

Ans.

(a) Fixed base index numbers

Fixed base index numbers are those for which the base period with which we compare the other time period remains fixed with progress of time. The weighted index numbers like Laspeyres's index number, Paiche's index number, Fisher's index number are all examples of fixed base indices.

(b) Chain base index number

In the construction of index number it should be noted that the time gap between the current and base period should not be too large. Because in that case many old commodities may disappear from the market and newer commodities may enter into the market. Besides, the quality of the commodities may enter into the market. Besides, the quality of the commodities may undergo a change. Also relative importance of various commodities being depended on the tastes and habits of the consumers may change.

In such a case it will not be possible to construct a fixed base index number.

In such cases we take recourse to chain-base index numbers.

Here we consider a number of periods say 1, 2, 3, ..., $n-1$ between the base period 0 and current period n . In that case it would be possible to construct the indices $I_{01}, I_{12}, \dots, I_{n-1, n}$ which are the indices for the period 1 with base 0, period 2 with base 1, ..., period n with base $n-1$ respectively. Finally ~~the~~ the index number for the period n with 0 as base is obtained by multiplication the indices $I_{01}, I_{12}, \dots, I_{n-1, n}$. This method is called linking. Accordingly the index number is called ~~is~~ chain index ~~o~~ for the period n with 0 as base and is given by

$$I'_{0n} = I_{01} \times I_{12} \times \dots \times I_{n-1, n}$$

chain base index numbers in general will be slightly different from the fixed base index numbers.

Advantages and disadvantages of chain

base index

i) As the gap between current period and base period increases, chain base index is considered more accurate than fixed base index. The argument is that chain base method unlike the fixed base method uses most of the information with regard to price and quantity changes in the intervening years between the base year and the current year.

ii) If the time gap is not too large, fixed base is preferred over chain base.

iii) Chain base index number is not considered suitable, because of the fact that if the indices $I_0, I_1, \dots, I_{n-1}, I_n$ are subjected to errors and in chain base index these errors appear in magnified form.

iv) Fixed base index numbers are generally easier to calculate and are more easily understood than chain base index numbers.

(c) Criteria of a good index number

A good index number should satisfy the following tests:

(i) The time reversal test (TRT)

According to TRT if we interchange the time subscript of index numbers the resulting index should be the reciprocal of the original index. Thus if I_{01} is the price index for period '1' with '0' as base then according to TRT

$$I_{01} \times I_{10} = 1$$

It can be shown that Laspeyres' and Pache's index do not satisfy TRT, but Marshall-Edgeworth and Fisher's indexes do.

(ii) The factor reversal test

According to this test when price index I_{01}^P is multiplied by quantity index I_{01}^Q (obtained from price index by interchanging price and quantity factors) the result should be the value index. Thus

according to FRT

$$I_{01}^P \times I_{01}^Q = V_{01}$$

$$\text{where } V_{01} = \frac{\sum P_{ij} Q_{ij}}{\sum P_{0i} Q_{0i}}$$

None except Fisher's index number statistics this test. Since Fisher's index number statistics both TRT and FRT, it is known as ideal index.