

- Mathematically, the demand function for product X can be expressed as follows:

- $Q_d = f(P, I, T, P_R, E_P, E_I, S_P, D_C, A, O)$

- Where Q_d refer to the quantity of demand

Impact of **DEMAND** factors

1. Price of the product

- Demand for a product is inversely related to its price.
- In other words, if the **price rise, the demand falls** and vice versa.
- This is the price demand function showing the **PRICE EFFECT OF DEMAND**

2.Income of the consumer

- The income of the consumer or the household increases, there is a tendency to **buy more and more** up to a particular limits.
- The **demand for product is directly related to the income of the consumer**

3.Prices of Substitutes or Complementaries

- The demand for product X is determined by the prices of its related products: substitutes or complementaries.
- If there is an **increase in the price** of a substitute, the **demand of product X will go up** and vice versa.
- Similarly, if the **price** of complementary goods **goes up**, the **demand for product X will fall**.

Tastes and Preferences

- If the tastes and preference of the consumers change, there is **change in the product demanded also.**
- The companies keep changing the product and services...(when T & P)
- The companies take advantages of the **technological changes and upgrade the product and services.(to meet specific requirements of customers)**

Elasticity of demand

- ✓ The elasticity of demand is defined as the rate of change in quantity demanded for a given change in price.
- ✓ It is primarily related to extension or contraction of demand for a fall or rise in price.
- ✓ Hence, this is called price elasticity of demand.
- ✓ But there are other factors which influence elasticity of demand and accordingly we have three types of elasticity of demand.
 - a) price elasticity of demand
 - b) income elasticity of demand and
 - c) cross elasticity of demand

Elasticity – the concept

- If price rises by 10% - what happens to demand?
- We know demand will fall
- By more than 10%?
- By less than 10%?
- **Elasticity measures the extent to which demand will change**

Elasticity

For example:

- An increase of price by 5% increases supply by 10%. (**Elastic**)
- An increase of price by 10% increases supply by 5%. (**Inelastic**)
- When the price rises but the supply is still kept constant. (**Unity** = elasticity = **1**) It is neither elastic nor inelastic.

Definitions

- In the words of **Dr. Marshall**, *"Elasticity of Demand may be defined as the percentage change in the quantity demanded divided by the percentage change in the price."*
- According to **Boulding**, *"Price elasticity of demand measures the responsiveness of the quantity demanded to the change in price."*
- In the words of **Dooley**, *"The price elasticity of demand measures the responsiveness of the quantity demanded to a change in its price."*
- According to **Antol Murad**, *"Elasticity of demand is the ratio of relative change in quantity to relative change in price."*

Thus, Price Elasticity of demand is a device to measure the rate of change in the quantity of a product demanded in response to a small change in its price.

Types of Elasticity of Demand

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graph TD; A[Types of Elasticity of Demand] --> B[Price Elasticity of Demand]; A --> C[Income Elasticity of Demand]; A --> D[Cross Elasticity of Demand]; A --> E[Advertising Elasticity of Demand];
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**Price
Elasticity of
Demand**

**Income
Elasticity of
Demand**

**Cross
Elasticity of
Demand**

**Advertising
Elasticity of
Demand**

4 types of elasticity

- **Price elasticity of demand:**

$$\frac{\text{Proportionate change in quantity demanded}}{\text{Proportionate change in price}}$$

- **Price elasticity of supply:**

$$\frac{\text{Proportionate change in quantity supplied}}{\text{Proportionate change in price}}$$

- **Income elasticity of demand:**

$$\frac{\text{Proportionate change in quantity demanded}}{\text{Proportionate change in income}}$$

- **Cross elasticity of demand for good A with respect to good B:**

$$\frac{\text{Proportionate change in quantity A demanded}}{\text{Proportionate change in price of B}}$$

Measurement of Price Elasticity

Price **elasticity** of demand measures the relationship between the proportionate change in demand and the proportionate change in price.

In other words, it shows how much change in price will cause how much change in demand. The formula to calculate the price elasticity of demand is:

$$E_P = \frac{\text{Proportionate change in Demand}}{\text{Proportionate change in Price}}$$

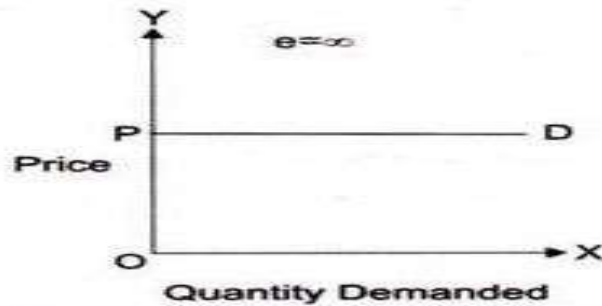
$$= \frac{dq}{dp} \times \frac{p}{q}$$

Types of Price Elasticity of Demand

- Perfectly elastic demand
- Perfectly inelastic demand
- Relatively elastic demand
- Relatively inelastic demand
- Unitary elastic demand

1. Perfectly elastic demand

Perfectly elastic demand is when the **price** is constant but there is a change in the demand i.e. increase or decrease of a commodity. Thus, the demand curve is parallel to the X-axis.



