INDEX NUMBERS
Course B.COM
semester – II
Paper Code –CC203

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INDEX NUMBERS: INTRODUCTION

- The value of money does not remains constant over time. It rises or falls and is inversely related to the change in the price levels.
- Changes in the general price levels can be measured by a statistical device known as “index number.”
- An index number is the measure of change in a variable (or group of variables) over time.

Introduction continued…

- Index numbers are one of the most used statistical tools in economics.
- Index numbers are not directly measurable, but represent general, relative changes.
- Index numbers are typically expressed as percents.

CHARACTERISTICS:

- Index numbers are specialised averages unlike mean, median and mode.
- The technique of index numbers measures changes in one variable or group of related variables.
- Index numbers measure the effect of changes over a period of time.
- Index numbers measures the change in the level of a phenomenon.
- Index numbers are meant to study the changes in the effects of such factors which cannot be measured directly.

TYPES OFINDEX NUMBER:

Index numbers are broadly classified into following three types:

(1) Price index numbers
(2) Quantity index numbers
(3) Value index numbers

PRICE INDEX NUMBERS:

- Price index compares changes in price from one period to another or from one place to another.
- These are used in studying price movements.
- They are the most frequently used index numbers.
- Example: Price of saree in Delhi and price of saree in Bihar will represent the change in prices from one place to another.

QUANTITY INDEX NUMBERS:

- Quantity index number measures the changes in the quantity of goods produced, consumed or marketed during given period of time with reference to base period.
- It represents change in number of items rather than price of items
- Example: number of sarees purchased by average women in a year in Delhi and in Bihar or in 2020 with reference to 2010.

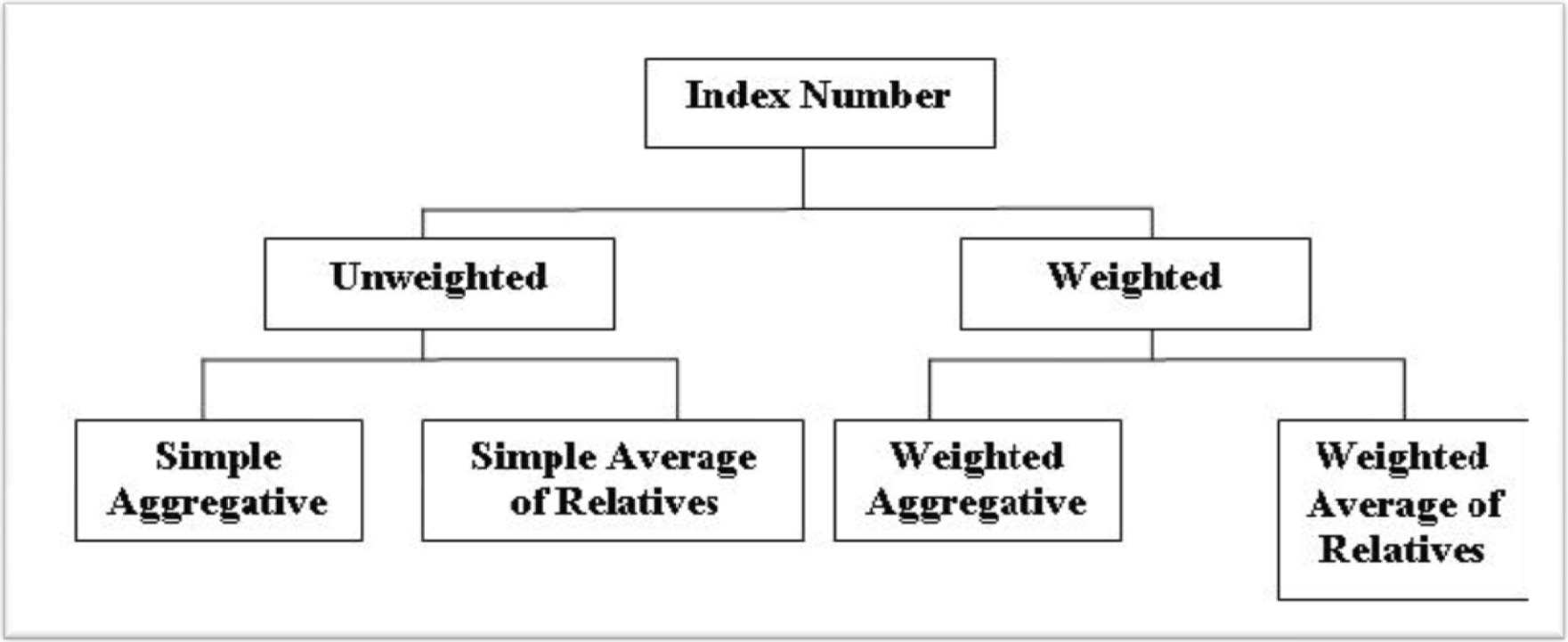
VALUE INDEX NUMBERS:

