

1. Introduction

Welcome to the series of E-learning modules on cost of living index numbers.

By the end of this session, you will be able to:

- Explain the concept of cost of living index
- Explain the steps in constructing the cost of living index
- Explain the methods used in construction of cost of living index
- List the precautions taken in cost of living index

Introduction

The cost of living index is also known as the consumer price index numbers. These numbers are generally intended to represent the average change over time in the prices paid by the ultimate consumer of a specified basket of goods and services.

The need for constructing consumer price indices arises because the general index numbers fail to give an exact idea of the effect of the change in the general price level on the cost of living of different classes of people. This is because a given change in the level of prices affects different classes of people in different manners.

Different classes of people consume different types of commodities and even these same type of commodities are not consumed in the same proportion by different classes of people.

For example, the consumption pattern of rich, poor and middle class people varies widely. It is not only the consumption habits of the people of the same class differ from place to place, also the mode of expenditure of a lower division clerk living in Delhi may differ widely from that of another clerk of the same category living in, say, Madras.

The consumer price index helps us in determining the effect of rise and fall in prices on different classes of consumers living in different areas. The construction of such an index is of great significance because very often the demand for a higher wage is based on the cost of living index. The wages and salaries in most countries are adjusted in accordance with the consumer price index.

It should be carefully noted that the cost of living index does not measure the actual cost of living nor the fluctuations in the cost of living due to causes other than the change in the price level. Its object is to find out how much the consumers of a particular class have to pay more for a certain basket full of goods and services in a given period compared to the base period.

The term 'cost of living index' is used as consumer price index and retail price index in different countries with practically no difference in their connotation.

It should be clearly understood at the very outset that two different indices representing two different geographical areas cannot be used to compare actual living costs of the two areas.

A higher index for an area compared to another with the same period has no indication that the living costs are higher in one area compared to another. All it means is that as compared with the base periods, prices have risen in one area than in another.

However, actual costs depend not only on the rise in prices as compared with the base period, but also on the actual cost of living for the base period, which will vary for different regions and for different class of population.

Utility of the consumer price indices:

The consumer price indices are of great significance as discussed below:

- The most common use of these indices is in wage negotiations and wage contracts. Automatic adjustments of wage or dearness allowance component of wages are governed in many countries by such indices
- At governmental level, the index numbers are used for wage policy, price policy, rent control, taxation and general economic policies
- The index numbers are also used to measure changing purchasing power of the currency, real income, etc.
- Index numbers are also used for analyzing markets for particular kinds of goods and services

2. Construction of a Consumer Price Index

Construction of a Consumer Price Index:

The following are the steps in constructing a consumer price index:

1. Decision about the class of people for whom the index is meant
2. Conducting family budget enquiry
3. Obtaining price quotations

Decision about the class of people for whom the index is meant: It is absolutely essential to decide clearly the class of people for whom the index meant, that is whether it relates to industrial workers, teachers, officers, etc. the scope of the index must be clearly defined.

For example, when we talk of teachers we are referring to primary teachers, middle class teachers, etc. or to all the teachers taken together. Along with the class of people, it is also necessary to decide the geographical area covered by the index. Thus, in the example taken above it is to be decided whether all teachers living in Delhi are to be included or those living in a particular locality of Delhi, say, Chandini Chowk area, Karol Bagh, etc.

Conducting family budget enquiry: Once the scope of the index is clearly defined, the next step is to conduct a family budget enquiry covering the population group for whom the index is to be designed. The object of conducting a family budget enquiry is to determine the amount that an average family of the group included in the index spends on different items of consumption.

While conducting such an enquiry, the quantities of commodities consumed and their prices are taken into account. The consumption pattern can thus be easily ascertained. It is necessary that the family budget enquiry amongst the class of people to whom the index series is applicable should be conducted during the base period.

The sixth international conference of labour statisticians held in Geneva in 1946 suggested that the period of enquiry of the family budgets and the base period should be identical as far as possible.

The enquiry is conducted on a random basis. By applying lottery method, some families are selected from the total number and their family budgets are scrutinized in detail.

The items on which the money is spent are classified into certain well-accepted groups, namely: food, clothing, fuel & lighting, house rent, miscellaneous.

Each of these groups is further divided into sub-groups, for example, the broad group 'food' may be divided into wheat, rice, pulses, sugar, etc. The commodities included are those, which are generally consumed by people for whom the index is meant.

Through family budget enquiry, an average budget is prepared which is the standard budget for that class of people. While constructing the index only such commodities should be included which are not subject to wide variations in quality or to wide seasonal alternations in

supply and for which regular and comparable quotations of prices can be obtained.