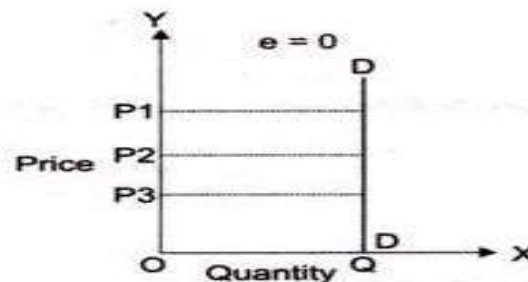
Here, $E_p = \infty$

Figure-2: Perfectly Elastic Demand

2. Perfectly inelastic demand

Perfectly inelastic demand is when the demand is constant or there is no change in the demand of a commodity even if the price changes i.e. increases or decreases.

Thus, the demand curve is parallel to the Y-axis. Demand for salt is an example of perfectly inelastic demand.

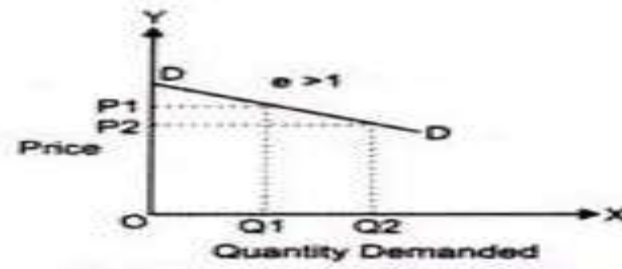


Here, $E_p = 0$

3. Relatively elastic demand

Relatively elastic demand is when the proportionate change in demand is more than the proportionate change in the price.

In other words, this means that a little change in the price shall cause more change in demand. Thus, the demand curve slopes downward from left to right. An example of this is luxury goods.

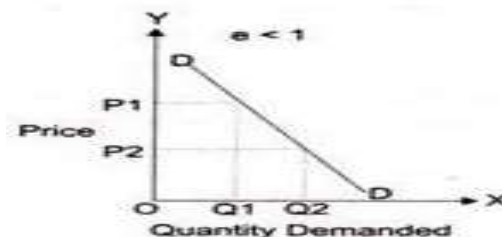


Here, $E_p > 1$

4. Relatively inelastic demand

Relatively inelastic demand is when the proportionate change in demand is less than the proportionate change in the price.

In other words, this means that more change in price shall cause less change in demand. Thus, the demand curve slopes downward from left to right but is steeper. An example of this is the necessary goods.



Here, $E_p < 1$

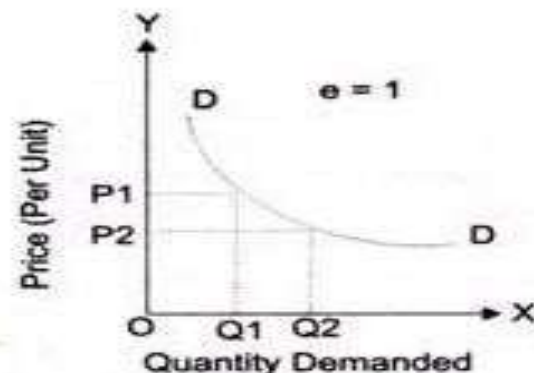
5. Unitary elastic demand

Unitary elastic demand is when the proportionate change in demand is **equal** to the proportionate change in price.

In other words, it means that the change in demand is the same as the change in price it may increase or decrease.

Thus, the demand curve slopes downward from left to right but it is a rectangular **hyperbola**. An example of this is comfort goods.

Here, $E_p = 1$



The different types of price elasticity of demand are summarized in Table-4:

Table-4: Price Elasticity of Demand		
Numerical Value	Type of Price Elasticity	Description
$e_p = \infty$	Perfectly elastic demand	There is a greater change in demand in response to percentage or smaller change in the price. For example, the demand for a product decreases or completely stops, with a little change in its price and vice versa.
$e_p = 0$	Perfectly inelastic demand	Consumers do not respond to the demand for a product with increase or decreases in its price. This implies that the demand remains the same with change in the price.
$e_p > 1$	Relatively elastic demand	The percentage change in the quantity demanded of a product is greater than percentage change in its price. In such a case, consumers generally switch to new brands when the price of a particular brand increases. However, some consumers are loyal to the same brand.
$e_p < 1$	Relatively inelastic demand	The change in the demand of a product is less than that of change in its price.
$e_p = 1$	Unitary elastic demand	The change in the demand and change in the price of a product is same.

