Quadrant II – Transcript and Related Materials

Programme: Bachelor of Arts (Third year)

Subject: Economics

Paper Code: ECD 114 (Honours)

Paper Title: Research Methodology II

Unit II : Measures of Central Tendency and Dispersion

Module Name: Skewness and Kurtosis

Module No: 14

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Notes

SKEWNESS AND KURTOSIS

A. MEASURES OF SKEWNESS

The measures of central tendency and dispersion do not reveal whether the dispersal of values on either side of an average is symmetrical or not. If observation are arranged in a symmetrical order round a measure of central tendency, it is called as ‘symmetrical distribution.’ In a normal distribution the values of the mean, median and mode coincide and the quartiles are equi-distant of the median. It is obvious that in such cases the sum of the deviations measured from the mean, median or mode would be 0.

A normal curve is a bell-shaped frequency curve in which the values on either side of a measure of central tendency are symmetrical.

a. **IDEAL SYMMETRICAL CURVE**

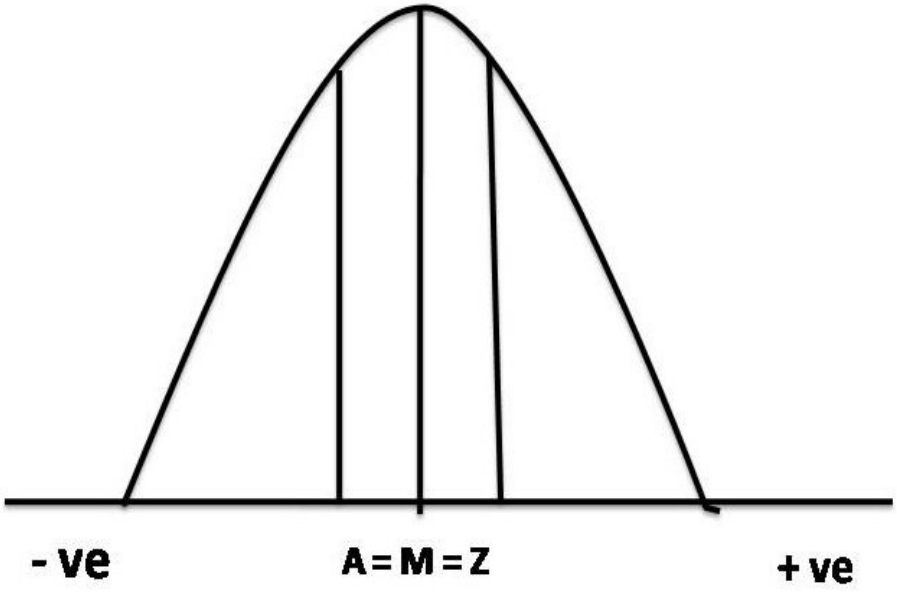

Figure 1 : Ideal Symmetrical Curve

Figure number 1 gives the shape of an ideal symmetrical curve. It is bell-shaped and there is no skewness. The value of mean, median and mode in such a curve would be identical.

b. MEASURES OF ASYMMETRY (SKEWNESS)

Measures of central tendency and measures of dispersion should always be supplemented by what are called measures of skewness.

Skewness is opposite of symmetry and its presence tells us that a particular distribution is not distribution is not symmetrical or in other words it is skew. Thus average tell us about the concentration of items round the central value, and measures of skewness tell us whether the disposal of items from an average is symmetrical.

Moderately Skewed (Positive)

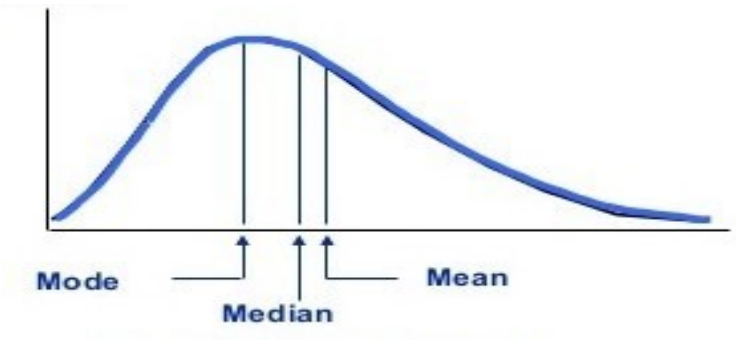

Figure 2 : Positively Skewed Curve

Figure number 2 gives the shape of moderately skewed curve. It is skewed to the right. In it the value of mean would be more than the values of the mode. Such curve are called positively skewed.

