Quantity Index Numbers (Q_{01})

Ques (1) Calculate Paasche's and Laspeyre's Quantity Index from the following data

Commodity	Quantity (unit)		Values in Rs	
	1995	1999	1995	1999
A	100	150	500	900
B	80	100	320	500
C	60	72	120	360
D	30	33	360	297

Solution: Value = Price × Quantity $\Rightarrow$ Price $= \dfrac{\text{Value}}{\text{Quantity}}$

Commodity	v_0	q_1	$p_0 q_0$	$p_1 q_1$	p_0	p_1	$p_1 q_0$	$p_0 q_1$
A	100	150	500	900	5	6	600	750
B	80	100	320	500	4	5	400	400
C	60	72	120	360	2	5	300	144
D	30	33	360	297	12	9	270	396
			$\Sigma p_0 q_0$ = 1300	$\Sigma p_1 q_1$ = 2057			$\Sigma p_1 q_0$ = 1570	$\Sigma p_0 q_1$ = 1690

Paasche's Quantity Index $Q_{01} = \dfrac{\Sigma q_1 p_1}{\Sigma q_0 p_1} \times 100 = \dfrac{2057}{1570} \times 100 = 131.02$

Laspeyre's Quantity Index $Q_{01} = \dfrac{\Sigma q_1 p_0}{\Sigma q_0 p_0} \times 100 = \dfrac{1690}{1300} \times 100 = 130$ **Ans**

Value Index Numbers (V_{01})

$$V_{01} = \frac{\Sigma p_1 q_1}{\Sigma p_0 v_0} \times 100 = \frac{\Sigma v_1}{\Sigma v_0} \times 100$$

ΣV_1 = Total value of all items in the given period

Σv_0 = Total value of same items in base period.

Test of consistency or adequacy

Used to select most suitable method in a given condition

(I) Unit Test: Method must be independent from the units in which price and quantities are quoted.

Note: Except simple aggregate method all the method satisfies this test.

(II) Time Reversal Test: $P_{01} \times P_{10} = 1$ (omitting the factor 100)

Note: Laspeyre's and Paasche's method does not satisfied time reversal test.

(III) Factor Reversal Test: $P_{01} \times Q_{01} = \dfrac{\Sigma p_1 q_1}{\Sigma p_0 q_0}$

Note: This factor reversal test is satisfied only by Fisher's Ideal Index.

(IV) Circular Test: $P_{01} \times P_{12} \times P_{20} = 1$

Note: Simple aggregate method, Kelly's method satisfies the circular Test.

Note: Fisher's Ideal Index satisfies both time reversal and factor reversal Test.