Index Numbers

An Index Number is a number which is used to measure the level of a certain phenomenon as compared to the level of the same phenomenon at some standard period.

An index number is a statistical device for comparing the general level of magnitude of a group of related variables in two or more situations. For example, if we want to compare the price level of 1996 with what it was in 1993, we may have to look into a group of variables - prices of rice, wheat, vegetables, clothes, rent etc. We want one figure to indicate the changes of different commodities as a whole. This is called an Index Number.

Characteristics of Index Numbers:

1) Index Numbers are specialised averages.

2) Index Numbers are expressed in percentages.

3) Index Numbers measure changes not capable of direct measurement.

4) Index Numbers are for comparison.

Uses of Index Numbers

1) They measure relative change.
2) They are of better comparison.
3) They are good guides.
4) They are economic barometers.
5) They are the pulse of the economy.
6) They are the wage adjuster.
7) They compare the standard of living.
8) They are a special type of averages.

Types of Index Numbers

There are various types of Index Numbers. They are

(i) Price Index
(ii) Quantity Index
(iii) Value Index.

(i) Price Index:

It is an index number which compares the prices for a group of commodities at a certain time or at a place with prices of a base period.

(ii) _Quantity Index_:

It study the changes in the volume of goods produced or consumed; for instance, industrial production, agricultural production, import, export, etc.

(iii) _Value Index_:

These index number compare the total value of a certain period with the total value of the base period. Here the total value is equal to the price of each, multiplied by the quantity; for instance, indices of profits, sales, etc.

Problems in the Construction of Index Numbers:

The following are some guidelines to construct the Index Numbers.

i) Purpose or Object:

The statistician must clearly determine the purpose for which the index numbers are to be constructed, because there is no all purpose index numbers. Every index number has got its own uses and limitations.

For example, if we want to study the

changes in the value of money, then we have to construct index numbers of wholesale prices.

2) ## Selection of base:

The base period of an index number is very important as it is used for the construction of index numbers. Every index number must have a base. One cannot say whether the price level has increased or decreased, unless one compares the prices level of the current year with the price level of the previous year.

Therefore, the year to be selected as base year must be normal year or a typical year and a recent year. The base may be of following type.

(a) Fixed base

The name reveals that the base year is a fixed one.

(b) Average base

Sometimes it is difficult to select an year as base through normality. Under such a critical position, the average of several

years is considered better.

(c) **Chain base**

In fixed base method, the base year once selected, remains fixed and all index numbers are based on the same base year. In this method, there is no fixed base year. It changes from year to year. When a comparison is desired from year to year, a system of chain base is used.

3) **Selection of commodities**

If we study the price changes of one commodity, we have to include only one item. For instance, if we study the changes in production of cloth, then we may include the production of mill cloth, power loom cloth, handloom cloth, silk, khadi, etc.

4) **Source of data**

The prices relating to the thing to be measured must be collected. If we want to study the changes in industrial production, we must collect the prices relating to the production of various goods of factories.

5. Selection of Averages:

One can use any average. But in practice, the arithmetic average is used, because it is easy for computation.

6. Weighting

The relative importance is the basis of Weightage. Generally, the quantities of the commodities produced or the values of quantities of the goods, sold, demanded or purchased are taken as suitable weights. These weights relate to the base year or the current years, depending on their availability.

Notations :—

Base Year : The year selected for which Comparison.

Current Year : The year for which comparisons are sought or required.

P_0 : Price of a commodity in the Base year.

P_1 : Price of a commodity in the Current year.

q_0 : Quantity of a commodity consumed or purchased during the base year.

q_1 : Quantity of a commodity consumed or purchased during the & Current year.

w : Weights assigned to a commodity according to its relative importance in the group.

P_{01} : Price index number for the base year

P_{10} : Price index number for the current year.

q_{01} : Quantity index number for the current year with reference to the base year.

q_{10} : Quantity index number for the base year with reference to the current year.