STATISTICS

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MEANING

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DEFINITION BY SPIEGEL

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An index number, therefore, is a statistical device for measuring changes in the magnitude of a group of related variables during a specific period in comparison to their level on some other period. i.e. index numbers measure changes in group of related variables over time.

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CHARACTERISTICS OF INDEX NUMBERS

- Index numbers are specialised averages.i.e. we consider different types of items, units, price quotations, etc.

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IMPORTANT USES OF INDEX NUMBERS

- Index numbers measure changes in price level.

- Index numbers are indicators of inflationary or deflationary tendencies. Index numbers are useful to arrive at the real value of money or purchasing power of money.

- Index numbers can be used to make measuring adjustments in wages of employees. When there is increase in cost of living index number the wages of workers are also to be increased accordingly.

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INDEX NUMBERS ARE ECONOMIC BAROMETERS

- Barometer is an instrument which is used for recording the changes in atmospheric pressure.

- Wholesale price index numbers record the changes in the price level of a country.

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- Index numbers are specialised type of average that they are subject to all limitations also which an average suffers.

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PROBLEMS IN CONSTRUCTING INDEX NUMBERS

- Purpose of index :- If not properly defined, would lead to confusions.
- Selection of the base period :- If not properly chosen, IN will be useless.
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SIMPLE AND WEIGHTED INDEX NUMBERS

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Simple Index numbers are those in the calculation of which all the items are treated equally important. No item has importance than other.

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MEANING OF THE TERM WEIGHT

- Weight refers to the relative importance of the item.
- The system of weighing may be arbitrary or rational.
- In arbitrary way, the statistician is free to assign weights.
- In rational weighing some criteria have been fixed for assigning weights.
- The weights may be on the basis of the value or quantity purchased, consumed or sold.
- When quantity forms the basis, it is called 'Quantity weighing' and in case of value, it is called 'Value weighing'.

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PRICE INDEX NUMBER

Price index numbers measure changes in the price of a commodity for a given period.

EXAMPLE
Wholesale Price Index Number, cost of living index number, etc.

METHODS FOR CONSTRUCTION OF PRICE INDEX NUMBER
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Simple index numbers are those index numbers in which all items are treated equally.

There are two methods available:

- Simple Aggregate Method
- Simple Average Price Relative Method.

SIMPLE AGGREGATE METHOD

Index Number $(P_{01}) = \dfrac{\sum P_1}{\sum P_0} \times 100$

where P_1 and P_2 are price for the current year and price for the base year.

EXAMPLE

Construct index number for 2015 on the basis of price of 2010.

Commodities	Price of 2010 (P_0)	Price of 2015 (P_1)
A	115	130
B	72	89
C	54	75
D	60	72
E	80	105
Sum	$\sum P_0 = 381$	$\sum P_1 = 471$

$$\text{Index Number } (P_{01}) = \frac{\sum P_1}{\sum P_0} \times 100 = \frac{471}{381} \times 100 = 123.62$$

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2. SIMPLE AVERAGE PRICE RELATIVE METHOD

Here Index number corresponding to each item is found out first and then average is taken.

$$\text{Price Index Index Number} = \frac{\sum I}{N}$$

Where 'I' $= \dfrac{P_1}{P_0} \times 100$ for each item and 'N' is the total number of items.

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EXAMPLE

Calculate simple index number by average relative method.

Items	Price in Base Year	Price in Current Year
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SOLUTION

Items	Price in Base Year	Price in Current Year	$I = \dfrac{P_1}{P_0} \times 100$
A	5	7	140
B	10	12	120
C	15	25	166.7
D	20	18	90
E	8	9	112.5
N=5			$\sum I = 629.2$

$$\text{Index Number} = \frac{\sum I}{N} = \frac{629.2}{5} = 125.84$$

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