIONING OF THE ECONOMY

Oligopoly is an important market feature in modem economies. Oligopoly has played an important role in modern economic growth. It is an emerging phenomenon in the developing economies in recent time. Many industries are operating through oligopoly market structure. The existence of economies of scale and economies of scope make impossible for perfect competition and monopolistic competition to survive. Too many firms cannot exist in such a situation. In the long run, oligopoly can be evaluated through the following three questions:

**1. The market mechanism under oligopoly**

Under perfect competition, prices are determined by the forces of demand and supply whereas prices are administered by the firms under oligopoly. Despite this difference, Lipsey observes that, the market system reallocates resources in response to change in demand and costs roughly by the same way under oligopoly as under perfect competition.

**2. Profits under oligopoly**

Oligopolists either co-operate or compete in the market. They can maximize their joint output and profit through co-operation, but one can always increase its individual profit by defecting. High profit in the long run can always attract

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the new firms, unless natural and/ or firm-created barriers exist to restrict entry of new firms in the market.

**3. Very long-run competition**

To survive in the long run, oligopolists keep on innovating to upgrade the quality of product and minimize their cost of production. Each firm spends significant amount on Research and Development to produce better quality at minimum costs. Differentiated products with different character are available in oligopoly market. Consumers get more choice in the market. Consumers get quality products at competitive rates. Oligopoly market structure is more conducive to economic growth in the long-run.

## 5.8 CONTESTABLE MARKETS AND POTENTIAL ENTRY

The theory of contestable markets explains that in the long-run, abnormal profits earned by oligopolists can be eliminated without actual entry. Potential entry can also affect the market as much as an actual entry does. It is possible only when the following two conditions are fulfilled

1. **Entry must be easy to accomplish:** There should not exist any barriers to entry, either natural or firm-created.
2. **The existing firms must consider potential entry while making price and output decisions:** The existing firms must react when new firms try to enter into the market. They must cut their prices and sacrifice profits (short run) to restrict the new entrants.

Contestable markets always expect potential entry because of huge profits earned by the existing firms in the market. But entry to such markets is too costly. Fixed costs are very high. To develop, design, and sell a new product in such a market involve huge sunk cost. Sunk costs are those costs which cannot be recovered if a firm leaves the market soon. Firms which produce multiple and differentiated products can easily distribute these costs among those many products. For new firms, producing huge number of differentiated products is

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not easy. Therefore, these costs are very high for a firm which produces single product in the market.

If a new firm can enter and leave the market without any sunk costs of entry, such markets are called perfectly contestable markets. A market can be perfectly contestable, even if, firms have to pay some costs of entry if these costs are recovered when firms leave the market. If the sunk costs are lower, the market will be more contestable and vice-versa.

Sunk costs of entry constitute entry barriers. Higher the sunk costs, larger will be profits earn by the existing firms. If the firms operate in the market without, large sunk costs of entry, then they will not earn large profits. As part of strategy, existing firms keep their prices as low as that can only cover the total costs. If they charge high prices and earn abnormal profits then the new firms will enter and may capture the profits and leave until it is vanished. Contestability forces the existing firms to keep the prices low. Potential entry works as good as actual entry in a contestable market to limit the profits of existing firms.

## 5.9 LEARNING OUTCOME

Oligopoly, a market structure that is most common in the real world consists of two different categories – collusive and non-collusive. This lesson talked about collusive oligopoly where collusion can be explicit and there is a proper written formal agreement between the firms to decide the price and output that each firm would produce and sell. Its most common form is Cartel, but this type of collusion is usually not allowed by the countries' legislation as it can lead to the creation of monopoly that can exploit the consumers. Two most famous cartels are OPEC – cartel of oil producing countries and CIPEC – a cartel of copper producing countries. While OPEC has been successful in raising the prices by cartelization, CIPEC is an unsuccessful cartel because of the reason that demand, and supply of oil is relatively inelastic whereas that of copper is elastic. The lesson also discussed about Implicit form of collusion that is price leadership by a dominant firm where there is no agreement between the firms to collude

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but still firms follow the price set by a leader firm as that avoids the uncertainty and reduces the chances of a price war. However, in spite of the benefits of cartelization, firms still cheat as that brings them more profits and it has been highlighted by Prisoner's Dilemma which shows that why firms in an oligopoly cheat while they would have been better off if they would have colluded.

Game theory is applied to explain co-operative and non-cooperative behaviour of oligopolistic firms.

## 5.10 TERMINAL QUESTIONS

1. Explain the features of oligopoly.
2. Explain the various co-operative and competitive behaviour of oligopolistic firms.

# UNIT II: CONSUMER AND PRODUCER THEORY

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# LESSON 6
# CONSUMER AND PRODUCER THEORY IN ACTION

**Devender**

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**Structure**



## 6.1 LEARNING OBJECTIVES

- To explain the changes in supply and technology in a competitive industry
- To use the theory of competitive market behaviour to understand some important real world problems
- To explain how the economy responds in the short run as well as in the long run to the shifts in supply
- To analyse the effects of taxation on competitive industry

This lesson is divided into following parts:

Part I: Changes in supply in a competitive industry

Part 2: Changes in technology in a competitive industry

Part 3: Effects of taxation on competitive industry

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**Part I: Changes in supply in a competitive industry**

The main aim of this part is to use the theory of competitive market behaviour to understand some important real world problems. In particular, we shall see how the economy responds in the short ran as well as in the long ran to shifts in supply that are brought about by changes in the cost structure of an industry.

## 6.2 COST CHANGES

Costs for an industry can change for a variety of reasons.

1. A common reason for a change in costs for an industry is a change in the price of some input used by the industry. We can think of several recent examples: Wheat prices in India have gone up sharply since 2006. This has increased the costs for several industries. For instance, restaurants and hotels, manufactures of bread and biscuits, etc., have seen their costs escalate in recent times as a result of the increase in wheat price. Another example is provided by the sharp increase in crude oil prices in the last few years. This has lead to an increase in costs for the petroleum products industry and consequently for the transportation industry. Another example that has been discussed a lot in the newspapers recently is the effect of a sharp hike in cement prices witnessed in India since 2006 on the costs for firms engaged in construction and infrastructure creation.
2. Technological changes might also lead to changes in costs. For example, technological advances over the last few decades have drastically reduced the costs of several industries. Computers and mobile phones are some of the examples that immediately come to mind if one wants to see evidence of a dramatic reduction in costs over a very short span of time due to technological advancement. However, there are times when use of a different technology in order to reduce environmental damage might actually lead to an increase in costs. This might explain why some advanced industrial countries are so vehemently opposed to pollution control measures advocated by environmentalists.

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3. Another common reason for a change in costs is a change in taxes paid by the firms in the industry. In India, every year industry watchers eagerly wait for the budget speech of the Finance Minister in the Lok Sabha to analyze the impact of changes in excise and customs duties on a wide variety of industries like iron and steel, cement, cars, petroleum products, etc.
4. Acts of nature might also be an important source of costs changes for some industries. Winter fog in Delhi, for instance, increases the costs for aviation industry because it leads to delays in landing and take-off of aircrafts and sometimes might even result in cancellation of flights. Massive rains that lead to widespread flooding in Mumbai a few years ago resulted in an increase in the costs for the insurance industry. On the other hand, adequate rain in the months of July and August in states like Punjab and Haryana might lower the costs of paddy production for farmers since they might not be required to use diesel-run pump sets for irrigation.

## 6.3 COMPARATIVE STATICS

In this lesson, we use the comparative static technique. We start with a market that is in long run equilibrium. We then introduce a cost change that leads the market to a new equilibrium (i.e., a new state of rest or no change for the system when all the adjustments to cost changes have taken place). We compare these two equilibrium states to study the impact of cost changes. Comparative statics is to be contrasted with static analysis that looks at equilibrium in a market that does not receive any external shocks or disturbances (i.e., a change in a variable fixed from outside). Both these methods are to be contrasted with dynamic analysis that looks at the path of evolution of the state of a system when it is not in equilibrium.

**Long run response might be very different from what happens in the short run**

We shall first see how the economy adjusts to changes in costs in the short run. In the long run, however, the response of a competitive industry can be very

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different. We will analyse the long run response next. A large part of the difference in our analysis and conclusions between the short run and long run effects is explained by free entry and exit of firms in a competitive industry in the long run in response to abnormally high or low profits.

Freedom of entry and exit of firms is one of the most important characteristics of competitive markets. Most of the efficiency results of competition stem from this. Freedom of entry and exit of firms lies at the heart of adjustment process in a competitive market and we try to illustrate it in a wide variety of situations. At times our conclusions are quite different from the answers of those who have not received a formal training in economics. A little investment of time and energy on your part will, we hope, change the way you think about major issues of public concern.

## 6.4 CHANGES IN INPUT PRICES

To begin with, we illustrate the general impact of a change in input prices on a competitive industry by considering a specific example. We consider the impact of a reduction in the price of wheat flour on the bread industry. Suppose each loaf of bread requires a constant amount of wheat flour, say 200 gm per loaf of bread. If the price of wheat flour declines, say by 5 Rs. per kg, the marginal and the average cost curves of a typical bread factory decline by the same vertical amount (by one Rupee for all levels of bread output).

This is shown in Figure 6.1. Notice that there is a parallel vertical shift in the average and marginal cost curves in Panel B and the extent of vertical shift is the same. Assume all firms in the industry have the same cost curves. The industry supply curve is obtained by horizontally adding up each firm's MC curve that lies above the AVC.

We start from a position of long run equilibrium. In Panel A of Figure 6.1, initial industry equilibrium is at $E_0$ where the industry demand curve D and initial industry supply curve $S_0$ intersect. The initial market price is $P_0$ and the quantity demanded and supplied in the industry is $Q_0$.

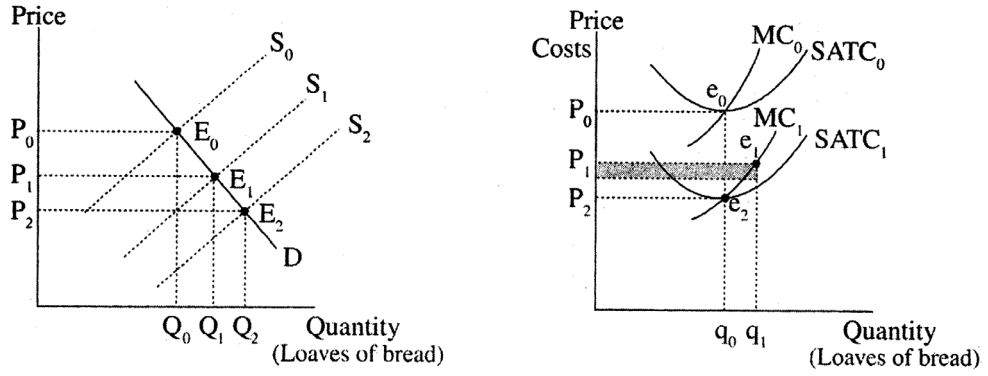


***Fig. 6.1***

The corresponding initial equilibrium for a typical firm in the industry is at $e_0$ in Panel B of Figure 6.1, where price = MC = AC. Each firm supplies $q_0$, a quantity at which AC is minimized and every firm makes zero economic profit (that is, it earns normal profits) and hence there is no incentive for an existing firm to exit or for a new firm to enter the industry. Given our assumption about fixed input use per unit of output, a reduction in price of wheat flour leads to a downward parallel shift of one Rupee in MC and AC curves from $MC_0$ and $STAC_0$ to $MC_1$ and $STAG_1$ respectively. In general, shifts in AC and MC are not parallel. As a matter of fact, while a cost reduction will always lead to a downward shift in AC curve, though not necessarily a parallel one, the MC might not shift down at all. This might happen, for instance, if only fixed costs decline and variable costs remain the same.

**Short run impact of a decline in input prices**

Since each firm's MC has shifted down, the industry supply curve also shifts down to $S_1$, market price falls to $P_1$ and industry output rises to $Q_1$ in Panel A of Figure 6.1. Notice that the fall in market price is less than the one Rupee fall in costs given by $P_0P_2$, the vertical distance between $S_0$ and $S_1$ in Panel A of Figure 6.1.

In Panel B we see that when the market price is $P_1$ and the costs for each firm have declined (by more than the decline in market price). Each firm in

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the industry increases its optimal quantity supplied to $q_1$ a level higher than the efficient one at which AC is minimum. Moreover, each firm in the industry makes supernormal profits in the short run since price is greater than AC. The area of the shaded rectangle in Panel B of Figure 6.1 gives the magnitude of this profit.

**Long run impact of a decline in input prices**

In the long run, however, in a competitive industry these positive economic profits will attract new firms into the industry. As the number of firms in the industry rises, the short run industry supply curve shifts to the right, the market price falls and the industry output rises. This process continues till the short run industry supply curve has shifted to $S_2$ and the market price falls to $P_3$, equal to the new minimum AC. The industry output rises to $Q_2$.

Fall in market price from $P_1$ to $P_2$ implies that each firm in the industry is now producing output $q_0$, the efficient level of output at which AC is minimum. Notice that $q_0$ is less than $q_1$, the output produced by an existing firm in the industry in the short run after a cost decline. The entry of new firms pushes down the market price and hence leads to disappearance of supernormal profits earned by the existing firms.

**Long run Supply Curve of the Industry**

An alternative way of analysing the long run impact is to look at how the long run industry supply curve shifts. With free entry and exit of firms and with identical cost curves for all the firms, the long run industry supply curve is a horizontal straight line whose vertical intercept is equal to the lowest AC for a typical firm. This is shown in Panel A of Figure 6.2 The long am industry supply curve shifts from S to S*. The market price drops from P to P*, the full extent of drop in costs, and industry output rises from Q to Q*.

In Panel B Figure 6.2, we see that each firm continues to produce output q, the efficient output level, when market price and costs decline. Moreover, each firm continues to make zero economic profits in the long run.

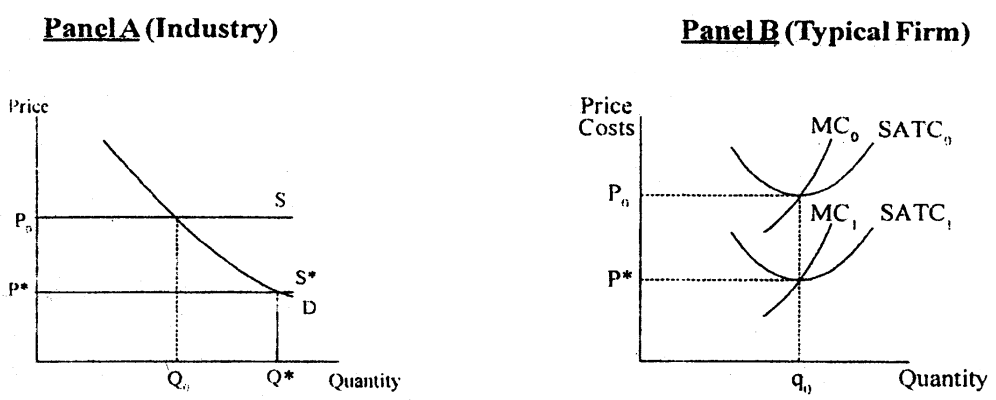


*Fig. 6.2*

In the long run, under perfect competition, the price declines by the full extent of the decline in the lowest AC. The output is higher and the price is lower. The firms are still making zero economic profits. All the benefits of lower input prices are passed on to consumers.

**Questions for Review**

1. We discussed above the case of a reduction in input prices. Discuss the opposite case of an increase in input prices. Carefully describe the short run and long run impact on the industry as well as on a typical firm in the industry.
2. We discussed a special case of cost change above where both MC and AC curves shifted down by the same vertical distance. We remarked that this need not always happen. Discuss the short run and long run impact of a decline in fixed costs on the industry as well as on a typical firm in the industry.

   (**Hint:** The MC curve for a firm will not shift at all.)

   (a) What happens to price and quantity in the short run?

   (b) What happens to profits of the firms in the industry in the short run?

   (c) Are there any incentives for entry of new firms in the industry?

   (d) What is the new long run equilibrium?

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**Part 2: Changes in technology in a competitive industry**

In this part we try to learn how a change in the technology for the production of a good affects its market. Preferences and technology are the basic building blocks from which demand-and supply curves are derived. In economics we normally take technology and preferences as exogenous (that is, we regard them as given from outside). Changes in technology, however, have important economic implications. In this lesson we will study the impact of exogenous changes in technology within the framework of competitive markets.

## 6.5 CHANGES IN TECHNOLOGY

We shall first see how the economy responds in the short run as well as in the long run to shifts in supply that are brought about by technological changes in an industry.

We noted in the previous lesson that technological changes are frequently major sources of changes in costs in the real world. In this lesson, we will analyse the short run and long-term impact of two kinds of technological changes.

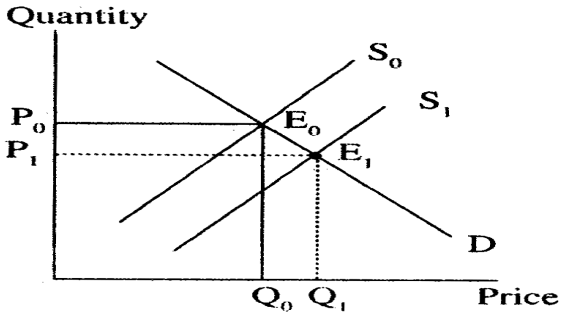
1. A once-for-all-change in technology
2. A continuous process of technological change

### A once-for-all-change in technology

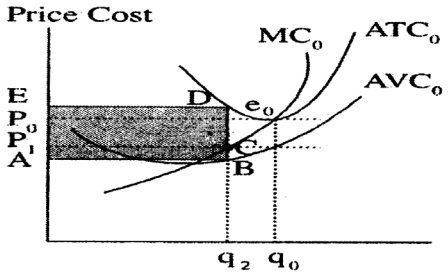
Assume that the industry starts from a situation where there has been no change in technology for a long time and all firms have the same cost curves. Further, suppose that the industry is initially in a state of long run equilibrium.

This is shown in Figure 6.3. We start from a position of long run equilibrium. In Panel A of Figure 6.3, initial industry equilibrium is at $E_0$ where the industry demand curve D and initial industry supply curve $S_0$ intersect. The initial market price is $P_0$ and the quantity demanded and supplied in the industry is $Q_0$.

**Panel A (Industry)**




**Panel B (Typical Firm) with old Plant**




**Panel C (Typical Firm) with new Plant**

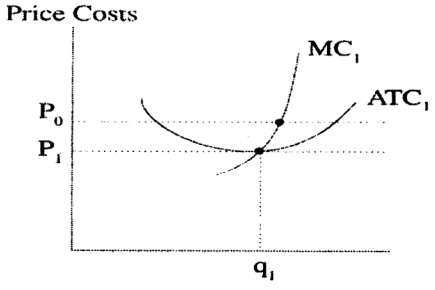



*Fig. 6.3*

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The initial equilibrium for a typical firm in the industry is at $e_0$ in Panel B Figure 6.3, where price = MC = ATC. Each firm supplies $q_0$, a quantity at which ATC is minimized and every firm makes zero economic profit (i.e., it earns normal profits) and hence there is no incentive for an existing firm to exit or for a new firm to enter the industry. Notice that P is greater than AVC, hence the firm is making positive operating profits (the difference between total revenue and total variable costs) that just cover its fixed costs.

Now suppose that a single advance in the industry's production technology takes place that lowers the costs of production for newly built plants. We assume that existing plants can not take advantage of this technological advance since the new technology has to be embedded in new plant and equipment. In the short run there will be no change in the industry since it takes time to build new plant and equipment.

In the medium run, since new technology lowers the average total cost curve to $ATC_1$ and the original price $P_0$ was equal to the average total cost for the existing plants; new plants are profitable and will be built soon. With this capacity expansion, the industry' supply curve shifts to the right to $S_1$, market price falls to $P_1$ and industry output rises to $Q_1$ in Panel A of Figure 6.3. Notice that capacity expansion and fall in market price continues till price has fallen to the lowest AC for the new plants and further entry is not profitable,

At price $P_1$, the new plants are operating at the most efficient scale where they are producing an output at which AC is minimized. Firms with new plants are making zero economic profits since their operating costs just cover their fixed costs. This is shown in Panel C of Figure 6.3.

Firms with old plants, however, will not be covering their total costs. If the costs for the new plants are sufficiently lower than that of the old plants, the new market price PI will be lower than minimum AVC of old plants. Old plants will be shut down immediately and all surviving firms will use the new technology.

A more interesting case, however, is where the new market price $P_1$ is higher than minimum AVC of old plants. This is shown in Panel B of Figure 6.3. At price $P_1$ firms with old plant produce output $q_2$, a level of output at which price = MC and since price is less than ATC, each firm with an old plant makes

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a loss given by the area of rectangle $P_1CDE$. It is, however, optimal to produce output $q_2$ since price is higher than AVC and the firm is making an operating profit given by the area of the rectangle ABC $P_1$. Had the firm shut down its loss would have been higher. Its revenue would have been zero, it would still have to incur the fixed cost of production (given by the area of the rectangle ABDE) and losses would have been greater since the firm would not have been able to use its operating profits to at least partially offset its fixed costs.

Old plants will continue to coexist with new ones and firms with old plants will be making losses. A non-economist might think that operating loss-making old plants is inefficient and it would be advantageous to discard them. He could not be more wrong! *As long as old plants recover their variable costs, it is optimal to operate them. Fixed costs are sunk; they can not be avoided by shutting down old plants.* One of the first lessons in economics is to ignore sunk costs. Let us try to understand this by looking at an example from everyday life. If you go to a restaurant and happen to order a lousy meal, don't force it down your throat just because the price you paid is very high. You have to pay the price whether you finish the meal or not. It is a sunk cost. The decision whether to eat all of what you ordered or to leave it in the plate depends not on the size of the bill (you have to pay that in either case), but on whether not eating (or eating something else or somewhere else and paying something additional for it) makes you happier than eating what is in front of you. Let *bygones be bygones.*

With the passage of time, however, old plants will wear out. They will now be replaced by plants using new technology. At the time of replacement, the cost of plant is not sunk. Profit maximizing firms will choose plants with lower costs. Plants with old (higher cost) technology will gradually disappear. In the long run a new equilibrium will be attained in which all plants use the new technology. As shown in Panel A of Figure 6.3 output will be $Q_1$, higher than output $Q_0$ in the original equilibrium. Price will be $P_1$ lower than $P_0$ in the original equilibrium. The new plants will be operating at an efficient scale and will be just covering their costs.

*All the benefits of lower costs due to technological advancement will be passed on to the consumers in the long run.*

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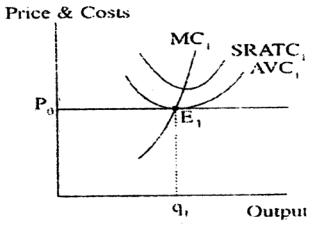
## Ongoing technological change

We can generalize the analysis of the previous section to consider the outcome in a competitive industry where there is a continuous technological change. Plants built today have lower costs than plants that were built in the past. However, costs are expected to be even lower for plants that might be built at a future date.

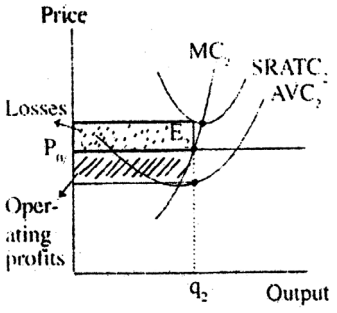
It is clear from the analysis of previous section that ongoing technological progress will lead to a continuous process of entry of newer lower cost firms. The market price will continually decline. However, older plants will not necessarily be shut down as soon as plants with better and lower cost technology make an appearance. Owners of old plants will continue to operate them as long as they cover their variable costs.

This situation is described in Figure 6.4. The Plant shown in Panel A of Figure 6.4 is the oldest plant that is on the margin of shutdown. It is making a loss since market price is lower than its average total cost. The plant is just covering its AVC and is indifferent between shutting down and continuing to produce output $q_1$. If the price drops any further, the plant will be shut down.

**Panel A**




**Panel B**



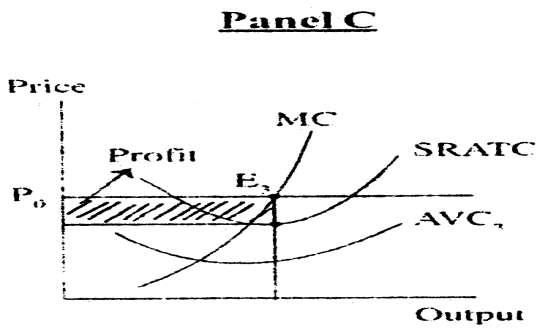



***Fig. 6.4***

The plant shown in Panel B is using an intermediate technology. It is also making a loss, but it is covering at least some part of its fixed costs (shown by the shaded area) in addition to covering all its variable costs by producing its optimal level of output $q_2$.

The plant shown in Panel C is the one that uses the newest technology and has the lowest costs. It not only covers its fixed costs (notice that price is higher than its AVC), but it also makes a profit (price is higher than its ATC) for the time being by producing its profit maximizing output, $q_3$. Since the potential entrant firms know that technological progress is continuous, they will enter the industry only if they make positive profits at the lime of entry that will compensate them for the losses they expect to make in the future when newer firms with lower cost technology will enter the industry and push down the price.

The point made above about the link between modernization and economic efficiency needs to be emphasized. Older plants have higher costs and firms using them might be making losses. At the same time there are firms in the industry that operate newer plants and have lower costs. These firms are making profits. Is this compelling evidence of economic inefficiency on the part of firms using the old plants? Is it true that firms using older loss-making plants should discard them immediately and modernize their plant and equipment? Is doing so profitable for these firms? Is it welfare enhancing for the society? It should be clear from our analysis above that the answer to all these questions is not necessarily in the affirmative. It is efficient to use older loss making plants as long as they cover

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their variable costs. They produce goods that are valued more by the consumers than the resources currently used up by operating the old plants (their variable costs). It is in the interest of the firms with old plants and also in the social interest to continue to use these old plants as long as the variable costs are covered.

Another point to be noted is that market price paid by consumers is determined not by the average costs of the old inefficient plants, but by the costs of the firms with the newest and the most efficient plants. Entry of firms with the most efficient technology into the industry will continue and supply will keep on increasing till the price has dropped to a level where latest entrants can barely cover the opportunity cost of their capital over the expected lifetime of their plants. It implies that new entrants today must earn positive economic profits for some time to offset the losses that they expect to earn later when firms with even more efficient technology enter the industry and push down the market prices to a level lower than the ATC of these current entrants. The full benefit of new technology is passed on to the consumers as soon as it begins to be used by the new entrants even though a vast majority of firms in the industry might still be using old technology. The price paid by the consumers depends only on the costs of the most efficient firms. As Paul Samuelson once said, it is the tail that wags the dog in economics. Owners of older firms have to sell their goods at the same lower price that is charged by the new firms. Their operating-profits keep on declining as entry of lower cost firms keeps on driving down the market price. These firms will ultimately quit the industry when they can not even cover their variable costs.

