UNIT - 3
(INTRODUCTION TO INDEX NUMBER)

Introduction to index numbers

Points to remember

-- An index number is a statistical device for measuring changes in the magnitude of a group of related variables.

* Features of Index Numbers

-- Index numbers are expressed in terms of percentages. However, percentage sign (%) is never used.

-- Index numbers are relative measurement of group of data.

-- Index numbers offer a precise measurement of the quantitative change in the concerned variables over time.

-- Index numbers shows changes in terms of averages.

* Types of Index numbers

(i) Wholesale price index (WPI)

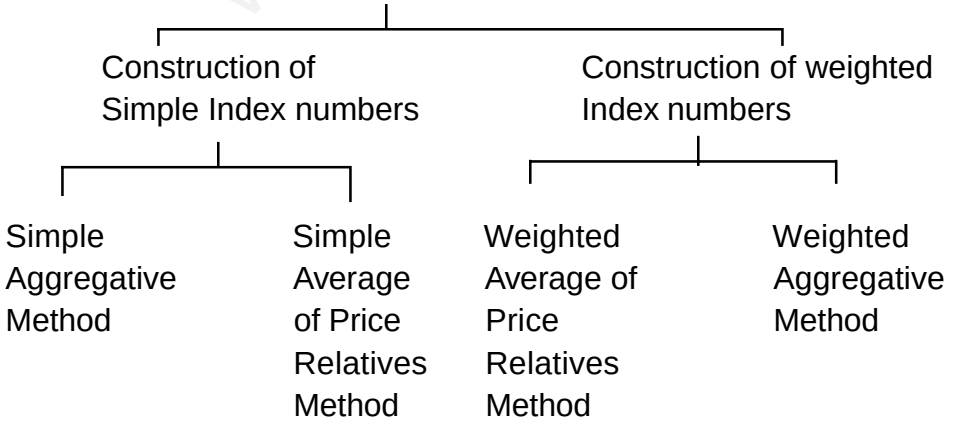
(ii) Consumer price index (CPI) or Cost of living index

(iii) Index of industrial production (IIP)

(iv) Index of Agricultural production (IAP)

(v) Sensex

* Methods of constructing index numbers



-- Simple aggregative method :

$$P_{01} = \frac{\Sigma P_1}{\Sigma P_0} \times 100$$

Here, P_{01} = Price index of the current year

ΣP_1 = Sum of the prices of the commodities in the current year

ΣP_o = Sum of the prices of the commodites in the base year.

-- Current year : Current year is the year for which average change is to be measured or index number is to be calculated.

-- Base Year : Base year is the year of reference from which we want to measure extent of change in the current year. The index number of base year is generally assumed to be 100.

-- Simple average of price Relatives method :

$$P_{01} = \frac{\Sigma\left(\frac{P_1}{P_0} \times 100\right)}{N}$$

Here,

P_o1 = Price index of the current year

$\frac{P1}{P_o} \times 100$ = Price relatives

N = Number of commodities

-- Weighted average of price relatives method :

$$P_o1 = \frac{\Sigma RW}{\Sigma W}$$

Here,

P_o1 = Index number for the current year

W = Weight

R = Price relatives i.e. $\frac{P1}{P_o} \times 100$

-- Weighted Aggregative method

(i) Laspeyre's Method :

$$P_{01} = \frac{\Sigma P_1 q_o}{\Sigma P_o q_o} \times 100$$

(ii) Paasche's method :-

$$P_{01} = \frac{\Sigma P_1 q_1}{\Sigma P_o q_1} \times 100$$

* Some Important Index numbers

(i) Consumer price index (CPI) : CPI is also known as the cost of living index, measures the average change in retail prices.

* Methods of Constructing CPI

(A) Family budget method :

$$CPI = \frac{\Sigma WR}{\Sigma W}$$

Here, $R = \frac{P_1}{P_o} \times 100$

W = Weights

(B) Aggregative expenditure method :

$$CPI = \frac{\Sigma P_1 q_o}{\Sigma P_o q_o} \times 100$$

(ii) Wholesale price index (WPI) : WPI

Indicate the change in the general price level.