Obtaining price quotation: The collection of retail prices is a very important. At the same time it is very tedious and difficult task because such prices may vary from place to place, shop to shop and person to person. Price quotation should be obtained from the localities in which the class of people concerned reside or from where they usually make their purchases.

Some of the principles recommended to be observed in the collection of retail price data required for purposes of construction of cost of living indices are described below:

- The retail price should relate to a fixed list of items and for each item, the quality should be fixed by means of suitable specifications
- Retail prices should be those actually charged to consumer for cash sales
- Discount should be taken into account if it is automatically given to all customers
- In a period of price control or rationing, where illegal prices are charged openly, such prices should be taken into account along with the controlled prices

The most difficult problem in practice is to follow principle. It is the problem of keeping the weights assigned and qualities of the basket of goods and services constant with a view to ensuring that only the effect of price change is measured. To conform to uniform qualities, the accepted method is to draw up detailed descriptions or specifications of the items priced for the use of persons furnishing or collecting the price quotations.

Since prices form the most important component of cost of living indices, considerable attention has to be paid to the methods of price collection and to the price collection personnel. Prices are collected usually by special agents, through mailed questionnaire, or in some cases through published price lists.

The greatest reliance can be placed on the price collection through special agents as they visit the retail outlets selected and collect the prices from them. However, these agents should be properly selected and trained and should be given a manual of instructions as well as manual of specifications of items to be priced.

Appropriate methods of price verification should be followed such as 'check pricing' in which price quotations are verified by means of duplicate prices obtained by different agents or 'purchase checking' in which actual purchases of goods are made.

After quotations have been collected from all retail outlets an average price for each of the items included in the index has to be worked out. Such averages are first calculated for the base period of the index and later every month if the index is maintained on a monthly basis.

The method of averaging the quotations should be such as to yield unbiased estimates of average prices as being paid by the group as a whole. This, of course, will depend upon the method of selection of retail outlets and also the scope of the index.

In order to convert the prices into index numbers the prices or their relatives must be weighted. The need for weighting arises because the relative importance of various items for different classes of people is not the same. For this reason, the cost of living index is always a weighted index.

While conducting the family budget enquiry the amount spent on each commodity by an average family is decided and these constitute the weights. Percentages of expenditure on the different items constitute the 'individual weights' allocated to the corresponding price relative and the percentage expenditure on the five groups constitute the 'group weights'.

3. Methods of Constructing the Index

Methods of constructing the Index:

After understanding the steps involved in constructing the cost of living index, let us now look at the various methods used in the construction of the index number. There are two methods followed:

- Aggregate expenditure method and
- Family budget method

Aggregate expenditure method:

When this method is applied, the quantities of commodities consumed by the particular group in the base year are estimated, which constitute the weights. The prices of the commodities for various groups or the current year are multiplied by the quantities consumed in the base year and the aggregate expenditure incurred in buying those commodities is obtained.

In a similar manner, the prices of the base year are multiplied by the quantities of the base year and aggregate expenditure for the base period is obtained. The aggregate expenditure of the current year is divided by the aggregate expenditure of the base year and the quotient is multiplied by 100.

Symbolically, consumer price index is equal to $\frac{\sum P_1 q_0}{\sum P_0 q_0} \times 100$.

This is the Laspeyres's method discussed earlier and is the most popular method for constructing the consumer price index.

Family budget method:

When this method is applied, the family budget of a large number of people for whom the index is meant are carefully studied and the aggregate expenditure of an average family on various items is estimated. These constitute the weights.

The weights are thus the value weights obtained by multiplying the prices by quantities consumed ($P_0 q_0$).

The price relatives for each commodity are obtained and these price relatives are multiplied by the value weights for each item and the product is divided by the sum of the weights. Symbolically, consumer price index is equal to $\frac{\sum P_1 \times V}{\sum P_0 \times V} \times 100$, where P is equal to $\frac{P_1}{P_0} \times 100$ for each item. And V is the value weights.

This method is the same as the weighted average of price relatives method discussed earlier. It should be noted that the answer obtained by applying the aggregate expenditure method and the family budget method shall be the same as the denominator and the numerator in both the methods is the same.