This brings us to the final point that we want to make in this lesson. The concept of economic obsolescence is different from that of physical wear and tear. We emphasized above that old machinery should not necessarily he discarded just because firms using it have higher costs and might even be making losses since market price depends on the costs of the most efficient firms. Just as one should not be overenthusiastic about discarding old machinery, one should not continue to use an old machine because it is still functional. When the price drops below average variable costs the machine is economically obsolete even though it may not be physically worn out. Old capital equipment is obsolete and

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should not be operated if by using it the firm can not even cover the variable costs. This might happen well before the equipment is physically worn out. The concept of economic efficiency should be understood both by those who have a fetish for new technology and want to discard old equipment as soon as they see something more modern and also by those who would never discard old equipment, as long as it works.

**Questions for Review**

1. In what sense are the benefits of technological progress passed on to the consumer in a competitive industry? Would your answer change if entry to the industry were restricted?
2. How would your answer to the first question be modified, if the new technology is patented and only one firm can use it?
3. In reality, firms have to spend money on research and development to generate technological progress. Use your answer to questions 1 and 2 to present an economic case for patents.

## 6.6 EFFECTS OF TAXATION ON COMPETITIVE INDUSTRY

There are various kinds of taxes that the government imposes which ultimately affect the costs of firms and industry. We will consider three different types of taxes-per-unit tax, lumpsum tax and profit tax.

(1) **Per-unit tax:** It is a tax that is levied on each unit produced by the firm. In a way it can be said to be another cost to the firm. As a result of per unit tax (say sales tax) the marginal cost of the firm shifts up by the amount of the tax. At the industry level the supply curve shifts up by the amount of the tax. Accordingly, the effects of a per-unit tax on output of a competitive industry can be listed as follows:

(i) In the short run the price of the output will rise but by less than the amount of the tax. So, the tax burden will be shared by consumers and

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producers. The consumers pay higher price than before and producers do not cover their average total costs.

(ii) In the long run, some firms who do not cover their costs may leave the Industry. The industry will contract (fall in size) and losses will disappear. If the cost curves of existing firms remain unaffected due to contraction of the industry then price will rise by full amount of the tax. In such a case the burden of the tax will be totally on the consumers. This also implies that government intervention in the competitive industry may affect its size, volume of sales and price in the short run but it cannot influence its long-run profitability effects of per-unit tax as shown in Figure 6.5.

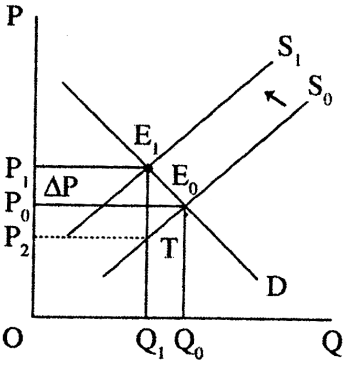


*Fig. 6.5*

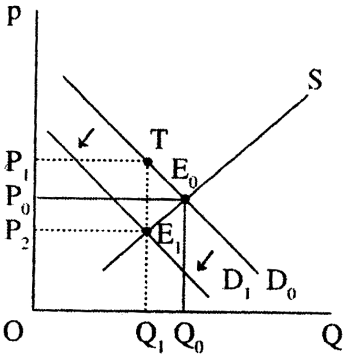


*Fig. 6.6*

**Figure 6.5** shows the effect of per-unit tax on price and quantity by shifting the supply curve upwards. The original equilibrium point is $E_0$ with price $P_0$ and quantity $Q_0$. A per-unit tax supply shifts from $S_0$ to S, so that new equilibrium is now at point E1. Tax equals $S_0S_1$ or $E_1T$ or $P_1P_2$. Price increases to $P_1$ since increase in price is $P_0P_1$ which in less than the tax $E_1T$, the tax burden is shared by consumers and producers in the short run. After tax quantity has also fallen to $Q_0$.

In **Figure 6.6,** the effect of per-unit tax is shown by shifting the demand curve down by the amount of tax. It shows that after tax producer gets price $P_2$ after tax which is less than the market price $P_1$.

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(2) **Lump-sum tax:** Lump sum tax is a kind of fixed cost of the firm. It increases the total cost of the firm and industry. The marginal costs and marginal revenues remain unaffected. The average cost curve shifts up due to tax at the existing level of output. Lumpsum tax reduces the revenue. As long as the firm is able to recover its variable costs, it will remain in business otherwise it will shut down in the short run. Lump sum tax does not affect price and output in the short run. However, in the long run some firms, who do not cover their increasing costs leave the industry and the size of the industry will fall. Price will rise and output will fall until the whole of tax burden is passed on to the consumers.

(3) **Tax on profits:** From the economists' point of view the firm in perfect competition earns normal profit or zero economic profit in the long run. So, on this basis a tax on profits will neither affect price nor output of a competitive industry in equilibrium. So, it will also not affect allocation of resources.

However, in reality profits are defined in tax laws according to accountants, usage which includes returns to capital, reward for risk-taking and could be taxed.

## 6.7 LEARNING OUTCOME

In this lesson you have learnt the following:

1. The cost of competitive firm and industry changes due to change in input price, change in technology and imposition of taxes.
2. Change in input price (rise/fall) causes change in supply (fall/rise) and change in MC (rise/fall).
3. Improvement in technology causes increase in supply and fall in average cost of competitive industry and firm and vice versa.
4. Imposition of per unit tax causes decrease in supply (upward shift) and decrease in demand (downward shift).

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## 6.8 TERMINAL QUESTIONS

1. Explain effect of per-unit tax on price and quantity from the demand side of the market.
2. Explain effect of per-unit tax on price and quantity from the supply side of the market.

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# LESSON 7
# MARKET FAILURE

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**Structure**



## 7.1 LEARNING OBJECTIVE

- To identify the situations that lead to market failure
- To understand the concept of Public Goods
- To compute the impact of Externalities
- To identify the situations that lead to Moral Hazard and how it can be reduced

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## 7.2 INTRODUCTION

The aim and objectives of market should be as follows:

1. There should be efficient production of goods by making use of the available resources. It being assumed that there are only two factors of production, i.e., labour and capital and their quantity is fixed, both have to be optimally utilized to produce two commodities. Here, the efficient production would be only if it is not possible to increase the production of either one or both the commodities without reducing the production of the other.
2. The goods being produced should be efficiently distributed amongst the consumers in the economy. This happens only when the distribution amongst the consumers is such that it is not possible to increase the satisfaction of one consumer without decreasing the satisfaction of the other. This happens when the indifference curves of the two consumers are tangent to each other, the marginal rate of substitution being same for both the consumers.
3. The output mix should be efficient such that the output is distributed amongst the consumers in such a manner that the marginal rate of substitution and marginal rate of transformation are equal.

In an economy that has perfect competition, all the above conditions are automatically fulfilled. However, such an economy rarely exists and it gives rise to imperfections in the economy and non-optimal allocations which would be discussed in the current lesson. Let us understand and explain the efficiency of perfect competition.

## 7.3 ALLOCATIVE EFFICIENCY UNDER PERFECT COMPETITION

Allocation efficiency refers to the situation where allocation of resources leads to maximum gain to the society reflected in maximization of the sum of consumers and producers surplus.

Consumer surplus is the difference between the total value which the consumers are willing to place on all the units consumed of the product and the actual payment that they make on its purchase.

Producers surplus is the difference between the value the producers receive by selling the product at its equilibrium price at which demand and supply of the product are equal and the value of the product at its minimum supply price which is its transfer earning.

Sum of consumers and producers surplus is maximized when price equals marginal cost of the product which actually occurs under perfect competition. We know that price reflects the value that household place on a good and marginal cost reflects the opportunity cost of the resources needed to produce the good. This implies that as long as price exceeds marginal cost then society gains by producing more of the good and when price falls below marginal cost society gains by producing less. Hence maximum gain takes place when price equals marginal cost which is referred to as allocative efficiency.

The left-hand panel of Figure 7.1 gives equilibrium of competitive firm showing price $P_0$ = MC at point e. The price $P_0$ is market clearing price at which market demand AD equals supply BS at point E as shown on right hand panel of the diagram. For equilibrium quantity $Q_0$, the maximum price consumers are willing to pay is at point A so that consumers surplus is the area $P_0AE$. Similarly, minimum supply price being at point B the producer surplus is the area $BP_0E$. The total surplus is the area BAE which is maximum possible for quantity $Q_0$ because the total surplus is reduced if quantity is either below or above $Q_0$.

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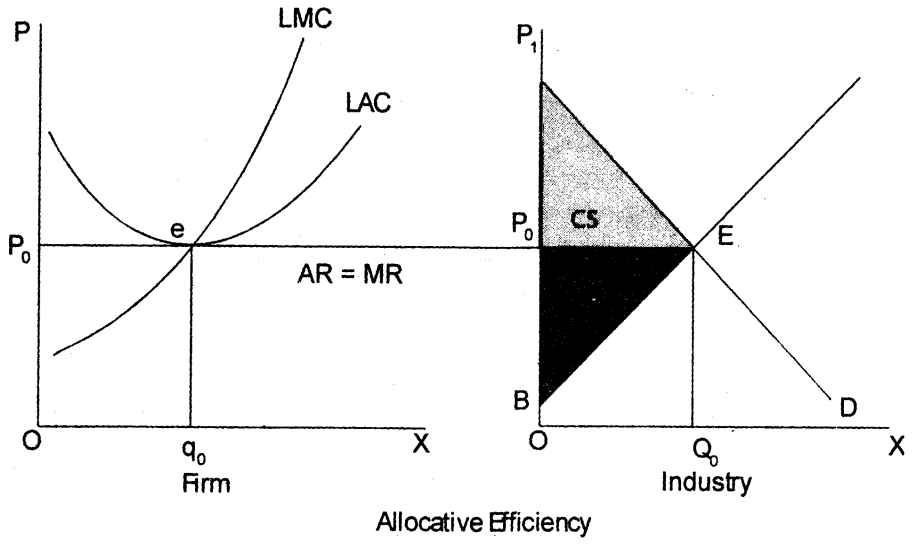


*Fig. 7.1*

## 7.4 MARKET FAILURE

Market failure refers to failure of market mechanism to achieve efficient allocation of resources in the economy allowing a smooth circular flow of income. There are several factors responsible for market failure. They are as follows:

(i) Lack of competition among firms and presence of market power in the form of oligopoly or monopoly which is also called imperfect competition. There is presence of excess capacity in these markets and price exceeds marginal cost causing allocative inefficiency by reducing consumers and producers combined surplus.

(ii) Provision of public goods whose consumption cannot be only restricted to those who can pay for them and common property resources whose owners are none but users are everybody.

(iii) Problems of externalities in both consumption and production wherein action of one agent affects another in the society.

(iv) Asymmetric information which creates a situation where one party to a market transaction has more knowledge of its consequences than the knowledge available to the other party. For example in the market for second-hand cars, only the seller knows the actual condition of the car and buyer has no information about the quality of the product.

(v) If there are missing markets, i.e., needed markets do not exist at all.

Market failure does not mean that nothing good is happening in the market but it means that the best possible outcome has not been attained. It arises in the following cases:

1. Asymmetric Information
2. Insurance Market
3. Market Signalling
4. Moral Hazard Problem
5. Principal Agent Problem

**1. Asymmetric information:** Asymmetric information means that the buyers and sellers do not possess the same set of information, one having a better or more set of information as compared to the other and hence is better off. The problem is also known as Lemons Problem given by Ackerlof. A 'lemon' is a derogatory term for a poor quality second-hand car. However, the lemon's problem has many wider implications in terms of understanding information failure in general. It can be explained with the help of an example as given below:

**Example 1 –** Let us assume that there is a car dealer who deals in second-hand cars and is aware about the conditions of the car and does not pass on the entire information to the buyers. Here the car dealer is thus having better and more information and takes the advantage of the information by selling the cars at a higher price then what they are worth off. The buyers would purchase it once but after becoming aware of the situation of the second-hand cars, they would not go for it the second time at the same price as they are suspicious of the seller's intention and hence the market and the demand for second-hand cars

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reduce because of asymmetric information as all the good quality cars are driven out of the market because of the lesser price being paid for it and only low quality cars would be left in the market. After a short period, it can be predicted that all cars sold in the second-hand car market will be lemons. When applying this concept to other markets it can be suggested that, whenever there is information failure, there is the possibility that markets will become lemons markets. If so, the supply of good quality products will fall and the supply of poor quality products will rise.

This problem of asymmetric information can be reduced by getting more information, like in the above case the buyers can get the second-hand cars evaluated by an independent car evaluator to find the correct status and price of the used cars.

2. **Insurance market:** Here also the problem is because of asymmetric information but unlike the used cars, here it is buyer of the insurance policy that is in possession of better and more information. It also leads to adverse selection as can be explained using the following example:

   **Example 2 –** Let us assume the case of a medical insurance where the buyer of the policy has more information about his health. The premium set by the insurance company is according to the average individual that includes both the healthy and unhealthy individuals, but it is the unhealthy ones that are more likely to go for insurance and it increases the losses of the insurance company because of which the premiums increase and it further rations out the healthy individuals out of the insurance market as they are not willing to buy the insurance at such high premiums. Thus the market now has only unhealthy individuals which further increases the losses and hence forces the insurance companies to go out of the market. This is also because of asymmetric information.

3. **Market signalling:** The problem of adverse selection can be reduced or even eliminated by market signalling wherein the producer gives signals about better quality of its products to the buyers thereby preventing the outflow of such goods from the market as happened in the Lemons

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problem. Thus the buyers are able to differentiate between high quality and low quality products and it gives the sellers an advantage as they are able to sell high quality products at a higher price. This can be done by branding the product or providing guarantees and warranties that assure the buyer about the quality of the product and helps in reducing the suspicion that buyers have about seller's description of the product or service.

4. **Moral Hazard problem:** This problem generally arises in case of insurance where if an individual is insured then there are greater chances of him being negligent about the subject matter of the insurance. Moral hazard refers to a situation where you do not behave in a manner that you are expected to in case there has been no one else to share the loss. For example if an individual gets his building insured for fire then if he does not take proper care to ensure that there is no fire then it is a case of moral hazard. Similarly, if an individual after taking medical insurance does not take preventive measures for his health, it also leads to issue of moral hazard. Such situations lead to market failure, because if the moral hazard is not reduced or eliminated then it leads to increased premiums of insurance thereby defeating the very purpose of insurance. The issue of moral hazard can be tackled by going for Coinsurance wherein the insurance company bears a part of the loss and the rest is borne by the beneficiary himself. For example in case of an insurance by an individual wherein the insurance company would bear 70% of the losses subject to a maximum limit in case of a mishap and the remaining 30% of the total loss would be borne by the insurance policy holder. Thus, in this case as the entire loss is not covered up by the insurance company, the beneficiary is bound to take care which he would have otherwise not assumed. Another way is to ensure that enough precautions have been taken to avoid the loss, for example in case of fire insurance even after taking the insurance it has to be made sure that enough safety provisions were made and loss is unavoidable. However, if the insurance company finds out that enough safety provisions were not there then no compensation of loss is made to the policy holder.

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5. **Principal agent problem:** In a modern world there is separation of ownership and management where the principal or the owners are the shareholders whereas the organization is managed by the agents or the managers. Because of this separation of ownership from management arises the principal– agent problem. The problem arises because of the distinction in the requirements and interests of the principal and agent whereas owners want maximum profits or total present value of the firm, the managers are usually interested in their self interests that is increased salaries, reputation, etc. For example, the shareholders of firms, the principals, usually delegate responsibility for day–to–day decision making to appointed managers, the agents. This creates a situation of asymmetric knowledge, with managers knowing much more than the shareholders, and raises the possibility of inefficiencies, especially when shareholders and managers have different objectives. To avoid the conflict and ensure that the organization is working for the best interest of the owners extra cost is incurred in terms of monitoring costs that reduces the efficiency which would have been there without these extra cost burden. The problem can be reduced to a certain extent by providing incentives to the managers to work in the best interest of the owners by providing them with Golden Parachutes or linking their incentives with the fulfilment of owners requirements.

## 7.5 EXTERNALITIES

Till now all the lessons and the discussions are concentrated on the buyer and the seller, there is however a third party also that is affected by the production and/or consumption of the goods or services though not being directly a part of the production or exchange process. The impact on such third party is known as externality as it is external to the parties that are directly involved in the generation process. Such effects can be positive or negative that is beneficial or harmful, the former being external benefit and the latter being external cost.

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A simple example of external benefit can be getting oneself immunized for a communicable disease; it is called external benefit as it will reduce the spread of the disease to others who have not got themselves immunized. External cost can be the effects of pollution that is being felt by the parties that reside near the factories in spite of not being a part of the generation process. While individuals who benefit from positive externalities without paying are considered to be free-riders, it may be in the interests of society to encourage free-riders to consume goods which generate substantial external benefits.

*Positive Externality in Production*: A farmer grows apple trees. An external benefit is that he provides nectar for a nearby bee keeper who gains increased honey as a result of the farmer's orchard.

*Negative Externality in Production*: Making furniture by cutting down rainforests in the Amazon leads to negative externalities to other people. Firstly, it harms the indigenous people of the Amazon rainforest. It also leads to higher global warming as there are fewer trees to absorb carbon dioxide.

*Positive Externality in Consumption*: If you take a three-year training course in IT. You gain skills but also other people in the economy can benefit from your knowledge.

*Negative Externality in Consumption:* If you smoke in a crowded room, other people have to breathe in your smoke. This is unpleasant for them and can leave them exposed to health problems associated with smoking.

Now government should try to encourage positive externalities and discourage negative externalities which can be done by providing subsidies or imposition of taxes as shown below:

**Taxes and its Impact on External Costs**

Taxes on negative externalities are intended to make consumers/producers pay the full social cost of the good. This reduces consumption and creates a more socially efficient outcome. Without a tax, there will be over consumption because people ignore the external costs. It has been shown below using Figure 7.2.

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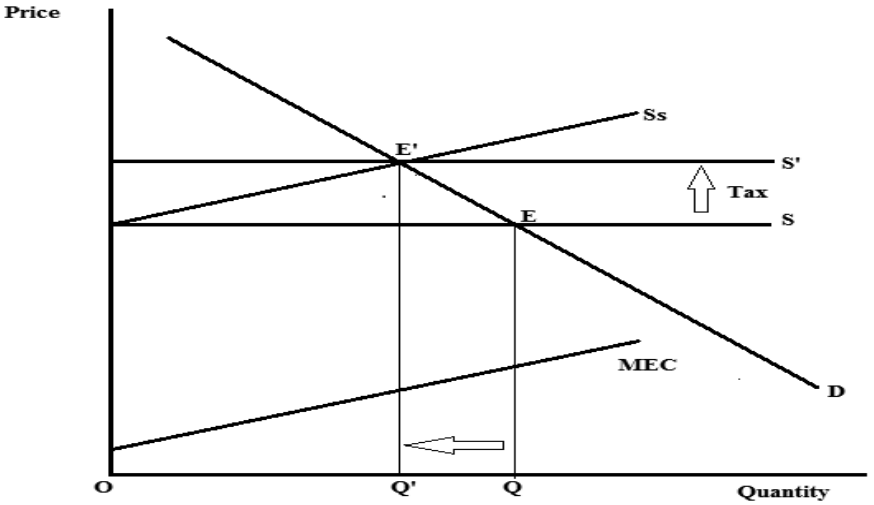


*Fig. 7.2*

In the above Figure 7.2, D is the demand curve of a commodity which is downward sloping. S is the supply curve of the firm which is assumed to be constant and therefore is horizontal straight line parallel to X axis, it is the marginal private cost of production of the firms and does not include the external costs. MEC is the marginal external cost curve which is upward sloping as with an increase in output the external cost also increases, for example if we assume that the external cost is the pollution that firm makes when it carries out production then it will increase as the production increases. The total cost of production is obtained by summation of private cost and external cost which gives Ss supply curve that is parallel to MEC. The equilibrium that firm derives is where demand and supply curve given by private cost intersects that is at point E', where the firm produces OQ level of output. However, the firm's equilibrium should be at point E where demand and total cost that includes both private and external costs are equal. The firm should reduce its output to OQ'. This can be done if government imposes tax on the firm which increases the private cost of production to S' and reduces the output to the desired level and with the tax revenue government can carry out the task of pollution control thereby reducing the impact of externality.



Subsidies and its Impact on External Benefits:

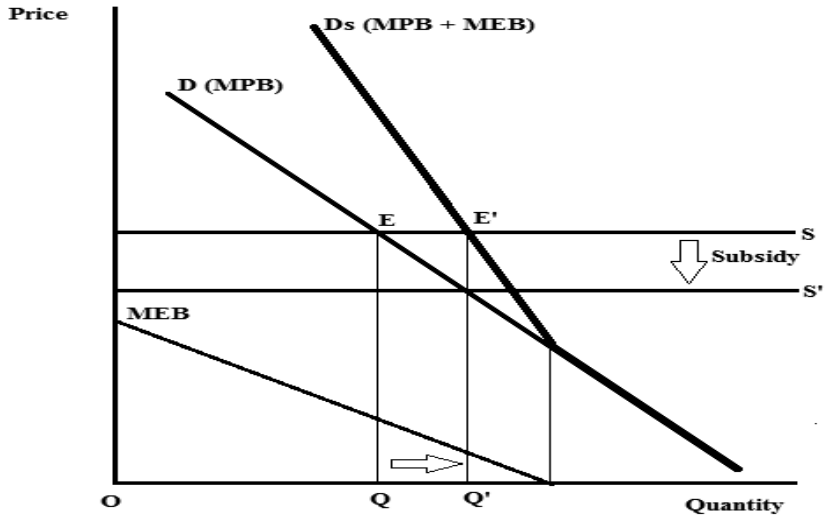


***Fig. 7.3***

In Figure 7.3, D is the demand curve that the firms take into consideration for determining their equilibrium level of output; it includes only the marginal private benefit. MEB is the marginal external benefit and S is the supply curve of the firm derived from the marginal cost. The equilibrium is where demand and supply curves intersect that is at point E where the firm is producing OQ level of output. But this is not what the firm should be actually producing as it is not taking into account the external benefit. Ds is the demand curve after adding the marginal private benefit and marginal external benefit and the actual output that should be produced should be where $D_s$ and S intersect, it is at point E' and firm should be producing OQ'. To increase the output, government can provide subsidy that reduces the cost of production and supply curve shifts downwards to S' and output increases to OQ'. Thus, increase in the output brings an increase in the total external benefit.

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## 7.6 PUBLIC GOODS

Generally, a commodity that is supplied by the government is known as public good but in economics the term is somewhat different as for a good to be called public good it should fulfill the following two characteristics:

1. **Non-Rival –** Consumption by one consumer does not restrict consumption by other consumers – in other words the marginal cost of supplying a public good to an extra person is zero. If it is supplied to one person, it is available to all.
2. **Non-Excludable –** The benefits derived from public goods cannot be confined solely to those who have paid for it. Non-payers who have not paid anything for the production of the commodity too can enjoy the benefits of consumption at no financial cost and economists call this the 'free-rider' problem. This leads to market failure as once the commodity is produced it can be enjoyed by all and therefore there is problem in the initiation that is who will pay for it.

The derivation of equilibrium in case of a public good is different from that of the market demand curve as here the market demand is not obtained by the horizontal summation of the individual demand curves but by the vertical summation of the individual benefits derived by the persons enjoying the benefits of the public good this is because of the fact that once one unit of public good is produced it can be enjoyed by all. It has been shown in Figure 7.4.

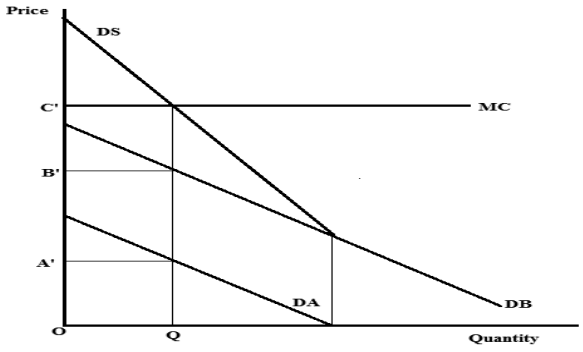


*Fig. 7.4*

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Here, let us assume that there are two consumers A and B and their demand curves that show marginal private benefit, $D_A$ and $D_B$, respectively. To get the market demand curve or the total demand curve we need to add the two individual demand curves vertically that gives $D_S$ as the demand curve. The equilibrium is where $D_S$ intersects MC and it provides that OQ units of output would be produced in the economy that would give the benefit of OA' to consumer A and OB' to consumer B. Public goods are not normally provided by the private sector because they would be unable to supply them for a profit. It is up to the government to decide what output of public goods is appropriate for society. To do this, it must estimate the social benefits from making public goods available. Because public goods are non-excludable, it is difficult to charge people for benefiting from a good or service once it is provided. The free-rider problem leads to under-provision of a good and thus causes market failure.

## 7.7 SELF ASSESSMENT QUESTIONS

**Check your progress**

**Exercise 1: True and False**

1. Moral Hazard is a problem that usually arises in case of insurance.
2. Public goods are the goods being produced by the government.
3. Free-rider problem arises because of usage of a commodity by the non-payers.
4. External costs can be reduced by granting of subsidy.
5. Externalities are not taken into account by the producer while determining the equilibrium.

**Ans.** 1(T), 2(F), 3(T), 4(F), 5(T)

**Exercise 2: Fill in the Blanks**

1. The combined demand curve in case of public good is obtained by…….. summation of the individual demand curves.

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2. Free Riders is the problem associated with…….. .
3. A public good is one that has two important characteristics …….. and …….. .
4. Problem of moral hazard to a certain extent can be reduced by going for …….. .

**Ans.** 1. Vertical 2. Public Goods 3. Non rival and non excludable 4. Reinsurance.

**Exercise 3: Questions**

1. How is equilibrium obtained in case of Public goods?
2. What is market failure and under what conditions is there a situation of market failure?
3. How is equilibrium obtained in case of Externalities?
4. Explain the concept of Lemons problem.
5. Explain why the combined demand curve of public goods is vertical summation of the individual demand curves.

## 7.8 FUNCTIONS OF GOVERNMENT

Basic functions of government: According to Classical economist Adam Smith government must-perform two basic duties:

(a) Government must protect the society from the violence and invasion of other independent societies.

(b) Government must protect, as far as possible, every member of the society from injustice or oppression of every other member of it. In the sphere of economy this implies that government must provide security of property and define and enforce property rights that give people a secure claim to the fruits of their own labour and allow markets to function efficiently.

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These property rights include effective legislation on consumption and production rights, working of institution such as insurance companies, banking, stock exchanges and joint stock companies, etc. Accordingly, it is the responsibility of the government to regulate and control monopoly tendencies and ensure allocative and productive efficiency the way they exist under a perfectly competitive market.

## 7.9 PUBLIC POLICY TOWARDS MONOPOLY AND COMPETITION

We have already seen that monopoly is allocatively inefficient because of lower output and price being higher than marginal cost which causes dead weight loss to the society. This calls for government intervention. Government intervention can take several forms as given below:

(i) Government may ask monopoly firm to produce at a price equal to marginal cost. This is not a problem if the monopolist continues to earn profit at marginal cost pricing. But in case of natural monopoly marginal cost pricing will create losses to the firm. (See Figure 7.5)

In panel-1 of Figure 7.5 if government controls the price at $p_0$ which is equal to marginal cost at point-E there is still profits for the monopolist since at this price average cost is $C_1$ which is less. So, profit is $P_0 C_1$, per unit of output. Here the government successfully controls the monopolist who also survives in the market by getting some profit.