Price Elasticity of Demand

- × **Price elasticity of demand** is the percentage change in quantity demanded given a percent change in the price.
- × It is a measure of how much the quantity demanded of a good responds to a change in the price of that good.

Price Elasticity Formula

$$\text{Price Elasticity of Demand} = \frac{\% \text{ Change in the Quantity Demanded } (\Delta Q)}{\% \text{ Change in the Price } (\Delta P)}$$

$$\text{Price Elasticity of Supply} = \frac{\% \text{ Change in the Quantity Supplied } (\Delta Q)}{\% \text{ Change in the Price } (\Delta P)}$$

Computing the Price Elasticity of Demand

The price elasticity of demand is computed as the percentage change in the quantity demanded divided by the percentage change in price.

$$\text{Price Elasticity of Demand} = \frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Price}}$$

The Percentage Method

Computing the Price Elasticity of Demand

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

Example: If the price of an ice cream cone increases from \$2.00 to \$2.20 and the amount you buy falls from 10 to 8 cones then your elasticity of demand would be calculated as:

$$\frac{\frac{(10 - 8)}{10} \times 100}{\frac{(2.20 - 2.00)}{2.00} \times 100} = \frac{20 \text{ percent}}{10 \text{ percent}} = 2$$

Ranges of Elasticity

Inelastic Demand

- ✗ Quantity demanded *does not respond* strongly to price changes.
- ✗ Price elasticity of demand is *less than* one.

Elastic Demand

- ✗ Quantity demanded *responds strongly* to changes in price.
- ✗ Price elasticity of demand is *greater than* one.

Income Elasticity

- The **income elasticity of demand** measures the response of Q^d to a change in consumer income.

$$\text{Income elasticity of demand} = \frac{\text{Percent change in } Q^d}{\text{Percent change in income}}$$

- It refers to the different quantities of commodities or services which consumers will buy at different levels of income, other things remaining the same.
- It expresses the relationship between income and quantity demanded.

Cross elasticity of demand

- It is the ratio of proportionate change in quantity demanded of A to a given proportionate change in the price of related commodity B.
- $E_c = \frac{\% \text{ change in demand for good A}}{\% \text{ change in price good B}}$

Advertising Elasticity of Demand (AED) :

- ◆ Advertising Elasticity of demand refers to the proportionate change in demand of a commodity due to proportionate change in advertising expense.
- ◆ Advertising elasticity is a measure of an advertising campaigns effectiveness in generating sales.
- ◆ Formula :

$$\text{AED} = \frac{\text{Proportionate change in Demand for product}}{\text{Proportionate change in Advertising expense}}$$

DETERMINANTS OF ELASTICITY OF DEMAND

1. Availability of substitutes
2. Proportion of income spent on a commodity
3. Different uses of commodity
4. Habit of consumer
5. Nature of commodity
6. Postponement of the use

Law of DEMAND

Law of demand

Statement of Law : “ Other things being equal, the higher the price of a commodity, the smaller is the quantity demanded and lower the price, larger the quantity demanded”.

The Law of Demand states **the relationship between price and demand of a particular product or services**

Assumptions of the Law of **DEMAND**

- **Other things being equal** : include income level of the consumer, tastes and preferences of the consumer, prices of related goods, expectation about the prices or incomes in the future, size of population, advertising efforts and any other factor capable of affecting the demand

The Law of Demand

- When a good's **price is lower**, consumers will **buy more of it**
- When a good's **price is higher**, consumers will **buy less of it**

DEMAND Curve

- The graph has two axis - vertical line is labeled as price and the horizontal line is for the quantity number.
- Remember to state the units used for price and quantity and name the graph.



Demand reflects an inverse relationship between price and quantity demanded.

The Demand Curve is a graph reflecting the price consumers are willing to pay and the quantity consumers are willing buy.

