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Topic: INDEX NUMBER

MEANING OF INDEX NUMBER

An index number may be defined as a special average which helps in comparison of the level of magnitude of a group of related variables under two or more situations.

Index numbers are a series of numbers devised to measure changes over a specified time period (the time period may be daily, weekly, monthly, yearly, or any other regular time interval), or compare with reference to one variable or a group of related variables. Thus, each number in a series of specified index number is:

- a) A pure number i.e., it does not have any unit.
- b) Calculated according to a pre-determined formula.
- c) Generated at regular time intervals, sometimes during the same time interval at different places.
- d) The regular generation of numbers form a chronological series.
- e) With reference to some specified period and number known as base period and base number, the latter is always 100. For

example, if the consumer price index, with base year 1996 is calculated to be 180 for the year 2003, it means that consumer prices have increased by 80 per cent in 2003 as compared to the prices prevalent in 1996.

USES OF INDEX NUMBERS

Though originally the index number was developed for measuring the effect of change in prices, today they have become indispensable for analyzing the data related to business and economic activity. This statistical tool can be used in several ways as follows:

- 1) Decision makers use index numbers as part of intermediate computations to understand other information better. Nominal income can be transformed into real income. Similarly, nominal sales into real sales & so on ..., through an appropriate index number. Consumer price index, also known as cost of living index, is arrived at for a specified group of consumers in respect of prices of specific commodities and services which they usually purchase. This index serves as an indicator of 'real' wages (or income) of the consumers. For example, an individual earns Rs. 100/- in the year 1970 and his earnings increase to Rs. 300/- in the year 1980. If during this period, consumer price index increases from 100 to 400 then the consumer is not able to purchase the same quantity of different commodities with Rs. 300, which he was able to purchase in the year 1970 with his income of Rs. 100/-. This means the real income has declined. Thus real income can be calculated by dividing the actual income by dividing the consumer price index:

Real income in 1980 = Actual income in 1980/Consumer price index of 1980

= 300/400=Rs.75/-with respect to 1970 as base year.

Therefore, the consumer's real income in the year 1980 is Rs. 75/- as compared to his income of Rs. 100/- in the year 1970. We can also say that because of price increase, even though his income has increased, his purchasing power has decreased.

2) Different types of price indices are used for wage and salary negotiations, for compensating in price rise in the form of DA (Dearness Allowance).

3) Various indices are useful to the Government in framing policies. Some of these include taxation policies, wage and salary policies, economic policies, custom and tariffs policies etc.

4) Index numbers can also be used to compare cost of living across different cities or regions for the purpose of making adjustments in house rent allowance, city compensatory allowance, or some other special allowance.

5) Indices of Industrial Production, Agricultural Production, Business Activity, Exports and Imports are useful for comparison across different places and are also useful in framing industrial policies, import/export policies etc.

6) BSE SENSEX is an index of share prices for shares traded in the Bombay Stock Exchange. This helps the authorities in regulating the stock market. This index is also an indicator of general business activity and is used in framing various government policies. For example, if the share prices of most of the companies comprising any particular industry are

continuously falling, the government may think of changes in its policies specific to that industry with a view to helping it.

7) Sometimes, it is useful to correlate index related to one industry to the index of another industry or activity so as to understand and predict changes in the first industry. For example, the cement industry can keep track of the index of construction activity. If the index of construction activity is rising, the cement industry can expect a rise in demand for cement.

ISSUES IN CONSTRUCTION OF INDEX NUMBERS

There are three major issues which may be faced in the construction of index numbers. They are:

1) Collection of Data; 2) Selection of Base Year and 3) Selection of Appropriate Index. Let us discuss them in detail:

1) Collection of Data

Data collection through a sample method is one of the issues in the construction of index numbers. The data has to be as reliable, adequate, accurate, Index numbers comparable, and representative, as possible. Here a large number of questions need to be answered. The answers ultimately depend on the purpose and individual judgement. For example, one needs to decide the following:

i) Identification of Commodities to be Included: How many and which category of commodities to include? A large number of items may be present. It is not possible to include all of them, only those items deserve to be included in the construction of an index number as would make it more representative. For

example, if we are required to construct indices for shares on the Bombay Stock Exchange, there are several shares listed and traded, it is not possible to include all of them. Therefore, it has to be decided which sample number of shares (may be 30 or 40) should represent the general movement of share prices of the Bombay Stock Exchange. Therefore, it is worthwhile to note that the selection of items must be deliberate and in keeping with the relevance and significance of each individual item to the purpose for which the index is constructed.

ii) Sources of Data:

From where to collect data? It is an important and difficult issue. The source depends on the information requirement. For example, one may need to collect prices and quantities consumed related to certain commodities for a consumer price index. However, there may be a large number of retailers and wholesalers, selling the commodities, and quoting different prices. To get the details, only a few representative shops (which represent the typical purchasing points of the people under question) need to be selected. Thus, based on a representative sample survey, sources should be from where accurate, adequate, and timely data can be available.

iii) Timings of Data Collection:

It is also equally important to collect the data at an appropriate time. Referring to the example of consumer price index, prices are likely to vary on different days of the month. For certain commodities prices may vary at different times of the same day. Take an example, vegetable prices are usually high in the morning when fresh vegetables arrive and are low in the late evening when sellers are closing for the day and wish to clear

the perishable stock. For each commodity, individual judgement needs to be exercised to represent reality and to serve the purpose for which an index is to be used.

2) Selection of Base Year

A base period is the reference period for comparing and analysing the changes in prices or quantities in a given period. For many index number series, value of a particular time period, usually a year, is taken as reference period against which all subsequent index numbers in the series are calculated and compared. In some other cases, especially when cost of living needs to be compared across the cities, the value of cost of living prevailing in a selected city is taken as a base against which cost of living in other cities is compared. In yet other cases, we may be required to compare one index number series against another series. In such a context, a 'base' common to all series is more appropriate. In the light of the above considerations, therefore, the period/year selected as base period/year must be a 'normal' period. Normal period is a period with price or quantity figures neither too low, nor too high. It should not have been affected by abnormal occurrences, such as floods, (if interested in agricultural production), wars, sudden recession etc. What is normal should also be decided keeping in view the purpose of constructing an index number, and the specific situation.

3) Selection of an Appropriate Index

Different methods of indices give different results, when applied to the same data. Utmost care must be taken in selection of a formula which is the most suitable for the purpose. Whether to use an unweighted or weighted index

is a difficult question to answer. It depends on the purpose for which the index number is required to be used. For example, if we are interested in an index for the purpose of negotiating wages or compensating for price rise, only a weighted index would be worthwhile to use. Which weights to be used? Whether base year quantities or current year quantities or some other weights are to be used is an important question to answer. Weights which realistically reflect the relative importance of items included in the construction of an index is perhaps the only answer. The purpose for which an index is needed will of course remain a vital factor to reckon with.