But in case of a natural monopoly (panel-2 of Figure 7.5) marginal cost pricing leads to loss because at price $P_0$ = MC, average cost $C_1$ is more so that loss is $C_1 P_0$ per unit of output. Natural monopolies emerge in the provision of public utilities where a single firm can supply the market output.

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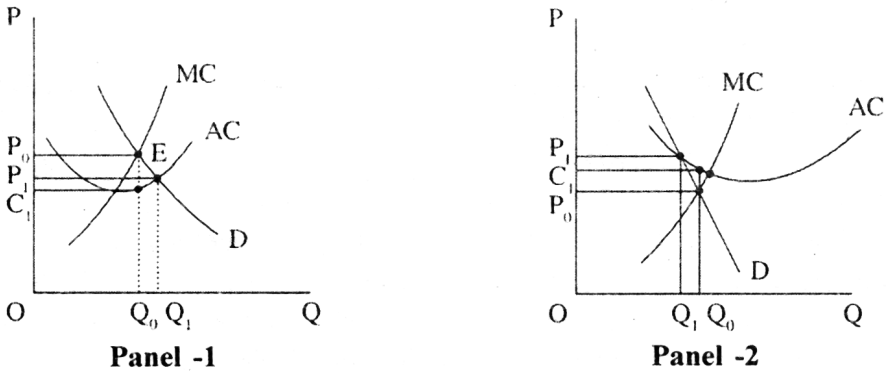


*Fig. 7.5*

(ii) Even controlling price at average cost level may be inefficient again for natural monopoly. As in panel-2 of Figure 7.5 $P_1$ is average cost price which is higher and the corresponding output, is below competitive level of $Q_0$.

(iii) Since both marginal cost and average cost pricing do not yield desired result for natural monopolies, they are directly taken over by government itself in many countries.

(iv) Technological changes have made many natural monopolies behave like competitive industry. So, government policies must adjust itself to continuous technological change.

(v) Due to failure of government as business organization there have been a wave of privatization recently in many countries including India. Many nationalized industries have been privatized in the UK. Disinvestment of public sector units in India is another example. While allowing privatization to be implemented rapidly governments are also creating public regulatory authorities to look into the functioning of these natural monopolies. In the UK, example of such bodies are OFTEL (Telephones), OFGAS (gas), etc. Security Exchange Board of India SEBI is a regulatory body in India. Privatization reduces governments' role in business and allows innovations to take place faster. It is expected that government's intervention as controller and regulator must allow competition to grow among firms.

## 7.10 LEARNING OUTCOME

Economics generally revolves around demand and supply of a commodity that is used to determine the equilibrium price and quantity but while doing so they do not take into consideration the external costs and benefits that the third party incurs because of the production and/or consumption process. These are known as externalities and if it is external costs then government should try to reduce the usage by imposition of tax and in case of external benefit the usage should be increased by granting subsidies as that is the true equilibrium. Another important concept that was discussed in the lesson was that of the public goods which is not same as the goods produced by government but are the commodities that are non-rival and non-excludable. Public goods also lead to market failure as it brings the problem of free riders where in once a commodity is being produced one cannot stop the non-payers from taking its benefit. Various other causes that lead to market failure are moral hazard, principal agent issue, Lemons problem and so on and the solution is reinsurance, golden parachutes, etc.

Government intervenes to regulate monopolies and other imperfect markets to ensure allocative and productive efficiencies the way they exist under perfect competition**.**

## 7.11 TERMINAL QUESTIONS

1. Give the meaning of market failure. What are the causes of market failure? Explain.
2. Differentiate between positive and negative externalities with the help of examples. How can they be dealt with to ensure better market outcomes?
3. What are the features of public goods? How are the public goods responsible for market failure? Determine the efficient amount of public good that should be produced?

# UNIT III: INCOME DISTRIBUTION AND FACTOR PRICING

## LESSON 8 MARKET FOR FACTOR INPUTS DEMAND AND SUPPLY OF FACTORS

## LESSON 9 FACTOR PRICING

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# LESSON 8
# MARKET FOR FACTOR INPUTS DEMAND AND SUPPLY OF FACTORS

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**Structure**



## 8.1 LEARNING OBJECTIVES

- To explain demand for factors
- To understand relation between MRP and VMP
- To explain supply of factors

## 8.2 INTRODUCTION

The total output of an economy is the result of the joint productive efforts of the various factors of production; land, labour, capital and enterprise. This total output ultimately gets distributed among the factors that contributed to its production in the form of wages, rent, interest and profit. The purpose of the theory of distribution is to explain the principles that govern this distribution. The distribution of total product depends on how the various factors are priced

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in the market. Thus, pricing of the various factors of production is the subject matter of the theory of distribution.

There are two aspects of the factorial distribution of national income; (i) determination of the per unit prices of the different factors and (ii) the division of the national income as between the different factors, i.e., absolute and relative shares of different factors in national income. The first question is essentially a micro-economic problem concerning the determination of equilibrium at the level of an individual firm or an industry. The second question concerns the factorial distribution of income at the level of the economy and, therefore, forms part of macro analysis. Thus, we have micro and macro theories of distribution. In the present set of lessons we are concerned only with the micro theories of distribution, i.e., the question of factor-price determination.

Just as the price of any commodity is determined by the interaction of the forces of supply and demand, similarly the price of a factor is determined by the interaction of the forces of supply and demand for it. The theory of distribution is, thus, a special case of the theory of price determination discussed in the earlier set of lessons. However, the supply and demand for factors exhibit some peculiarities which have to be taken into account while considering the pricing of particular factors. Herein lies the justification for a separate theory of factor price determination. Let us first examine the demand for and supply of factors in some detail.

## 8.3 THE DEMAND FOR FACTORS

### 1. The Nature of the Demand for a Factor

Why does a producer demand a factor? The demand for a factor is derived (or indirect) and not direct demand. The demand for a commodity is direct in the sense that it directly satisfies some human want. The demand for a factor, on the other hand, is not direct in this sense. A factor is demanded not for its own sake, but simply because it can contribute to the production of some commodity demanded by the consumers. For example, a farmer pays rent for the use of land simply because it helps to produce, let us say, wheat which is demanded by the consumers. Similarly, he pays for seeds and fertilizers because they help to produce commodities, which are demanded by the consumers.

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When a producer employs an additional unit of a factor it yields him some extra output. While demanding a factor, the producer is not so much interested in the extra output that it yields him as in the amount of the extra revenue he will get from the sale of that output. In other words, he demands a factor simply because it ultimately contributes to his revenue. Hence the price a producer will be willing to pay for a factor unit will depend upon the addition to his total revenue which results from the employment of an additional unit of that factor. The additional revenue yielded due to the employment of an additional unit of a factor is called the marginal revenue product (MRP). For example, suppose that by employing 10 labourers on a given plot of land a farmer gets 100 quintals of wheat which sell for Rs. 20,000 in the market and by employing 11 labourers instead of 10 he is able to raise 110 quintals of wheat which sell for Rs. 22,000. It is evident that due to the employment of an additional labourer total revenue of the producer rises from Rs. 20,000 to Rs. 22,000. Rs. 2000 is, thus, the MRP of the 11th unit of labour. While demanding a factor the producer has his eyes set on this quantity. It is in this sense that the demand for factors is derived out of the demand for the commodities that they help to produce.

## 2. Different Concepts of Marginal Product

There are three different senses in which the concept of marginal product (MP) is used. Firstly, it may be used to express the addition made to the total physical product of a producer due to the employment of an additional unit of a factor, the amounts of all other factors remaining constant We call this additional physical product as the marginal physical product (MPP). For example, if by employing 11 labourers on a given piece of land instead of 10, the total wheat output of a farmer increases from 200 quintals of rice to 220 quintals, then the MPP of the 11th unit of labour will be said to be 20 quintals. Thus, the MPP of a factor is the addition made to the total physical output of a producer due to the employment of an additional unit of a factor while keeping the amounts of all other factors constant.

Secondly, the concept of MP may be used in value productivity sense. The addition to the total revenue of a producer made by the employment of an additional unit of a factor, with amounts of all other factors remaining constant, is called the marginal revenue product (MRP) of the variable factor in question. According to this above example, the total physical product of the producer

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increases from 200 quintals to 220 quintals when he employs 11 labourers instead of 10 on the same plot of land. Now if the total revenue of the producer increases from Rs. 40,000 to Rs. 42,000 when he sells 220 quintals instead of 200, the MRP of the 11th labourer will be said to be Rs. 2,000.

It is evident that the MRP of a factor depends upon two things: (a) the additional units of output produced and (b) the contribution of each unit of output to the total revenue of the producer. The additional output produced by the employment of an additional unit of a factor is called the MPP and the contribution of an additional unit of output to the total revenue of a producer is called the marginal revenue (MR). Thus:

$$MRP = MPP \times MR$$

Thirdly, the concept of marginal product may also be used to denote the market value of the MPP of a factor. For instance, the MPP of the $11^{th}$ labourer according to the above example is 20 quintals of wheat. Now if the ruling market price of wheat, when the larger output is sold (220 quintals instead of 200 quintals) is Rs. 200 per quintal, the market value of the additional output will equal Rs. 4,000, Rs. 4000 then will be said to be the value of marginal product (VMP) of the 11th labourer. VMP is simply the MPP multiplied by the market price of the commodity. As already explained in the context of the theory of firm, market price and average revenue (AR) are one and the same thing. Thus:

$$VMP = MPP \times AR$$

### 3. Relation between MRP and VMP

MRP equals MPP × MR while VMP equals MPP × AR MPP is common to both concepts. MPP depends solely on the technical conditions of production while MR and AR depend upon the structure of commodity market where the firm sells its output. If the firm sells its output on a perfectly competitive commodity market, it will be faced with a perfectly elastic demand curve and its AR and MR will then be identical. Thus, in the event of perfect competition in the commodity market the MRP (=MPP × MR) and VMP (=MPP × AR) of a factor to a firm will be the same because AR and MR are identical. But if the firm is faced with an imperfectly competitive commodity market, then MRP and VMP will not be the same. In the event of imperfect competition in the commodity market, as we have



already studied, MR will necessarily be less than AR. From this, it follows that in the event of imperfect competition in the commodity market, MRP (which equals MPP × MR) will necessarily be less than VMP (which equals MPP × AR) because MR is less than AR. Thus, in conclusion we note that in case of perfect competition in the commodity market MRP equals VMP and in case of imperfect competition MRP will necessarily be less than VMP. Thus:

MRP (=MPP × MR) VMP (=MPP × AR) in case of perfect competition in commodity market.

MRP (=MPP × MR) < VMP (=MPP × AR) in case of imperfect competition in the commodity market.

We clarify the point further with a simple example. Suppose the total physical product of a farmer per year increases from 200 quintals to 220 quintals of rice when he employs 21 labourers instead of 20, on a given piece of land. The MPP of the 21st labourer, according to this example, would be 20 quintals. Further, suppose that the farmer sells his output on a perfectly competitive commodity market so that the price of rice remains constant at Rs. 100 per quintal even when he sells the larger output. MRP of the 21st labourer in this case would equal the change in the total revenue of the producer due to the sale of the larger output, i.e., 220 × 100-200 × 100 = 22000–20000 = Rs. 2000. VMP (MPP × AR) in this case would also equal Rs. 2000 (=20 × 100 = 2000). Now suppose the farmer is faced with an imperfect commodity market so that he is able to sell the larger output at Rs. 98 per quintal and not at Rs. 100 per quintal. In this case MRP of the 21st labourer would equal 220 × 98 – 200 × 100 = 21560 – 20000 = Rs. 1560. And VMP would equal MPP (=20) × AR (=Rs. 98) = Rs. 1960. Why is MRP in this case smaller than VMP? The reason is very simple. When the price falls from Rs. 100 to Rs. 98, this reduction in price applies not only to the extra output but also to the earlier output (i.e., 200 quintals) which was earlier sold at Rs. 100 instead of Rs. 98. Thus, while the producer gets additional revenue from the sale of the extra output (=20 quintals) at the current market price equal to Rs. 1960, at the same time he suffers a loss in his earlier total revenue equal to the fall in price (i.e., Rs. 2) multiplied by the earlier total output (i.e., 200 quintals) i.e., output but also to the earlier output (i.e., 200 quintals) i.e., Rs. 400. The MRP (or the net addition to the earlier total revenue of the producer) would thus equal Rs. 1960 – Rs 400 = Rs. 1560.

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*Thus as a general rule we note that in the event of imperfect competition in the commodity market MRP will be less than VMP by the amount of loss of revenue suffered by the producer on his earlier output due to the fall in price*. In the present case when, in order to sell the larger output (220 quintals instead of 200. quintals), price falls from Rs. 100 to Rs. 98, he is compelled to sell the earlier output (200 quintals) also at Rs. 98 per quintal and thus suffers a loss of revenue of Rs. 400/-. Therefore, MRP of 21st unit will be less than its VMP by Rs. 400.

### 4. The Shape of the MRP Curve

The demand for a factor is derived from its MRP. MRP, as we have seen above depends upon MPP and MR. The behaviour of MRP will thus depend upon the behaviours of its components with changes in the quantity of the variable factor employed. Under a given set of conditions, the behaviour of MPP is determined by the operation of the law of diminishing returns (or the law of variable proportions). The law states that as more units of a variable factor are used with a given amount of other factors, after a point its MPP starts diminishing, provided there is no change in the state of technology. We can explain this law with a simple numerical example. Imagine a farmer employing more and more labourers on a given plot of land. The Table 8.1 below records total, average and marginal products as the farmer employs more and more labourers on the given plot of land and other equipment, etc.

***Table 8.1***

| *No. of workers* | *Total Product* | *Average Product* | *Marginal Product (In physical units)* |
|---|---|---|---|
| 1 | 15 | 15 | 15 |
| 2 | 36 | 18 | 21 |
| 3 | 60 | 20 | 24 |
| 4 | 92 | 23 | 32 |
| 5 | 120 | 24 | 28 |
| 6 | 144 | 24 | 24 |
| 7 | 161 | 23 | 17 |
| 8 | 176 | 22 | 15 |
| 9 | 189 | 21 | 13 |
| 10 | 189 | 19 | 0 |
| 11 | 176 | 16 | –13 |

**NOTES**

The figures in the above Table 8.1 show that both the average and marginal products increase at first and then decline. The marginal product falls faster than the average. The important point to note is that with the employment of the fifth unit the marginal product starts diminishing. The same phenomenon is depicted in Figures 8.1 and 8.2.

In the Figure 8.1 below the MPP curve rises till the employment of OA units of labour and thereafter it falls continuously. The APP curve rises till the employment of OB units and thereafter starts declining. The relationship between APP and MPP is the same as that between AC and MC explained in the earlier set of lessons.

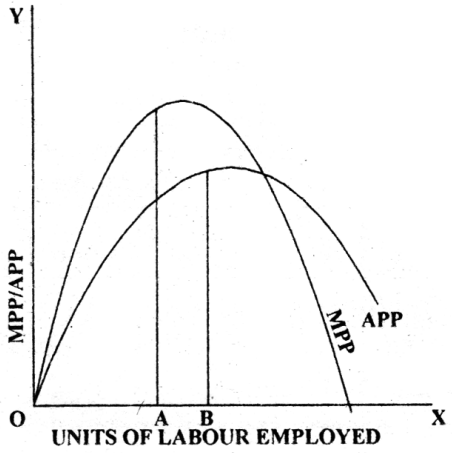


*Fig. 8.1*

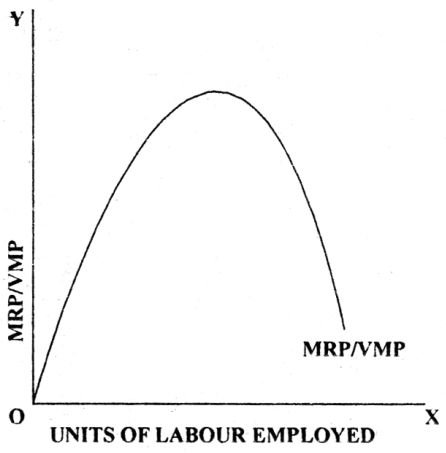


*Fig. 8.2*

In order to convert the MPP curve into the MRP curve we need to know the contribution to revenue made by the MPP at each level of employment of the factor. It bears repetition to point out at this stage that while MPP depends entirely on the technical conditions of production, its value productivity depends upon the commodity market where the firm sells its output. If the firm sells its output on a perfectly competitive market, its MR will equal its AR and thus the MRP curve can be derived from the MPP curve simply by multiplying the MPP corresponding to each level of employment of the factor by the given market price of the product (AR). Figure 8.2 depicts the MRP curve corresponding to the MPP curve of the Figure 8.1.

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Carefully note the fact that just like the MPP curve the MRP curve is also downward sloping. The reason for this is the diminishing marginal productivity of the factor. Also note the fact that in this particular case MRP curve is also the VMP curve.

However, as already explained, if the firm is confronted with an imperfectly competitive commodity market, it will be able to sell larger outputs only by reducing the market price so that MR will be less than AR. As a result two things happen. Firstly, as the firm is able to sell its extra output at a lower price, the VMP curve (which is derived from the technically given MPP curve by multiplying MPP corresponding to each level of employment of the factor by the market price of the product) will fall more sharply than the MPP curve. Secondly, since MR will be less than AR, the MRP curve will lie below the VMP curve and slope more sharply than the latter. Figure 8.3 depicts the VMP and MRP curves of a firm selling its product in an imperfectly competitive commodity market.

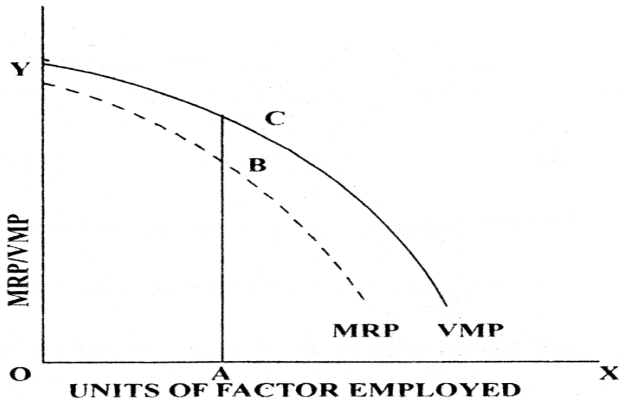


*Fig. 8.3*

The difference between MRP and VMP is further explained with hypothetical figures given in Table 8.2 below.

***Table 8.2*** *Difference between MRP and VMP under Perfect and Imperfect Competition in the Commodity Market*

| Units of the Factor | Total Product | MPP. | Perfect Competition in the Commodity Market | | | | Imperfect Competition in the Commodity Market | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Pirce* | *T.R.* | *M.R.P.* | *V.M.P.* | *Pirce* | *T.R.* | *M.R.P.* | *V.M.P.* |
| 1 | 15 | 15 | 100 | 1500 | 1500 | 1500 | 100 | 1500 | 1500 | 1500 |
| 2 | 36 | 21 | 100 | 3600 | 2100 | 2100 | 99 | 3564 | 2064 | 2079 |
| 3 | 60 | 24 | 100 | 6000 | 2400 | 2400 | 98 | 5880 | 2316 | 2352 |
| 4 | 92 | 32 | 100 | 9200 | 3200 | 3200 | 97 | 8924 | 3044 | 3104 |
| 5 | 120 | 28 | 100 | 12000 | 2800 | 2800 | 96 | 11520 | 2596 | 2688 |
| 6 | 144 | 24 | 100 | 14400 | 2400 | 2400 | 95 | 13680 | 2160 | 2280 |
| 7 | 161 | 17 | 100 | 16100 | 1700 | 1700 | 94 | 15134 | 1454 | 1598 |
| 8 | 176 | 15 | 100 | 17600 | 1500 | 1500 | 93 | 16368 | 1234 | 1395 |
| 9 | 189 | 13 | 100 | 18900 | 1300 | 1300 | 92 | 17388 | 1020 | 1196 |
| 10 | 197 | 8 | 100 | 19700 | 800 | 800 | 91 | 17927 | 539 | 728 |

*Explanatory Notes:*

1. MPP = Difference between two successive total products.
2. T.R, = Total revenue = Total product × price at which it is sold:
3. MRP = Marginal revenue product = Difference between two successive total revenues.
4. VMP = Value of MPP = MPP × the price at which total product sells.

Carefully note the following*:*

1. Total product and MPP figures are the same because they are determined purely by technical factors.
2. In case of perfect competition in the commodity market, MRP and VMP figures are identical.
3. In case of imperfect competition in the commodity market MRP is always less than VMP.

NOTES

## 5. Firm's Demand Curve for a Factor

Just as it is true that a profit maximizing firm, whether it is selling its product under conditions of perfect competition, imperfect competition or monopoly, will produce to the point at which its MC equals its MR, so it is true that a profit-maximizing firm will purchase units of a variable factor up to the point at which the addition to its total cost resulting from the employment of an additional unit (i.e., marginal factor cost, MFC) equals the MRP of the factor in question. Thus, in the purchase of a single variable factor a firm will be in equilibrium when MFC equals MRP of the factor.

Thus, in equilibrium:

MFC = MRP (1)

The above condition is a perfect general equilibrium condition applicable to all market situations. If we further assume that the firm is able to purchase any amount of the factor without influencing market price (i.e, purchases in a competitive factor market), the MFC of the factor to the firm is simply the market price (AFC). Therefore, for firms that purchase their factor supplies in a perfectly competitive market the above equilibrium condition (1) can be alternatively stated as follows:

AFC = MRP (2)

This condition allows us to derive a firm's demand curve for a factor from the MRP curve. The factor's MRP curve shows different MRPs corresponding to the different amounts of the factor employed with given amounts of all other factors, Firm's demand curve for a factor would show the different amounts of the factor that the firm would be willing to purchase at different prices of the factor. Therefore, when a firm purchases its factor supplies in a competitive factor market (so that MFC = AFC) the MRP curve of the factor becomes the firm's demand curve for the factor as shown in the Figure 8.4.

In the Figure 8.4, amount OA of the factor equates its MRP at point 'a' with the price OW. Therefore, at OW price the firm would be willing to purchase OA amount of the factor. Amount OB of the factor equates its MRP at point 'b' with price OWS. Therefore, with OW, as the price the firm would be willing

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to purchase OB amount of the factor. Similarly, at $OW_2$ price the firm would be willing to purchase OC amount of the factor. However, at this stage let us carefully note that the MRP curve is the firm's demand curve for the variable factor in question on the assumption that the price of the product and the price of the factor are both given for the firm.

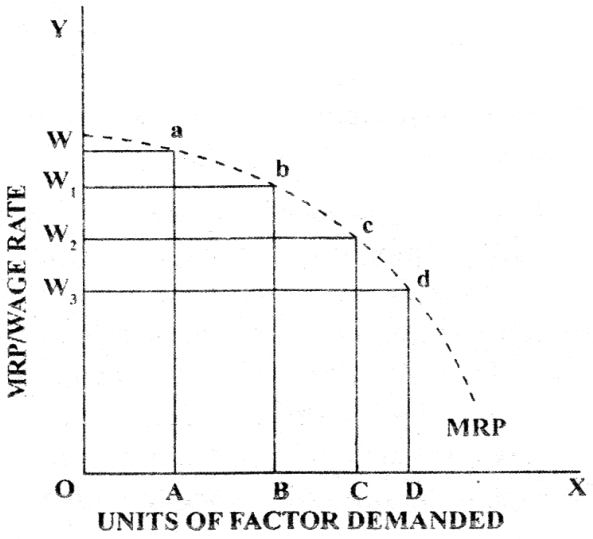


*Fig. 8.4*

## 6. Market Demand Curve for a Factor

In the preceding Figure 8.4, the MRP curve is the firm's demand curve for the factor in question on the assumption that changes in the price of the factor do not, directly or indirectly, affect the price of the commodity produced and hence the given MRP curve. This assumption would be valid only if all other firms in the industry keep their outputs fixed. However, this is not a realistic assumption. In the event of a fall in the price of a variable factor we would expect all firms in the industry to employ more of this relatively cheaper factor. This would increase the total output of the industry and cause the price of the commodity to fall. A fall in the price of the commodity would cause the MRP curves of all the firms (based on the higher price of the commodity) to shift leftward. Firms will adjust their purchases of the factor with reference to the new MRP curve

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(corresponding to the lower commodity price). Thus, each fall in the price of a variable factor (via its effects on the factor's total employment, total output and hence the price of the commodity produced) will give rise to a new lower MRP curve with one equilibrium point corresponding to the new factor price. The line joining such equilibrium points on the different MRP curves will be the firm's demand curve for the variable factor in question when the reactions of other firms in the industry to changes in the price of the factor are allowed for. This is shown in the Figure 8.5.

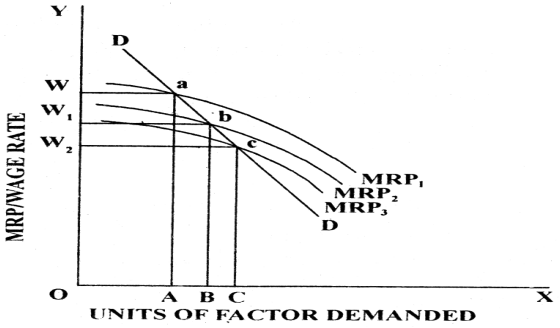


*Fig. 8.5*

In Figure 8.5 let us start from an equilibrium position such as point a on the curve MRP, with OW as the factor price and OA as the amount demanded of it by the firm. Now suppose the price of the variable factor falls from OW to $OW_1$. All firms in the industry employ more of this factor, as a result total output of the commodity increases and consequently price of the commodity falls. Fall in the price of the commodity (say, from Rs. 100/- to Rs. 98/-) causes the MRP curves of all firms to shift leftward. Suppose as a result of these indirect effects the MRP in the Figure 8.5 above shifts position $MRP_2$ with $MRP_2$ and $OW_1$ as the factor price equilibrium is established at point b with OB as the amount demanded of the factor 0. Similarly, when the price of the factor rails further to $OW_2$, $MRP_2$ shifts leftward to the position of $MRP_3$ on which equilibrium with the lower factor price ($OW_2$) is established at point 'c'; with OC as the amount demanded of the factor. The line DD joining equilibrium points such as a, b, c, etc., is the firm's demand curve for the factor when reactions of other firms in the industry to variations in the price of the factor are allowed for.

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The lateral summation of the demand curves of all firms for a factor, as derived above, gives us the market demand curve for the factor in question. Just like the firm's demand curve, the market demand curve for a factor will also be downward sloping.