Price of
Ice-Cream Cone

\$3.00

2.50

2.00

1.50

1.00

0.50

0

1

2

3

4

5

6

7

8

9

10

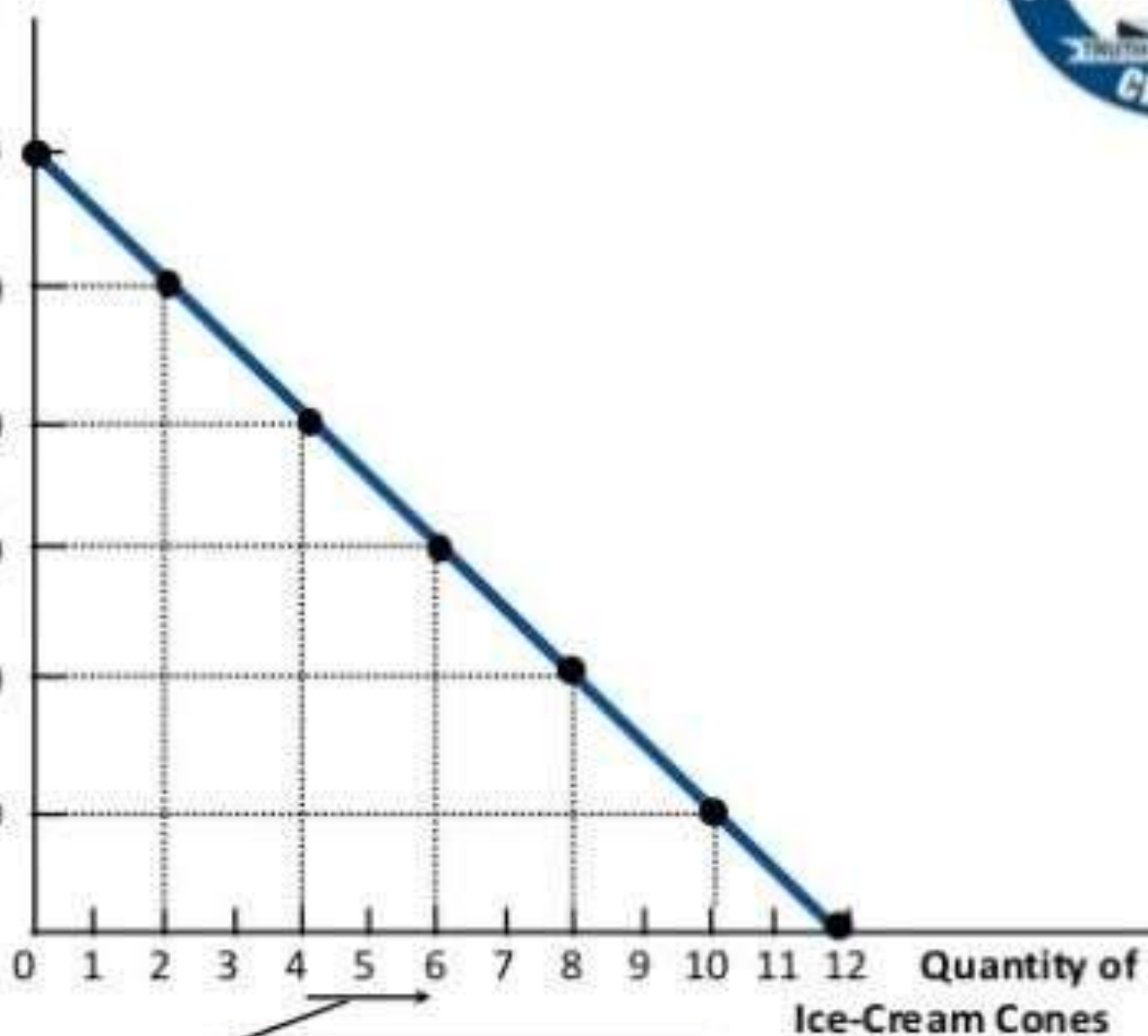
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Quantity of
Ice-Cream Cones

1. A decrease
in price ...

2. ... increases quantity
of cones demanded.



Law of Demand and Income effect

- When there is a **fall in the price** of a commodity. It leads to a **rise in the real income of the consumer**.
- Rise in **real income means the consumer will be able to buy more commodities for a given amount of money**.
- Example: the price of fall in banana

Increase **DEMAND**

- If the consumers are willing and able to buy more of a particular brand of shirts (say.X) at the same price, the result will be an increase in demand.
- The demand curve will shift to the right



