

## CHAPTER 2

### CONSUMER BEHAVIOUR AND DEMAND

#### INTRODUCTION

In economics, understanding how consumers make decisions about purchasing goods and services is crucial. This chapter delves into the principles of *consumer behaviour*, exploring how individuals strive to maximize their satisfaction, or utility, from limited resources. The concept of *consumer's equilibrium* is introduced, explaining how equilibrium is achieved through the *Utility Approach* for both one and two commodity cases. The second part of the chapter focuses on *demand*, one of the fundamental pillars of market economics. It examines the concept of *market demand*, its determinants, and how factors like price changes influence demand. The *demand schedule* and *demand curve* are introduced, along with the crucial distinction between *movements along the demand curve* and *shifts in the demand curve*. Lastly, this chapter delves into *price elasticity of demand*, exploring different methods to measure it, including the percentage method, total expenditure method, and geometric method, giving insights into how consumers respond to price changes.



#### TOPICS COVERED

1. **Consumer's Equilibrium: Meaning and attainment of equilibrium through Utility Approach: One and two commodity cases.**
2. **Demand: market demand, determinants of demand, demand schedule, demand curve, movement along and shifts in the demand curve, price elasticity of demand, measurement of price elasticity of demand - percentage, total expenditure, and geometric methods.**

#### CONSUMER BEHAVIOUR

This refers to the study of how individuals or households make decisions about purchasing and using goods and services to meet their needs and wants. It explores the factors that influence these decisions, such as income, preferences, prices, and cultural or social influences. Understanding consumer behaviour helps businesses tailor their products and marketing strategies to meet consumer demands effectively.

#### UTILITY

Utility refers to the satisfaction or benefit a person gains from consuming a good or service. It reflects the value that individuals place on products based on how well they fulfil their needs or wants. Utility helps explain consumer choices and behaviour, as people aim to maximize their satisfaction given their available resources.

## Types of Utility

### 1. Cardinal Utility Analysis

Cardinal utility assumes that satisfaction (utility) from consuming goods or services can be measured in specific numerical units, allowing consumers to quantify their level of satisfaction.

a). **Total Utility (TU):** The total amount of satisfaction a consumer derives from consuming a certain quantity of a good or service.

$$TU = \sum MU$$
$$TU = MU_1 + MU_2 + MU_3 + MU_4$$

**Example:** If consuming 3 apples gives you 15 utils of satisfaction, that is your total utility from eating all 3 apples.

b). **Marginal Utility (MU):** The extra satisfaction gained from consuming one additional unit of a good or service. The marginal utility usually decreases with each extra unit, known as the law of diminishing marginal utility.

$$MU = \Delta Q / \Delta TU$$

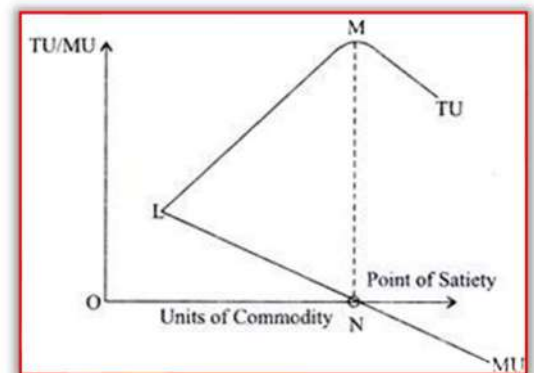
where:  $\Delta TU$  = Change in total utility  
 $\Delta Q$  = Change in quantity consumed

**Example:** If the first apple gives you 10 utils and the second gives 7 utils, the marginal utility of the second apple is 7. As you consume more, each additional unit provides less satisfaction.

**Ordinal Utility:** Ordinal utility assumes that satisfaction cannot be measured in exact numbers but can be ranked in terms of preference. Consumers make choices by ordering goods based on which provide more or less satisfaction without assigning specific values to that satisfaction. **Example:** If a consumer prefers coffee over tea and tea over juice, they rank these preferences, but don't measure how much more they like coffee compared to tea. They simply know the order of preference (coffee > tea > juice).

### Relationship Between TU and MU:

- Total utility increases as long as marginal utility is positive.
- Total utility is maximized when marginal utility is zero.
- Total utility starts to decline when marginal utility becomes negative.
- Marginal utility measures the change in total utility with each additional unit consumed.



## Law of Diminishing Marginal Utility

- In terms of marginal use limitations, as the consumer uses additional units of goods, the minimum profit per unit subsequent decreases.
- As consumption increases, the additional satisfaction (marginal utility) from each extra unit decreases.
- The first units of consumption provide high marginal utility, but subsequent units provide less additional satisfaction.
- Eventually, the marginal utility may become zero or negative if too much of the good is consumed.
- This principle explains why consumers may only buy a limited amount of a product despite its availability.

Units of Orange	Marginal Utility	Total Utility
1	10	10
2	8	18
3	6	24
4	4	28
5	2	30
6	0	30
7	-1	29

## Assumption of the law

- Consumers aim to maximize satisfaction.
- Preferences remain stable during consumption.
- Each unit of the good is identical.
- Focus is on one good at a time.
- Other factors like income and prices are constant.

As the number of units consumed increases, the total utility continues to rise but at a decreasing rate. Marginal utility decreases with each additional unit, and eventually, it may become zero or negative, illustrating the law of diminishing marginal utility. TU only rise to the point where the MU is positive, when MU turns negative, TU begins to decline.