### 7. Firm's Demand Curve for a Factor when factor Market Imperfect

As explained earlier, equality of MRP with MFC of a variable factor determines a firm's equilibrium in the purchase of a single variable factor under all market situations. However, a firm's demand curve for a factor, defined as indicating the different amounts of the factor demanded by the firm at different prices of the factor, is based on the assumption that MFC of the factor to the firm equals its price (AFC) so that equality of MFC with MRP also means the equality of price of the factor (AFC) with MRP. This implies that the firm purchases its factor supplies in a perfectly competitive factor market so that it is able to purchase any amount of the factor without influencing the given market price and as a result MFC of the factor equals its AFC. We derived the individual and the market demand curves in the preceding sub-section on the basis of this assumption. However, if a firm does not purchase its factor supplies in a perfectly competitive factor market, it will be able to purchase larger amounts of the factor only at higher prices. When a firm purchases larger amounts of a factor at higher prices, MFC of the factor will necessarily be higher than its AFC. For example, if in order to purchase 51 instead of 50 units of a factor a firm has to raise the factor price from Rs. 100 to Rs. 102, the MFC of the additional unit to the firm will equal Rs. 202 (102 × 51- 100 × 50 = 202) which is greater than AFC.

When the MFC of a factor to a firm is greater than its AFC, it cannot afford to equate MRP with the AFC because in doing so it will incur a net loss equal to the excess of MFC over AFC and thus reduce its profits. In such a case the MRP curve cannot be described as the firm's demand curve for the factor in the sense of indicating the different amounts of the factor demanded by the firm at different prices of the factor. Even in such cases MRP curve will be described as the firm's demand curve for a factor but in a different sense which we will explain in a latter section.

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## 8.4 SUPPLY OF FACTORS

### I. Supply of Factors to the Whole Economy

At first glance it may appear that quantities of most factors are fixed in an economy. For example, there is an upper limit to the number of workers. Similarly, there are upper limits to quantities of coal, oil, copper, iron ore, etc., available in the economy. However, in practice we are never near these limits. Often a large undiscovered or unexploited quantity exists, and a shortage of the resource that raises its price encourages exploration and the development of previously unprofitable sources. Thus, the supply of a resource to the economy usually varies considerably with changes in the price of the resource. With this brief introduction we now come to a discussion of the characteristic features of the supplies of individual factors.

### 2. Supply of Land

Land in economics includes all natural resources provided free by nature. The quantity of a particular natural resource existing in the world is, of course, limited. But we are never near these upper limits. Generally large undiscovered (or unexploited) sources exist and a shortage that raises their prices encourages exploration, research and development of previously unprofitable sources. Therefore, the supply of any natural resource usually varies considerably with changes in its price. A high return to land provides incentives for the development of its productive powers through irrigation, drainage, fertilization, etc., which greatly increase the supply of arable land. On the other hand, if the return to land is low, its fertility may be allowed to be exhausted within a short period of time. Traditionally, however, the supply of land (which includes all natural resources besides mere space) to the whole economy has been assumed to be absolutely inelastic.

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### 3. Supply of Labour

By the supply of labour (or the supply of effort) we mean the total number of hours of work that the population is willing to supply. The supply of effort depends upon the following factors:

**(i) The size of the population:** The size of the population sets the upper limit to the total of labour. While there is some evidence that the birth and immigration rates are higher in good times than in bad times, it is doubtful especially in advanced economies, whether economic factors are of paramount importance in determining the growth of population. It is difficult to establish any definite relationship between the reward of labour and growth of population. The reasons for which population varies are at the moment largely unexplained. Therefore, for our purpose we may take the size of population as fixed.

**(ii) The proportion of the population willing to work:** The proportion of the population entering the labour market varies considerably in response to variations in the wage rate. Generally, a rise in the wage rate results in an increase in the proportion of the population willing to work. Women, old people and even young boys are induced to join the labour force when the wage rate is high. For example, the proportion of married women and old persons in the labour force increased dramatically during the Second World War. In addition to the rate, the proportion of the population entering the labour market also depends on the age composition of population, social institutions, customs and distribution of wealth in the economy. For example, the extent to which women, especially married women, enter the labour market partly depends on customs and opportunity. Customs and opportunity can vary from one time to another and from one place to another even within the same country. Greater equality in the distribution of property in a society, by reducing the number of those who live on unearned incomes and consequently do not need to work, will increase the supply of labour in an economy.

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**(iii) The number of hours of work offered by each individual worker:** By hiring out his services a labourer gets some money as his wage. With this money he purchases goods and services for his consumption. Thus, the labourer trades his leisure for goods, by giving up leisure (i.e., by working) he gets money, and hence, goods. A rise in the wage rate means that there is a change in the relative price of goods and leisure. Leisure becomes dearer- relative-to goods (since each hour of leisure consumed now is at the cost of more goods forgone), or alternatively, goods become cheaper relative to leisure since each hour worked (i.e., leisure traded for goods) now results in more goods than before. In the context of the theory of consumer's demand we noted that a consumer tends to substitute a cheaper good at the cost of a dearer good when their relative prices change. The same logic applies to change in the wage rate also. Due to rise in the wage rate, goods become cheaper relatively to leisure and as a result a labourer tends to substitute goods at the cost of his leisure; he tends to have more goods by reducing his leisure. This is known as the, 'substitution effect' of wage increase.

The substitution effect of a wage increase will tend to expand the supply of effort in two ways. Firstly, some of those who were not willing to work at the lower wage rate would now like to work because leisure has now become costlier in terms of goods forgone. Secondly, for the same reason those who were already working would now like to put in more hours of work per day or per week by reducing their leisure. Thus, the total supply of effort will tend to expand due to these two factors.

Quite apart from the substitution effect discussed above, a wage increase also generates an income effect. With an increase in the wage rate a labourer grows richer than before even if he continues to work the same number of hours per day or per week as he did when the wage rate was lower. Being richer the worker would demand more of all normal goods including leisure. He will spend a part of the increase in his real income in the purchase of leisure. He can do so by reducing the number of hours worked. So, the income effect of a higher wage rate induces the worker to reduce the number of hours worked per day or per, week. Thus, the substitution and income effects of a wage increase tend to pull in opposite directions; the substitution effect tending to increase the number of hours



worked while the income effect tending to reduce the number of hours worked. The net effect of a wage increase on the supply of effort will, therefore, depend on the relative strengths of the two opposing tendencies. If the substitution effect is stronger than the income effect, labourers will put in longer hours of work in response to a rise in the wage rate. But if at any stage income effect becomes stronger than the substitution effect, labourers will put in shorter hours of work consequent upon arise in the wage rate. The supply curve of effort in this case will be backward rising as the one shown in Figure 8.6 below.

In figure 8.6 (A), as the wage rate rises from $W_1$ to $W_2$ and then to $W_3$. The supply of effort expands from OA to OC and then to OD. In other words, upto the wage level $W_3$ substitution effect is stronger than the income effect and as a consequence supply of effort expands in response to increases in the wage rate. But when the wage rate rises beyond $W_3$ the income effect becomes stronger than the substitution effect and consequently the supply curve of labour starts sloping backwards to the left. In the Figure 8.6 (B) when the wage rate increases from $W_3$ to $W_4$ instead of expanding, the supply of effort actually contracts from OD to OB.

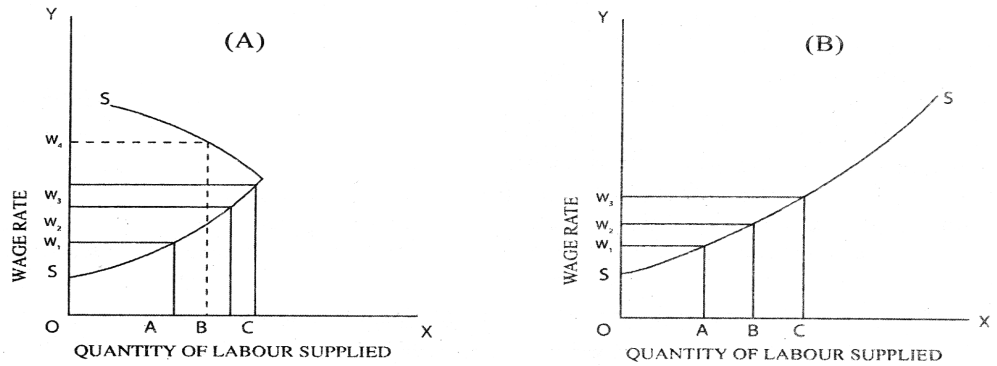


***Fig. 8.6***

Concluding our discussion of the supply of effort we can say that the backward rising supply of effort curve presents a strong possibility but cannot be taken as the typical case. There is no conclusive evidence available in support of a backward labour supply curve. Therefore, we assume that normally labour supply curve will be upward rising bending.

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### 4. Supply of Capital

Capital is a man-made factor of production and interest is its cost. The supply of capital in a country consists or the existing machines plants, equipment, buildings, etc., and is called the Capital Stock. In the course of production during the year a part of the existing capital stock is used up and to that extent the supply diminishes. On the other hand, new machines, buildings, plant and equipment are produced every year which go partly to replace the worn-out part of the capital stock and partly to add to the stock. Ignoring cyclical fluctuations, the supply of capital has been increasing over time in all modern economies.

### 5. Supply of factors to particular uses

Different factors of production can normally be put to alternative uses. Only few resources may be specific to a particular use and that too only in the short run. A given piece of land can be used to grow a variety of crops. Similarly, a labourer can be employed either to weave cloth in a factory or to build a road or to dig a canal or to grow various crops on a farm. Therefore, factors have to be allocated among various competing industries and among different firms in the same industry in a rational manner.

Factor owners choose the use for their resources in which they earn the most. They, of course, take many other things into account besides monetary benefits. Factors move among different uses until there is no net advantage in further movement. A change in the relative price paid to a factor in two uses leads factor owners to increase the quantity supplied to the use in which the relative price has increased and to decrease the quantity supplied to the use where it has decreased. This means that higher the (relative) price offered to a factor in a particular use, the larger will be the amount of the factor supplied to it. This gives rise to an upward rising supply curve to an industry as shown in the Figure 8.7.

SS curve in the Figure 8.7 is the supply curve of a factor to an industry. It is upward rising indicating that higher the price offered to the factor, larger is the quantity supplied to the industry in question. For example, when the price offered is $OW_1$ only OA amount of the factor is supplied.

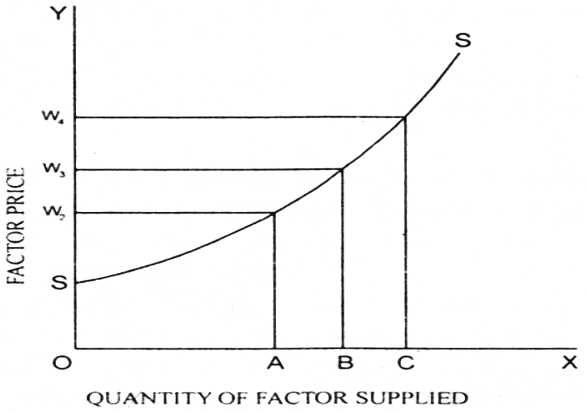


***Fig. 8.7***

But when the price offered rises to $OW_2$, amount supplied increases to OB. And when the price offered rises to $OW_3$ amount supplied increases further to OC.

As explained previously, the supply curve of any factor to the economy as a whole will be normally more than perfectly inelastic. However, even in a case where the supply curve of a factor to the economy as a whole is perfectly inelastic (as for example, classical economists assumed the supply of land to be), its supply to a particular industry will not be perfectly inelastic, it will be more classic because the industry will always be able to attract more units of the factor from other industries by offering a slightly higher price. Therefore, the supply curve of a factor to an industry will normally be more elastic compared to its elasticity of supply for the whole economy.

### 6. Supply of a factor to an individual firm

In a factor market a firm may be either one of a large number of purchasers or one of the few purchasers of a particular factor. If the firm is one of a large number of purchasers of the same factor, its purchases will constitute a negligibly small fraction of the total market supply of the Factor. As a result, the firm would be able to purchase any amount of the factor at the going market price. In other words, the supply of the factor to such a firm will be perfectly elastic at the price determined by the forces of market supply and demand for the factor. As

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already explained, when the supply of a factor is perfectly elastic, price (AFC) and marginal factor cost (MFC) to the firm are identical. On the other hand, if the firm in question is one of the few big purchasers of a factor, its purchases will constitute a sizeable fraction of the market supply of the factor and as a result when the firm buys a large amount of the factor, its price is raised. Thus, in such a case the firm is able to buy more units of the factor only at higher and higher prices. The supply curve of the factor to the firm in such a case will rise upward. When the supply curve is upward rising, as already explained, MFC is higher than AFC and therefore, the MFC curve lies above AFC curve.

We may conclude our discussion by observing that normally the supply of all factors to an economy is responsive to factor prices in the long run. In the short run the same factor can have supply curves ranging from the vertical (i.e., perfectly inelastic supply curve) to the horizontal, depending on which demand curve is coupled with supply-the demand curve of a small firm, of an industry (or a big firm) of a group of industries (i.e., the whole economy). This is shown in the Figure 8.8.

It is thus evident that even when the supply of a factor to the economy as a whole is rigidly fixed (as in Figure 8.8 (A) below), it will be more elastic to a particular use (as shown in Figure 8.8 (B) below), and will be perfectly elastic to a small user of the factor (as shown in Figure 8.8 (C) below).

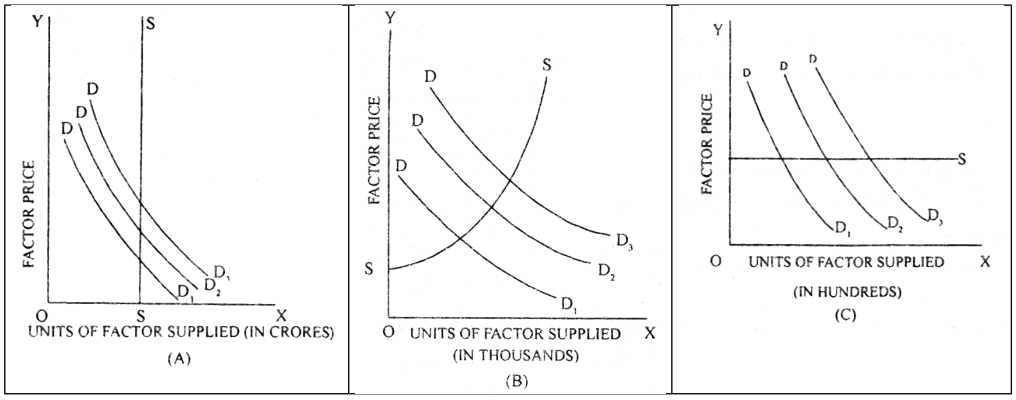


*Fig. 8.8*

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## 8.5 LEARNING OUTCOME

In this lesson you have learnt the following:

1. In the economic sense factor supplies for the economy as a whole are never perfectly inelastic except, possibly, in the very short run.
2. Supply of a factor to an industry is generally more elastic than its supply to the whole economy.
3. Supply of a factor to a small user of the factor can be assumed to be perfectly elastic.

## 8.6 TERMINAL QUESTIONS

1. What are the determinants of demand for factor? Derive individual and market demand curve of factor.
2. What are the determinants of supply of factors in the economy and for firms? Discuss.

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# LESSON 9
# FACTOR PRICING

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**Structure**



## 9.1 LEARNING OBJECTIVES

- To understand the concept of Factor Pricing
- To differentiate between pricing of commodity and factors of production
- To establish the equilibrium in pricing of factors
- To comprehend the Marginal Productivity Theory

## 9.2 INTRODUCTION

Till now all the lessons have discussed about output market, that is, how equilibrium price of a commodity is determined by the analysis of its demand and supply. This lesson concentrates on the input market, that is, how pricing of

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the factors of production that are used to produce the commodity is determined. It is not only dependent on the demand and supply of the factor itself but also on the productivity of the factor. There is however few differences between the pricing of a commodity and a factor of production like:

1. Demand for a factor of production is not direct but indirect demand as it is dependent on the demand for the commodity for which it is used. If there is no demand for that commodity then the factor too would not be demanded. For example if a particular type of labour is used in manufacture of tyres and if demand for tyres increases then the demand for the labour too would increase and vice versa.
2. Demand for a factor of production is a joint demand as no commodity can be produced by using just one type of factor of production. A particular combination of different factors of production is needed to produce a commodity. Though the factors of production can be substituted for each other but this substitution is not infinite.

As done in the commodities market that there can be various types of market structures starting from perfect competition on one extreme and monopoly on the other extreme, similarly in the factor market too price determination is done under the following conditions:

1. Perfect competition in both the product (commodity) market and factor market.
2. Imperfect Competition in product market and perfect competition in factor market.
3. Perfect Competition in product market and imperfect competition in the factor market.
4. Imperfect competition in both product and factor market.

Pricing of a factor of production say land, labour, raw material or other inputs is explained by Marginal Productivity theory as given below.



## 9.3 MARGINAL PRODUCTIVITY THEORY

Marginal Productivity Theory, a significant work that explains how factors of production are priced was given at the end of 19th century and its main contributor was John Bates Clark who proposed that a business firm would be willing to pay a productive agent only what he adds to the firm's well-being or utility. In other words every input will be paid the value of its marginal product.

According to J.B. Clark, "Under static conditions, every factor including entrepreneur would get a remuneration equal to its marginal product."

Productivity can be measured in three ways:

1. **Marginal Physical Product (MPP) –** It refers to addition to total production by addition of one variable factor of production, other things remaining constant.

   For example: One unit of variable factor of production produces 10 units of output and two units of variable factor produces 22 units of output, the $MPP_1$ would be = 22 – 10 = 12 units

   $MPP_n = TPP_n – TPP_{n-1}$

   Where $TPP_n$ = Total Physical Product or total output using 'n' units of variable factor of production.

   $TPP_{n-1}$ = Total Physical Product or total output using 'n–1' units of variable factor of production.

2. **Marginal Revenue Product (MRP) –** It refers to addition to total revenue by employing one additional variable factor of production, other things remaining constant.

   For example: In case of Perfect competition in the product market if one unit of variable factor of production produces 10 units of output which can be sold at the rate of Rs 20 per unit and two units of variable

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factor produces 22 units of output, then $MRP_l$ = 12 units * Rs 20 = Rs 240

$MRP_l = MPP_l * MRx$

where, $MPP_l$ = Marginal Physical Product of 'l' units of factor of production

MRx = Marginal Revenue of the commodity (product)

Note: In case of Imperfect competition in the product market, marginal revenue would be different from the price of the commodity. This has been taken in Lesson 6.

3. **Value of Marginal Product (VMP)** – It refers to the Marginal Physical Product multiplied by the price of the commodity.

   $VMP_l = MPP_l * Px$

   where, $MPP_l$ = Marginal Physical Product of 'l' units of factor of production

   Px = Price of the commodity (product)

Marginal Productivity Theory is based on the following assumptions:

1. **Perfect Competition in Product Market -** Product market has perfect competition implying that the price of the commodity is determined by the industry and all the firms take that price as given, also the price remains same and firms can produce and sell any quantity at the same price. In case of perfect competition in the product market, marginal revenue product and value of marginal product are same as price and marginal revenue of the commodity are equal.
2. **Perfect Competition in Factor Market** - Factor market also faces perfect competition that is at the prevailing factor price, any units of factor of production can be employed.
3. **Factors of Production are Homogeneous** - All units of the factors of production are homogeneous that is all are equally efficient and no unit of factor of production is more or less productive than the other.



4. **Substitution of Factors of Production is Possible** - Different factors of production can be substituted for each other, that is, labour can be substituted for capital and vice versa.
5. **Factors of Production are divisible** - Factors of production can be used in any divisible parts.
6. **Goal of the Firm is Profit Maximization** - Objective of the firm carrying on the production of a commodity by employing factors of production is to maximize profits.
7. **There is Full Employment in the Economy** - Economy is utilizing all the factors of production that are available such that there is neither underemployment nor overemployment.
8. **Technology is Constant** - There is no change in the technology because if technology improves then production too can increase with the same units of factors of production, but this is assumed to be constant.

**Explanation of the Marginal Productivity Theory**

The theory explains the demand for factors of production based on the belief that a profit maximizing firm would employ a factor of production after analyzing its marginal productivity (benefit to the firm) and its cost to the firm. The theory is based on the Law of diminishing marginal returns which states that as more and more variable factors of production are employed along with a fixed factor of production, the output first increases at increasing rate then at diminishing rate and ultimately the marginal product of the variable factor declines.

**Step 1: Demand for Factor of Production by a Single Firm**

Case 1: When there is only one variable factor of production.

Law of variable proportion suggested that as firm increases the variable factor with fixed quantity of other factors then total output first increases at increasing rate then at diminishing rate and ultimately falls. It also suggested that a profit maximizing producer would operate in the second stage where total physical product (total output) is increasing at diminishing rate and marginal

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physical product is falling. Thus, the shape of marginal physical product (MPP) is downward sloping as shown below in Figure 9.1:

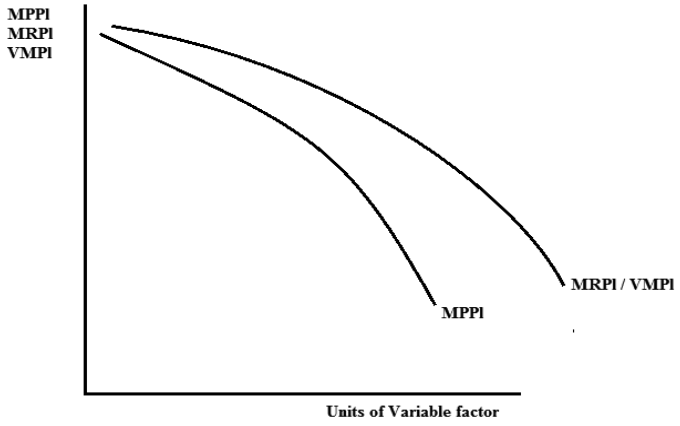


*Fig. 9.1*

Figure 9.1 reveals what happens in the factor market. Now moving to the product market, here also the firm is operating under perfect competition, thus its demand curve is a straight line parallel to X axis and price is equal to marginal revenue as it is fixed by the industry. It is shown in Figure 9.2. It is because of this that marginal revenue product and value of marginal product coincide as shown in Figure 9.1.

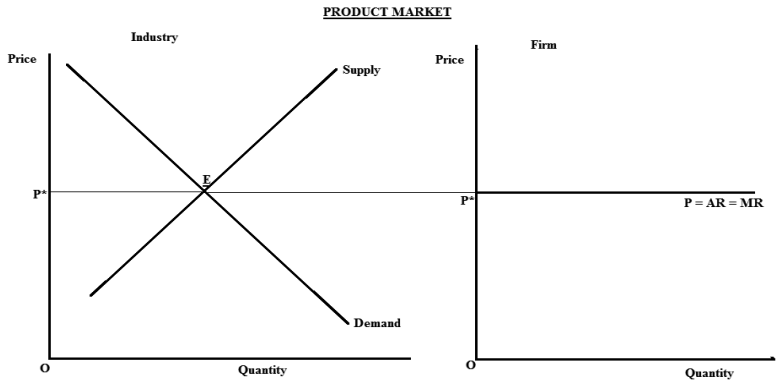


*Fig. 9.2*

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Now to get the demand curve of labour (it being the only variable factor), we assume that wage rate is $w_1$, at this rate the firm demands $OL_1$ units of labour where the cost of employing labour is equal to its benefit to the firm which is measured by its productivity (given by $VMP_1$). If wage rate changes to $w_2$ or $w_3$, the demand of the variable factor (in this case labour) changes to $OL_2$ and $OL_3$ respectively. Thus, the $VMP_1$ curve is the demand curve of labour (variable factor) for the firm in case of perfect competition in the product and factor market and when labour is the only variable factor as shown in Figure 9.3.

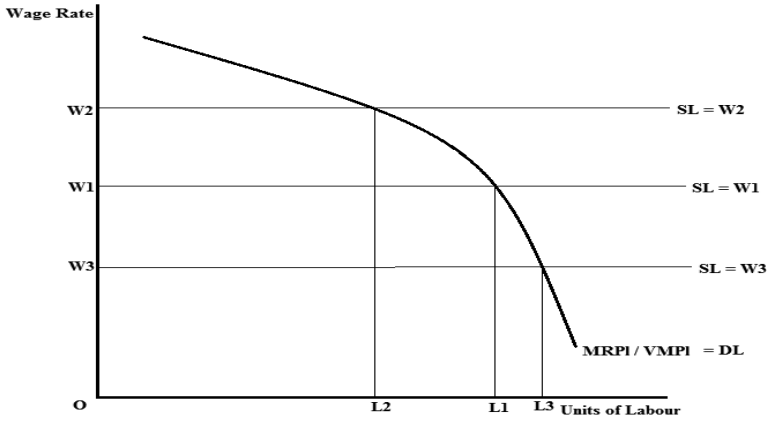


***Fig. 9.3***

According to Gould and Lazear, "*Thus the individual demand curve for a single variable productive service is given by the value of the marginal product curve of the productive service in question*."

Case 2: When there are several variable factors of production.

In case of firms carrying on production with various factors such that more than one factor is variable, then the VMP or MRP is not the demand curve as now there are multiple variable factors and they are interdependent. This is because a change in the price of any one factor brings relative changes in price that brings adjustment in all the variable factors of production. There are three effects that work behind this adjustment: Income effect, Substitution effect and profit maximizing effect. This is being explained with Figure 9.4.

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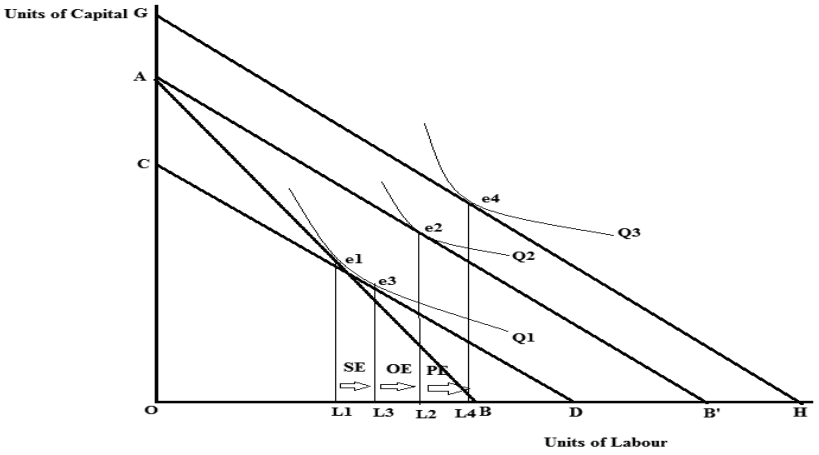


*Fig. 9.4*

Initially if the wage rate is $w_1$ the iso cost line is AB' and producer is at $e_1$ equilibrium using $OL_1$ units of labour. If we assume that there are only two factors of production that are variable namely labour and capital then with reduction in the wage rate of labour to $w_2$, the iso cost line pivots to AB' and producer moves to higher isoquant using $OL_2$ units of labour. The increase in labour from $OL_1$ to $OL_2$ in fact consists of two effects namely substitution and output effect. To divide the total effect into these two effects we draw an iso cost line parallel to AB' and tangent to old isoquant. The movement from $e_1$ to $e_3$ on the same isoquant shows the substitution effect as labour that has become relatively cheaper is being substituted for capital to produce the same level of output. The remaining that is $OL_3$ to $OL_2$ is the output effect showing how higher output can be produced because of cheaper labour that gives the firm higher purchasing power. $E_3$ the new equilibrium where firm produces $Q_2$ units of output is however not the profit maximizing level as with reduction in the wage rate the marginal cost of the firm reduces and firm's profit maximizing level of output increases to $Q_3$ which is the final equilibrium showing the impact of reduced wage rate in both the product market and factor market. It is being shown in Figure 9.5.