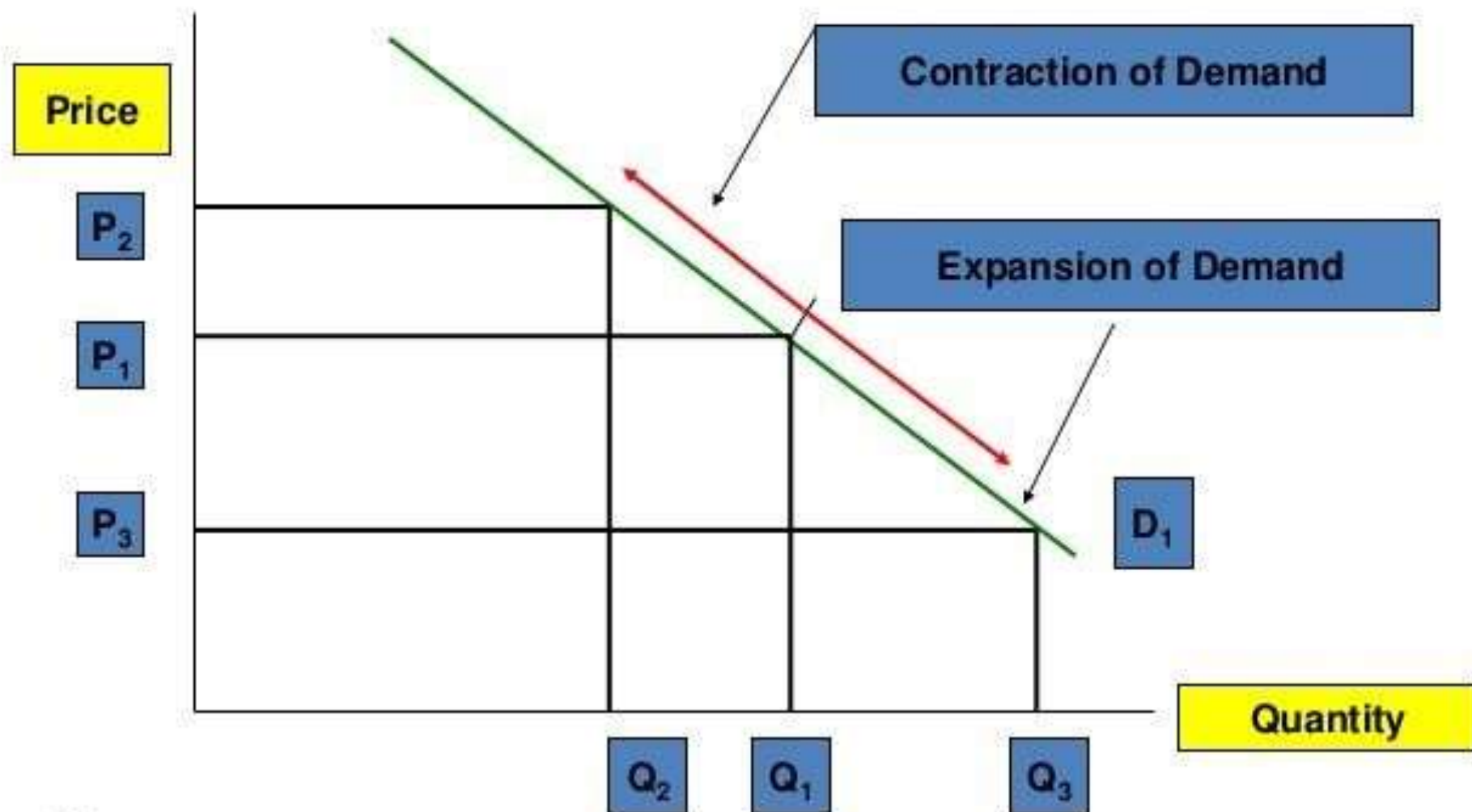
Decrease in **DEMAND**

- A decrease in demand occurs when buyers buy less of a product at each possible price rise because of factors like fall in income, rise in price of complementary goods etc.,

Extension and Contraction in **DEMAND**

- **Extension** is a downward movement along the demand curve, which indicates that a higher quantity is demanded for a given fall in the price of a good.
- **Contraction** is an upward movement along the demand curve which indicates that a lower quantity is demanded for a given increase in the price of the good

Movements Along the Demand Curve



Factors governing elasticity of demand

- Nature of product
- Time frame
- Degree of postponement
- Number of alternative uses
- Tastes and preferences of the consumer.
- availability of close substitute
- In case of complementary or joint foods
- Level of prices
- Availability of subsidies
- Expectation of prices
- Durability of the product
- Government policy

Significance of elasticity of demand

- To fix the prices of factors of production
- To fix the prices of goods and services provided rendered
- To formulate or revise government policies
- to forecast demand
- to plan the level of output and price.

