

Fourth: Relative Weighted Average of Price Index Number

1- Laspeyres Method of Relatives Average (Price Index)

This index is a simple aggregate price index, but weighted by the base year values.

$$I_{LW} = \left(\frac{\sum \left(\frac{p_1}{p_0} \right) * (W)}{\sum W} \right) * 100$$

$$W = p_0 q_0$$

Economic Interpretation

Economically, this indicator:

Assumes that all prices within the aggregate move as a single unit.

Then, it weighs this movement against the spending structure in the base year.

It does not differentiate between the behavior of individual goods.

Example (Common Iraqi Goods)

We compare **2020 (base year)** with **2024 (current year)**.

EX12:

Commodity	(P ₀)	(Q ₀)	(P ₁)
Rice (kg)	1,500	100	2,400
Oil (liter)	2,500	60	4,000
Sugar (kg)	1,000	120	1,800
Gas (cylinder)	12,000	15	18,000

Commodity	Weight (W)
Rice	(1500 * 100 = 150,000)
Oil	(2500 * 60 = 150,000)

Commodity	Weight (W)
Sugar	(1000 * 120 = 120,000)
Gas	(12000 * 15 = 180,000)

$$\sum W = 150000 + 150000 + 120000 + 180000 = 600000$$

EX13:Price Relatives

Commodity	(R _i)	W	(R _i * W)
Rice	2400/1500 * 100=160	150,000	24,000,000
Oil	4000/2500 * 100=160	150,000	24,000,000
Sugar	1800/1000 * 100=180	120,000	21,600,000
Gas	18000/12000 * 100=150	180,000	27,000,000

$$\sum \left(\frac{p_1}{p_0}\right) * W = 24000000 + 24000000 + 21600000 + 27000000 = 96600000$$

$$I_{LW} = \left(\frac{\sum \left(\frac{p_1}{p_0}\right) * (W)}{\sum W} \right) * 100 = \left(\frac{96600000}{600000} \right) * 100 = 161\%$$

Interpretation

The price level (weighted by base-year values) increased by:

$$161 - 100 = 61\%$$

Important quick check:

This result is equivalent to the **Laspeyres aggregative price index**, which confirms the correctness of the calculation

$$I_L = (C_1/C_0) * 100 = \left(\frac{\sum p_1 q_0}{\sum p_0 q_0} \right) * 100$$

$$\sum p_1 q_0 = 2400(100) + 4000(60) + 1800(120) + 18000(15) = 966000$$

$$I_L = (966000/600000) * 100 = 161$$

Exactly the same result.

If you want, I can give you a second example where the weights (base-year values) are very unequal, so the effect of weighting appears more clearly.

Ex14: (Iraqi goods – with a large difference in weights).

Example (Iraqi goods – large difference in weights)

Commodity	(P₀)	(Q₀)	(P₁)
Bread (loaf pack)	500	600	700
Tomatoes (kg)	800	200	1600
Petrol (liter)	450	1200	750
Chronic medicine (box)	25,000	12	40,000

Interpretation:

Prices (weighted by base-year values) increased by about:

$$163.1 - 100 = 63.1\%$$

Agricultural Question

EX15:Question

The following data are for agricultural crops between 2020 and 2024:

Crop	(P ₀)	(Q ₀)	(P ₁)
Wheat (ton)	300	40	420
Barley (ton)	200	60	260
Tomatoes (ton)	250	20	500
Potatoes (ton)	180	30	240

Calculate the **Laspeyres Price Index** for 2024 relative to 2020 and interpret the result.

Solution

2- Paasche Method of Relatives Average (Price Index)

It is: a simple aggregate index of prices, but weighted by the values of the comparison year (Pasch method).

$$I_{PW} = \left(\frac{\sum \left(\frac{p_1}{p_0} \right) * (W)}{\sum W} \right) * 100$$

where the weight is:

$$W = p_1 q_1$$

Economic Interpretation

Economically, this indicator assumes that:

Prices move as a single group.

The structure of modern consumption (comparative year) is the basis.

There is no differentiation between goods in terms of individual price changes.

EX16: We have the following data for three commodities in two years:

2020 = base year, 2024 = current year.

Commodity	(P ₀)	(P ₁)	(Q ₁)
Wheat	300	450	120
Oil	2,000	3,600	50
Medicine	10,000	15,000	30

Step 1: Calculate price relatives Ri

Commodity	Calculation	Ri
Wheat	$(450/300 * 100)$	150
Oil	$(3600/2000 * 100)$	180
Medicine	$(15000/10000 * 100)$	150

Commodity	(P ₁ × Q ₁)	(P ₁ × Q ₁)*Ri
Wheat	$(450 * 120 = 54000)$	8,100,000
Oil	$(3600 * 50 = 180000)$	32,400,000
Medicine	$(15000 * 30 = 450000)$	67,500,000

$$8,100,000 + 32,400,000 + 67,500,000 = 108,000,000$$

$$I_{PW} = \left(\frac{108,000,000}{684000} \right) * 100 = 157.9\%$$

Economic interpretation (typical):

This means that the price level, after being weighted by the current consumption basket (current-year values), increased by about:

$$158 - 100 = 58\% \quad 158 - 100 = 58\% \quad 158 - 100 = 58\%$$

In other words, the real inflation faced by the current consumer is about **58%**

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