Quadrant II – Notes

Course Code : ECD 114

Module Name : Simple Graph and Scatter Diagram

Methods of Measuring Correlation

1) Simple Graph
2) Scatter Diagram
3) Statistical Method (Karl Pearson's Coefficient of Correlation and Spearman's Rank Correlation Method

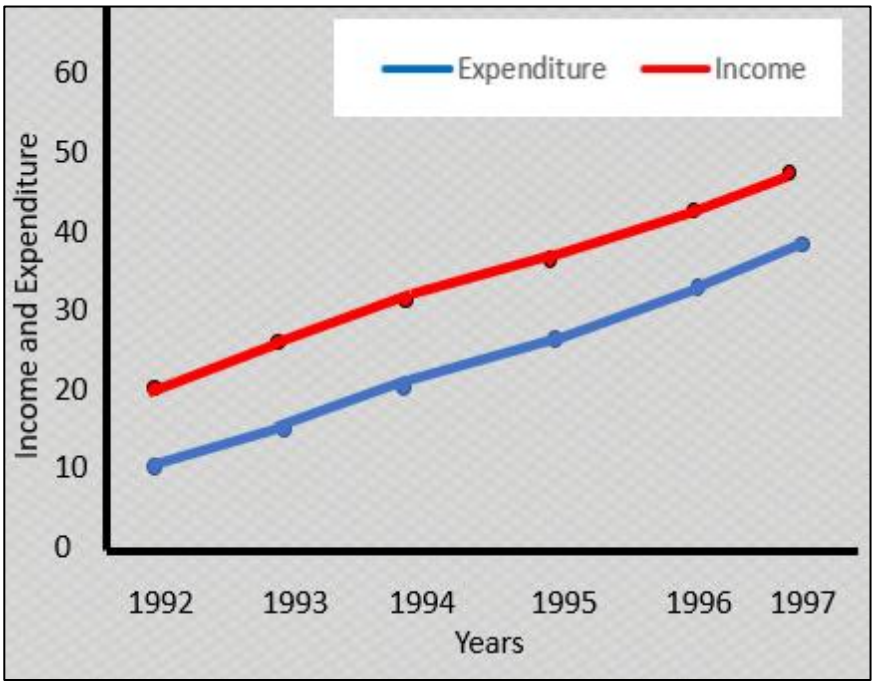
Simple Graph

- In this method, individual values of two variables are plotted on the graph paper.
- We thus obtain curves, one for X variable and another for Y variable.
- By examining the direction and closeness of two curves, we can infer whether or not the variables are related to each other.
- If both curves move in the same direction, either upward or downward, then we say that they are highly positively correlated with each other.
- On the other hand, if the curves are moving in the opposite direction, correlation is said to be negative.

Example: Correlation using Simple Graph Method

Year	Expenditure	Income
1992	10	20
1993	15	25
1994	20	30
1995	25	35
1996	30	40
1997	35	45

Correlation measured using Simple Graph Method



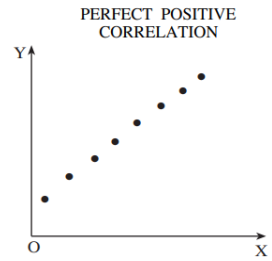
Both curves move in the same direction, i.e. both are moving upward, thus we say that Income and Expenditure are highly positively correlated with each other.

Scatter Diagram

- This is the simplest method of studying correlation by preparing a dot chart called scatter diagram. The values of the two variables are plotted (on a graph paper), one variable is taken along X-axis and the other along Y-axis.
- By plotting the data on a graph paper we get the points which are generally scattered, and hence it is called a scatter diagram.
- The data are plotted in the form of dots.
- Looking at the scatter of the plotted points we can get an idea whether the variables are related or not.
- The manner in which the points are scattered, suggests the degree and direction of correlation between the two variables: The greater the scatter of the plotted points on the chart, the lesser is the relationship between the two variables. The more closely the points come to a straight line, there is a higher degree of relationship.
- The degree of correlation is denoted by the letter 'r' and the direction by its sign, +ve or -ve.

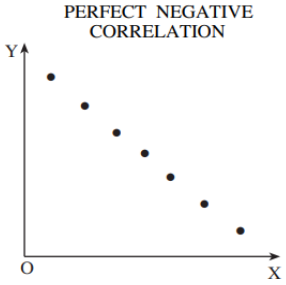
Degrees of Correlation illustrated using Scatter Diagrams

1. **Perfect Positive Correlation (r = +1)**



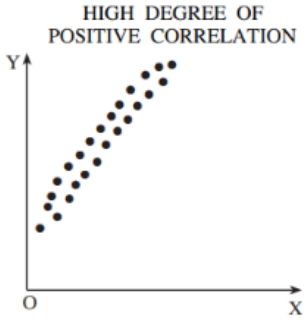
- If all the points lie on a rising straight line from the lower left hand corner to the upper right hand corner, the correlation is perfectly positive
- r = + 1.

2. **Perfectly Negative Correlation (r = -1)**



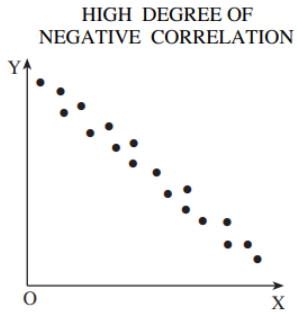
- If all the points lie on a falling line straight line from the upper left hand to the lower right hand corner of the diagram, the correlation is perfectly negative
- r = -1.

3. **High Degree of Positive Correlation (r = +)**



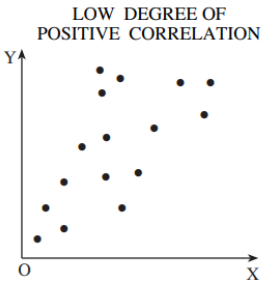
- If the points lie in a narrow strip which rises upwards it denotes a high degree of positive correlation between the variables.
- Correlation is positive if the points show a rising tendency from lower left hand corner to the upper right hand corner.
- E.g. r = + 0.9

4. **High Degree of Negative Correlation (r = -)**



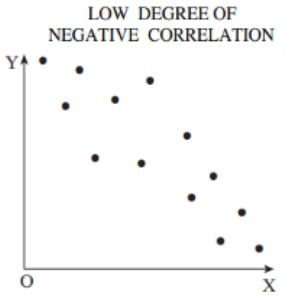
- If the points lie in a narrow strip which falls downwards, it denotes a high degree of negative correlation.
- Correlation is negative if the points show a declining tendency from the upper left hand corner to the lower right hand corner.
- E.g. r = - 0.9

5. **Low degree of Positive Correlation (r = +)**



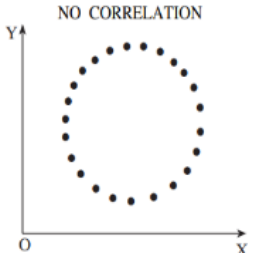
- If the points are spread widely over a broad strip rising upwards, it denotes low degree of positive correlation

- E.g. r = + 0.15



6. Low Degree of Negative Correlation (r = -)

- If the points are spread widely over a broad strip, falling downwards, it denotes a low degree of negative correlation
- E.g. r = - 0.15



7. <u>No Correlation</u> (r = 0)

- If the plotted points are in a haphazard manner without showing any definite pattern, it depicts the absence of any relationship between the variables under study.
- Hence there is no correlation. E.g. r = 0