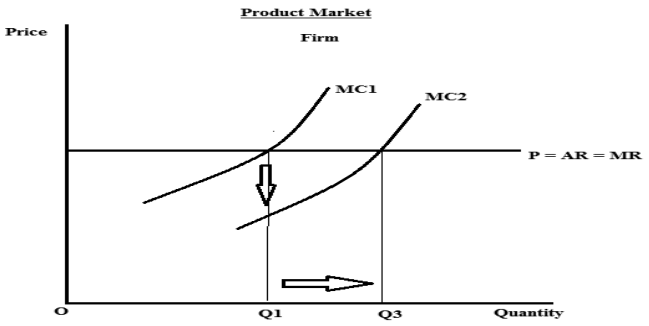


***Fig. 9.5***

The impact of all these three effects shifts the VMP curve. Because of the substitution effect more of labour is being used with lesser units of capital that reduces the marginal physical productivity of labour and shifts the MPP or VMP curve to the left. Output effect and profit maximizing effect that brings increase in both the labour and capital shifts the MPP or VMP curve to the right as it increases the productivity because both the factors are increased. Thus, the final shift in the VMP curve is to the right with reduced wage rate as shown in Figure 9.6.

The demand curve in case of more than one variable factor is thus the loci of equilibrium points joining the wage rate and shifting VMP curves.

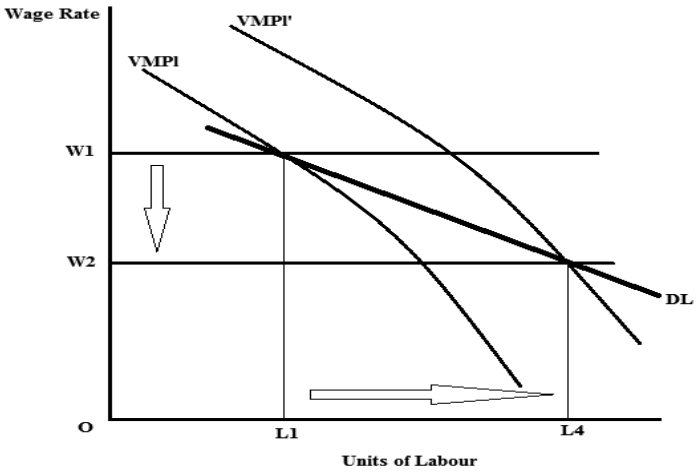


***Fig. 9.6***

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**Step 2: Demand for Factor of Production by the Industry**

All similar firms when combined together form the industry. In the product market horizontal summation of the demand of all firms is equal to the demand of the industry but the same is not the case in factor market. It can be explained using Figure 9.7:

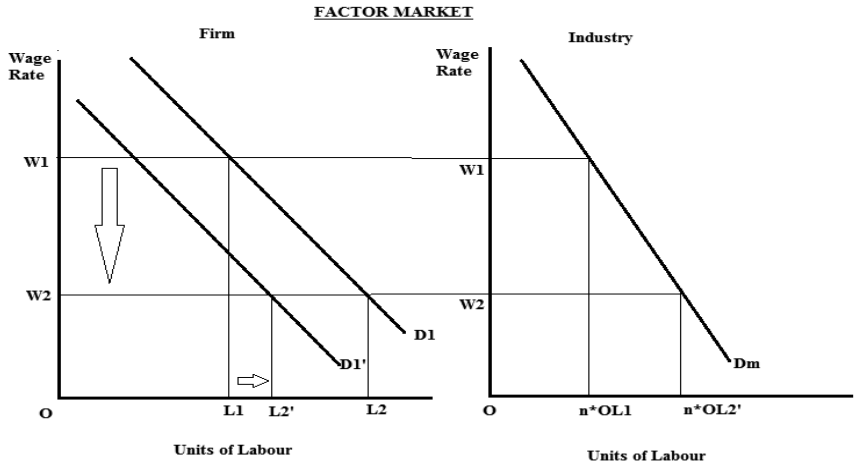
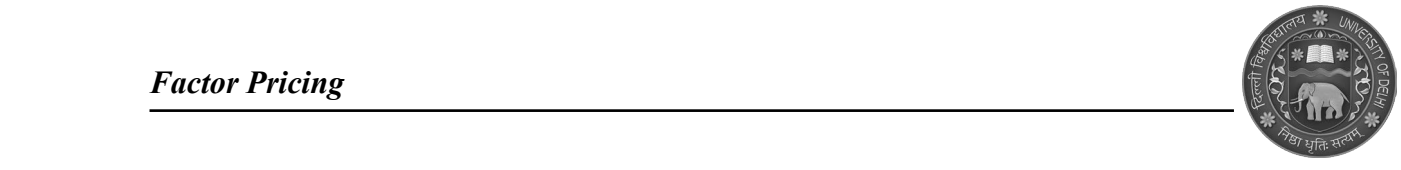



*Fig. 9.7*

Initially with wage rate $OW_1$, firm is using $OL_1$ units of labour and if we assume that there are 'n' firms in the industry then the total demand of labour is horizontal summation of the demand of labour by all the firms that is $n*OL_1$. If wage rate reduces to $OW_2$ then all firms demand more of labour and produce more of the commodity. With increased supply the price of the commodity in the product market reduces which shifts the VMP curve to the left and hence at reduced price the demand of labour is $OL_2$' and not $OL_2$. Thus, cs demand for the whole industry is $n*OL_2$'. So we see that in factor market the demand of the industry is not simply the horizontal summation as is the case in the product market because of interaction between factor market and product market.

**Step 3: Supply of a Variable Factor of Production by a Single Individual**

Supply of labour by one individual is backward bending showing that initially with increased wage rate the individual supplies more of labour, but with further



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increase in the wage rate the individual substitutes leisure for work and reduces the supply of labour to enjoy the wage that he has earned. It is explained with the help of indifference curve analysis.

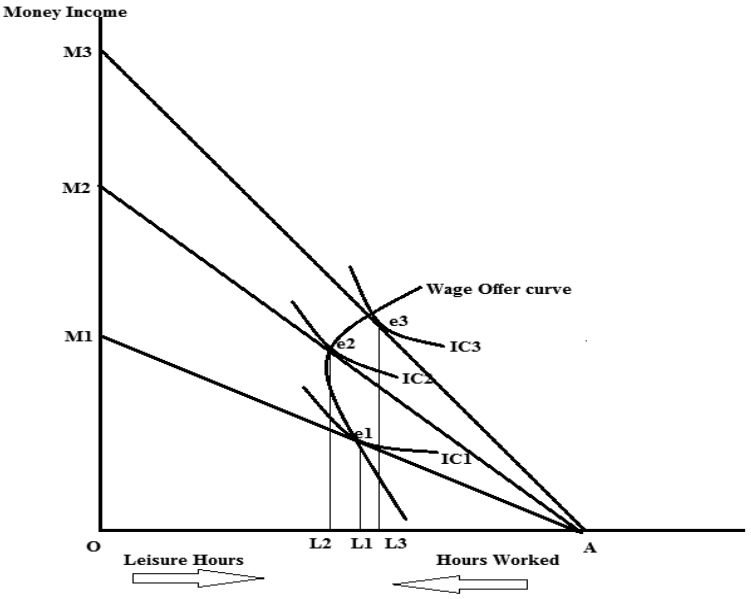


***Fig. 9.8***

Figure 9.8 has leisure hours on X axis measured from left to right and hours worked from right to left, and money income on Y axis. When wage rate is $W_1$ the income-leisure line is $AM_1$ and individual is at equilibrium $e_1$ where $IC_1$ is tangent to $AM_1$ where he is having $OL_1$ leisure hours and working for $AL_1$ hours. Now if wage rate increases then income-leisure line pivots to $AM_2$ where individual moves to new equilibrium at $e_2$ working for more number of hours that is $AL_2$ to earn higher income. With further increase in wage rates individual moves further to $e_3$ where he reduces hours worked and increases leisure hours to $OL_3$. Joining the successive equilibrium points we get the wage offer curve which shows that initially with increase in wage rate, an individual works more to earn higher income and with further increase in the wage rate consumer reduces hours worked to enjoy the income that he has earned. Figure 9.8 can also be presented as Figure 9.9.

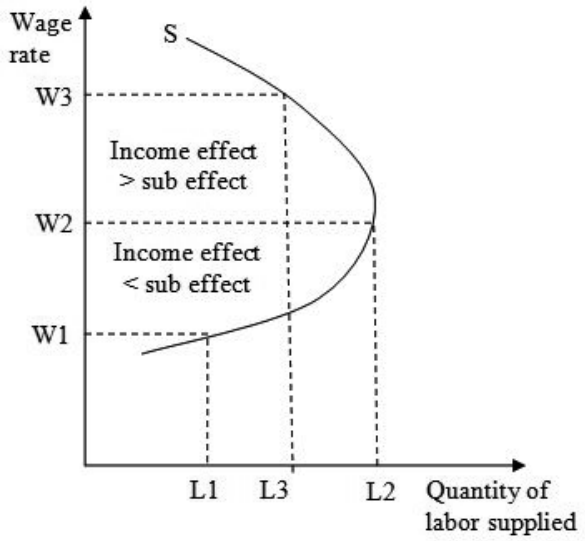


*Fig. 9.9*

Thus, the supply curve of labour by an individual is backward bending as initially Income effect is stronger that forces the individual to work more and earn higher income. with further increase in wage rate substitution effect becomes stronger that forces the individual to work less and substitute leisure for work.

**Step 4: Market Supply curve of a Factor of Production (Labour)**

The individual supply curve of labour is backward bending but for the market as a whole the supply curve (Figure 9.10) is upward sloping because of the following reasons:

1. Geographical Mobility – With increased wage rate labour may move from location to another thereby increasing the supply with increase in the wage rate.
2. Occupational Mobility – Individuals may also shift from one occupation to another with increase in the wage rate thereby increasing the supply.
3. Retired individuals may also join the work force with increased wage rate.
4. Youngsters too join the work force as part time with increase in the wage rate.

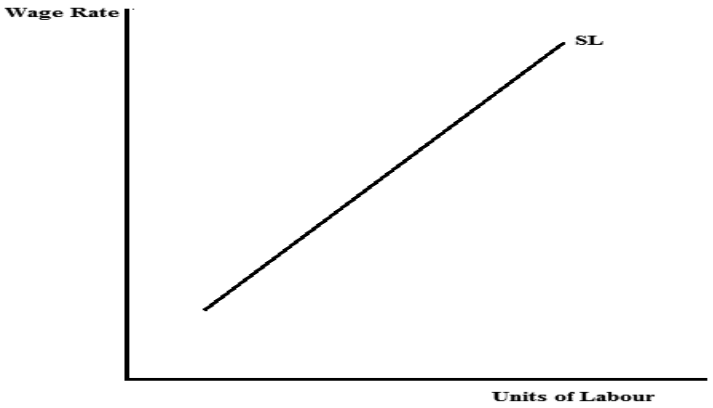


*Fig. 9.10*

### Step 5: Determination of Equilibrium Factor Price

As in the product market the price of the commodity is determined by the intersection of market (industry) demand and supply curve, similarly the factor price too is determined by the intersection of the industry demand and supply curve of the factor of production. Taking the case of labour the equilibrium wage rate is determined in the following manner (Figure 9.11):

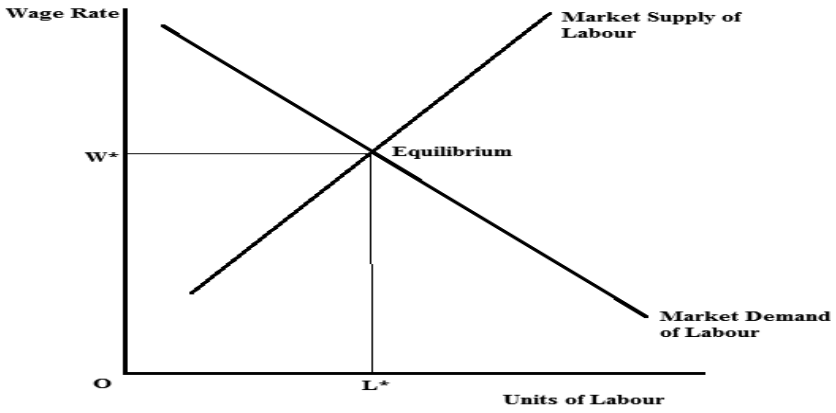


*Fig. 9.11*

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The market demand for labour which is obtained from step 2 above is downward sloping. The market supply curve of labour obtained from step 4 above is upward sloping. The intersection of these two curves gives the equilibrium factor price (wage rate in this case) which is OW* and OL* units of labour would be demanded and supplied.

Thus, marginal productivity theory explained how the pricing of factors of production is done in factor market and how it is different from the pricing of commodities in the product market. However, the theory suffers from various limitations which are given below:

**Limitations of the Marginal Productivity Theory**

1. **Different units of factors of production are not homogeneous**- The theory assumed that all units of a particular factor of production are same in efficiency, however this assumption is not always true, for instance a labour may be more efficient in working than some other labour and vice versa.
2. **Factors of production cannot be easily substituted for each other**- The theory is based on the premise that two factors of production can be easily substituted for each other to carry on the production such that if labour is not available then capital can be substituted for labour to carry on the production, however this is not always the case as production of a particular commodity requires a particular proportion of different factors of production.
3. **Criticism by Keynes**- Economist Keynes criticized the marginal productivity theory. The theory stated that if employment has to be increased then wages must be lowered as it would attract more labour, however this can be true for a firm or a particular industry but it is not applicable to the entire economy as it is the aggregate demand that determine the level of employment in an economy and not only the wages.
4. **Assumption of perfect competition**- Marginal Productivity theory assumed perfect competition in both the product market and factor market.

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However this assumption in itself is faulty as there is usually presence of imperfect competition in the markets, so the theory needs modification to incorporate the imperfections.

5. **Difficulty in measuring productivity** -The foundation of the theory lies in the productivity which in itself is difficult to measure as it assumes all the other factors to be constant except the efficiency which however is not true. Efficiency is in fact dependent on various factors simultaneously.

## 9.4 SELF ASSESSMENT QUESTIONS

**Check your progress**

**Exercise 1: True and False**

1. Demand for factors of production is Direct demand.
2. Factors of Production are always jointly demanded.
3. Marginal Physical Product refers to addition made to total output by employing one additional factor of production.
4. Marginal Productivity theory assumes perfect competition in both product and factor markets.

**Ans.** 1(F), 2(T), 3(T), 4(T)

**Exercise 2: Fill in the Blanks**

1. Marginal Physical Productivity theory was given by _ _ _ _ _ _ _ _ .
2. In case of perfect competition in product and factor market the value of marginal revenue product and value of marginal product is _ _ _ _ _ _ _ .
3. The price of a factor production is dependent on its _ _ _ _ _ _ _ _ _ _ .

**Ans.** 1. Clark 2.same 3. productivity

**Exercise 3: Questions**

1. Explain the different concepts of Productivity.
2. What are the assumptions on which Marginal Productivity Theory is based?

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3. How is Marginal Revenue Product different in case of Perfect competition and imperfect Competition in the product market? Explain using an example.
4. How are the prices of factors of production determined using Marginal Productivity Theory?

## 9.5 ECONOMIC RENT

The concept of Economic rent was first given by David Ricardo (1772– 1823) "Rent is that portion of the produce of earth which is paid to landlord for the use of original and indestructible powers of the soil."

Ricardo gave two reasons for the existence of rent:

1. Scarcity of resources and
2. Alternative use of the resources

Modern Economists like Joan Robinson, etc., however were of the opinion that rent is not only attributable to land but any and every factor of production can earn rent, whereby it is defined as the excess of actual earnings over the amount that is needed to keep the factor of production in its present use, the latter being termed as transfer earning. To understand the concept of Economic rent the concept of transfer earnings needs to be understood. It is the minimum amount that is to be paid to a factor of production to prevent it from moving to an alternative.

Example: If a worker is being paid Rs 2000 per day for working as an executive whereas for working as an officer he would have been paid Rs 1500, thus Rs 1500 is the transfer earnings. Thus, rent in this case can be calculated as:

Economic Rent = Actual Earnings – Transfer Earnings

= Rs 2000 – Rs 1500

= Rs 500

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The amount of economic rent depends upon the elasticity of supply of the factor of production such that there can be following three cases:

1. **Perfectly Inelastic Supply** – If a factor of production is perfectly inelastic then its transfer earnings are zero as it has no opportunity cost or alternative use, thus whatever the factor earns it is all economic rent. It is shown in Figure 9.12.

   Such a situation is usually found in case of specialists like singers, professionals etc., who earn all the rent in the form of economic surplus.

2. **Perfectly Elastic Supply** – When a factor of production is perfectly elastic then it can be easily shifted to its alternative and hence whatever it earns is the transfer earning and it is equal to actual earnings and hence economic rent is zero Figure 9.13. It takes place in case of unskilled labourer, rickshaw pullers, etc.

3. **Relatively Inelastic Supply** – When the supply is relatively inelastic then a part of actual earning is paid to prevent its transfer to the alternative use and the remaining that is in excess is the economic rent. Thus, here actual earnings are more than the transfer earnings as is shown Figure 9.14.

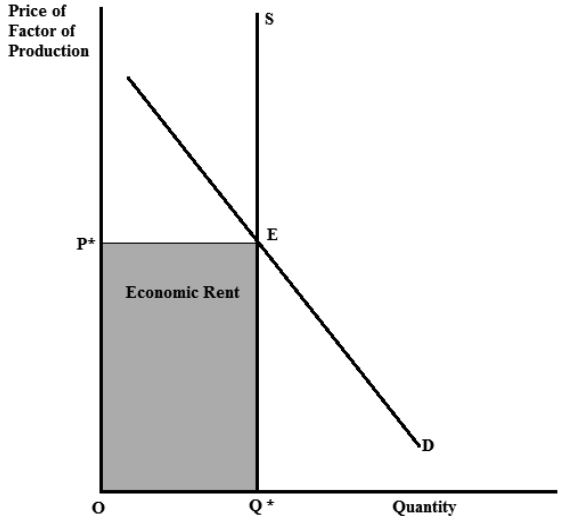


***Fig. 9.12***

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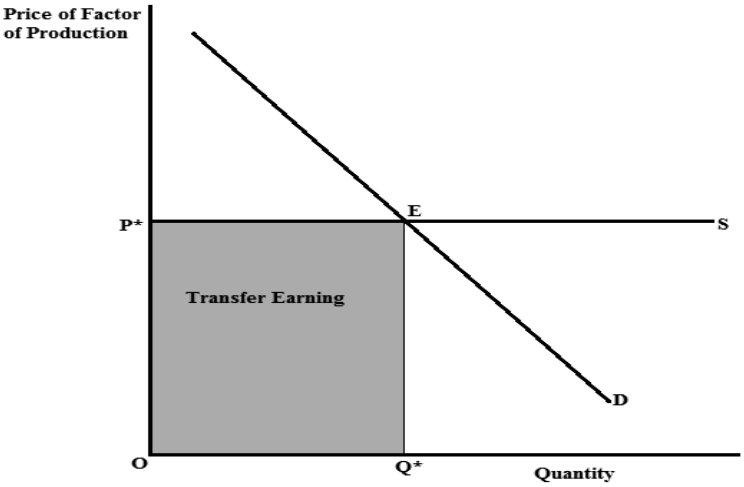


*Fig. 9.13*

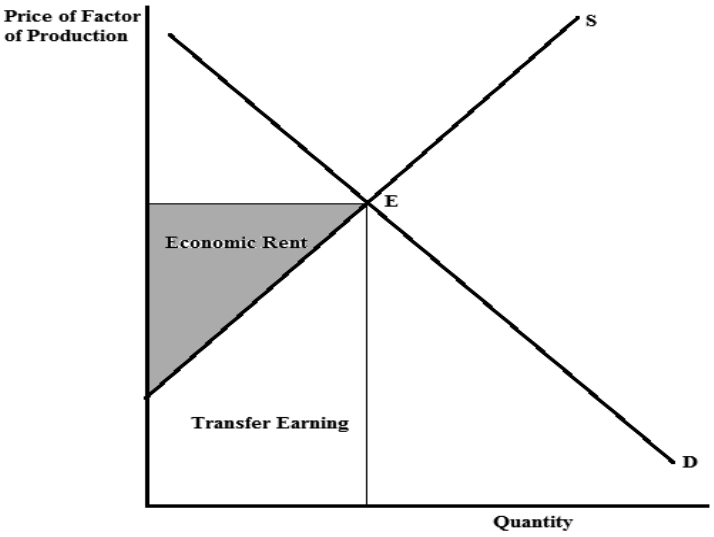


*Fig. 9.14*

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The size of economic rent received by an owner of a factor of production is determined by the elasticity of supply for that particular good or service.

(a) If the elasticity of supply is neither elastic nor inelastic, the supply curve will slope upward, and the supplier's income would be split between economic rent and opportunity cost.

(b) If the elasticity of supply is inelastic, the supply curve would be perfectly vertical, and the supplier's entire income would be comprised of economic rent. For example, if the supply were a particular plot of land, or a

(c) If the elasticity of supply is elastic, the supply curve would be perfectly horizontal, and the supplier's entire income would be comprised of opportunity cost.

## 9.6 SELF ASSESSMENT QUESTIONS

**Check your progress**

**Exercise 1: True and False**

1. Marginal Physical Product refers to addition made to total output by employing one additional factor of production.
2. Economic Rent arises only to land.

**Ans.** 1. (T), 2. (F)

**Exercise 2: Fill in the Blanks**

1. Economic rent concept arises because of …… of resources.
2. In case of monopoly in product market and perfect competition in the factor market the …… curve is used.
3. The price of a factor production is dependent on its …… .

**Ans.** 1. Scarcity 2.MRP 3. Productivity

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## 9.7 LEARNING OUTCOME

In this lesson you have learnt the following:

Factor Price determination is not as simple as commodity pricing as apart from demand and supply there are various other factors that have an impact on the prices that the factors of production command in the market. Moreover, there is an interaction between the product market and factor market that determines the demand of any factor of production as factor's demand is indirect or derived from the demand of the commodity that it produces. Also, the demand for factors of production being joint demand the prices, availability, efficiency and substitutability of other factors of production also impact the prices of a particular factor of production. Various economists have given various theories to determine the factor prices the most prevalent is the Clark's Marginal productivity theory that assumes perfect competition in both the product market and factor market and based on various other assumptions determine that the price of a variable factor of production is determined by the intersection of the market demand and market supply of that factor.

The concept of economic rent as given by traditional economists and modern economists too had been explained where rent is defined as the excess of actual earnings over the transfer earnings and can be earned by any and all factor of production whose supply is not perfectly elastic.

## 9.8 TERMINAL QUESTIONS

1. Explain the concept of economic rent. How does elasticity of supply of factor affect economic rent?
2. Critically examine the marginal productivity theory of factor pricing.
3. What is the reason behind supply of labour to be backward bending? Explain by using suitable diagram.

# UNIT IV: INTERNATIONAL TRADE

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# LESSON 10
# INTERNATIONAL TRADE AND ABSOLUTE ADVANTAGE

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Assistant Professor
University of Delhi

**Structure**



## 10.1 INTRODUCTION

Let us look at our typical day. We wake up in the morning and get dressed in clothes that have been stitched in Bangladesh. We have a cup of tea that has been grown on a tea estate in Assam. We decide to study economics from a book that has been written by an author in the United States and make notes in a notebook that has been made in a factory in Maharashtra.

Every day, we rely on many people, most of whom we have never met, to provide us with the goods and services that we enjoy. Such interdependence is possible because people trade with one another.

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## 10.2 LEARNING OBJECTIVES

- To understand the meaning of trade
- To analyse why trade occurs
- To explain the Theory of Absolute Advantage
- To understand how everyone can gain from trade
- To discuss diagrammatically how people can consume more than they are able to produce

## 10.3 WHAT IS TRADE?

The exchange of goods, services or resources between economic agents is called **trade**. Trade that occurs between two countries is called **international trade** and the trade that occurs between two regions of the same country is called **inter-regional trade or domestic trade**.

## 10.4 WHY DO PEOPLE TRADE?

People trade because there are **gains from trade**, that is, when countries sell goods and services to one another, this exchange is to their mutual benefit. This means that if there are 2 parties trading with each other, then trade makes them better off than they were before trading. But how does that happen? Let us understand this with the help of an example.

**Example 1:** Two parties and each party can produce only one good.

Consider that there are only two goods in the world – milk and potatoes. Further, consider there are only two people in the world – Usha, who owns a cow; and Raj who is a potato farmer.

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Case I: Usha can produce only milk and Raj is able to produce only potatoes.

Therefore, without trade, Usha consumes only milk and Raj consumes only potatoes. Suppose after some time, Usha gets bored of just being able to drink milk and Raj gets bored of just eating potatoes. However, if both start trading with each other, both will be able to have both milk and potatoes. So, their consumption set increases. This makes both better off. Hence, trade is advantageous.

**Example 2:** Two parties and each party can produce two goods.

Consider two countries – United States and Colombia.

One can assume that in Colombia, which is a developing nation, workers are less efficient than their U.S. counterparts at making sophisticated goods such as computers. This means that a given amount of resources used in computer production yields fewer computers in Colombia than in the United States.

Also, around Valentine's Day (which falls in February), there is a lot of demand for roses in the United States. However, the climate is not as conducive for growing roses in the United States as it is in Colombia. For one thing, it is a lot easier to grow February roses in the Southern Hemisphere, where it is summer in February rather than the winter that is there in Northern Hemisphere.

Hence, more resources are required to grow roses in the United States than in Colombia, in the form of heated greenhouses, which is at a great expense in terms of energy, capital investment, and other scarce resources. Those resources could be used to produce other goods, like computers. Inevitably, there is a tradeoff. To produce winter roses, the U.S. economy must produce fewer of other things, such as computers. Economists use the term **opportunity cost** to describe such trade-offs: The opportunity cost of roses in terms of computers is the number of computers that could have been produced with the resources used to produce a given number of roses.

Suppose, that the United States currently grows 10 million roses for sale on Valentine's Day and that the resources used to grow those roses could have produced 100,000 computers instead. Then the opportunity cost of those 10 million roses is 100,000 computers. (Conversely, if the computers were produced

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instead, the opportunity cost of those 100,000 computers would be 10 million roses.)

Furthermore, since we have assumed that Colombian workers are likely to be less efficient than their U.S. counterparts at making capital intensive goods like computers, a given amount of resources used in computer production yields fewer computers in Colombia than in the United States. So, the trade-off in Colombia might be something like 10 million winter roses for only 30,000 computers.