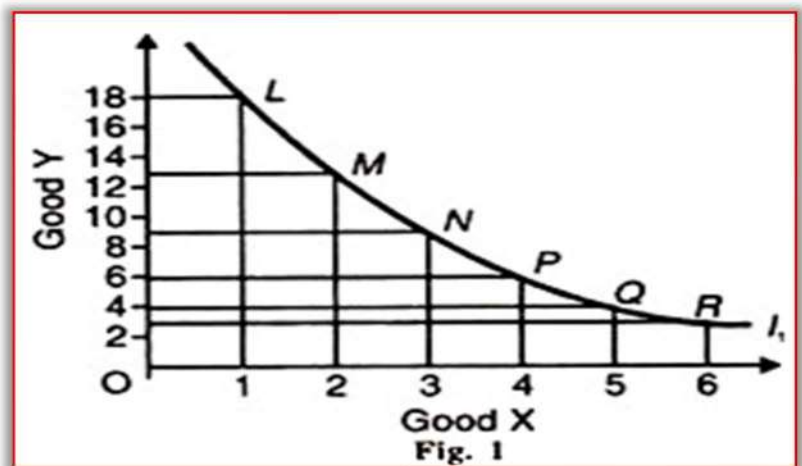
## INDIFFERENCE CURVE

- Represents combinations of two goods between which a consumer is indifferent, meaning they provide the same level of satisfaction.
- Any point on the curve shows that the consumer is equally satisfied with those combinations.
- Higher curves indicate higher levels of satisfaction or utility.

Combination	X	+	Y
1	1	+	18
2	2	+	13
3	3	+	9
4	4	+	6
5	5	+	4
6	6	+	3

- Shows how much of one good a consumer is willing to give up to gain more of another good while maintaining the same level of satisfaction.

- **Explanation:** If the various combinations are plotted on a diagram and are joined by a line this becomes an indifference curve, as f in the Figure 1. The indifference curve  $I_1$  is the locus of the points L, M, N, P, Q, and R,



showing the combinations of the two goods X and Y between which the consumer is indifferent.

**IC Slope: Marginal Rate of Substitution (MRS):** MRS is the rate at which a consumer is willing to give up one good for another while keeping their overall satisfaction constant. MRS is represented by the slope of the indifference curve at any specific point.

$$MRS = - (\Delta Y / \Delta X),$$

where  $\Delta Y$  is the change in the quantity of one good, and  $\Delta X$  is the change in the quantity of the other good. Typically, as you move along the indifference curve, the MRS decreases, meaning that the consumer is willing to trade fewer units of one good for more units of another good as they have more of the latter. **Example:** If a consumer is willing to give up 4 units of Good X for 1 more unit of Good Y, then MRS is 4.

### Characteristics of Indifference Curves (IC)

- **Downward Sloping:** An indifference curve slopes downward from left to right, indicating that as the quantity of one good increases, the quantity of the other good must decrease to maintain the same level of satisfaction.
- **Convex to the Origin:** Indifference curves are typically convex to the origin. This reflects the diminishing marginal rate of substitution, where the consumer is willing to give up fewer units of one good to get more of another good as they consume more of the latter.
- **Cannot Intersect:** Indifference curves cannot intersect. If two curves intersected, it would imply that a single combination of goods provides different levels of satisfaction, which is inconsistent with the concept of a consistent preference.
- **Higher Curves Represent Higher Utility:** Indifference curves further from the origin represent higher levels of utility. This means combinations of goods on these curves provide more satisfaction than those on curves closer to the origin.

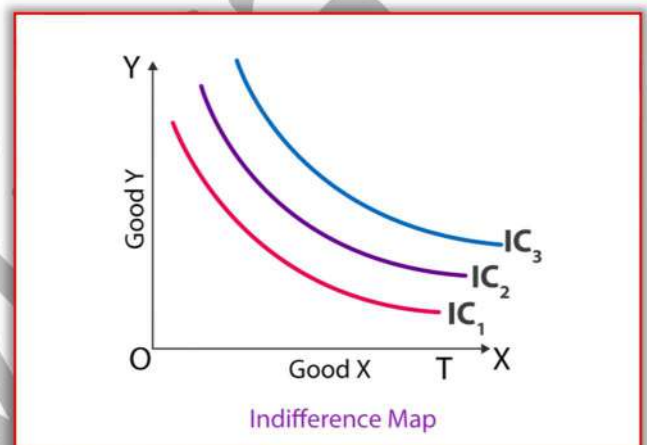
- **All Points on the Curve are Equally Preferred:** Every point on a given indifference curve provides the same level of satisfaction to the consumer, so they are indifferent between these combinations.

## Indifference Map

An indifference map is a graphical representation showing a set of indifference curves that illustrate different levels of satisfaction or utility a consumer can achieve with various combinations of two goods. The map helps visualize how a consumer's preferences change with different combinations of goods and how higher levels of satisfaction are achieved.

### Features:

- **Multiple Curves:** Displays several indifference curves, each representing different levels of utility.
- **Higher Curves:** Curves further from the origin indicate higher levels of satisfaction.
- **No Intersection:** Indifference curves on the map do not intersect, as each curve represents a distinct level of satisfaction.
- **Example:** An indifference map might include curves showing preferences between apples and oranges, with each curve representing a different level of overall satisfaction, illustrating the consumer's trade-offs between the two goods.