4. Precautions

Precautions while using the consumer index:

Quite often, the consumer price indices are misinterpreted. Hence, while using these indices the following points should be kept in mind:

- As pointed earlier, the consumer price index measures changes in the retail prices only in the given period compared to base period. It does not tell us anything about the variations in living standard at two different places
- Thus, if the cost of living index for working class for Bombay is Rs. 175 and for Delhi is Rs. 150 for the same period and for the same class of people, it does not necessarily mean that living costs are higher in Bombay compared to Delhi
- While constructing the index number it is assumed that the quantities of the base year are constant and hold good for the current year. However, this assumption does not appear to be very logical because the pattern of consumption goes on changing with change in fashion, introduction of new commodities in the market, etc. It is desirable that while constructing the index the current year quantities are taken into account.
- This index does not take into account the changes in qualities. Unlike changes in consumption pattern, changes in qualities of goods and services are more frequent. When marked changes in the quality of items occur, appropriate adjustments should be made to ensure that the index takes into account change in qualities also. However, in practice it is a difficult proposition to follow, and therefore, constant qualities are assumed at two different dates which again is a shaky assumption
- Like any other index, the consumer price index is based on a sample. While constructing the index, sampling is used at every stage – in the selection of commodities, in obtaining price quotations, selecting families for family budget enquiry, etc.
- The accuracy of the index hinges upon the use of sampling methods. The consumption pattern derived from the expenditure data of a sample of households covered in the family budget enquiry has to be representative of all the items in the average budget
- The localities from which the price data are collected have to be representative of all the localities from which the population group makes the purchases. The retail outlets from which the prices are collected have to be representative of all the retail outlets patronized by the population group, etc. However, it is often difficult to ensure perfect representativeness and in the absence of this, the index may fail to provide the real picture

5. Examples

Example 1:

Construct a cost of living index for the following indices. The weights being food-55, rent-20, clothing-15, fuel and lighting-15, and miscellaneous-5.

Figure 1

Year	Food	Rent	Clothing	Fuel & lighting	Miscellaneous
2006	100	100	100	100	100
2007	105	104	98	100	110
2008	110	112	102	101	115
2009	112	115	105	103	120

Solution:

Let us now discuss the construction of cost of living index numbers. Let us prepare the table.

Figure 2

Commodities	Weights	2007		2008		2009	
		Index	Weighted relatives	Index	Weighted relatives	Index	Weighted relatives
Food	55	105	5775	110	6050	112	6160
Rent	20	104	2080	112	2240	115	2300
Clothing	15	98	1470	102	1530	105	1575
Fuel & Lighting	15	100	1500	101	1515	103	1545
Miscellaneous	5	110	550	115	575	120	600
Total	$\Sigma W = 110$		$\Sigma WI = 11375$		$\Sigma WI = 11910$		$\Sigma WI = 12180$

The first column indicates the commodities like the food, rent, clothing, fuel & lighting and miscellaneous. The second column is the weights 55, 20, 15, 15 and 5. The third and fourth columns will indicate the index and weighted relatives for the year 2007. Similarly, fifth and sixth columns indicate the index and weighted relatives for the year 2008. The seventh and eighth columns will indicate the index and weighted relatives for the year 2009. Now, let us take the total of all the weighted relatives that is eleven thousand three hundred and seventy five for 2007, eleven thousand nine hundred and ten for the year 2008 and twelve thousand one hundred and eighty for the year 2009.

Now, let us calculate the cost of living index for 2007 as summation of weighted relatives which is equal to eleven thousand three hundred and seventy five by summation of weights which is equal to 110 which is equal to hundred and three point four one. Similarly, the cost of living index for 2008 is equal to eleven thousand nine hundred and ten by 110 which is equal to hundred and eight point two seven and the cost of living index for 2009 is equal to twelve thousand one hundred and eighty divided by 110 is equal to hundred and ten point seven three.

Example 2:

Calculate the cost of living index using the weighted geometric mean.

Figure 3

Group	Index number	Weights
Food	350	10
Fuel & lighting	150	2
Clothing	200	2
House rent	150	2
Miscellaneous	225	4

Solution:

Let us prepare the table for getting the various values.

Figure 4

Groups	Index number	Weights	Log I	logIW
Food	350	10	2.5441	25.4410
Fuel & lighting	150	2	2.1761	4.3522
Clothing	200	2	2.3010	4.6020
House rent	150	2	2.1761	4.3522
Miscellaneous	225	4	2.3522	9.4088
Total		$\Sigma W = 20$		$\Sigma \log IW = 48.1562$

In column one, we represent the groups, the second column is the values of the index numbers 350, 150, 200, 150 and 225. The third column is the weights 10, 2, 2, 2, and 4. Now, let us take the log of the index numbers, which are 2.5441, 2.1761, 2.3010, 2.1761 and 2.3522 in the fourth column. Now, multiplying it with the weights, we will get log IW which is equal to 25.4410, 4.3522, 4.6020, 4.3522 and 9.4088. The total of this column is equal to 48,1562.

Let us calculate the cost of living index, which is equal to antilog of summation log IW divided by summation W, which is equal to antilog of 48,1562 divided by 20, which is equal to antilog of 2.4078 is equal to 225.8

Here's a summary of our learning in this session, where we have understood :

- The method of constructing index numbers using
- The concept of cost of living index
- The steps in constructing the cost of living index
- The methods used in construction of cost of living index
- The precautions taken in cost of living index