



Laspeyres-type what?! a European notion of Laspeyres, Lowe and Young

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The European Harmonised Index of Consumer Prices (HICP)

- **Target formula for the HICP:** Laspeyres index *with annual weights*

$$P_L^{0t,mt} = \frac{\sum_{i=1}^N p_i^{mt} \cdot q_i^{t-1}}{\sum_{i=1}^N p_i^{0t} \cdot q_i^{t-1}} = \sum_{i=1}^N \frac{p_i^{mt}}{p_i^{0t}} \cdot \frac{p_i^{0t} \cdot q_i^{t-1}}{\sum_{j=1}^N p_j^{0t} \cdot q_j^{t-1}},$$

where December of the preceding year $t - 1$ ("0t") is the **price reference period** and the year $t - 1$ is the **weight reference period**.

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- **Sub-index weights:** as representative as possible for consumers' expenditure patterns in the **previous calendar year** (at 5-digit ECOICOP sub-class level).
- **Weights *data source*:** preliminary national accounts data on **consumption patterns of year $t - 2$** .
- **Usual strategy:** make the **best estimate of consumers' expenditure patterns in the weight reference period** year $t - 1$ based on preliminary national accounts data on consumption patterns of year $t - 2$.

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- **Price-updating:** to reflect the prices of the price reference period $0t$; **thus derived weights** denoted by $w_i^{0t,t-1}$.

- **Laspeyres-type index:**
$$P^{0t,mt} = \sum_{i=1}^N \frac{p_i^{mt}}{p_i^{0t}} \cdot w_i^{0t,t-1} .$$

- **Weights:** do not correspond to observable expenditure shares, called **mixed-period weights**.

"Laspeyres-type index" label imprecise

- **Deriving the weights:** from the **observed annual expenditures shares of year $t - 2$**

$$v_i^{t-2} = \frac{(p_i^{t-2} \cdot q_i^{t-2})}{\sum_{j=1}^N (p_j^{t-2} \cdot q_j^{t-2})}$$

in two ways.

1. **Use v_i^{t-2} as the best approximation** for the true but unknown weight w_i^{t-1} .
2. The **expenditure shares are inflated by the price change** between year $t - 2$ and year $t - 1$.

"Laspeyres-type index" label imprecise

- If **goods and services are substitutes** at such a rate that the expenditure on one product relative to another one is independent of the relative prices (**Cobb-Douglas preferences**), **option 1** is the preferred approach → **Young price index**.

$$w_i^{t-1} := v_i^{t-2} = \frac{(p_i^{t-2} \cdot q_i^{t-2})}{\sum_{j=1}^N (p_j^{t-2} \cdot q_j^{t-2})}$$

"Laspeyres-type index" label imprecise

- If **goods and services are perfect complements**, i.e. there is no substitutability between them and they are consumed in fixed proportions (**Leontief preferences**), the best approximation is the price-updated weight of **option 2** → **Lowe price index**.

$$w_i^{t-1} := \frac{v_i^{t-2} \cdot \frac{p_i^{t-1}}{p_i^{t-2}}}{\sum_{j=1}^N v_j^{t-2} \cdot \frac{p_j^{t-1}}{p_j^{t-2}}} = \frac{(p_i^{t-1} \cdot q_i^{t-2})}{\sum_{j=1}^N (p_j^{t-1} \cdot q_j^{t-2})}$$

The forthcoming *Methodological Manual of the HICP*

- The manual explains **preferred methods, illustrated by examples** of good practice.
- The **considerations here** are part of **chapter 8 "Index calculation"** of the forthcoming manual, which will be published in early 2018.
 - **The draft of the full chapter is available for download from the conference website.**
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