- Value index number measures the changes in the monetary value of the transaction, consumption or sale during a given period with reference to base period.
- It represents change in value which includes both price as well as quantity.
- Example: total expenditure of average women of Delhi and Bihar on saree will give value index number.

PROBLEMS IN THE CONSTRUCTION OF INDEX NUMBERS:

(1) The purpose of the index.
(2) Availability and comparability of data.
(3) Selection of base period.
(4) Selection of number of items.
(5) Price quotations.
(6) Choice of an average.
(7) Selection of appropriate weights.
(8) Selection of an appropriate formula.

METHODS OF CONSTRUCTING INDEX NUMBERS:



UNWEIGHTED: SIMPLE AGGREGATIVE METHOD–

- It expresses the aggregate price of all commodities in the current year as a percentage of aggregate price in the base year.
- Formula – $P_{01} = \frac{\Sigma_{P1}}{\Sigma_{P0}} \times 100$

UNWEIGHTED: SIMPLEAVERAGE OF RELATIVES METHOD–

- Under this method price relatives are obtained for the various items included in the index and then an average of these relatives is obtained using any one of the measures of central tendency, i.e, arithmetic mean, median, mode, geometric mean or harmonic mean.
- Formula using arithmetic mean–

$$P_{01} = \frac{\sum\left(\frac{p_1}{p_0} \times 100\right)}{N}$$

WEIGHTED AGGREGATIVE METHOD:

- These index numbers are of simple aggregative type with fundamental difference that weights are assigned to the various items included in the index.
- Some of important formulas for constructing index numbers are:

(1) Laspeyre's Price Index

(2) Paasche's Price Index

(3) Fisher's ideal Price Index

WEIGHTED AGGREGATIVE METHOD CONTINUED…

- Laspeyres Method- In this method the base year quantities are taken as weights.

$$P_{01} = \frac{\sum p_1 q_1}{\sum p_0 q_0} \times 100$$

- Paasches Method- In this method the current year quantities are taken as weights.

$$P_{01} = \frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$$

- Fisher's Ideal Method- In this method both current year as well as base year prices and quantities are taken into consideration.

$$P_{01} = \sqrt{\frac{\Sigma p_1 q_0}{\Sigma p_0 q_0} \times \frac{\Sigma p_1 q_1}{\Sigma p_0 q_1}} \times 100$$

WEIGHTED AVERAGE OF RELATIVE INDEX NUMBERS:

- To overcome the disadvantages of simple average of relative methods we use weighted average of relative methods under which weights are assigned based on the relative importance of a commodity within the group of given commodities.
- Formula –

$$P_{01} = \frac{\Sigma PV}{\Sigma V}$$

Where P= price relative

V=Value weights, i.e., p_0q_0

ADVANTAGES AND USES OF INDEX NUMBERS:

- help in framing suitable policies.
- reveal trends and tendencies.
- useful in deflating.
- help in measuring the changes in the value of money.
- facilitates comparison.
- helps in analysing the markets.

LIMITATIONS OF INDEX NUMBERS:

- Do not cover all commodities .
- Do not cover retail transactions.
- Does not facilitates international comparison.
- May not give true picture due to the effect of time.
- Limited use.
- Unscientific weightage.

THANK YOU