This difference in opportunity costs offers the possibility of a mutually beneficial rearrangement of world production. Let the United States stop growing winter roses and devote the resources this frees up to producing computers; meanwhile, let Colombia grow those roses instead, shifting the necessary resources out of its computer industry. The resulting changes in production can be shown in the form of Table 10.1.

***Table 10.1*** *Hypothetical Changes in Production*

| | Roses (in millions) | Computers (in thousands) |
|---|---|---|
| United States | -10 | +100 |
| Colombia | +10 | -30 |
| **Total** | **0** | **+70** |

We see that the world is producing just as many roses as before, but it is now producing more computers. So, this rearrangement of production, with the United States concentrating on computers and Colombia concentrating on roses, increases the size of the world's economic pie. Because the world as a whole is producing more, it is possible in principle to raise everyone's standard of living. Hence, we see that trade can make people better off, and that is why people trade.

## 10.5 THEORY OF ABSOLUTE ADVANTAGE

The concept of absolute advantage was developed by 18th-century economist Adam Smith in his book *The Wealth of Nations,* which was published in 1776,

to show how countries can gain from trade by specializing in producing and exporting the goods that they can produce more efficiently than other countries.

According to this theory, a country, person or firm that can produce a good *more cheaply* than others is said to have an **absolute advantage** in producing that good. Here, when we say 'more cheaply' we mean, being able to produce one unit of the good with the least quantity of inputs or given a quantity of input, producing the highest quantity of output. The theory further propounds that a country, firm or person should **specialize** in the production of that commodity in which it has an absolute advantage and trade it for the commodity in which the other country, person or firm has an absolute advantage. In such a case, trade can be beneficial for both the parties. Note, here when we say a country should specialize in a particular commodity, we mean that it should allot all or most of its resources towards the production of that good. The Theory of Absolute advantage is applicable when there are absolute differences in the costs of production of the goods in different countries.

**In-Text Questions 1**

1. Fill in the blanks by choosing one correct option.

   If a nation has an absolute advantage in the production of a good, _____.

   a. It can produce that good at a lower opportunity cost than its trading partner.
   b. It can produce that good using fewer resources than its trading partner.
   c. It can benefit by restricting imports of that good.
   d. It will specialize in the production of that good and export it.
   e. None of the above is true.

Let us understand this further with the help of an example. Let us consider another case of the example 1 discussed earlier.

Case II: Both Usha and Raj can produce milk as well as potatoes.

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Let, for simplicity, consider that there are only 2 units of input/factor(s) of production/resources (input can be in the form of labour, time or anything else). Let, for these 2 units of input, Usha produces 6 units of milk or 2 units of potatoes. Further, for the same 2 units of input, assume that Raj produces 4 units of milk or 10 units of potatoes. This means, if Usha used all the inputs available to her towards production of milk, she would be able to produce 6 units of milk and if she puts all her inputs towards production of potatoes, she will be able to produce 2 units of potatoes. Similarly, if Raj used all the inputs available to him towards production of milk, he would be able to produce 4 units of milk and if he put all his inputs towards production of potatoes, he would be able to produce 10 units of potatoes.

These production possibilities are represented in Table 10.2.

For 2 units of inputs/factor(s) of production-

***Table 10.2*** *Production possibilities available to Usha and Raj if they have 2 units of input.*

| | **Milk** | **Potatoes** |
|---|---|---|
| **Usha** | 6 | 2 |
| **Raj** | 4 | 10 |

As it can be seen by comparing the quantity of milk for Usha and Raj in Table 10.2 (second column), Usha produces more amount of milk than Raj (6 > 4). This means, Usha has an absolute advantage in producing milk. Also, we see that Raj produces more quantity of potatoes as compared to Usha (10 > 2) and hence, Raj has an absolute advantage in producing potatoes. Thus, according to the Absolute Advantage Theory, Usha should produce only milk and Raj should produce only potatoes and then trade with each other.

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**In-Text Questions 2**

2. The following table shows the units of output a worker can produce per month in Australia and Korea. Use this table to answer the question.

| | **Food** | **Electronics** |
|---|---|---|
| Australia | 20 | 5 |
| Korea | 8 | 4 |

Which of the following statements about absolute advantage is true?

a. Australia has an absolute advantage in the production of food while Korea has an absolute advantage in the production of electronics.

b. Korea has an absolute advantage in the production of food while Australia has an absolute advantage in the production of electronics.

c. Australia has an absolute advantage in the production of both food and electronics.

d. Korea has an absolute advantage in the production of both food and electronics.

At this juncture, we shall analyze *how* both parties will be better off according to the theory of absolute advantage. For this, let us dive deeper.

Since in our example, 2 units of input Usha produces 6 units of milk or 2 units of potatoes, therefore in 1 unit of the input, she will produce $\frac{6}{2} = 3$ units of milk and $\frac{2}{2} = 1$ unit of potatoes. Similarly, if in 2 units of input Raj produces 4 units of milk or 10 units of potatoes, then in 1 unit of the input, he will produce $\frac{4}{2} = 2$ units of milk and $\frac{10}{2} = 5$ units of potatoes.

This can be represented in Table 10.3.

For 1 unit of inputs/factor(s) of production-

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***Table 10.3*** *Production possibilities available to Usha and Raj if they have 1 unit of input.*

| | Milk | Potatoes |
|---|---|---|
| **Usha** | $\frac{6}{2} = 3$ | $\frac{2}{2} = 1$ |
| **Raj** | $\frac{4}{2} = 2$ | $\frac{10}{2} = 5$ |

Diagrammatically, we can show this in the form of Production Possibilities Frontiers (PPF). A Production Possibilities Frontier, as you may recall, is a graph that shows the combinations of output (in our case, milk and potatoes) that can possibly be produced given the available factors of production and the available production technology.

The analysis through which we have formed Table 10.3 implicitly assumes that there is constant marginal opportunity cost, that is, a constant amount of one commodity needs to be sacrificed in order to gain an additional unit of the other commodity. This means the rate at which one good can be traded for the other does not depend on the amount that was being produced. Hence, if Usha uses one less unit of input to produce milk and one more unit of input to produce potatoes, she decreases her output of milk by 3 and increases her output of potatoes by 1, regardless of how much she is already producing. Same is the case for Raj. This results in a straight line PPF as shown in Figure 10.1(a), Figure 10.1(b) and Figure 10.1(c).

Figure 10.1(a) shows the PPF for Usha, Figure 10.1(b) shows the PPF for Raj and Figure 10.1(c) shows the PPF of both of them on the same graph. In all 3 figures, we are measuring the quantity of milk produced on the X axis and we are measuring the quantity of potatoes produced on the Y axis.

Given that Usha produces 6 units of milk if she puts all its resources/inputs towards milk production (and therefore doesn't produce potatoes), the X intercept of her PPF will be (6, 0), represented by $U_x$ in Figure 10.1(a). Alternatively, if Usha produces only potatoes, she will be able to produce 2 potatoes, hence, the Y intercept of her PPF is (0, 2) represented by $U_y$. . Further, since we know the x and y intercepts, and the PPF is a straight line, we can calculate the equation

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of Usha's PPF to be x + 3y = 6 where x is the quantity of milk produced and y is the quantity of potatoes produced. Any combination of milk and potatoes that falls on this line is the maximum that can be produced by Usha given her factors of production.

Similarly, given that Raj produces 4 units of milk if he puts all his resources/ inputs towards milk production (and therefore doesn't produce potatoes), the X intercept of his PPF will be (4, 0), represented by $R_x$ in Figure 10.1(b). Alternatively, if Raj produces only potatoes, he will be able to produce 10 potatoes, hence, the Y intercept of his PPF is (0, 10) represented by $R_y$. Further, since we know the x and y intercepts, and the PPF is a straight line, we can calculate the equation of Raj's PPF to be 5x + 2y = 20 where x is the quantity of milk produced and y is the quantity of potatoes produced. Any combination of milk and potatoes that falls on this line is the maximum that can be produced by Raj given his factors of production.

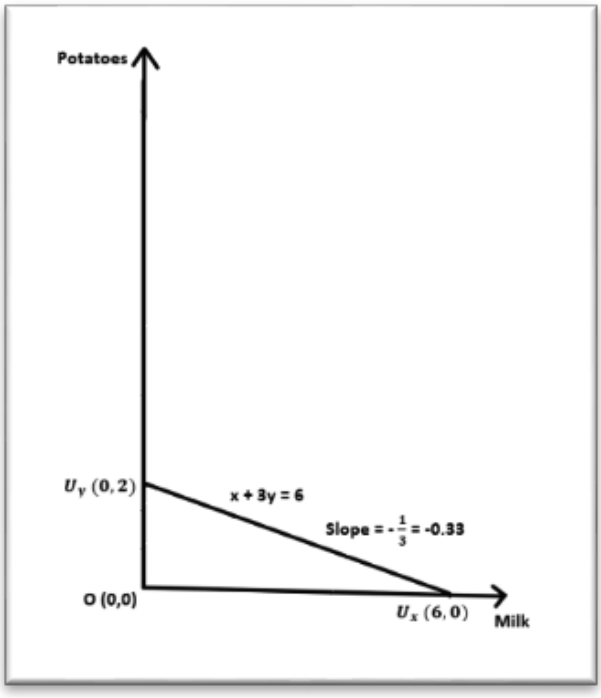


***Fig. 10.1(a)*** *Combinations of milk and potatoes that Usha can produce*

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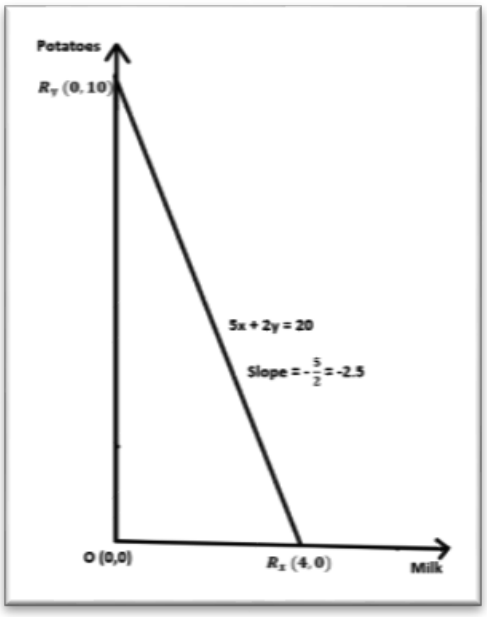


***Fig. 10.1(b):*** *Combinations of milk and potatoes that Raj can produce*

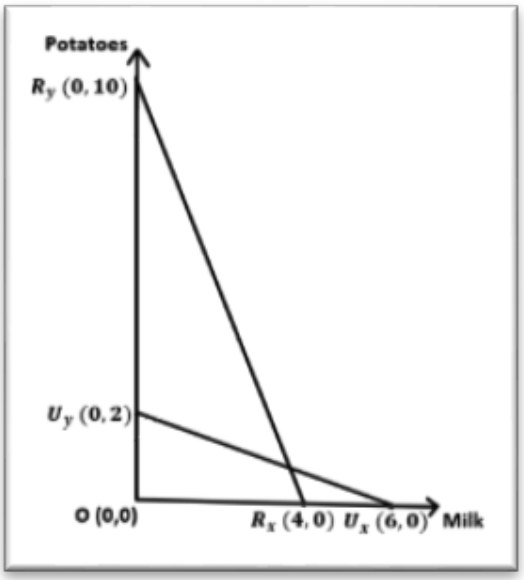


***Fig. 10.1(c):*** *Combinations of milk and potatoes that Usha and Raj can produce, drawn together*

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It is likely that each individual will prefer to consume some combination of both goods and not just one good (either milk or potatoes). Let us, for instance, suppose that if there was no trade. Usha would produce and consume 3 units of milk and 1 unit of potatoes. Similarly, Raj would produce and consume 2 units of milk and 5 units of potatoes. Keep in mind that without trade they will consume whatever they produce.

Alternatively, suppose Usha produces only milk, in which she has an absolute advantage, and Raj produces only potatoes, in which he has an absolute advantage and then they trade with each other. Say, they exchange 2 units of milk for 4 units of potatoes. Usha will have 4 units of milk and 3 units of potatoes to consume. Raj will have 2 units of milk and 7 units of potatoes to consume. This is more than what they had before trade, because each person gets more of one good and no less of the other. Thus, we can see that both parties are better off by following the theory of absolute advantage. This is shown in tabular form in Table 10.4 below.

***Table 10.4** Gains from trade for Usha and Raj*

| | | Usha | | Raj | |
|---|---|---|---|---|---|
| | | **Milk** | **Potatoes** | **Milk** | **Potatoes** |
| **Without trade** | **Production and consumption** | 3 | 1 | 2 | 5 |
| **After trade** | **Production** | 6 | 0 | 0 | 10 |
| | **Trade** | Gives 2 | Gets 3 | Gets 2 | Gives 3 |
| | **Consumption** | 4 | 3 | 2 | 7 |
| **Gains from trade** | | + 1 | + 2 | 0 | + 2 |

Additionally, Figure 10.2(a) and Figure 10.2(b) show the production and consumption of Usha and Raj before and after trade. The proposed trade between Usha and Raj offers each of them a combination of milk and potatoes that would be impossible in the absence of trade. In Figure 10.2(a), after trade, Usha gets to consume at point B* which is above her PPF, rather than point B which is on her PPF. Hence, through trade, she is able to consume more than she would have ever been able to produce. Correspondingly, in Figure 10.2(b), Raj gets to consume at

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point A* after trade, which lies above his PPF. Hence, he too is able to consume a bundle of goods that was impossible for him to consume without trade.

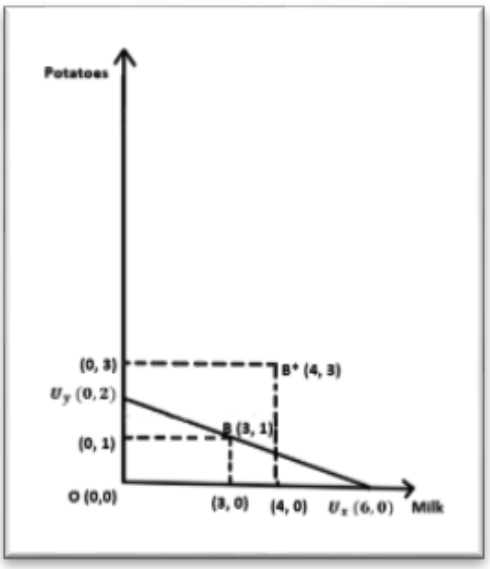


***Fig. 10.2(a):*** *Usha's production and consumption before and after trade*

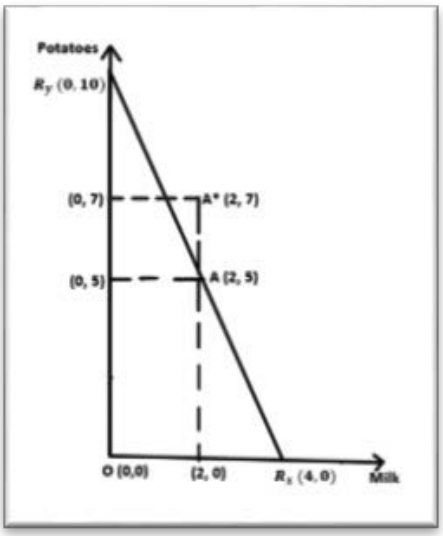


***Fig. 10.2(b):*** *Raj's production and consumption before and after trade*



## 10.6 GLOSSARY

- **Absolute Advantage:** Absolute advantage is the ability of an individual, company, region, or country to produce a greater quantity of a good or service with the same quantity of inputs per unit of time, or to produce the same quantity of a good or service per unit of time using a lesser quantity of inputs, than its competitors.
- **Gains from Trade:** It is the increase in total production due to specialization allowed by trade. When countries sell goods and services to one another and this exchange is to their mutual benefit, they are said to have gains from trade.
- **Opportunity Cost:** It is the cost of the next best alternative. It represents the potential benefits that a party misses out on when choosing one alternative over another.
- **Specialization:** Specialization is when an individual or a country allocates most or all of its resources towards the production of a particular good or service.

## 10.7 ANSWERS TO IN-TEXT QUESTIONS

### In-Text Question -1

**Answer:** The correct answer is b. because that is the definition of absolute advantage.

Let us look at why the other options are incorrect.

Option c. is incorrect because the Absolute Advantage Theory does not make any comments about restricting imports (and hence trade). On the contrary, it encourages trade if the countries have an absolute advantage. Its proponent, Adam Smith, extolled the virtues of free trade.

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Option a. is not the correct answer because absolute advantage, by definition, looks at the lowest absolute cost of producing a good, which means, producing a good with the least inputs, or conversely, producing the most amount of goods with a unit of input. It does not consider the opportunity cost.

Finally, option d. is incorrect too. This is because the Absolute Advantage Theory propounds that a country with absolute advantage in a particular good should specialize in that good and export it. It does not say that the country will specialize in it and export it. It is a theory, not a law.

**In-Text Question -2**

**Answer:** The correct answer is c. because the amount of food that Australia produces (20 units) is more than that of Korea (8 units). Similarly, the amount of electronics that Australia produces (5 units) is more than the amount of electronics that Korea produces (4 units). Hence Australia has an absolute Advantage in both the goods.

## 10.8 LEARNING OUTCOMES

In this lesson you have been taught-

- The exchange of goods, services or resources between economic agents is called **trade**.
- People trade because there are **gains from trade.**
- A country, person or firm that can-
  - Produce one unit of the good with the least quantity of inputs or, in other words,
  - Given a quantity of input, produce the highest quantity of output is said to have an **absolute advantage** in producing that good.
- According to the theory of absolute advantage, a country, firm or person should **specialize** in the production of that commodity in which it has

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an absolute advantage and trade it for the commodity in which the other country, person or firm has an absolute advantage.

## 10.9 TERMINAL QUESTIONS

Q.1 Consider two people, Frank and Ruby. Each of them works 8 hours per day and can devote this time to producing wheat or rice or a combination of the two. Table A shows the amount of time each person requires to produce 1 kilogram of each good. Frank can produce one kilogram of wheat in 15 minutes and a kilogram of rice in 60 minutes. Ruby can produce a kilogram of wheat in 10 minutes and a kilogram of rice in 20 minutes. Table B shows the amounts of wheat or rice Frank and Ruby can produce if they devote all 8 hours to producing only that good.

***Table A***

| | Time (in minutes) needed to make one kilogram of: | |
|---|---|---|
| | Wheat | Rice |
| Frank | 60 | 15 |
| Ruby | 20 | 10 |

***Table B***

| | Amount (in kilograms) produced in 8 hours: | |
|---|---|---|
| | Wheat | Rice |
| Frank | 8 | 32 |
| Ruby | 24 | 48 |

(a) Does Frank have an absolute advantage in any of the goods?

(b) Does Ruby have an absolute advantage in any of the goods?

(c) Draw the PPF for Frank.

(d) Draw the PPF for Ruby.

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Q.2 Let, for the same amount of labour (say L units), India produces 10 units of wheat, and 5 units of computers and USA produces 7 units of wheat and 11 units of computers.

a) Does India have an absolute advantage in producing any of the two goods?

b) Does the USA have an absolute advantage in producing any of the two goods?

c) What should the countries do based on the theory of Absolute Advantage?

Q.3 Angela is a college student. She takes a full load of classes and has only 5 hours per week for her hobby. Angela is artistic and can make 2 clay pots per hour or 4 coffee mugs per hour.

(a) Draw Angela's production possibilities frontier for pots and mugs.

(b) What is Angela's opportunity cost of 1 pot? 10 pots?

(c) What is Angela's opportunity cost of 1 mug? 10 mugs?

(d) Why is her production possibilities frontier a straight line instead of being bowed out?

## 10.10 SOLUTIONS TO TERMINAL QUESTIONS

**Solution 1**

(a) No, Frank does not have an absolute advantage in producing any of the goods as compared to Ruby.

Table B shows that Frank produces 8 kg of wheat in 8 hours which is less than the 24 kg of wheat that Ruby produces in the same time. Hence, he does not have an absolute advantage in producing wheat. Further, from Table B we see that Frank produces 32 kg of rice in 8 hours as compared to 48 kg that Ruby produces. Since $32 < 48$, he does not have an absolute advantage in producing rice either.

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The same conclusion is reached when we analyze the same data written in the form of Table A. Table A indicates that Frank takes more time (which is out only input/ factor of production, in this case) to produce one kilogram of wheat as compared to Ruby (60 mins/kg for Frank versus 20 mins/kg for Ruby). Hence, Frank does not have an absolute advantage in producing wheat. Similarly, Frank takes 15 minutes to produce a kilogram of rice which is more than the 10 minutes that Ruby takes to produce the same one kilogram of rice. Hence, Frank does not have absolute advantage in producing rice either.

(b) As a corollary to Solution 1(a), Ruby has an absolute advantage in producing both wheat and rice.

(c) Frank's PPF is-

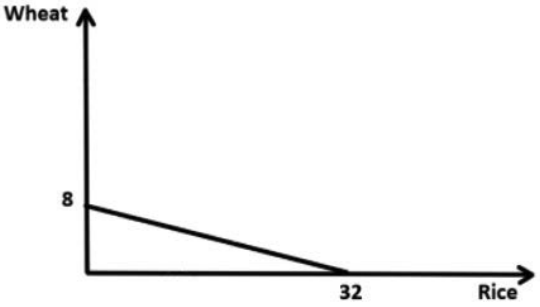


***Fig. A:*** *Frank's PPF*

(d) Ruby's PPF is-

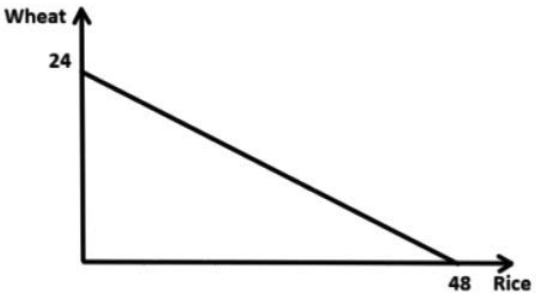


***Fig. B:*** *Ruby's PPF*

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**Solution 2**

The information in the question can be represented in the form of the following table-

***Table C***

| | Wheat | Computers |
|---|---|---|
| India | 10 | 5 |
| USA | 7 | 11 |

(a) Since India produces more amount of wheat (10 units) as compared to USA (7 units) in the same amount of inputs (labour), India has an absolute advantage in producing wheat.

(b) Since USA produces more amount of computers (11 units) as compared to India (5 units) in the same amount of inputs (labour), USA has an absolute advantage in producing computers.

(c) According to the theory of absolute advantage, India should specialize in the production of wheat and trade it with USA which should specialize in the production of computers.

Solution 3. The information given in the question can be represented in tabular form as-

***Table D***

| Amount produced in one hour | |
|---|---|
| Pots | Mugs |
| 2 | 4 |

(a) Table D shows the number of pots *or* mugs she can make in 1 hour. However, she has a total of 5 hours. Therefore, in 5 hours she will be able to make 5 times the number of pots *or* mugs she made in 1 hour. Therefore-

***Table E***

| Amount produced in 5 hours | |
|---|---|
| Pots | Mugs |
| 10 | 20 |

This implies, on a graph where X axis shows the quantity of pots Angela made and Y axis shows the quantity of mugs that she produced, the X intercept of her PPF will be 10 and the Y intercept will be 20. Thus, her PPF is-

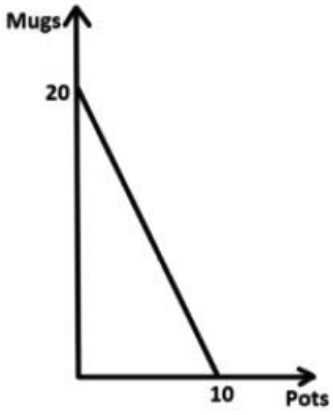


***Fig. C:** Angela's PPF*

(b) From Table D, it can be inferred that the opportunity cost for 2 pots is 4 mugs.

This implies that the opportunity cost for 1 pot will be $\frac{4}{2} = 2$ mugs.

This further implies that the opportunity cost of 10 pots will be 2 x 10 = 20 mugs.

(c) Similarly, from Table D, it can be inferred that the opportunity cost of 4 mugs is 2 pots.

This implies that the opportunity cost for 1 mug will be $\frac{2}{4} = \frac{1}{2}$ pot.

This further implies that the opportunity cost of 10 mugs will be $\frac{1}{2} \times 10 = 5$ pots.

(d) Typically, a PPF is drawn bowed out (that is, concave shaped, or convex to the origin) because typically there are increasing marginal opportunity costs. This means, more and more units of one commodity need to be

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sacrificed in order to gain an additional unit of the other commodity. In other words, the rate at which society could trade one good for the other depended on the amounts that were being produced. However, Angela's resources can be moved from the production of one good to another at a constant rate. This means, a constant amount of pots needs to be sacrificed in order to gain an additional unit of mugs (and vice versa). Therefore, her PPF is a straight line.

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# LESSON 11
# COMPARATIVE ADVANTAGE AND TERMS OF TRADE

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**Structure**



## 11.1 INTRODUCTION

The purpose of this lesson is to demonstrate how everyone can gain from trade. Trade allows people to specialize in the production of goods for which they have a comparative advantage and then trade it for goods that other people produce. Because of specialization, total output rises, and through trade, we are all able to share in the bounty. This is as true for countries as it is for individuals.

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## 11.2 LEARNING OBJECTIVES

- To understand the Theory of Comparative Advantage
- To explain how everyone can gain from trade
- To discuss diagrammatically, how people can consume more than they are able to produce through trade
- To describe the sources of Comparative Advantage
- To understand the meaning of Terms of Trade
- To discuss the types of Terms of Trade

## 11.3 THEORY OF COMPARATIVE ADVANTAGE

The concept of Comparative Advantage was given by David Ricardo in the year 1817 to show how countries can gain from trade by specializing in goods that they can produce more efficiently than other countries.

According to David Ricardo, it is not the absolute but the comparative differences in costs that determine trade relations between two countries. Production costs differ in countries because of geographical division of labour and specialization in production. Due to differences in climate, natural resources, geographical situation and efficiency of labour, a country can produce one commodity at a lower cost than the other. Hence, *comparatively*, that country will have an advantage in producing that commodity vis-a-vis another country.

A country is said to have a **comparative advantage** in producing a good if the opportunity cost of producing that good in terms of the other good is lower in that country as compared to the other country. Recall that **opportunity cost** refers to the cost of the next best alternative. It represents the potential benefits that a party misses out on when choosing one alternative over another.

Ricardo shows that trade is possible between the two countries even when a country does not have an absolute advantage in the production of any of the commodities but has a comparative advantage in the production of one commodity



than in the other. The theory propounds that a country, firm or person should specialize in the production of that commodity in which it has a comparative advantage and trade it for the commodity in which the other country, person or firm has a comparative advantage. In such a case, trade can be beneficial for both the parties.

Let us understand this with the help of an example. Consider two people, Frank and Ruby. Each of them works 8 hours per day and can devote this time to producing wheat or rice or a combination of the two. If Frank produces only wheat, he can produce 8 kilograms of wheat and if Frank produces only rice, he can produce 32 kilograms of rice. Similarly, if Ruby produces only wheat, she can produce 24 kilograms of it and if she produces only rice, she can produce 48 kilograms of it. Table 11.1 shows this in tabular form.