(iii) Index of industrial production (IIP) :

IIP is used to measure the relative increase or decrease in the level of industrical production.

$$IIP_{o1} = \frac{\Sigma\left(\frac{q_1}{q_o}\right)w}{\Sigma w}$$

Here, q_1 = Level of production in the current year

qo = Level of production in the base year

W = Weight

(iv) Index of agricultured production (IAP) :

IAP is used to study the rise and fall of the yield of principal crops from one period to other period.

(v) Sensex : Sensex is the short form of Bombay stock exchange sensitive index with 1978-79 as base. It is the benchmark index for the Indian stock market. It consists of 30 stocks which represent 13 sectors of the economy and the companies listed are the leaders in their respective industries.

* Problems in construction of index numbers

(i) Purpose of index number

(ii) Selection of base year

(iii) Selection of items.

(iv) Selection of the prices of items.

(v) Selection of method of weighting

(vi) Selection of sources of data

(vii) Choice of an average.

(viii) Choice of method.

* Uses of index numbers :

(i) To measure the purchasing power of money.

(ii) Knowledge of change in standard of living.

(iii) Adjustment in salaries and allowances.

(iv) Help in framing suitable policies.

(v) As economic barometers.

* Inflation and index numbers.

-- Inflation is described as a situation characterised by a sustained increase in the general price level.

-- Generally, inflation is measured in terms of wholesale price index.

-- Rate of inflation = $\frac{A_2 - A_1}{A_1} \times 100$

Here, A_1 = WPI for week first (1)

A_2 = WPI for week second (2)

VERY SHORT ANSWER TYPE QUESTIONS.
ONE MARK QUESTIONS

1. What do you mean by index numbers?
2. State two categories of price index jumbers.
3. Define base year.
4. Name the consumer groups for which CPI is computed.
5. What is price relative?
6. Give Laspeyre's formula for weighted index number.
7. Where can we get some important index numbers such as CPI, WPI IIP etc.?
8. Write the formula for calculating index of industrial production.
9. How many types of CPI are constructed in India?
10. Define current year.
11. What is the difference between simple index number and weighted index numbers?
12. Give the formula to calculate the rate of inflation.
13. Which sign is used to indicate the price index number?
14. What does wholesale price index indicate?
15. Give Paasche's formula for weighted index number.
16. Which index number is known as cost of living index?
17. Mention the weight of primary articles in wholesale price index.
18. In how many groups all the commodities are classified for WPI?
19. Mention the weightage of different groups in index of industrial production.
20. Which index number is generally used to measure inflation?
21. Which change is measured in consumer price index?
22. Which item having the highest weight in CPI for industrial worker?
23. In which index number there is a relative importance of the items?

SHORT ANSWER TYPE QUESTIONS.
3/4 MARKS QUESTIONS

1. State three difficulties of constructing index numbers.
2. What are the desirable properties of the base period?
3. Why do we need an index number?
4. Write a short note on inflation and index numbers.
5. Why is it essential to have different CPI for different categories of consumers?
6. Mention the difficulties in construction of consumer price index.
7. What is the difference between a price index and a quantity index?
8. Define index number. State its utility.
9. What does an index of industrial production measure? Give formula to calculate IIP.
10. Calculate price index number for 2004 taking 1994 as the base year from the following data by simple aggregative method:

Commodities :	A	B	C	D	E
Price in 1994 (in Rs.)	100	40	10	60	90
Price in 2004 (in Rs.)	140	60	20	70	100

(Ans. 130)

11. Construct an index number for year 2005 taking 2000 as the base year from the following data by simple average of price relative method:

Commodities :	A	B	C	D	E
Price in 2000 (in Rs.)	100	80	160	220	40
Price in 2005 (in Rs.)	140	120	180	240	40

(Ans. 122.32)

12. Calculate weighted average of price relative index number of prices for 2010 on the basis of 2004 from the following data :

Goods	Weight	Price 2004 (Rs.)	Price 2010 (Rs.)
Wheat	20	20	35
Rice	12	15	18
Milk	8	10	11
Ghee	4	5	5
Sugar	6	4	5