## CONSUMER BUDGET

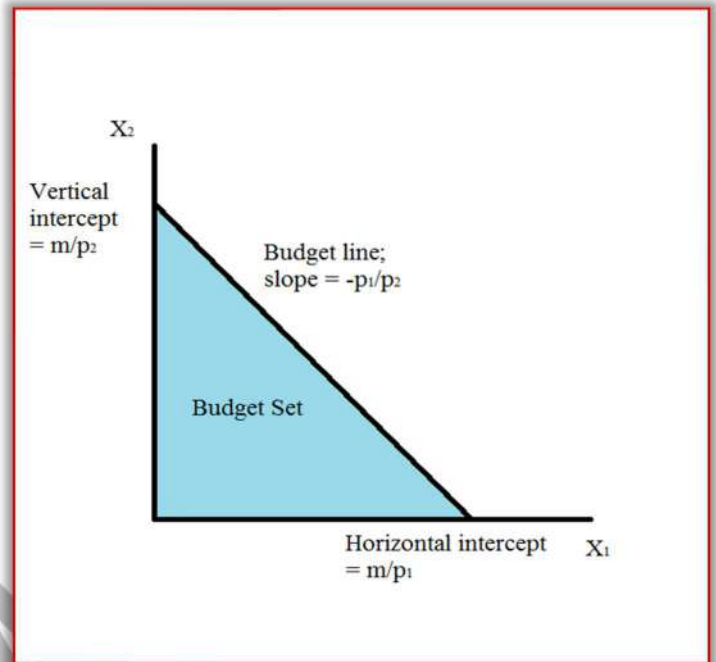
The consumer budget refers to the total income a consumer has available to spend on goods and services. It determines the range of possible combinations of goods a consumer can afford based on their income and the prices of those goods. The budget constraint illustrates the trade-offs a consumer faces when allocating their budget between different goods.

**BUDGET SET:** The consumer budget refers to the total income a consumer has available to spend on goods and services. It determines the range of possible combinations of goods a consumer can afford based on their income and the prices of those goods. The budget constraint illustrates the trade-offs a consumer faces when allocating their budget between different goods.

- $P_1 \cdot X_1 + P_2 \cdot X_2 \leq M$  - equation (i) [Where,  $P_1$  represents the price of product 1.  $X_1$  stands for the quantity of product 1.  $P_2$  represents the price of product 2.  $X_2$  stands for the quantity of product 2  $M$  is the total monetary earning of a consumer]

- These combinations of bundles that a consumer can afford to purchase according to his/her income and item prices, collectively constitute the budget set.

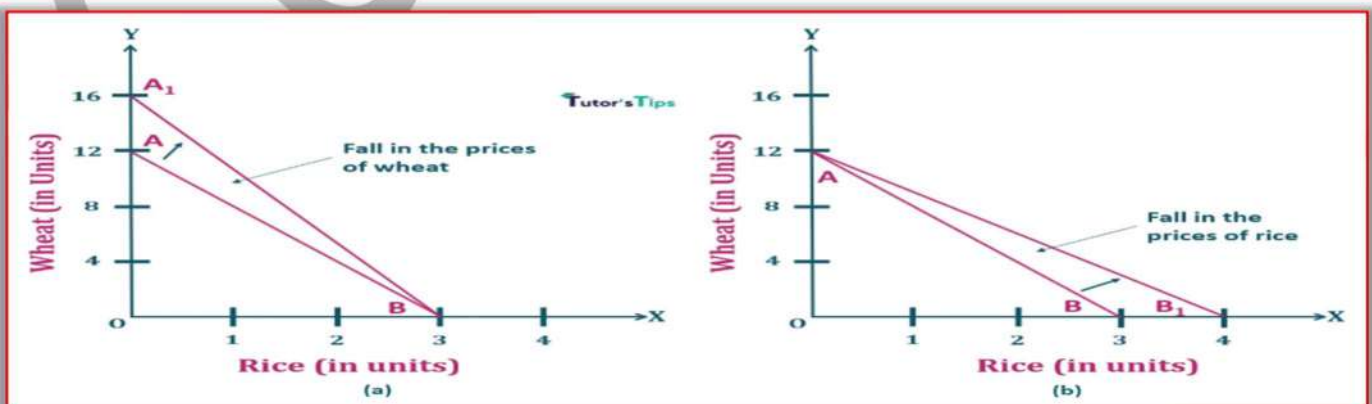
**Budget Line:** The budget line represents all the combinations of two goods that a consumer can afford to buy given their total income and the prices of those goods. It illustrates the trade-offs between the goods, showing the maximum quantity of one good that can be purchased for any given quantity of another, given the consumer's budget constraints. The budget line equation is:  $P_x \cdot X + P_y \cdot Y = I$  ( $P_x$ : Price of Good X;  $X$ : Quantity of Good X;  $P_y$ : Price of Good Y;  $Y$ : Quantity of Good Y;  $I$ : Total Income). This equation shows the combinations of Goods X and Y that a consumer can purchase without exceeding their total income.



**Attainable and non-attainable combinations:**

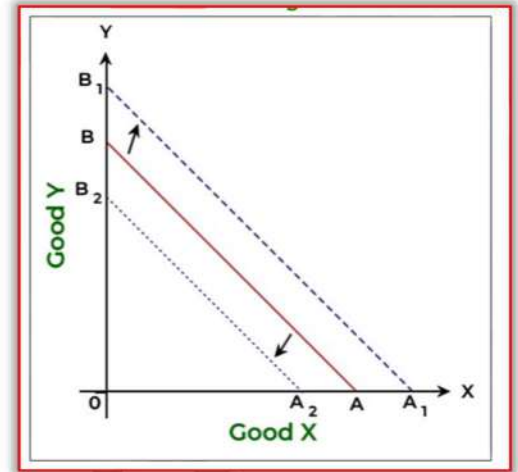
These are combinations of two goods that lie on or below the budget line, meaning the consumer can afford them with their given income. They fall within the consumer's budget set. These are combinations that lie outside or above the budget line, meaning the consumer cannot afford them with their current income. They are beyond the consumer's budget.