Skewed Curve (Negative)

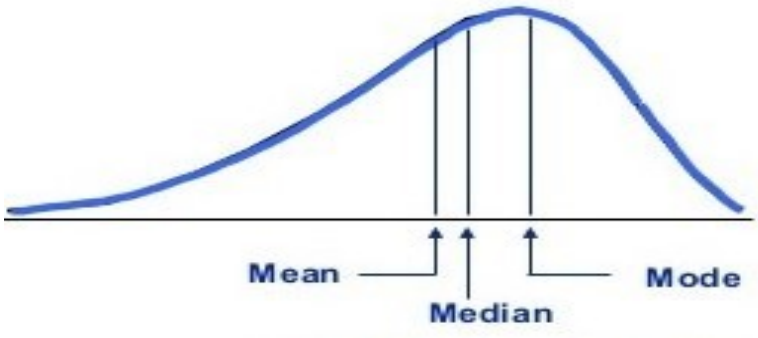

Figure 3 : Negatively Skewed Curve

Figure number 3 gives the shape of a skewed curve. This curve is skewed to the left and in it the value of mode would be greater than the value of median, and value of median will be greater than the mean. Such curve are called negatively skewed.

Test of skewness

In order to find out whether a particular distribution is skew, certain tests are usually applied. The most important are following.

In skew distribution values of mean, median and mode would not coincide. The mean and mode would be pulled wide part and median would usually lie between them.

Moderately asymmetrical distribution : **Mean = Mode + 2 / 3 (Median – Mode)**

Positive and Negative Skewness

If a curve is skewed to the right, the value of the Mean (A) would be more than the value of either Median (M) or Mode (Z). In such cases skewness is positive.

On the other hand, curve is skewed to the left, the value of the Mean (A) would be less than the values of Median (M) and Mode (Z). In such cases skewness is said to be negative.

B. KURTOSIS

Measures of skewness tell us whether a particular distribution differs from a normal or symmetrical distribution and if so, to what extent. Another measure to test, how near a particular frequency distribution differs from a normal or symmetrical distribution and if so to what extent, is Kurtosis. It indicates whether a distribution is more flat-tapped or more peaked than the normal distribution. Kurtosis is the humpedness of the curve and points to the curve and points to the nature of distribution of items in the middle of a series.

It may be pointed out here that knowing the shape of the distribution curve is crucial to the use of statistical methods in research analysis since most methods in research analysis make specific assumptions about the nature of the distribution curve.

Meso-Kurtic : Kurtosis is the measure of flat-toppedness of a curve. A bell shaped curve or the normal curve is Mesokurtic because it is kurtic in the centre. It is a curve having normal peak or the normal curve. There is equal distribution of items around the central value.

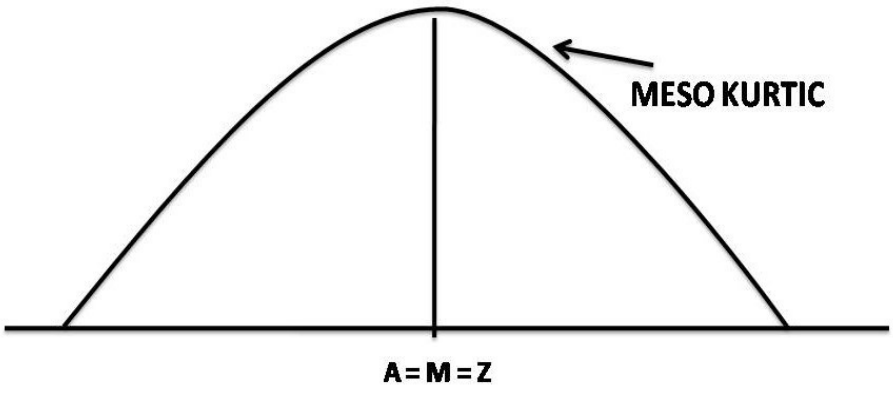

Figure 4 : Meso-Kurtic Curve

Lepto-Kurtic : If the curve is relatively more peaked than the normal curve, it is called Leptokurtic. It is a curve having high peak than normal curve. It has too much concentration the items near the centre.