(Ans. 139.4)

13. Calculate price index number from the following data using Laspeyre's method:

Commodity	Base year		Current year	
	Price Rs.	Quantity	Price Rs.	Quantity
A	8	100	10	120
B	4	60	5	80
C	10	20	12	25
D	12	25	15	30
E	3	5	4	6

(Ans. 124.44)

14. From the data given below, construct Paasche's price index:

Commodity	Base year		Current year	
	Price Rs.	Quantity	Price Rs.	Quantity
A	4	2	6	3
B	3	5	2	1
C	8	2	4	6

(Ans. 69.84)

15. An enquiry into the budgets of the middle class families in a certain city gave the following information :

Expenses On items	Food 35%	Fuel 10%	Clothing 20%	Rent 15%	Misc. 20%
Price (Rs.) in 2004	1500	250	750	300	400
Price (Rs.) in 1995	1400	200	500	200	250

What is the cost of living index during the year 2004 as compared with 1995?

(Ans. 134.49)

16. From the data given below construct the consumer price index number :

Commodity	Price Relatives	Weights
Food	250	45
Rent	150	15
Clothing	320	20
Fuel and lighting	190	5
Miscellaneous	300	15

(Ans. 253.5)

LONG ANSWER TYPE QUESTIONS.
6 MARKS QUESTIONS

1. Explain the problems involved in the construction of index numbers.
2. Discuss the various uses of index numbers.
3. Discuss the features of index numbers.
4. Give the meaning of whole sale price index numbers. Discuss the utility of WPI.
5. Write short notes on :
   (a) Base year
   (b) CPI
   (c) WPI
   (d) IIP
6. What do you meant by index numbers?
   Discuss the importance of index numbers.
7. Calculate the cost of living index from the following data :

Item	Qty. consumed in the given year	Price per unit (Rs.)	
		Base year	Given year
Rice	2.5 qt x 12	12	25
Pulses	3 kg. x 12	0.4	0.6
Oil	2 L x 12	1.5	2.2
Clothing	6 metres x 12	0.75	10
Housing	12 months	20 per month	30 per month
Miscellaneous	Expenditure of 12 month	10 per month	15 per month

(Ans. 252.8)

8. Define consumer price index number.
   Explain the uses of consumer price index numbers.

ANSWERS OF ONE MARK QUESTIONS

1. An index number is a statistical device for measuring changes in the magnitude of a group of related variables.
2. (a) Simple index numbers
   (b) Weighted index numbers.
3. Base year is the year of reference from which we want to measure extent of change in the current year.
4. There the three consumer group for which CPI is computed :
   (i) CPI for industrial worker
   (ii) CPI for urban non manual employees
   (iii) CPI for agricultural labourers.
5. A price relative is the percentage ratio of the value of a variable in the current year to its value in the base year.
6. $$P_{01} = \frac{\Sigma P_1 q_0}{\Sigma P_o q_0} \times 100$$
7. Economic survey
8. $$IIP_{o1} = \frac{\Sigma \left(\frac{q_1}{q_o}\right) w}{\Sigma W} \times 100$$
9. There are three types of CPI.
   (i) CPI (IW)
   (ii) CPI (UNME)
   (iii) CPI (AL)
10. Current year is the year for which average change is to be measured or index number is to be calculated.
11. In simple index number, all items of the series are accorded equal weightage or importance but in weighted index number different items of the series are accorded different weightage, depending upon their relative importance.

12. Rate of inflation = $\frac{A_2 - A_1}{A_1} \times 100$

Here, A_1 = WPI for week first (1)

A_2 = WPI for week second (2)

13. P_{01}

14. WPI indicates the change in the general price level.

15. $P_{01} = \frac{\Sigma P_1 q_1}{\Sigma P_0 q_1} \times 100$

16. Consumer price index (CPI)

17. 22.02 % (or) 22%

18. Three

19.

	Groups	Weightage
(i)	Mining	10.47
(ii)	Manufacturing	79.36
(iii)	Electricity	10.17

20. Wholesale price index number

21. Retail prices

22. Food

23. Weighted index numbers.