**Budget Constraint:** It refers to the limit on the consumption choices a consumer can make based on their income and the prices of goods. It shows the combinations of two goods that a consumer can purchase without exceeding their total income. The budget constraint is represented by the budget line, which depicts the trade-offs between the goods given the consumer's income and the prices of the goods. The formula for the budget constraint is:  $P_x \cdot X + P_y \cdot Y = I$  Where:  $P_x$ : Price of Good X;  $X$ : Quantity of Good X;  $P_y$ : Price of Good Y;  $Y$ : Quantity of Good Y;  $I$ : Total Income. This equation shows the maximum combination of two goods that a consumer can buy within their income limit.



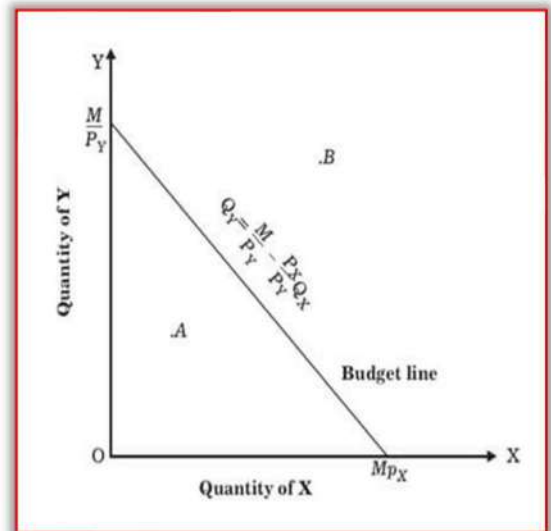
## Shift/Change in BUDGET LINE

- **Increase in Income:** The budget line shifts **rightward**, allowing the consumer to buy more of both goods as their purchasing power increases.
- **Decrease in Income:** The budget line shifts **leftward**, reducing the consumer's ability to purchase goods due to lower income.
- **Change in Price of a Good:**
  - **Price Decrease:** The budget line pivots **outward** for the good whose price has decreased, indicating the consumer can buy more of that good.
  - **Price Increase:** The budget line pivots **inward** for the good whose price has increased, reducing the quantity of that good the consumer can afford.
- **Example:** If income doubles, the entire budget line shifts outward, whereas if only the price of one good decreases, the line pivots out along the axis for that good.



**Derivation of the Slope of the Budget Line:** Let us assume that there are only two commodities X and Y. The price of X is  $P_x$  and that of Y is  $P_y$ . Let  $Q_x$  be the quantity of commodity X and  $Q_y$  be the quantity of commodity Y, purchased by the consumer with income  $M$ .

- $M = P_x Q_x + P_y Q_y$
- The budget equation states that the total expenditure of a consumer on various combinations of commodities X and Y cannot exceed his/her money income  $M$ . The different quantities that the consumer can purchase using his/her income can be obtained using the following formula:  $Q_x = M / P_x - (P_y / P_x \cdot Q_y)$  and
- $Q_y = M / P_y - (P_x / P_y \cdot Q_x)$
- When different numerical values of  $Q_x$  and  $Q_y$  are plotted on a graph, a straight line with a negative slope is derived. This is called the budget line or price line, which has been depicted in Figure.



## Changes in The Budget Set

The set of obtainable bundles relies upon the cost of two commodities and the earnings of the customer. When the cost of either of the commodities or the customer's earnings changes, the set of obtainable bundles is also probable to change.

Suppose that the customer's earnings change from  $N$  to  $N'$ , the prices of the two commodities remain constant. With the new earnings, the customer manages to purchase all the bundles  $(x_1, x_2)$  such as  $p_1 x_1 + p_2 x_2 \leq N'$ .

Now, the equation of the budget line is as follows:

$$p_1 x_1 + p_2 x_2 = N'$$

The given equation can also be written as follows:

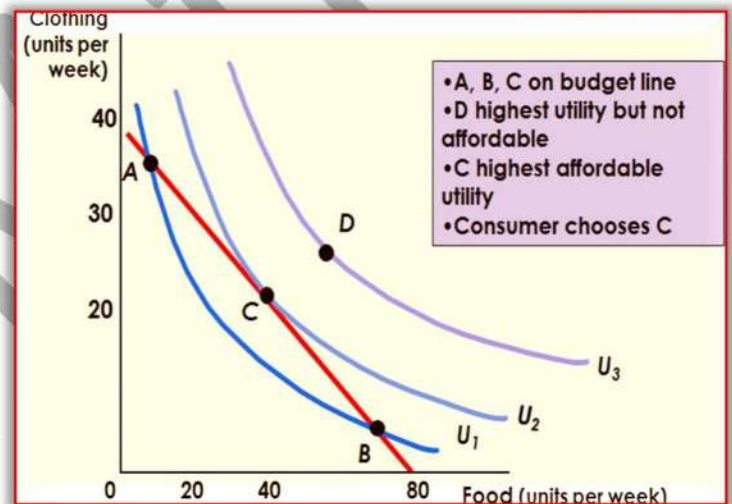
$$x_2 = N_1 / p_2 - p_1 / p_2 x_1$$

Note that the slope of the new budget line is the same as the slope of the budget line prior to the change in the customer's earnings.

