

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.

$$I_p = \frac{\sum p_1 q_s}{\sum p_0 q_s}$$

- **Aggregate quantity 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 prices  $p_s$

$$I_q = \frac{\sum p_s q_1}{\sum p_s q_0}$$