

Sol

q_0	p_0	q_1	p_1	$p_1 q_0$	$p_0 q_0$	$p_1 q_1$	$p_0 q_1$
10	3	8	3.25	32.50	30	26	24
20	15	15	20	400	300	300	225
2	25	23	23	46	50	69	75
				478.50	380	395	324

(a) Laspeyre's Method :

$$\begin{aligned} P_{01}(L_a) &= \frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100 \\ &= \frac{478.50}{380} \times 100 \\ &= 125.9 // \end{aligned}$$

(b) Paasche's Method

$$\begin{aligned} P_{01}(P_a) &= \frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100 \\ &= \frac{395}{324} \times 100 \\ &= 121.9 // \end{aligned}$$

(c) Bowley Method.

$$P_{01}(Bo) = \frac{\frac{\sum p_1 q_0}{\sum p_0 q_1} \times \frac{\sum p_1 q_1}{\sum p_0 q_1}}{2} \times 100$$

$$= \frac{\frac{478.50}{380} + \frac{395}{324}}{2} \times 100$$

$$= 123.9 //$$

(d) Fisher's Ideal Formula.

$$P_{01}(Fis) = \sqrt{\frac{\sum p_1 q_0}{\sum p_0 q_0} \times \frac{\sum p_1 q_1}{\sum p_0 q_1}} \times 100$$

$$= \sqrt{\frac{478.50}{380} \times \frac{395}{324}} \times 100$$

$$= 123.9 //$$

(e) Marshall Edgeworth method

$$P_{01}(Ma) = \frac{\sum p_1 q_0 + \sum p_1 q_1}{\sum p_0 q_0 + \sum p_0 q_1} \times 100$$

$$= \frac{478.50 + 395}{380 + 324} \times 100$$

$$= 124 //$$

2) Weighted average of price relative:-

Price relative is not calculated by the weighted aggregate method. If we know the values consumed in the base year, then we can construct the weighted index number according to the weighted average of relative method.

$$\therefore P_{01} = \frac{\left(\frac{P_1}{P_0} \times P_0 Q_0 \right)}{\sum P_0 Q_0} \times 100.$$

Quantity Index Number

The quantity index number permit comparison of the physical quantity of goods produced, consumed or distributed.

* Laspeyre's Method; $Q_d = \frac{\sum Q_1 P_0}{\sum Q_0 P_0} \times 100$

* Paasche's Method; $Q_{01} = \frac{\sum Q_1 P_1}{\sum Q_0 P_1} \times 100$

* Fisher's Method; $Q_{01} = \sqrt{\frac{\sum Q_1 P_0}{\sum Q_0 P_0} \times \frac{\sum Q_1 P_1}{\sum Q_0 P_1}} \times 100.$

* Chain Base Index Number (CBI Number)

The following formula is used for finding out the chain index:

$$\text{Chain Index} = \frac{\text{Link Relative of Current Year} \times \text{Previous year Chain Index}}{100}$$

Construction of chain Indices

Step 1: Link relatives are found out by stating the figures for each year as percentages of the preceding year; i.e., the link relative is equal to

$$\frac{\text{Current Year's price}}{\text{Previous year's price}} \times 100$$

Step 2: Link together these percentages by successive multiplication to get link relatives.

Step 3: Chain index for current year

$$= \frac{\text{Average link relative of current year} \times \text{chain index of previous year}}{100}$$

Problem

- 1) Convert the following fixed base index number into chain base index number.

Year :	1986	1987	1988	1989	1990	1991
FBI :	376	392	408	380	392	400

Sol

$$\text{Link Relative (L.R)} = \frac{\text{Current Year}}{\text{Previous Year}} \times 100$$

$$\text{Chain Index (C.I)} = \frac{\text{L.R of Current Year} \times \text{C.I of Previous Year}}{100}$$

Year	F.B.I	L.R	C.I
1986	376	-	376
1987	392	$\frac{392}{376} \times 100 = 104.26$	$\frac{376 \times 104.26}{100} = 392$
1988	408	$\frac{408}{392} \times 100 = 104.08$	$\frac{392 \times 104.08}{100} = 408$
1989	380	$\frac{380}{408} \times 100 = 93.14$	$\frac{408 \times 93.14}{100} = 380$
1990	392	$\frac{392}{380} \times 100 = 103.16$	$\frac{380 \times 103.16}{100} = 392$
1991	400	$\frac{400}{392} \times 100 = 102.04$	$\frac{392 \times 102.04}{100} = 400$