### Consumer's Optimum Choice

The consumer's optimum choice refers to the combination of goods that maximizes the consumer's satisfaction (utility) given their income and the prices of goods. It occurs at the point where:

- The **budget line** (representing their income and prices) is **tangent** to the highest possible **indifference curve** (representing their preferences).
- At this point, the **Marginal Rate of Substitution (MRS)** between the two goods equals the **price ratio** ( $P_x / P_y$ ).
- This means the consumer cannot increase their satisfaction by reallocating their spending between the two goods.



## DEMAND

**Definition:** The quantity of a good or service that consumers are willing and able to buy at different prices over a period of time.

### Demand Function

- **Definition:** A mathematical representation showing how the quantity demanded of a good changes with changes in its price and other influencing factors.
- **Formula:**  $Q_d = f(P, I, P_r, T, E)$ 
  - $Q_d$ : Quantity demanded



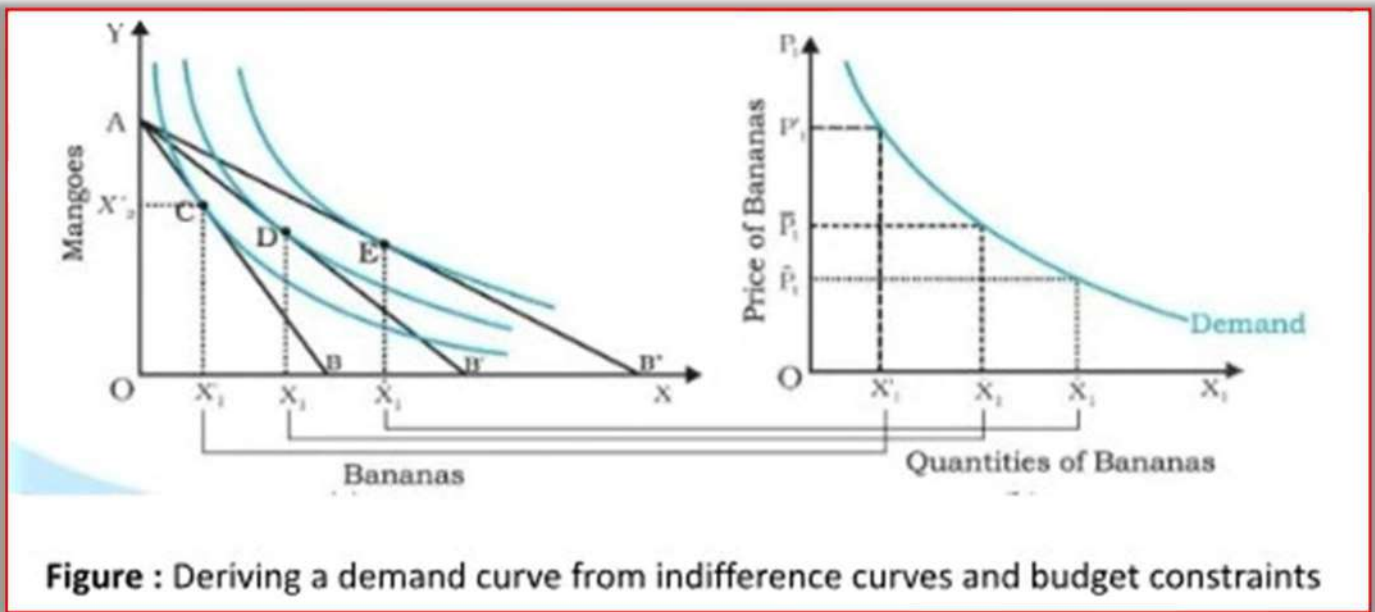
- **P:** Price of the good
- **I:** Consumer's income
- **P<sub>r</sub>:** Prices of related goods
- **T:** Tastes and preferences
- **E:** Expectations about future prices

## Factors Affecting Demand

- **Product Price:** As the price of a product decreases, the quantity demanded generally increases, and as the price increases, the quantity demanded typically decreases. This is due to the Law of Demand.
- **Consumer Income:**
  - **Normal Goods:** As consumer income increases, the demand for normal goods also increases. For example, as people earn more, they may buy more luxury items like branded clothing.
  - **Inferior Goods:** As consumer income increases, the demand for inferior goods decreases. Inferior goods are those for which demand falls as income rises, such as instant noodles when people can afford to buy higher-quality food.
- **Related Asset Prices:**
  - **Complementary Goods:** An increase in the price of a complementary good (e.g., printers) can lead to a decrease in the demand for the related good (e.g., computer paper), since they are used together.
  - **Substitute Goods:** An increase in the price of a substitute good (e.g., tea) can lead to an increase in the demand for the original good (e.g., coffee), as consumers switch to the cheaper alternative.
- **Customer Tastes and Preferences:** Changes in consumer preferences can lead to an increase or decrease in demand. For example, if a new study shows that a particular food is very healthy, demand for that food might increase.
- **Expectations:** Expectations about future prices or economic conditions can influence current demand. For example, if consumers expect prices to rise in the near future, they might increase their current purchases to avoid higher costs later.