ELASTICITY OF DEMAND IN DECISION MAKING PROCESS

- (a) BUSINESS DECISIONS.**
- (b) ECONOMIC POLICIES OF GOVERNMENT.**
- (c) DETERMINATION OF PUBLIC UTILITIES.**
- (d) TAXATION POLICY.**
- (e) DETERMINATION OF FACTOR PRICING.**
- (f) INTERNATIONAL TRADE**

Steps in Demand Forecasting

Specifying the objective



Determining the time prospective



Choices of methods for demand forecasting

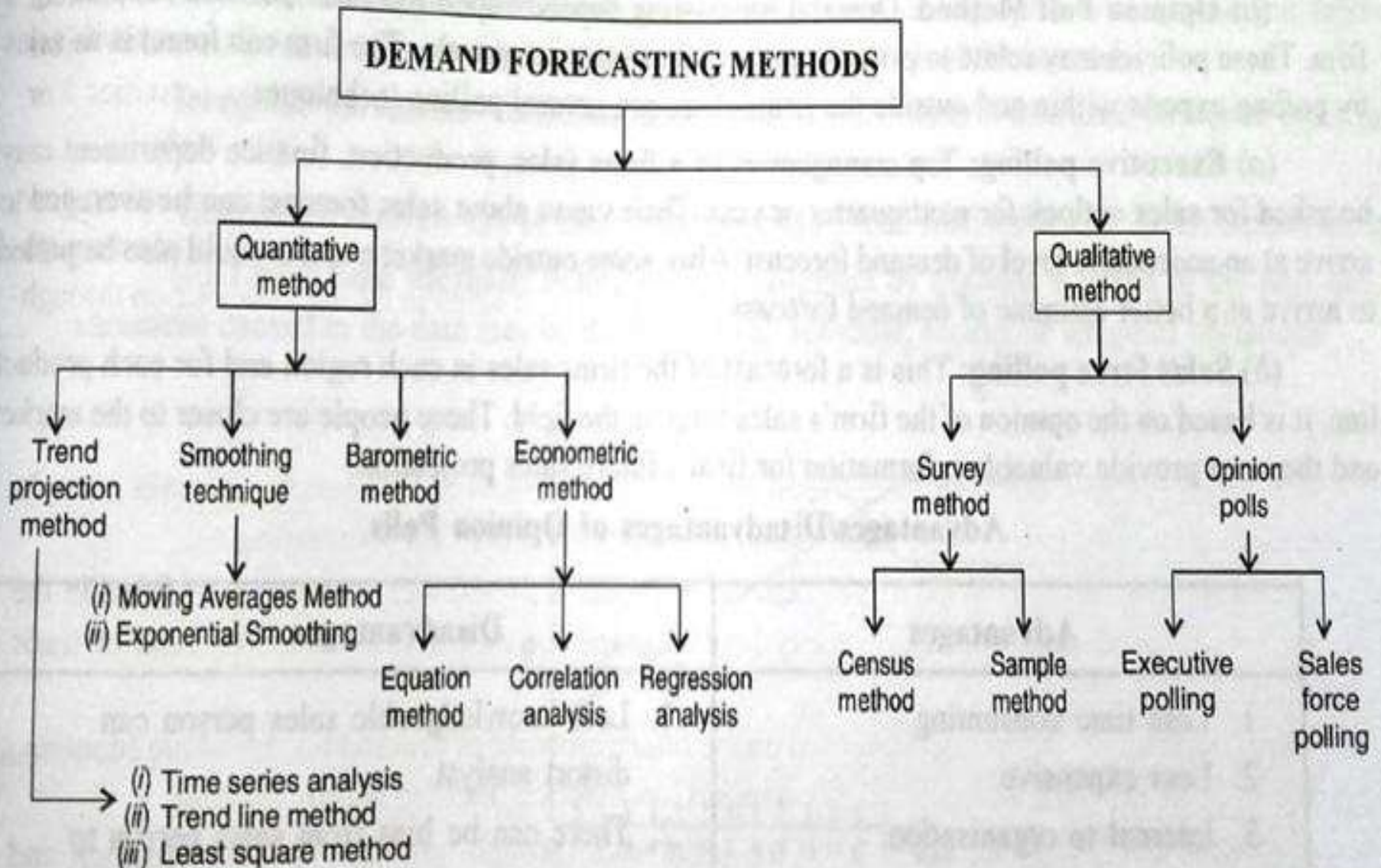


Collection of data and data adjustments



**Estimation and interpretation of results
(Monitoring Results)**

METHODS OF DEMAND FORECASTING



Qualitative Methods

Delphi Method

- Involves a group of experts who eventually develop a consensus
- They usually make long range forecast for future technologies



Merits:

1. Time saving
2. Useful for new product

Demerits:

1. Bias
2. Risk of loss of confidential information

Sales Force Opinions

- Sales people are a good source of information with regard to customers future intentions to buy a product



Merits:

1. Easy and cheaper
2. Collection wisdom of salesmen's

Demerits:

1. Carry Biases
2. Short run only
3. Salesmen are not trained

Expert Opinion Method

- Involves a group of experts within organization.
- Long run Demand Forecasting.



