MEASURE OF DISPERSION

MEANING

The measure of dispersion shows the scatterings or variation of the data.

•It tells the variation of the data from one another and gives a clear idea about the distribution of the data.

•The measure of dispersion shows the homogeneity or the heterogeneity of the distribution of the observations.

Classification of Measures of Dispersion

- **(i) An absolute measure of dispersion:**

- The measures which **express the scattering of observation in terms of absolute numbers** i.e., range, quartile deviation. In others word in the **same unit in which the data is expressed** .

- Expressed in original units such as rupees, kg etc.

- **(ii) A relative measure of dispersion:**

- We use a relative measure of dispersion **for comparing distributions of two or more data set and here variability stated in the form of ratio or percentage**.

- They are the **coefficient of range, the coefficient of mean deviation, the coefficient of quartile deviation, the coefficient of variation, and the coefficient of standard deviation.**

Range

A range is the most common and easily understandable measure of dispersion. It is the difference between two extreme observations of the data set. If Xmax and Xmin are the two extreme observations then

- Range = Xmax–Xmin

Quartile Deviation

The quartiles divide a data set into quarters.

- Quartile deviationor **semi-inter-quartile** deviationis

- $Q = ½ \times (Q3 – Q1)$

Standard Deviation

Introduced by karlpearsonin 1893.

•It is one of the **widely used method of measure of dispersion** .

$$\mathrm{SD} = \sqrt{\frac{\sum |x - \bar{x}|^2}{n}}$$

COEFFICIENT OF VARIATION

Another method of measuring dispersion

- Given by **KARL PEARSON**

$$CV\ (\%) = \left(\frac{Standard\ deviation}{Mean}\right) \times 100$$

MEASURE OF SKEWNESS

- Skewnessmeans lack of symmetry in a frequency distribution .
- Mean, median and mode are not equal.
- A skewed distribution is an asymmetrical distribution.
- It has a long tail on one side and short tail on the other side.
- Eg:-Income, Savings, etc.

TEST OF SKEWNESS

1. mean, median and mode are not equal.

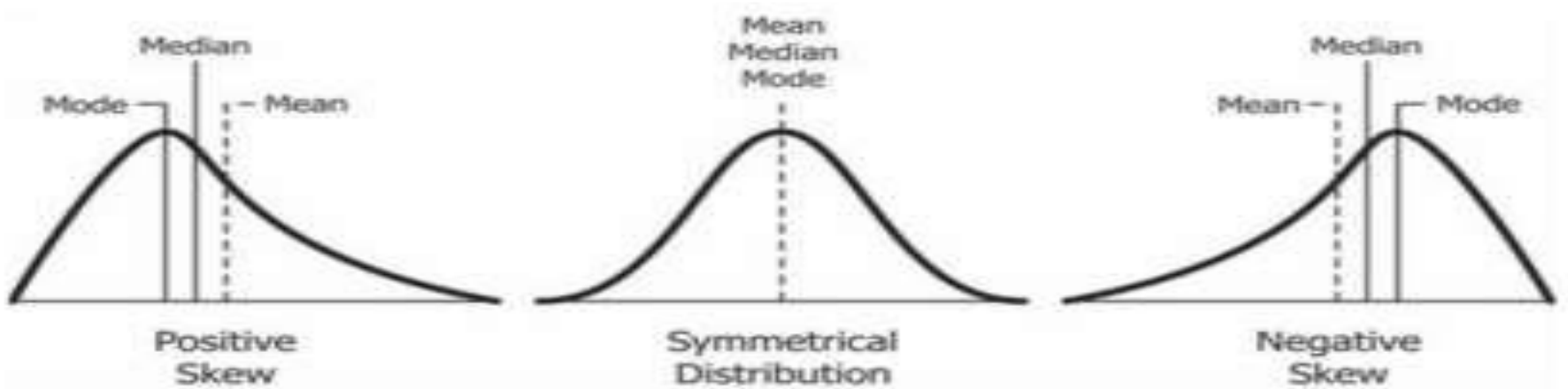
•2. sum of positive deviations from median are not equal to the sum of negative deviation from median

•3.The frequency curve has longer tail on the left side or on the right side.

POSITIVE AND NEGATIVE SKEWNESS

Skewnessis said to be positive when the mean is greater than the median and median is greater than mode.

•Skewnessis sais to be negative when the mean is less than the median and the median is less than mode.



METHODS OF MEASURING SKEWNESS

1) Karl Pearson's Method :•Value of coefficient of skewnessusually lies **between -1 and +1** but in case mode **is ill defined, the value lies between -3 and +3.**

2) Bowley'sMeasure or Quartiles Measure :•This measure is useful in distributions **where mode is ill-defined** and can also be used in open end distributions.

•COFF OF SKEWNESS $= \frac{Q_3 + Q_1 - 2M}{Q_3 - Q_1}$

3) **Kelly's Method:** •This methods is based on 90% of observations.

$$\text{Coefficient of Skewness } (J_P) = \frac{P_{90} + P_{10} - P_{50}}{P_{90} - P_{10}}$$

THANK YOU