**Derivation of Demand Curve:** Consider individual consuming bananas ( $X_1$ ) and mangos ( $X_2$ ), whose income is  $M$  and market prices of  $X_1$  and  $X_2$  are  $P'_1$  and  $P'_2$  respectively. Diagram (a) depicts her consumption equilibrium at point  $C$ , where she buys  $X'_1$  and  $X'_2$  quantities of banana and mangoes respectively. In panel (b) of figure 2.14, we plot  $P'_1$  against  $X'_1$  which is the first point on the demand curve for  $X_1$



**Figure : Deriving a demand curve from indifference curves and budget constraints**

Suppose the price of  $X_1$  drops to  $P_1$  with  $P_2$  and  $M$  remaining constant. The budget set in panel (a), expands and new consumption equilibrium is on a higher indifference curve at point D, where she buys more of bananas ( $X_1 > X'_1$ ). Thus, demand for bananas increases as its price drops. We plot  $P_1$  against  $X_1$  in panel (b) of to get the second point on the demand curve for  $X_1$ . Likewise the price of bananas can be dropped further to  $\wedge P_1$ , resulting in further increase in consumption of bananas to  $\wedge X_1$ .  $\wedge P_1$  plotted against  $\wedge X_1$  gives us the third point on the demand curve. Therefore, we observe that a drop in price of bananas results in an increase in quantity of bananas purchased by an individual who maximizes his utility. The demand curve for banana is thus negatively sloped.

- **The Indifference Curve at Point D:** The demand for bananas, following the Law of Demand, increases as their price drops, leading to a higher indifference curve at point D in Figure.
- **A Negatively Sloped Demand Curve:** This decrease in price results in an increase in banana consumption, resulting in a negatively sloped demand curve.
- **Substitution and Income Effects:** This can be explained by the substitution effect and income effect, where consumers, in adherence to the Law of Demand, maximize their utility by substituting bananas for mangoes when prices change, resulting in an increase in demand for bananas.
- Moreover, as price of bananas drops, consumer's purchasing power increases, which further increases, demand for banana (and mangoes). This is the income effect of a price change, resulting in further increase in demand for bananas.

## LAW OF DEMAND

- **Definition:** The Law of Demand states that, all other things being equal (*ceteris paribus*), when the price of a good decreases, the quantity demanded increases, and when the price increases, the quantity demanded decreases.
- **Reason:** Consumers tend to buy more of a good when it is cheaper and less when it becomes expensive.

## Exceptions to the Law of Demand

### 1. Distinction Articles (Veblen Goods):

- These are luxury goods where higher prices make the product more desirable because they serve as a status symbol.
- **Example:** Expensive watches or designer brands. People buy them to showcase wealth, and demand increases with price.

### 2. Assets Required (Speculative Goods):

- Goods where the demand increases with price due to expectations of future price rise. Buyers purchase the good, expecting it to become more expensive later.
- **Example:** Real estate or gold. People buy these assets even when prices rise, expecting further price hikes in the future.

### 3. Giffen Goods:

- Inferior goods where an increase in price leads to an increase in demand due to a strong income effect. As the price of these goods rises, consumers with limited income forego more expensive alternatives, increasing demand for the cheaper good.
- **Example:** Staple foods like bread or rice in low-income groups. When bread becomes more expensive, people may buy more of it, as they can't afford other items.

## Types of Goods

### 1. Normal Goods:

- Goods whose demand increases as income increases and decreases when income falls.
- **Example:** Branded clothes, smartphones.

### 2. Inferior Goods:

- Goods whose demand decreases as income increases because consumers shift to better alternatives.
- **Example:** Generic food items like instant noodles.

### 3. Giffen Goods:

- Inferior goods for which demand increases when their price rises due to the income effect overpowering the substitution effect.
- **Example:** Basic staples like bread or rice in poor economies.

### 4. Luxury Goods:

- High-end goods that see a large increase in demand as income rises, often bought for prestige.
- **Example:** Designer handbags, luxury watches.

### 5. Substitute Goods:

- Goods that can replace one another; when the price of one rises, the demand for the other rises.
- **Example:** Butter and margarine.

### 6. Complementary Goods:

- Goods that are used together; when the price of one increases, the demand for the other decreases.

- **Example:** Cars and fuel.

## 7. Public Goods:

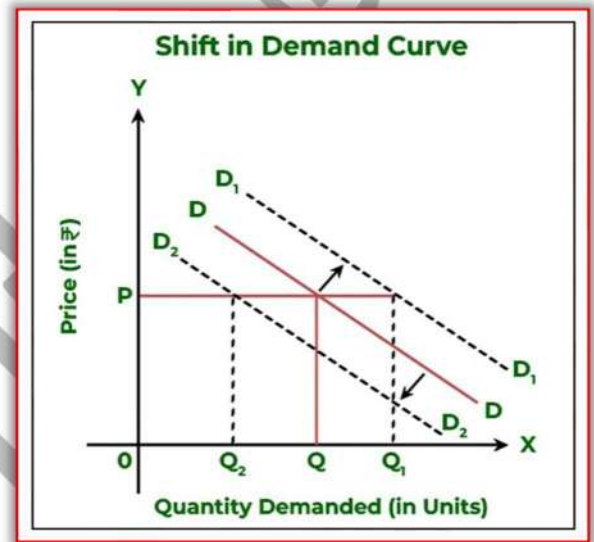
- Goods that are non-excludable and non-rival; everyone can use them without reducing their availability to others.
- **Example:** National defence, public roads.

## 8. Private Goods:

- Goods that are rival and excludable, meaning consumption by one person reduces its availability to others.
- **Example:** Food, personal vehicles.

## Shift in the Demand Curve

A **shift in the demand curve** occurs when the quantity demanded for a good change at every price level due to factors other than the price of the good itself. The demand curve can shift **rightward** or **leftward**.



### 1. Rightward Shift (Increase in Demand):

- Occurs when consumers are willing to buy more of the good at every price.
- **Causes:**
  - Increase in consumer income (for normal goods).
  - Increase in the price of substitute goods.
  - Decrease in the price of complementary goods.
  - Change in consumer preferences in favour of the good.
  - Positive expectations about future prices or availability.
  - Increase in population or market size.
- **Example:** An increase in income leads to more demand for smartphones, shifting the curve rightward.