Merits:

1. Time Saving
2. Saving Resources
3. Long term forecasting

Demerits:

1. High Costs
2. Biased forecast

Customer Survey method

- By using a customer survey a firm can base its demand forecast on the customers purchasing plans



1. Complete Enumeration Survey:

Door to Door survey

2. End use method :

Producer Goods

3. Test marketing survey :

Representative of Households

Controlled Experiment Method

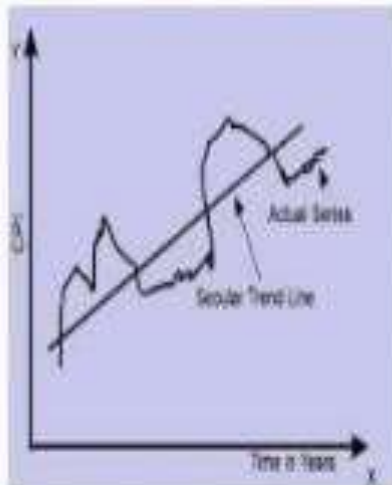
- Forecasting controlling expenditure on advertisement and try to find out effect on demand
- Assuming other things are constant
- Change in packaging



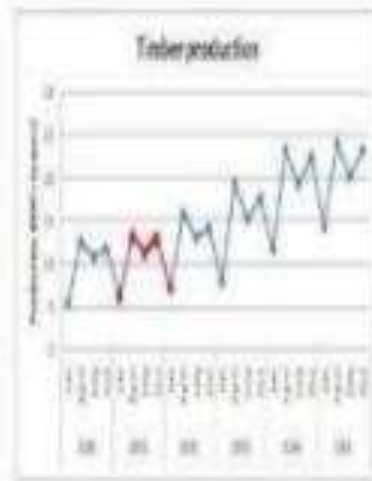
Quantitative Methods

Time Series Analysis

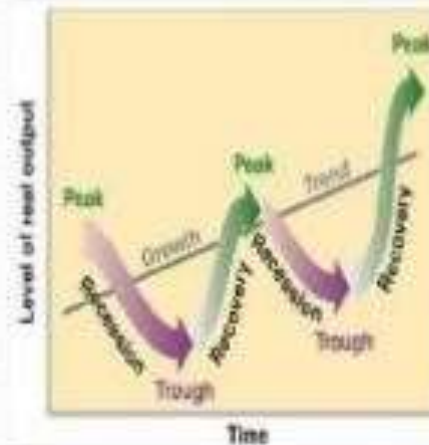
- Trend projection method
- On the basis of data regarding sales of past years and demand
- Chronological orderly sales Data.



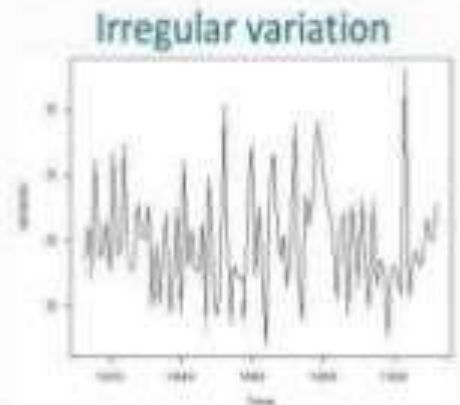
Secular Trend



Seasonal Variation



Cyclic Variation



Irregular Variation

Barometric Techniques

- Indicates changes in atmospheric pressures.
- Forecast future trends on the basis of movements in the index of economic indicators

Leading indicators :- it moves up & down ahead of some other series.

E.g., (i) index of net business investment, (ii) change in the value of inventories: (iii) index of prices of the materials .

Coincidental indicators :-

it moves up and down simultaneously with the level of general economic activities. e.g., (i) no.s of employees in non agriculture sector : (ii) rate of unemployment ;(iii) gross national products at constant prices.