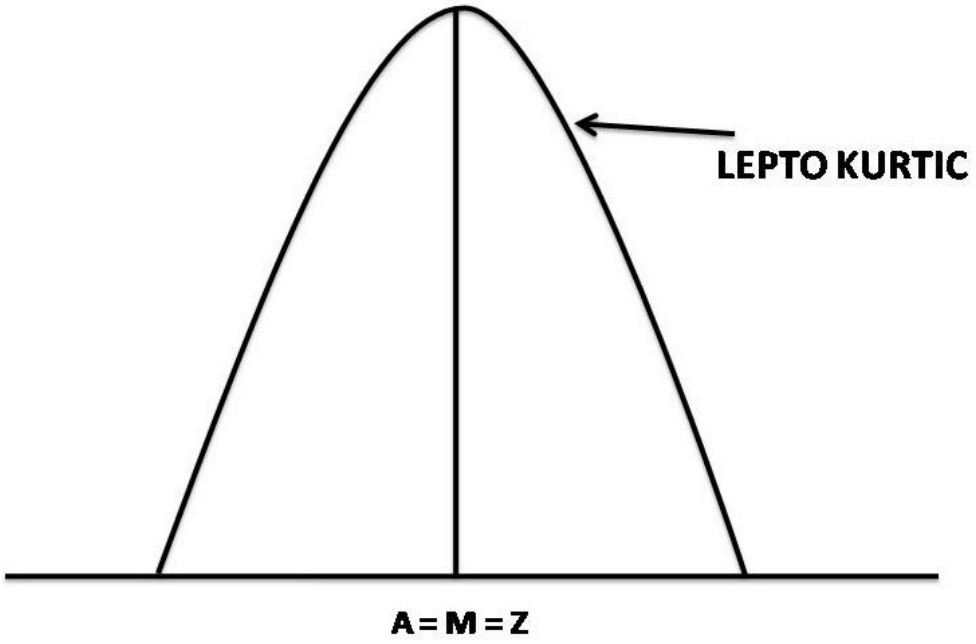

Figure 5 : Lepo-Kurtic Curve

Platy-Kurtic : A curve is more flat than the normal curve, it is called Platy Kurtic. It is a curve having low peak. There is less concentration of items near the centre.

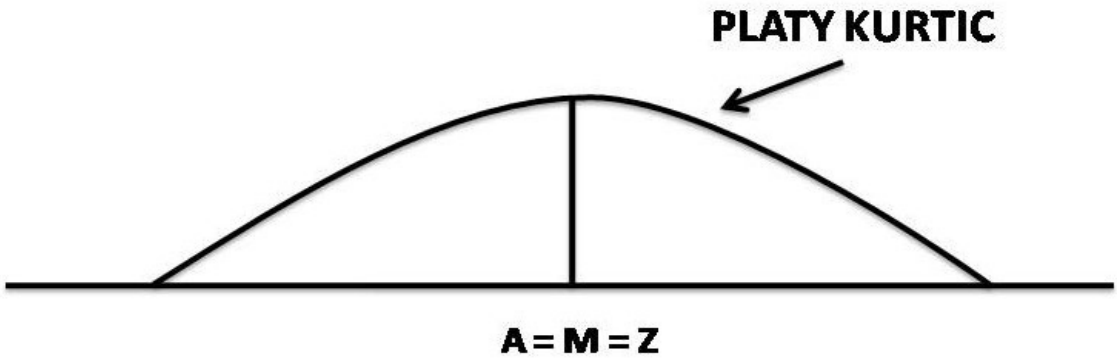

Figure 4 :Platy-Kurtic Curve