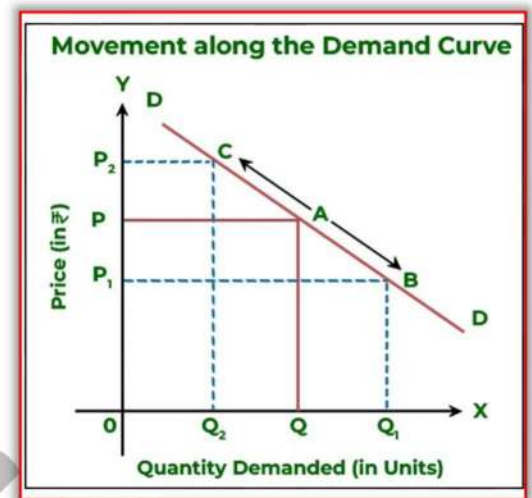
### 2. Leftward Shift (Decrease in Demand):

- Occurs when consumers are willing to buy less of the good at every price.
- **Causes:**
  - Decrease in consumer income (for normal goods).
  - Decrease in the price of substitute goods.
  - Increase in the price of complementary goods.
  - Change in consumer preferences against the good.
  - Negative expectations about future prices or availability.
  - Decrease in population or market size.
- **Example:** A decrease in income leads to less demand for luxury goods, shifting the curve leftward.

The **shift in the demand curve** signifies a change in the overall demand, unlike a movement along the curve, which only happens due to changes in the good's own price.

### Movement Along the Demand Curve

Movement along the demand curve occurs when there is a change in the quantity demanded due to a change in the price of the good itself, while other factors remain constant.



#### 1. Expansion of Demand (Downward Movement):

- When the price of the good decreases, the quantity demanded increases, leading to a downward movement along the demand curve.
- **Example:** A decrease in the price of apples causes people to buy more apples.

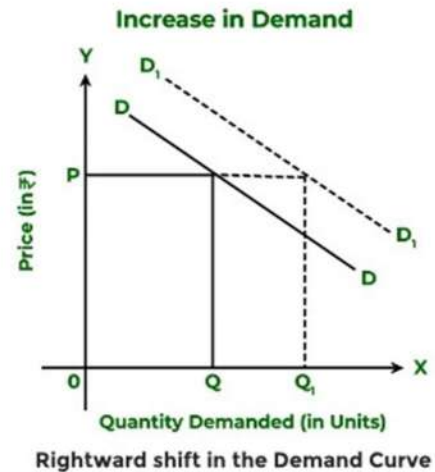
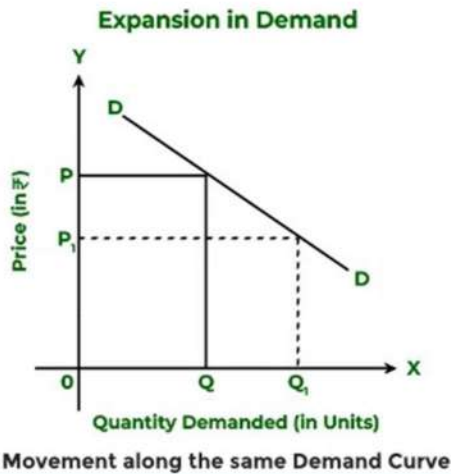
#### 2. Contraction of Demand (Upward Movement):

- When the price of the good increases, the quantity demanded decreases, causing an upward movement along the demand curve.
- **Example:** An increase in the price of movie tickets leads to fewer people going to the movies.

### DIFFERENCE- Movement in Demand Curve and Shift in Demand Curve

Criteria	Movement Along the Demand Curve	Shift in the Demand Curve
Cause	Change in the price of the good itself	Changes in non-price factors (e.g., income, tastes, prices of related goods)
Direction	Upward (contraction) or downward (expansion) along the same demand curve	Rightward (increase in demand) or leftward (decrease in demand) shift of the entire curve
Effect on Quantity Demanded	Changes in the quantity demanded due to a price change	Changes the quantity demanded at every price level
Graphical Representation	Movement from one point to another on the same demand curve	Entire demand curve shifts to a new position
Examples	A fall in the price of a product increases the quantity demanded (expansion)	An increase in consumer income raises the demand for normal goods (rightward shift)

## Difference between Expansion in Demand and Increase in Demand



### Market Demand

- **Definition:** The total quantity of a good or service that all consumers in the market are willing and able to buy at various prices during a specific period.
- **Determined by:** Aggregating individual demand curves of all consumers in the market.
- **Influencing Factors:** Product price, consumer income, tastes, expectations, and prices of related goods.
- **Graphical Representation:** Typically shown as a downward-sloping curve on a graph where the x-axis represents quantity and the y-axis represents price.



