

- b) How much has the quantity of consumption changed during these years? (per item and total)
- c) How much has the price of consumption changed during these years? (per item and total)

Solution

We can answer these questions by using index numbers. A convenient and traditional way of expressing this comparison is in percentage terms.

We can distinguish between index numbers of a single item and of a group.

Index numbers of a single item are called simple indexes. Index numbers of a group are called average indexes.

Simple indexes

Suppose that we have two periods. One of the periods is designated as the base period (period 0); let v_0 , p_0 , q_0 be the value, price and quantity of a single item in this period. The second period is called the current period (period 1) with corresponding value, price and quantity of single item v_1 , p_1 , q_1 .

- Simple value index: $i_v = \frac{v_1}{v_0} = \frac{p_1 q_1}{p_0 q_0}$

- Simple price index: $i_p = \frac{p_1}{p_0}$

- Simple quantity index: $i_q = \frac{q_1}{q_0}$

$$i_v = i_p \cdot i_q$$

Average indexes

Aggregate formula

- **Aggregate value index:** the ratio of the total value of a group of products in the current period to total value of those products in the base period.

$$I_v = \frac{\sum p_1 q_1}{\sum p_0 q_0}$$

- **Aggregate price index:** the ratio of the total value of a group of products in the current period to total value of those products in the base period for fixed quantities q_s . The same quantities are used to compute values for both periods. This ensures that only the change in prices is measured.