Lagging indicators :-

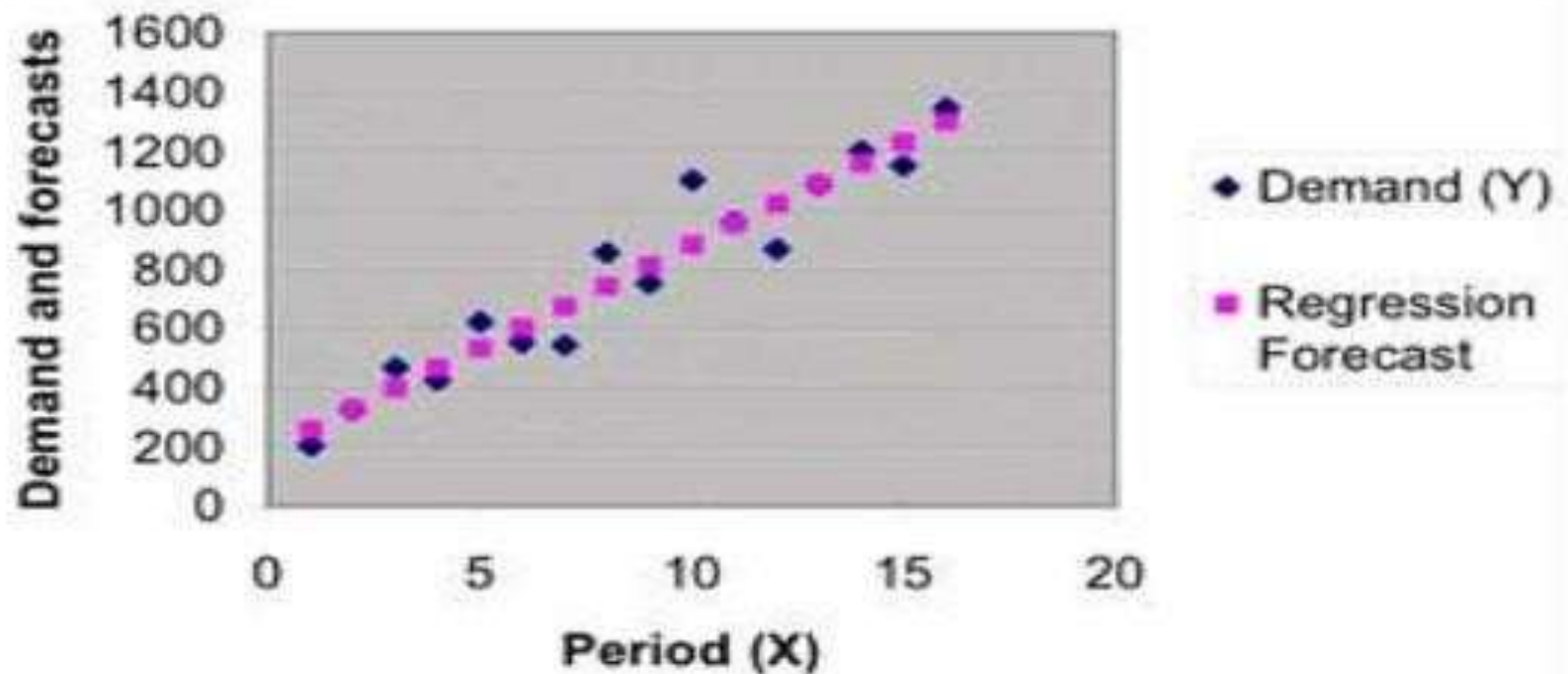
it consist of those indicators that follows a change after some time-lag.

e.g., labour cost per unit of manufactured output,

Lending rates for short term loans

Regression Analysis

- To access relationship between two variables from historical data
- On or more independent variables and one dependent variable



Demand Forecasting

- S A forecast is a prediction or anticipation of any event which is likely to happen in future.**
- S Demand forecast is the prediction of the future demand for a firm's product.**
- S It can either be made through experience or by statistical methods.**

Forecasts are necessary for :

- S Fulfillment of the objectives.**
- S Preparations of budgets.**
- S Stabilization of employment and production.**
- S Decisions about expansion of a firm.**
- S Other decisions like long term investment plans, warehousing and inventory decisions.**

A forecast is important for at least five reasons:

1. A forecast becomes a basis for setting and maintaining a production schedule – manufacturing.
2. It determines the quantity and timing of needs for labor, equipment, tools, parts, and raw materials – purchasing, personnel.
3. It influences the amount of borrowed capital needed to finance the production and the necessary cash flow to operate the business – controller.
4. It provides a basis for sales quota assignments to various segments of the sales force – sales management.
5. It is the overall base that determines the company's business and marketing plans, which are further broken down into specific goals – marketing offer.

Methods of Demand forecasting

- § **There are two different sets of methods for demand forecasting :**
- § **Interview & survey methods (for short term forecasts)**
- § **Projection Approach (for long term forecasts)**

Interview and Survey approach

- S Executive Opinion :**
- S In small companies, usually the owner takes the responsibility of forecasting.**
- S As a result of the experience and knowledge he is expected to have, he can predict what would be the course of activities in future and plan his own activities accordingly.**

Interview and Survey approach

- S Opinion polling method : Information about the consumer's expenditure can be collected either by the market research department or through the wholesalers and retailers.**
- S As a result of technological advancements, it is now possible to collect this information by the means of internet.**

Interview and Survey approach

S **Collective opinion method :**

- ④ Jury is a group of individuals, usually the top bosses or sales, production, marketing managers having experience in different fields.
- ④ The advantage of this method is that instead of basing the forecast on the opinion of one single individual, a more accurate forecast can be drawn.