### Elasticity of Demand

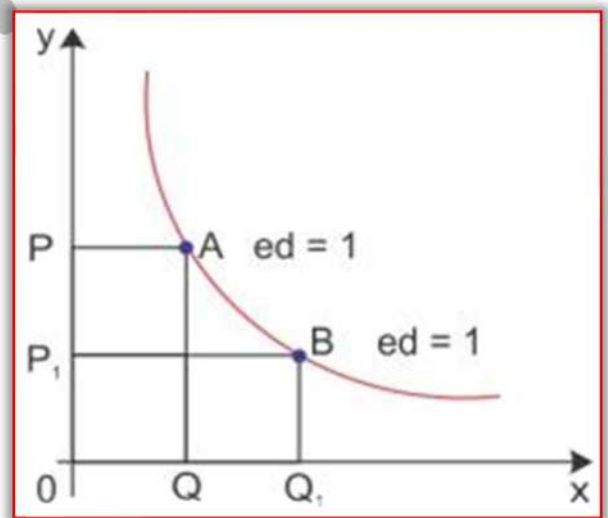
- **Definition:** Measures the responsiveness of the quantity demanded of a good to a change in its price. There are 3 dimensions of elasticity of demand:
- **Price Elasticity of Demand:** It refers to the percentage change in demand for a commodity concerning the percentage change in the price of the given commodity.
 
$$PED = \% \text{ Change in Quantity Demanded} / \% \text{ Change in Price}$$
- **Cross Elasticity of Demand:** It refers to the percentage change in demand for a commodity concerning the percentage change in price of a related good.
- **Income Elasticity of Demand:** This refers to the percentage change in demand for a commodity concerning the percentage change in the income of a consumer.

## Degrees of Elasticities of Demand

- **Perfectly Elastic Demand:** When there is an infinite demand at a particular price & demand becomes zero with a slight rise in the price, then demand for such a commodity is said to be perfectly elastic. ( $E_d = \text{infinite}$ ).
- **Perfectly Inelastic Demand:** When there is no change in demand with the price change, then demand for such a commodity is said to be perfectly inelastic. ( $E_d = 0$ ).
- **Highly Elastic Demand:** When the percentage change in the quantity demanded is more than the percentage change in price, then demand for such a commodity is said to be highly elastic. ( $E_d$  is more than 1).
- **Less Elastic Demand:** When the percentage change in quantity demanded is less than the percentage change in price, then demand for such a commodity is said to be less elastic or inelastic. ( $E_d$  is less than 1).
- **Unitary Elastic Demand:** When the percentage change in the quantity demanded is equal to the percentage change in price, then demand for such a commodity is said to be unitary elastic. ( $E_d = 1$ ).
- **Examples:**
  - **Elastic Demand:** Designer clothes—small price changes can lead to significant changes in quantity demanded.
  - **Inelastic Demand:** Basic food items—price changes have minimal impact on quantity demanded.
  - **Normal Goods:** Organic food—demand rises as consumer income increases.
  - **Inferior Goods:** Instant noodles—demand decreases as consumer income rises.

## Rectangular hyperbola

It is a curve under which all rectangular areas are equal. When the elasticity of demand is equal to unity ( $ed = 1$ ) at all points of the demand curve then the demand curve is a rectangular hyperbola. It is a downward-sloping curve as given in figure: In the case of any two points of A and B on the curve, each rectangular area shows total expenditure on the good. Thus, the total expenditure on the good remains constant even as the price of the good increases or decreases.



## The Geometric Method of Elasticity of Demand:

- Geometric method was suggested by Prof. Marshall and is used to measure the elasticity at a point on the demand curve.

- When there are infinitely small changes in price and demand, then the 'Geometric Method' is used. This method is also known as 'Graphic Method' or 'Point Method' or 'Arc Method'.
- Elasticity of demand ( $E_d$ ) is different at different points on the same straight line demand curve.
- In order to measure  $E_d$  at any particular point, lower portion of the curve from that point is divided by the upper portion of the curve from the same point: Elasticity of Demand ( $E_d$ ) = Lower segment of demand curve (LS) / Upper segment of demand curve (US).

### Total Expenditure Method of Elasticity of Demand

- The total expenditure method of elasticity of demand involves examining how total expenditure (price multiplied by quantity demanded) changes as price changes.
- If total expenditure decreases when price increases, demand is elastic; if total expenditure increases when price increases, demand is inelastic. When total expenditure remains unchanged regardless of price changes, demand is unitary elastic.
- This method helps to understand how sensitive demand is to price fluctuations based on observed changes in revenue.

### Relationship between Total Expenditure and Price Elasticity of Demand

- **Elastic Demand ( $ED > 1$ ):** When the price of a good increases, the total expenditure decreases because the percentage decrease in quantity demanded is greater than the percentage increase in price. Conversely, when the price decreases, total expenditure increases.
- **Inelastic Demand ( $ED < 1$ ):** When the price increases, the total expenditure increases because the percentage decrease in quantity demanded is less than the percentage increase in price. Conversely, when the price decreases, total expenditure decreases.
- **Unitary Elastic Demand ( $ED = 1$ ):** Changes in price do not affect total expenditure; it remains constant because the percentage change in quantity demanded exactly offsets the percentage change in price.

### Factors influencing the price elasticity of demand

1. **Availability of Substitutes:** The more substitutes available, the more elastic the demand. If consumers can easily switch to alternative products when the price rises, demand is more responsive to price changes.
2. **Necessity vs. Luxury:** Necessities tend to have inelastic demand because consumers need them regardless of price changes. Luxuries, on the other hand, usually have more elastic demand as consumers can forgo them if prices rise.
3. **Proportion of Income Spent:** Goods that take up a larger proportion of a consumer's income generally have more elastic demand because price changes significantly impact the budget. Conversely, goods that consume a small portion of income tend to have inelastic demand.
4. **Time Period:** Demand is generally more elastic in the long run than in the short run. Over time, consumers have more opportunities to adjust their behavior and find substitutes.



5. **Definition of the Market:** The elasticity of demand can vary depending on how broadly or narrowly a market is defined. For instance, the demand for "food" might be less elastic than the demand for "organic vegetables."
6. **Consumer Preferences:** Strong brand loyalty or unique product features can make demand more inelastic. If consumers have a strong preference for a particular brand, they are less likely to reduce their quantity demanded in response to price increases.

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