***Table 11.1***

| | **Amount (in kilograms) produced in 8 hours:** | |
|---|---|---|
| | **Wheat** | **Rice** |
| Frank | 8 | 32 |
| Ruby | 24 | 48 |

For Frank-

- Opportunity cost for 8 kg of wheat = 32 kg of rice

  => opportunity cost for 1 kg of wheat = $\frac{32}{8} = 4$ kg of rice eq. (1)

  => opportunity cost for 1 kg of rice = $\frac{1}{4}$ kg of wheat (reciprocal of eq. (1))

For Ruby-

- Opportunity cost for 24 kg of wheat = 48 kg of rice

  => opportunity cost for 1 kg of wheat = $\frac{48}{24} = 2$ kg of rice eq. (2)

  => opportunity cost of 1 kg of rice = $\frac{1}{2}$ kg of wheat (reciprocal of eq. (2))

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This can be represented in tabular form as given in Table 11.2.

***Table 11.2*** *Opportunity cost of producing wheat and rice for Frank and Ruby*

| | Opportunity Cost of wheat | Opportunity cost of rice |
|---|---|---|
| Frank | 4 | $\frac{1}{4}$ |
| Ruby | 2 | $\frac{1}{2}$ |

Ruby has a lower opportunity cost in producing wheat as 2 < 4 (compare quantities in second column of Table 11.2). Hence Ruby has a comparative advantage in producing wheat.

Frank has a lower opportunity cost of producing rice as $\frac{1}{4} < \frac{1}{2}$ (compare quantities in third column of Table 11.2). Hence Frank has a comparative advantage in producing wheat.

Therefore, according to the theory of comparative advantage, Ruby should specialize in producing wheat and Frank should specialize in producing rice.

**In-Text Question**

1. Suppose a country's workers can produce 4 watches per hour or 12 rings per hour. If there is no trade,
   a. The domestic price of 1 ring is 3 watches.
   b. The domestic price of 1 ring is 1/3 of a watch.
   c. The domestic of 1 ring is 4 watches.
   d. The domestic price of 1 ring is 1/4 of a watch.
   e. The domestic price of 1 ring is 12 watches.
2. State true or false: If Germany's productivity doubles for everything it produces, this will not alter its prior pattern of specialization because it has not altered its comparative advantage.
3. State true or false: If gains from trade are based solely on comparative advantage, and if all countries have the same opportunity costs of production, then there are no gains from trade.

Now, let us see how both parties will be better off by following the theory of comparative advantage.

The PPFs of Frank and Ruby are shown in Figure 11.1(a) and Figure 11.1(b), respectively. The PPFs are straight lines instead of being bow shaped for reasons discussed in the previous chapter. Y axis represents the quantity of wheat and X axis represents the quantity of rice.

Given that Frank produces 8 kg of wheat if he puts all its resources/inputs towards wheat production, the Y intercept for his PPF will be 8. Alternatively, if he produces only rice, he will be able to produce 32 kg of rice, hence, the X intercept of his PPF will be 32. Further, since we know the x and y intercepts, and the PPF is a straight line, we can calculate the equation of Frank's PPF to be $x + 4y = 32$. Any combination of wheat and rice that falls on this line is the maximum that Frank can produce given his factors of production.

Similarly, we have calculated the equation of Ruby's PPF to be $x + 2y = 48$.

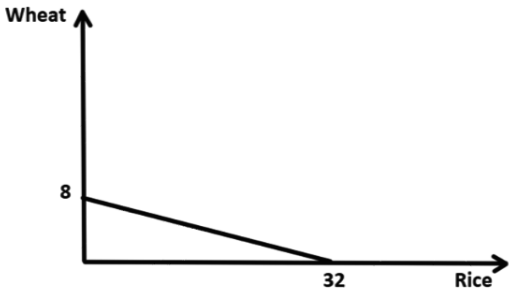


***Fig. 11.****1(a): Frank's PPF*

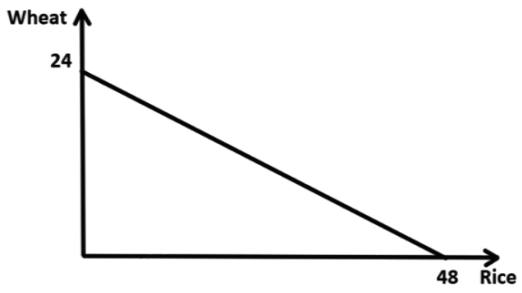


***Fig. 11.1****(b): Ruby's PPF*

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It is likely that each individual will prefer to consume some combination of both the goods. Let us say, without trade, Frank produces and consumes 4 kg of wheat and 16 kg of rice. This bundle lies on his PPF as it satisfies the equation $x + 4y = 32$, where x represents quantity of rice and y represents quantity of wheat. Also, suppose, Ruby produces and consumes 12 kg of wheat and 24 kg of rice before trade. This bundle lies on Ruby's PPF as well, since it satisfies the equation of her PPF, $x + 2y = 48$.

Now, let us look at an alternative that is available if the two decide to trade with each other. Recall, when an individual or a country allocates most or all of its resources towards the production of a particular good or service, they are said to specialize in the production of that good or service. Suppose Frank decides to specialize in the production of rice, in which he has a comparative advantage such that he produces only rice, and no wheat. Also suppose, Ruby decides to specialize in the production of wheat, in which she has a comparative advantage, such that, she produces 18 kg of wheat and 12 kg of rice. Further, say, they trade such that Ruby gives 5 kg of wheat for 15 kg of rice from Frank. Frank will have 5 kg of wheat and 17 kg of rice to consume. Ruby will have 13 kg of wheat and 27 kg of rice to consume. This is more than what they had before trade, because each person gets more of one good and no less of the other. Thus, we can see that both parties are better off by following the theory of comparative advantage and have gains from trade. This is shown in tabular form in Table 11.3 below.

***Table 11.3*** *Gains from trade for Frank and Ruby*

| | | Frank | | Ruby | |
|---|---|---|---|---|---|
| | | **Wheat** | **Rice** | **Wheat** | **Rice** |
| **Without trade** | **Production and consumption** | 4 | 16 | 12 | 24 |
| **After trade** | **Production** | 0 | 32 | 18 | 12 |
| | **Trade** | Gets 5 | Gives 15 | Gives 5 | Gets 15 |
| | **Consumption** | 5 | 17 | 13 | 27 |
| **Gains from trade** | | + 1 | + 1 | + 1 | + 3 |

**NOTES**

This has been shown diagrammatically in the form of Figure 11.2(a) and Figure 11.2(b). Figure 11.2(a) shows Frank's production and consumption without trade and with trade. Figure 11.2(b) shows Ruby's production and consumption with and without trade. In Figure 11.2(a), point A shows Frank's consumption and production bundle without trade and point A' and A* show his production and consumption bundles respectively after trade. In Figure 11.1(b), point B shows Ruby's consumption and production bundle without trade and point and point B' and B* show her production and consumption bundles after trade. Since A* lies above Frank's PPF and B* lies above Ruby's PPF, Figures 11.2(a) and 11.2(b) show that through trade both Frank and Ruby are able to consume a bundle of wheat and rice that they could not have ever produced.

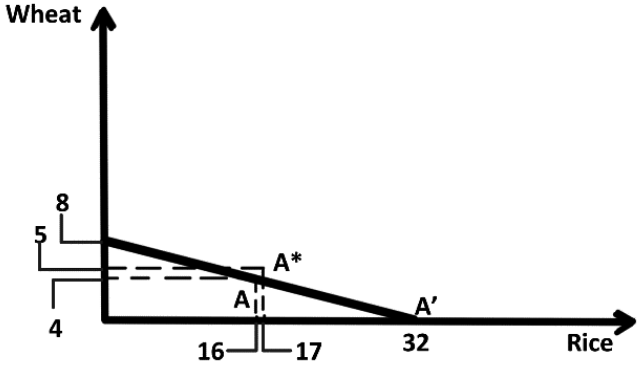


***Fig. 11.2****(a): Frank's production and consumption before and after trade*

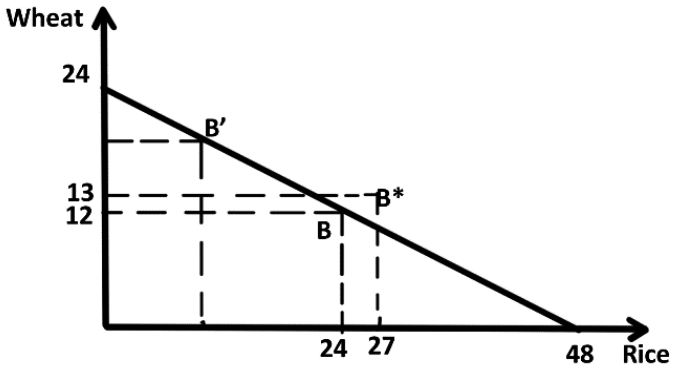


***Fig. 11.2****(b): Ruby's production and consumption before and after trade*

NOTES

Notice from Table 11.1 that Ruby has an absolute advantage in producing both the goods. Hence, the theory of absolute advantage will not suggest trade. However, we can see that both Ruby and Frank are better off through trade. This is because Ruby has a comparative advantage in producing one good and Frank has a comparative advantage in producing the other.

Observe that though it is possible for one person to have an absolute advantage in both goods (as Ruby does in our example), it is impossible for one person to have a comparative advantage in both goods. Because the opportunity cost of one good is the inverse of the opportunity cost of the other, if a person's opportunity cost of one good is relatively high, the opportunity cost of the other good must be relatively low. Comparative advantage reflects the relative opportunity cost. Unless two people have the same opportunity cost, one person will have a comparative advantage in one good, and the other person will have a comparative advantage in the other good.

Therefore, even if countries do not have absolute advantage in producing any good, they can still trade because they will have a comparative advantage in producing some good(s).

**In-Text Questions**

4. Which of the following statements is true?
   a. Self-sufficiency is the road to prosperity for most countries.
   b. A self-sufficient country consumes outside its production possibilities frontier.
   c. A self-sufficient country at best can consume on its production possibilities frontier.
   d. Only countries with an absolute advantage in the production of every good should strive to be self-sufficient.
5. Suppose the world consists of two countries – the United States and Mexico. Furthermore, suppose there are only two goods – food and clothing. Which of the following statements is true?
   a. If the United States has an absolute advantage in the production of food, then Mexico must have an absolute advantage in the production of clothing.

b. If the United States has a comparative advantage in the production of food, then Mexico must have a comparative advantage in the production of clothing.

c. If the United States has a comparative advantage in the production of food, it must also have a comparative advantage in the production of clothing.

d. If the United States has a comparative advantage in the production of food, Mexico might also have a comparative advantage in the production of food.

e. None of the above is true.

6. State true or false: If Japan has an absolute advantage in the production of an item, it must also have a comparative advantage in the production of that item.
7. State true or false: The gains from trade can be measured by the increase in total production that comes from specialization.
8. State true or false: Talented people that are the best at everything have a comparative advantage in the production of everything.

## 11.4 SOURCES OF COMPARATIVE ADVANTAGE

1. Endowment of natural resources: When the good is a natural resource, countries can have a comparative advantage in the good if they are richly endowed with it. For instance, nations that have ample oil resources can typically produce oil at a low cost. Saudi Arabia, being able to produce oil inexpensively, holds a comparative advantage in the oil industry and exports oil to generate revenue for importing goods. Similarly, countries with extensive forest coverage often serve as the primary exporters of timber, paper, and related products. The quantity of available exports also depends on domestic demand. Canada, with its vast forested areas, has a significant supply of lumber for export to the United States. This is partly because its relatively small population consumes a limited portion of the lumber supply, allowing a substantial amount to be available for export.

NOTES

2. Factor endowments- the Heckscher-Ohlin theory: According to the Heckscher-Ohlin theory, countries that possess an abundance of a specific factor of production, such as capital or labour, will have a comparative advantage in producing goods that require the abundant factor. For example, countries with plentiful capital relative to labour tend to have high wages and lower rent and can efficiently produce capital-intensive goods like automobiles and chemicals. On the other hand, countries with an abundance of labour relative to capital tend to have lower wages and higher rent and can produce labour intensive goods such as textiles and sporting goods at a lower cost.

   The theory emphasizes the importance of the relative availability of factors of production within a country, rather than the absolute amount of those factors. For instance, even if a small country has less total capital than a larger country, it can still have a higher capital-to-worker ratio and a comparative advantage in producing capital-intensive goods.

   Consider 2 countries – A and B. Say, country A has an abundance of capital and country B has an abundance of labour. Further, let X be a capital intensive good, and Y be a labour intensive good.

   Since country A has an abundance of capital and country B has an abundance of labour. Therefore, the capital-labour ratio of country A will be greater than that of country B.

$$\left(\frac{K}{L}\right)_A > \left(\frac{K}{L}\right)_B$$

   Now, since country A has a higher supply of capital relative to labour, the price of capital relative to labour is lower in it as per the theory of supply and demand. The price of labour is measured in wages (denoted by w) while the price of capital is rent (denoted by r). So, the rent to wage ratio will be lower in country A compared to country B.

$$\left(\frac{r}{w}\right)_A < \left(\frac{r}{w}\right)_B$$

   Because the rent to wage ratio of country A is lower, therefore, its ratio of cost of production for capital intensive good (good X) to the labour intensive good (good Y) will be lower as compared to country B. Since

NOTES

the relative cost of production of good X to good Y is lower in country A, so the relative prices will be lower for country A too.

$$\left(\frac{P_x}{P_y}\right)_A < \left(\frac{P_x}{P_y}\right)_B$$

Since $\frac{P_x}{P_y}$ is lower for country A, opportunity cost of producing X will be lower for it as compared to country B. So, it will have a comparative advantage in producing good X and country B will have a comparative advantage in producing good Y. Hence, the relative difference in the factor prices allows for the relative difference in product prices and thus provides a source for comparative advantage.

3. Economies of scale: Economies of scale refer to the cost advantage experienced by a firm when it increases its level of output. This is the idea that, as a company grows and it needs to make more of a product, the average cost of making each item falls. Suppose country A has economies of scale in producing a good. So, the cost of producing the good decreases for it. It can decrease such that the opportunity cost of producing that good can become lower than that of another country, giving country A a comparative advantage in producing that good.
4. Technology: Technology can be a source of comparative advantage. A country which is technologically advanced will be able to produce a technology intensive good at a lower price and hence have a comparative advantage in it, as per the Heckscher-Ohlin Model.

## 11.5 TERMS OF TRADE (TOT)

- The terms of trade refer to the rate at which the goods of one country exchange for the goods of another country.
- It is a measure of the purchasing power of exports of a country in terms of its imports and is expressed as the relation between export prices and import prices of its goods.

NOTES

- When the export prices of a country rise relative to its import prices, its terms of trade are said to have improved. The country gains from trade because it can have a larger quantity of imports in exchange for a given quantity of exports.
- On the other hand, when its imports prices rise relative to its export prices, its terms of trade are said to have worsened. The country's gains from trade are reduced because it can have a smaller quantity of imports in exchange for a given quantity of exports than before.
- If TOT is above 100, it is said that the TOT is favourable and if it is below 100, it is said to be unfavourable.

## 11.6 TYPES OF TERMS OF TRADE

The types of terms of trade are given in Figure 11.3.

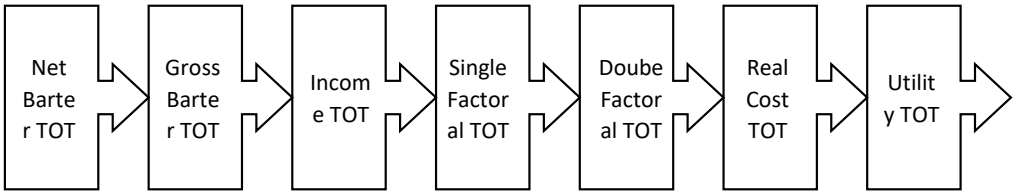


*Fig. 11.3*

1. Net Barter TOT/Commodity TOT
   - Concept given by Taussig.
   - It is the ratio of the price of a country's exports to the price of the country's imports.

$$T_c = \frac{P_x}{P_m} \times 100$$

where $T_c$ = Commodity TOT
$P_x$ = Price of exports
$P_m$ = Price of imports

**NOTES**

If we compare current year prices with the base year prices, then,

$T_c = \frac{\frac{P_x^1}{P_x^0}}{\frac{P_m^1}{P_m^0}}$ x 100 where $T_c$ = Commodity TOT

$P_x^1$ = Price of exports in current year

$P_x^0$ = Price of exports in base year

$P_m^1$ = Price of imports in current year

$P_m^0$ = Price of imports in base year

**In-Text Questions**

9. Take 1971 as the base year and let India's both export prices and import prices be 100 in the base year. If we find that by the end of 1981 its index of export prices had fallen to 90 and the index of import prices had risen to 110, what will be the Commodity TOT? What does it imply?

2. Gross Barter TOT
   - Given by Taussig
   - The gross barter terms of trade are the ratio between the quantities of a country's imports and exports.

$T_g = \frac{\frac{Q_m^1}{Q_m^0}}{\frac{Q_x^1}{Q_x^0}}$ x 100 where $T_g$ = Gross Barter TOT

$Q_m^1$ = Quantity of imports in current year

$Q_m^0$ = Quantity if imports in base year

$Q_x^0$ = Quantity of exports in base year

$Q_x^1$ = Quantity of exports in current year

NOTES

**In-Text Questions**

10. Take 1971 as the base year and let India's both quantities of imports and exports as 100 in 1971. If we find that the index of quantity imports had risen to 160 and that of quantity exports to 120 in 1981, then, what would be the Gross Barter TOT? What does it indicate?

3. Income TOT
   - Given by Dorrance
   - It shows a country's changing import capacity in relation to changes in its exports.
   - Thus, the income terms of trade is the net barter terms of trade of a country multiplied by its export volume index.

$T_y = T_c \cdot Q_x$ where $T_y$ = Income TOT

$T_c = \frac{P_x}{P_m}$ = Commodity TOT

$Q_x$ = Quantity of exports

$\Rightarrow T_y = \frac{P_x}{P_m} \cdot Q_x$ where $P_x$ = Export price

$P_m$ = Import Price

4. Single Factorial TOT
   - Given by Viner
   - It admits changes in productivity of factors involved in producing exports
   - It is calculated by multiplying the commodity terms of trade index by an index of productivity changes in domestic export industries. It can be expressed as:

$T_s = T_c \cdot F_x$ where $T_s$ = Single Factoral TOT

$T_c = \frac{P_x}{P_m}$ = Commodity TOT

$F_x$ = Productivity index of export industries

$\Rightarrow T_s = \frac{P_x}{P_m} \cdot F_x$ where $P_x$ = Export price

$P_m$ = Import Price

5. Double Factorial TOT
   - Given by Viner
   - The double factorial terms of trade consider productivity changes both in the domestic export sector and the foreign exports sector producing the country's imports.
   - It is calculated by multiplying the commodity TOT with ratio of domestic export productivity index to domestic import productivity index.
   - Note that domestic imports are essentially foreign country's exports, hence by considering domestic import productivity index, double factorial TOT is also considering the productivity in foreign sector.
   - It explains the number of units of domestic factors embodied in our exports which are exchanged for a unit of foreign factors embodied in our imports.
   - A rise in the index of double factorial terms of trade of a country means that the productive efficiency of the factors producing exports has increased relative to the factors producing imports in the other country.
   - It is measured using the following formula-

NOTES

$T_d = T_c \cdot \frac{F_x}{F_m}$ where $T_d$ = Double Factoral TOT
$T_c$ = Commodity TOT
$F_x$ = Export Productivity Index
$F_m$ = Import Productivity Index

$\Rightarrow T_d = \frac{P_x}{P_m} \cdot \frac{F_x}{F_m}$

6. Real Factorial TOT
   - Given by Viner
   - This index is calculated by multiplying the single factorial terms of trade with the reciprocal of an index of the amount of disutility per unit of productive resources used in producing export commodities.
   - Note, there is disutility per unit of productive resources used in producing export commodities. This is because those factors of production are being used to produce goods that would be exported and hence will not be used by the citizens of the country. These factors of production could have been redirected to produce goods that would be consumed by the citizens of the nation, thereby providing them with utility.

$T_r = T_s \cdot R_x$ where $T_r$ = Real Factoral TOT
$T_s$ = Single Factoral TOT
$R_x$ = Index of the disutility per unit of factors of production engaged in country's exports

$\Rightarrow T_r = T_c \cdot F_x \cdot R_x$ where $F_x$ = Export Productivity Index
$T_c$ = Commodity TOT

$\Rightarrow T_r = \frac{P_x}{P_m} \cdot F_x \cdot R_x$ where $P_x$ = Price of exports
$P_m$ = Price of imports

**NOTES**

7. Utility TOT

- The utility terms of trade index measures "changes in the disutility of producing a unit of exports and changes in the relative satisfactions yielded by imports, and the domestic products foregone as the result of export production."
- In other words, it is an index of the relative utility of imports and domestic commodities forgone to produce exports.
- The utility terms of trade index is calculated by multiplying the real cost terms of trade index (denoted by $T_r$ ) with an index of the relative average utility of imports and of domestic commodities foregone (denoted by u).

$u = \frac{U_m}{U_a}$ where u = Index of the relative average utility of imports and of domestic commodities foregone

$U_m$ = Average utility from imports

$U_a$ = Average utility of domestic commodities forgone due to export production

If we compare current year prices with the base year prices, then,

$u = \frac{\frac{U_m^1}{U_a^1}}{\frac{U_m^0}{U_a^0}}$ where $U_m^1$ = Average utility from imports in current year

$U_a^1$ = Average utility of domestic commodities forgone due to export production in current year

$U_m^0$ = Average utility from imports in base year

$U_a^0$ = Average utility of domestic commodities forgone due to export production in base year

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- Thus, the utility terms of trade index can be expressed as:

$T_u = T_r \cdot u$ where $T_r$ = Real Factor TOT

$\Rightarrow T_u = T_c \cdot F_x \cdot u$ where $T_c$ = Commodity TOT

$F_x$ = Export Productivity Index

$\Rightarrow T_u = \frac{P_x}{P_y} \cdot F_x \cdot u$ where $P_x$ = Price of exports

$P_y$ = Price of imports

## 11.7 GLOSSARY

- **Comparative Advantage:** It refers to the ability to produce a good at a lower opportunity cost than another producer.
- **Economies of Scale:** Economies of scale refer to the cost advantage experienced by a firm when it increases its level of output. This is the idea that, as a company grows and it needs to make more of a product, the average cost of making each item falls.
- **Heckscher-Ohlin Model:** The theory says that countries that are rich in capital will export capital intensive goods and countries that have much labour will export labour intensive goods. According to it, the main cause of trade between regions is the difference in prices of commodities based on relative factor endowments and factor prices. Commodities which use large quantities of scarce factors are imported because their prices are high while those using abundant factors are exported because their prices are low.
- **Opportunity Cost:** It is the cost of the next best alternative. It represents the potential benefits that a party misses out on when choosing one alternative over another.

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- **Specialization :** When an individual or a country allocates most or all of its resources towards the production of a particular good or service.
- **Terms of Trade:** It refers to the rate at which the goods of one country are exchanged for the goods of another country.

## 11.8 ANSWER TO IN-TEXT QUESTIONS

1. b
2. True
3. True
4. c
5. b
6. False
7. True
8. False. A low opportunity cost of producing one good implies a high opportunity cost of producing the other good.
9. The Commodity TOT will be:

$$T_c = \frac{\frac{90}{100}}{\frac{110}{100}} \times 100 = 81.81$$

It implies that India's terms of trade is unfavorable as it is less than 100.

10. $T_g = \frac{\frac{160}{100}}{\frac{120}{100}} \times 100 = 133.33$

It implies that the terms of trade is favorable.

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## 11.9 LEARNING OUTCOMES

In this lesson you have been taught:

- A country is said to have a **comparative advantage** in producing a good if the opportunity cost of producing that good in terms of the other good is lower in that country as compared to the other country.
- Opportunity cost is the cost of the next best alternative. It represents the potential benefits that a party misses out on when choosing one alternative over another.
- Trade is possible between the two countries even when a country does not have an absolute advantage in the production of any of the commodities but has a comparative advantage in the production of one commodity than in the other.
- In a model where there are only two countries and two goods, if one country has a comparative advantage in one good, the other country will necessarily have a comparative advantage in the other.
- Endowment of natural resources, factor endowments, economies of scale and technology are some of the sources of comparative advantage.
- The **terms of trade** (TOT) refer to the rate at which the goods of one country exchange for the goods of another country.
- It is a measure of the purchasing power of exports of a country in terms of its imports and is expressed as the relation between export prices and import prices of its goods.
- When the export prices of a country rise relative to its import prices, its terms of trade are said to have improved. The country gains from trade because it can have a larger quantity of imports in exchange for a given quantity of exports.

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- On the other hand, when its imports prices rise relative to its export prices, its terms of trade are said to have worsened. The country's gains from trade are reduced because it can have a smaller quantity of imports in exchange for a given quantity of exports than before.
- If TOT is above 100, it is said that the TOT is favorable and if it is below 100, it is said to be unfavorable.
- There are various types of terms of trade/ various ways of calculating terms of trade. Some of them are as follow:
  - Gross Barter TOT
  - Net Barter TOT
  - Income TOT
  - Single Factoral TOT
  - Double Factoral TOT
  - Real Factoral TOT
  - Utility TOT

## 11.10 TERMINAL QUESTIONS

**Question 1**

You are watching an election debate on television. A candidate says, "We need to stop the flow of foreign automobiles into our country. If we limit the importation of autos, our domestic auto production will rise and India will be better off,"

1. Is it likely that India will be better off if we limit auto imports? Explain.
2. Will anyone in India will be better off if we limit auto imports? Explain.
3. In the real world, does every person in the country gain when restrictions on imports are reduced? Explain.

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**Question 2**

Suppose a worker in Germany can produce 15 computers or 5 tons of grain per month. Suppose a worker in Poland can produce 4 computers or 4 tons of grain per month. For simplicity, assume that each country has only one worker.

a. Fill out the following table:

| | Computers | Grain |
|---|---|---|
| Germany | | |
| Poland | | |

b. Graph the production possibilities frontier for each country.

c. What is the opportunity cost of 1 computer in Germany? What is the opportunity cost of 1 ton of grain in Germany?

d. What is the opportunity cost of 1 computer in Poland? What is the opportunity cost of 1 ton of grain in Poland?

e. Which country has the absolute advantage in producing computers? Which country has the absolute advantage in producing grain?

f. Which country has the comparative advantage in producing computers? Which country has the absolute advantage in producing grain?

g. Each country should tend toward specialization in the production of which good? Why?

h. What is the range of prices for computers and grain for which both countries would benefit?

i. Suppose Germany and Poland settle on a price of 2 computers for 1 ton of grain or 1/2 ton of grain for a computer. Suppose each country specializes in production and they trade 4 computers for 2 tons of grain. Plot the final consumption points on the graphs you made in part b. above. Are these countries consuming inside or outside of their production possibilities frontier?

j. Suppose the productivity of a worker in Poland doubles so that a worker can produce 8 computers or 8 tons of grain per month. Which country has

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the absolute advantage in producing computers? Which country has the absolute advantage in producing grain?

k. After the doubling of productivity in Poland, which country has a comparative advantage in producing computers? Which country has the absolute advantage in producing grain? Has the comparative advantage changed? Has the material welfare of either country changed?

I. How would your analysis change if you assumed, more realistically, that each country had 10 million workers?

**Question 3**

Evaluate this statement: A technologically advanced country, which is better than its neighbor at producing everything, would be better off if it closed its borders to trade because the less productive country is a burden to the advanced country.

**Question 4**

Take 1971 as the base year and let, India's both export prices and import prices be 100 in it. If we find that by the end of 1981 its index of export prices had risen to 180 and the index of import prices had risen to 150, what will be the Net Barter TOT? What does it indicate?

**Question 5**

Take 1971 as the base year and let, India's both quantities of imports and exports as 100 in the base year. If we find that the index of quantity imports had risen to 130 and that of quantity exports to 180 in 1981, then, what would be the Gross Barter TOT? What does it imply?

## 11.11 SOLUTIONS TO TERMINAL QUESTIONS

**Solution 1**

1. No. If we import autos, it is because the opportunity cost of producing them elsewhere is lower than in India.

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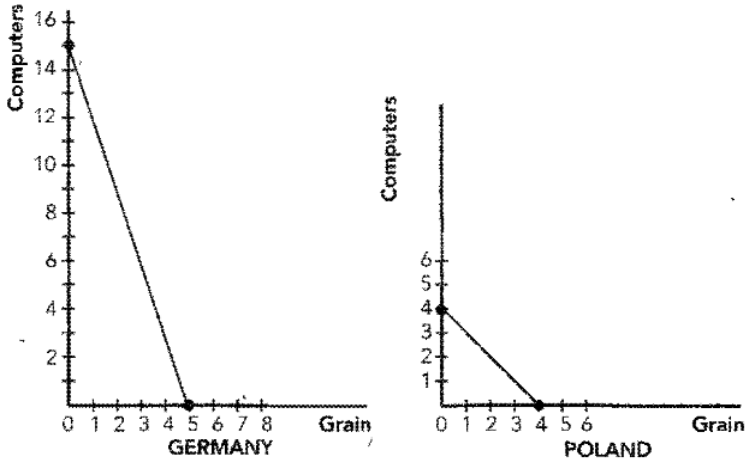
2. Yes. Those associated with the domestic auto industry--stockholders of domestic auto producers and autoworkers.
3. No. When we reduce restrictions on imports, the country gains from the increased trade but individuals in the affected domestic industry may lose.

**Solution 2**

a.

| | Computers | Grain |
|---|---|---|
| Germany | 15 | 5 |
| Poland | 4 | 4 |

b. See diagrams below:




c. 1/3 ton grain. 3 computers

d. 1 ton grain. 1 computer

e. Germany because one worker can produce 15 computers compared to 4. Germany because one worker can produce 5 tons of grain compared to 4.

f. Germany because a computer has the opportunity cost of only 1/3 ton of grain compared to 1 ton of in Poland. Poland because a ton of grain has the opportunity cost of only 1 computer compared to 3 computers in Germany.

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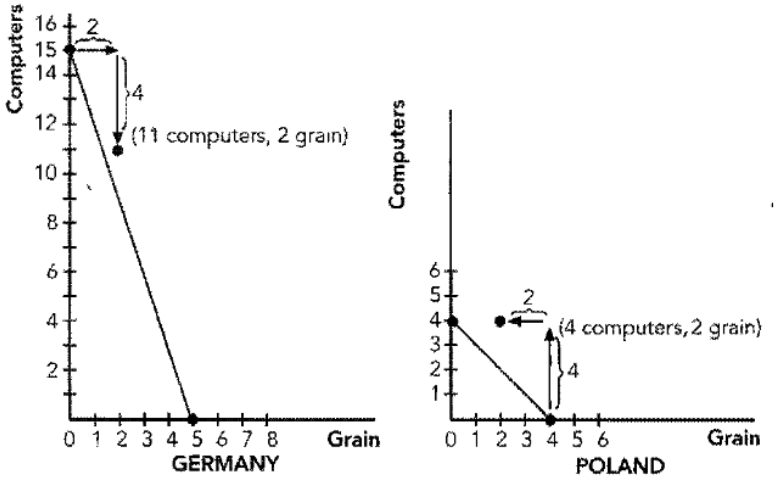
g. Germany should produce computers while Poland should produce grain because the opportunity cost of computers is lower in Germany and the opportunity cost of grain is lower in Poland. That is, each has a comparative advantage in those goods.

h. Grain must cost less than 3 computers to Germany. Computers must cost less than 1 ton of grain to Poland.

i. They are consuming outside their production possibilities frontier. See figures below:




j. Germany because one worker can produce 15 compared to 8. Poland because one worker can produce 8 compared to 5.

k. Germany has comparative advantage in computers. Poland has comparative advantage in grains. No change in comparative advantage. Poland is better off, however, because it now has a larger set of choices.

l. It would not change absolute advantage or comparative advantage. It would change the scale in the previous two graphs by a factor of 10 million.

**Solution 3**

This is not true. All countries can gain from trade if their opportunity costs of production differ. Even the least productive country will have a comparative

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advantage at producing something, and it can trade this good to the advanced country for less than the advanced country's opportunity cost.

**Solution 4**

The Net Barter TOT/ Commodity TOT will be:

$$T_c = \frac{\frac{180}{100}}{\frac{150}{100}} \times 100 = 120$$

This implies an improvement in the terms of trade is favorable as it is above 100.

**Solution 5**

The Gross Barter TOT is:

$$T_g = \frac{\frac{130}{100}}{\frac{180}{100}} \times 100 = 72.22$$

It implies that the terms of trade is unfavorable as it is below 100.

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# LESSON 12
# TRADE BARRIERS AND THE DEBATE BETWEEN FREE TRADE AND PROTECTIONISM

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**Structure**



## 12.1 INTRODUCTION

So far, we have established that there are gains from trade. In this lesson, we shall explain how the international marketplace achieves these gains from trade and how the gains are distributed among the various economic participants. We shall analyze who gains and who loses from free trade among countries, and how the gains compare to the losses.

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## 12.2 LEARNING OBJECTIVES

- To understand what determines whether a country imports or exports a good
- To examine who wins and who loses from international trade
- To learn that the gains to winners from international trade exceed the losses to losers
- To analyze the welfare effects of tariffs
- To examine the arguments people use to advocate trade restrictions

## 12.3 TRADE BARRIERS

International trade is carried out by both businesses and governments—as long as no one puts up trade barriers. In general, trade barriers keep firms from selling to one another in foreign markets. The major obstacles to international trade are natural barriers, tariff barriers, and non-tariff barriers.

## 12.4 TYPES OF TRADE BARRIERS

### 1. Natural Barriers

Natural barriers to trade can be either physical or cultural. For instance, even though raising beef in the relative warmth of Argentina may cost less than raising beef in the bitter cold of Siberia, the cost of shipping the beef from South America to Siberia might drive the price too high. *Distance* is thus one of the natural barriers to international trade.

### 2. Tariff Barriers

A tariff is a tax or duty levied on goods when they enter and leave the national frontier or boundary. In this sense, a tariff refers to import duties and export

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duties. But for practical purposes, a tariff is synonymous with import duties or custom duties.

**In-Text Questions**

1. Which of the following statements about tariffs is true?
   a. A tariff increases producer surplus, decreases consumer surplus, increases revenue to the government, and reduces total surplus.
   b. A tariff increases consumer surplus, decreases producer surplus, increases revenue to the government, and reduces total surplus.
   c. A tariff increases producer surplus, decreases consumer surplus, increases revenue to the government, and increases total surplus.
   d. A tariff increases consumer surplus, decreases producer surplus, increases revenue to the government, and increases total surplus.

### 3. Non-Tariff Barriers

Non–Tariff Barriers are of many kinds. We shall discuss some of them.

a. Import Quota: Under an import quota, a fixed amount of a commodity in volume or value is allowed to be imported into the country during a specified period of time, usually a year. For this purpose, the government may issue an import license that it may sell either to importers at a competitive price or just give it to importers on a first-come first-served basis. Alternatively, the government may limit the value of imports by providing the importers with a limited amount of foreign exchange for the purchase of a particular commodity to be imported by them.

b. Voluntary Export Restraints (VERs): A voluntary export restraint (VER) is an agreement by an exporter country's exporters or government with an importing country to limit their exports to it. It is entered into by the importing country when its domestic industry is suffering from large imports. The limit on imports may be set in terms of quantity, value or market share. VERs are seldom 'voluntary'. They are accepted by exporters lest they may be restricted to trade by more powerful trade barriers on the part of the importing country. If, however, the exporting country expects

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to make more profit by exporting less at higher prices, it may agree voluntarily to restrict its exports. VERs have been used by U.S., EEC and other industrialized countries to restrict exports of steel, TVs, automobiles, textiles, etc., from Japan and developing countries.

**In-Text Questions**

2. Which of the following statements about import quotas is true?
   a. Import quotas are preferred to tariff because they raise more revenue for the imposing government.
   b. Voluntary quotas established by the exporting country generate no deadweight loss for the importing country.
   c. For every tariff, there is an import quota that could have generated a similar result.
   d. An import quota reduces the price to the domestic consumers.

## 12.5 FREE TRADE VERSUS PROTECTIONISM

**Free Trade Policy** refers to a trade policy without any tariffs, quantitative restrictions and other policy devices obstructing the movement of goods between countries. Prof. Jagdish Bhagwati defines free trade policy, "as absence of tariffs, quotas, exchange restrictions, taxes and subsidies on production, factor use and consumption". Thus, the policy of free trade means simply complete freedom of international trade without any restrictions on the movement of goods between countries.

The term **protection** refers to a policy whereby domestic industries are to be protected from foreign competition. The aim is to impose restrictions on the imports of low-priced products in order to encourage domestic industries. They can be protected by either tariff or non-tariff barriers.

### Arguments for Free Trade

Typically, when a country opens itself to trade and if the domestic price of a commodity is higher than the price prevailing in the rest of the world (world

price), then, through trade, the country will be importing that commodity. The domestic producers will lose out and the producer surplus will decrease. But the domestic consumers will gain, and the consumer surplus will increase. This change happens in such a way that the gains of the winners exceed the losses of the losers thereby giving overall gains to the economy. Thus, there are winners and losers when a nation opens itself up to trade, but the gains of the winners exceed the losses of the losers.

**In-Text Questions**

3. Answer whether the following statement is true or false. If it is false, explain.

   "Trade makes everyone better off."

4. Answer whether the following statement is true or false. If it is false, explain.

   "If free trade is allowed and a country imports wheat, domestic buyers of bread are better off and domestic farmers are worse off when compared to the before-trade domestic equilibrium."

Some of the other benefits are as follows:

- *Increased variety of goods.* Goods produced in different countries are not exactly the same. German beer, for instance, is not the same as American beer. Free trade gives consumers in all countries greater variety to choose from.
- *Lower costs through economies of scale.* Some goods can be produced at low cost only if they are produced in large quantities—a phenomenon called economies of scale. A firm in a small country cannot take full advantage of economies of scale if it can sell only in a small domestic market. Free trade gives firms access to larger world markets and allows them to realize economies of scale more fully.
- *Increased competition.* A company shielded from foreign competitors is more likely to have market power, which in turn gives it the ability to raise prices above competitive levels. This is a type of market failure. Opening up trade fosters competition and gives the invisible hand a better chance to work its magic.

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- *Enhanced flow of ideas.* The transfer of technological advances around the world is often thought to be linked to the trading of the goods that embody those advances. The best way for a poor agricultural nation to learn about the computer revolution, for instance, is to buy some computers from abroad rather than trying to make them domestically.

**Arguments for Protectionism**

**1. *The Jobs Argument***

To understand this, let us consider the textile market in the imaginary country of Isoland. Say, before trade, the price of textiles is higher in Isoland than it is in the rest of the world. That is, before trade, the domestic price is higher than the world price. So, in our example, when the economy opens up and trade happens with the rest of the world, the domestic consumers will be able to buy the textiles at a lower price (i.e., the world price) than they did before the trade. Thus, free trade in textiles would cause the price of textiles to fall in Isoland, reducing the quantity of textiles produced in Isoland and thus reducing employment in the Isolandian textile industry. Some Isolandian textile workers would lose their jobs. Yet free trade creates jobs at the same time that it destroys them. When Isolandians buy textiles from other countries, those countries obtain the resources to buy other goods from Isoland. Isolandian workers would move from the textile industry to those industries in which Isoland has a comparative advantage. The transition may impose hardship on some workers in the short run, but it allows Isolandians as a whole to enjoy a higher standard of living. Opponents of trade are often skeptical that trade creates jobs. They might respond that everything can be produced more cheaply abroad. Under free trade, they might argue, Isolandians could not be profitably employed in any industry. However, the gains from trade are based on comparative advantage, not absolute advantage. Even if one country is better than another country at producing everything, each country can still gain from trading with the other. Workers in each country will eventually find jobs in an industry in which that country has a comparative advantage.

**In-Text Questions**

5. Answer whether the following statement is true or false. If it is false, explain.

   "If the world price for a good exceeds a country's before-trade domestic price for that good, the country should import that good."

6. Which of the following statements about trade is true?

   a. Unrestricted international trade benefits every person in a country equally.

   b. People that are skilled at all activities cannot benefit from trade.

   c. Trade can benefit everyone in society because it allows people to specialize in activities in which they have an absolute advantage.

   d. Trade can benefit everyone in society because it allows people to specialize in activities in which they have a comparative advantage.

### 2. *The National-Security Argument*

When an industry is threatened with competition from other countries, opponents of free trade often argue that the industry is vital to national security. For example, if Isoland were considering free trade in steel, domestic steel companies might point out that steel is used to make guns and tanks. Free trade would allow Isoland to become dependent on foreign countries to supply steel. If a war later broke out and the foreign supply was interrupted, Isoland might be unable to produce enough steel and weapons to defend itself. Economists acknowledge that protecting key industries may be appropriate when there are legitimate concerns over national security. Yet they fear that this argument may be used too quickly by producers eager to gain at consumers' expense. One should be wary of the national-security argument when it is made by representatives of industry rather than the defense establishment. Companies have an incentive to exaggerate their role in national defense to obtain protection from foreign competition. A nation's generals may see things very differently. Indeed, when the military is a consumer of an industry's output, it would benefit from imports. Cheaper steel in Isoland, for example, would allow the Isolandian military to accumulate a stockpile of weapons at lower cost.

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### 3. *The Infant-Industry Argument*

New industries sometimes argue for temporary trade restrictions to help them get started. After a period of protection, the argument goes, these industries will mature and be able to compete with foreign firms. Similarly, older industries sometimes argue that they need temporary protection to help them adjust to new conditions. Economists are often skeptical about such claims, largely because the infant-industry argument is difficult to implement in practice. To apply protection successfully, the government would need to decide which industries will eventually be profitable and decide whether the benefits of establishing these industries exceed the costs of this protection to consumers. Yet "picking winners" is extraordinarily difficult. It is made even more difficult by the political process, which often awards protection to those industries that are politically powerful. And once a powerful industry is protected from foreign competition, the "temporary" policy is sometimes hard to remove. In addition, many economists are skeptical about the infant-industry argument in principle. Suppose, for instance, that an industry is young and unable to compete profitably against foreign rivals, but there is reason to believe that the industry can be profitable in the long run. In this case, firm owners should be willing to incur temporary losses to obtain the eventual profits. Protection is not necessary for an infant industry to grow. History shows that start-up firms often incur temporary losses and succeed in the long run, even without protection from competition.

### 4. *The Unfair-Competition Argument*

A common argument is that free trade is desirable only if all countries play by the same rules. If firms in different countries are subject to different laws and regulations, then it is unfair (the argument goes) to expect the firms to compete in the international marketplace. For instance, suppose that the government of Neighborland subsidizes its textile industry by giving textile companies large tax breaks. The Isolandian textile industry might argue that it should be protected from this foreign competition because Neighborland is not competing fairly. Would it, in fact, hurt Isoland to buy textiles from another country at a subsidized price? Certainly, Isolandian textile producers would suffer, but Isolandian textile

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consumers would benefit from the low price. The case for free trade is the same as before: The gains of the consumers from buying at the low price would exceed the losses of the producers. Neighborland's subsidy to its textile industry may be a bad policy, but it is the taxpayers of Neighborland who bear the burden. Isoland can benefit from the opportunity to buy textiles at a subsidized price. Rather than objecting to the foreign subsidies, perhaps Isoland should send Neighborland a thank-you note.

### 5. *The Protection-as-a-Bargaining-Chip Argument*

Another argument for trade restrictions concerns the strategy of bargaining. Many policymakers claim to support free trade but, at the same time, argue that trade restrictions can be useful when we bargain with our trading partners. They claim that the threat of a trade restriction can help remove a trade restriction already imposed by a foreign government. For example, Isoland might threaten to impose a tariff on textiles unless Neighborland removes its tariff on wheat. If Neighborland responds to this threat by removing its tariff, the result can be freer trade. The problem with this bargaining strategy is that the threat may not work. If it does not work, the country faces a choice between two bad options. It can carry out its threat and implement the trade restriction, which would reduce its own economic welfare. Or it can back down from its threat, which would cause it to lose prestige in international affairs. Faced with this choice, the country would probably wish that it had never made the threat in the first place.

**In-Text Questions**

7. When U.S. politicians argue that outsourcing or offshoring of technical support to India by Dell Computer Corporation is harmful to the U.S. economy, they are employing which of the following arguments for restricting trade?
   a. The infant-industry argument
   b. The jobs argument
   c. The national-security argument
   d. The deadweight-loss argument

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8. Which of the following is not employed as an argument in support of trade restrictions?
   a. Free trade destroys domestic jobs.
   b. Free trade harms the national security if vital products are imported.
   c. Free trade is harmful to importing countries if foreign countries subsidize their exporting industries.
   d. Free trade harms both domestic producers and domestic consumers and therefore reduces the total surplus.
   e. Free trade harms infant industries in an importing country.

## 12.6 GLOSSARY

- **Free Trade:** It refers to complete freedom of international trade without any restrictions on the movement of goods between countries.
- **Import Quota:** Under an import quota, a fixed amount of a commodity in volume or value is allowed to be imported into the country during a specified period of time
- **Protectionist Policy/Protectionism:** It refers to a policy whereby domestic industries are to be protected from foreign competition by implementing various trade barriers.
- **Trade Barriers:** Trade barriers are devices that keep firms from selling to one another in foreign markets.
- **Voluntary Export Restraint (VER):** A voluntary export restraint (VER) is an agreement by an exporter country's exporters or government with an importing country to limit their exports to it.

## 12.7 ANSWER TO IN-TEXT QUESTIONS

1. a
2. c

**NOTES**

3. False. Some gain and some lose but the gains of the winners outweigh the losses of the losers.
4. True
5. False. The country should *export* that good.
6. d
7. b
8. d

## 12.8 LEARNING OUTCOMES

In this lesson, you have been taught-

- Trade barriers are obstacles to international trade. That is, they keep firms from selling to one another in foreign markets.
- The major trade barriers are-
  - natural barriers
  - tariff barriers
  - nontariff barriers
- Some major non-tariff barriers are-
  - Import quotas
  - Voluntary export restraints
- Free Trade Policy refers to a trade policy without any tariffs, quantitative restrictions and other policy devices obstructing the movement of goods between countries.
- The term protection refers to a policy whereby domestic industries are to be protected from foreign competition.
- If the world price of a good is greater than its before-trade domestic price, the country will export the good.
- If the world price of a good is less than its before-trade domestic price, the country will import the good.

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- When a country imports a good, the producer surplus decreases and the consumer surplus increases. So, the consumer wins and the producer loses when a country imports a good.
- When a country opens itself to trade and it imports a good because the world price is less than the domestic before-trade price, the gains of the consumer exceed the losses of the producer when a country imports a good.
- There is a deadweight loss associated with a tariff.
- There is often a debate in policy circles whether to impose trade restrictions or to allow free trade. Different arguments are made for both.
- Arguments for free trade-
  - The gains of the winners exceed the losses of the losers thereby giving overall gains to the economy.
  - Increased variety of goods
  - Lower costs through economies of scale
  - Increased competition
  - Enhanced flow of ideas
- Arguments for restricting trade/arguments against free trade-
  - **The Jobs Argument-** Free trade will cause loss of jobs in the domestic industry which produces the goods that are being imported.
  - **The National-Security Argument-** Some industries argue that their product is vital for national security so it should be protected from international competition. They argue that if a war later broke out and the foreign supply was interrupted, the country may not be able to defend itself.
  - **The Infant-Industry Argument-** New industries argue that they need temporary protection from international competition until they become mature enough to compete.
  - **The Unfair-Competition Argument-** Opponents of free trade argue that other countries provide their industries with unfair advantages such as subsidies, tax breaks, and lower environmental restrictions, thereby making the competition unfair.

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- **The Protection-as-a-Bargaining-Chip Argument-** Opponents of free trade argue that the threat of trade restrictions may result in other countries lowering their trade restrictions.

- Response of proponents of free trade to arguments against free trade-
  - **Response to the Jobs Argument-** While free trade does destroy inefficient jobs in the importing sector, it creates more efficient jobs in the export sector, industries where the country has a comparative advantage. This is always true because each country has a comparative advantage in the production of something.
  - **Response to the National-Security Argument-** The danger of this argument is that it runs the risk of being overused, particularly when the argument is made by representatives of industry rather than the defense establishment.
  - **Response to the Infant Industry Argument-** There is a problem choosing which new industries to protect, and once protected, temporary protection often becomes permanent. In addition, the industries that the government truly expects to be competitive in the future don't need protection because the owners will accept short-term losses.
  - **Response to the Unfair-Competition Argument-** The gains of consumers in the importing country will exceed the losses of the producers in that country, and the country will gain when importing subsidized production.
  - **Response to the Protection-as-a-Bargaining-Chip Argument-** if for some reason it does not work, the threatening country must back down or reduce trade--neither of which is desirable.
- The arguments made in support of trade restrictions get defeated.
- Countries that restrict trade usually restrict imports rather than exports. This is because producers lose from imports and gain from exports, and producers are better organized to lobby the government to protect their interests. For example, when a country imports a product, consumers win and producers lose. Consumers are less likely to organize and lobby the government than the affected producers, so imports may be restricted. When a country exports a product, producers win and consumers lose. Yet

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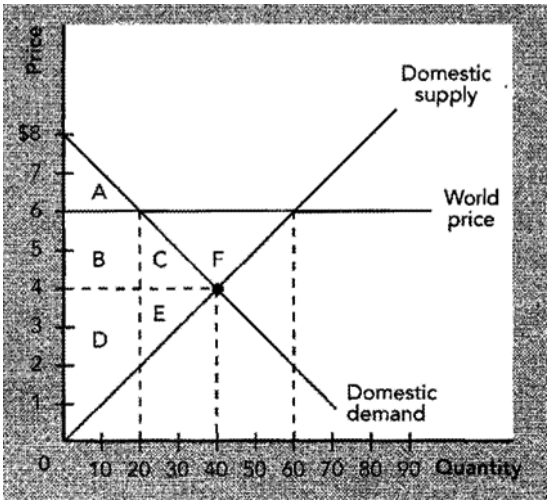
again, consumers are less likely to organize and lobby the government to restrict exports, so exports are rarely restricted.

- The overwhelming majority of economists find no sound economic argument in opposition to free trade. The only argument against free trade that may not be defeated on economic grounds is the national-security argument. This is because it is the only argument against free trade that is not based on economics but rather it is based on other strategic objectives.

## 12.9 TERMINAL QUESTIONS

1. Use the diagram below to answer the following questions.




   a. If trade is not allowed, what is the equilibrium price and quantity in this market?

   b. If trade is allowed, will this country import or export this commodity? Why?

   c. If trade is allowed, what is the price at which the good is sold, the domestic quantity supplied and demanded, and the quantity imported or exported?

**NOTES**

d. What area corresponds to the consumer surplus if no trade is allowed?

e. What area corresponds to the consumer surplus if trade is allowed?

f. What area corresponds to the producer surplus if no trade is allowed?

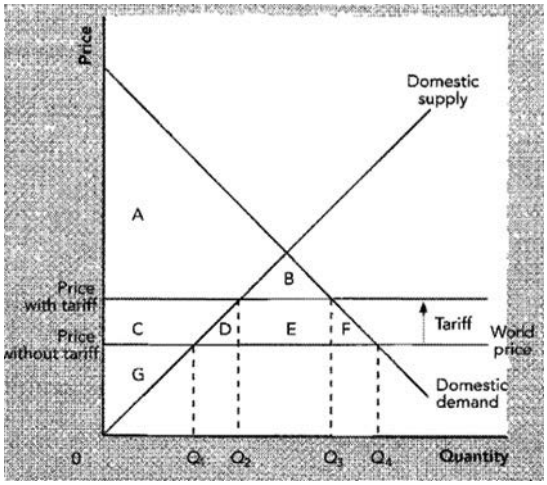
g. What area corresponds to the producer surplus if trade is allowed?

h. If free trade is allowed, who gains and who loses- the consumers or the producers? What area corresponds to their gain or loss?

i. What area corresponds to the gains from trade?

2. If a foreign country artificially lowers the cost of production for its producers with lax environmental regulations and direct subsidies and then exports the products to us, who wins and who loses in our country – producers or consumers?

3. Use the following diagram to answer the questions below.




i. If free trade is allowed, consumer surplus is the area

a. A.

b. A + B.

c. A + B + C.

d. A + B + C + D + E + F

e. A + B + C + D + E + F + G.

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ii. If a tariff is placed on this good, consumer surplus is the area

a. A.

b. A + B.

c. A + B + C.

d. A + B + C + D + E + F.

e. A + B + C + D + E + F + G.

iii. Government revenue from the tariff is the area

a. C + D + E + F

b. D + E + F

c. D + E

d. G

e. E

iv. If a tariff is placed on this good, producer surplus is the area

a. G

b. G + C

c. G + C + D + E + F

d. G + C + D + E + F + B

e. G + C + E

v. The deadweight loss from the tariff is the area

a. B + D + E + F

b. B

c. D + E + F

d. D + F

e. E

## 12.10 SOLUTIONS TO TERMINAL QUESTIONS

**Solution 1**

a. Price = $4, quantity = 40 units

b. Export because the world price is above the domestic price, which implies that this country has a comparative advantage in the production of this good.

c. Price = $6, quantity supplied = 60 units, quantity demanded = 20 units, quantity exported 40 units.

d. A + B + C

e. A

f. D + E

g. B + C + D + E + F

h. Consumers lose B + C, producers gain B + C + F.

i. F

**Solution 2**

Consumers gain, producers lose.

**Solution 3**

1. d
2. b
3. e
4. b
5. d

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## 12.11 RECOMMENDED READINGS


- Mankiw, N. G. (2018). Principles of Microeconomics 8th ed.
- Bernheim, B., Whinston, M. (2009). Microeconomics. Tata McGraw-Hill.

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