

Relative Price

Relative price and price level are the two terms which are frequently used in analyzing classical theory. Relative price is a micro economic concept and price level is a macroeconomic concept.

Relative Price

Relative price is the exchange ratio of two goods between two individuals. Interpretation of the meaning of a ratio is essential for cognizing the meaning of relative price. What is the meaning of $\frac{y}{x}$? It means quantity of y for one unit of x. What is the meaning $\frac{x}{y}$? It means quantity of x for one unit of y. It can be generalized and applied in all ratios in economics. That is value of numerator for one unit of denominator. Now we can apply this to estimate relative price.

Assume that two individuals exchanged 10 kg of wheat for 5 kg of meat. Price is defined in terms of wheat or in terms of meat. If we ask the question what is the price of meat in terms of wheat? Then divide $\frac{5}{10} = \frac{1}{2} kg$. It means that for one kg wheat he gets $\frac{1}{2} kg$ meat and is defined as value. Price is the reciprocal of value that is 1 divided by $1/2 = 2$. It means that the price of one kilo meat is 2 units of wheat.

Similarly we can calculate the price of wheat in terms of meat. For that:

$$\text{Value of wheat in terms of meat} = \frac{\text{Quantity of wheat}}{\text{Quantity of meat}} = \frac{10}{5} = 2$$

This means that value of one kg of meat is two kg of wheat. Or to get 1 kg meat, one should pay 2 kg of wheat. The price is reciprocal or the price of one kg wheat in terms of meat is $1/2$.

This type of estimating the price, explaining quantity of one commodity in terms of other commodity is defined as relative price.

Assume that 10 kg wheat is exchanged for 5 kg meat, 20 kg vegetables, 4 kg vegetable oil and 3 kg detergent. Value of 4 commodities in terms of wheat is:

$$\frac{5}{10}, \frac{20}{10}, \frac{4}{10}, \frac{3}{10}$$

Then what is the price of wheat?

$$\frac{10}{10} = 1$$

If there are n commodities, then there will be n-1 prices and the nth commodity is used as measuring rod. The price of money is always '1'.

Price Level

Price level is a macroeconomic concept. Assume that in an economy, there are four products - 50 kg wheat, 20 kg meat, 100 kg vegetables and 100 kg fruits – are produced in an year. The aggregate of these products are Gross Domestic Product. Assume that the relative price these commodities are:

Price of wheat 20 per kg (P_w)

Price of meat 100 per kg (P_m)

Price of vegetables 10 per kg (P_v)

Price of fruits 50 per kg (P_f)

$P_w Q_w + P_m Q_m + P_v Q_v + P_f Q_f$ = Total income or Gross Domestic Income

$20 \times 50 + 100 \times 20 + 10 \times 100 + 50 \times 100$ = GDI

$\sum p_0 q_0 = 1000 + 2000 + 1000 + 5000$ = 9000

Assume that without increasing the quantity of output, the prices of all the commodities doubled.

$P_w = 40, P_m = 200, P_v = 20, P_f = 100,$

Then, the total output in money terms will be:

$\sum p_1 q_0 = 40 \times 50 + 200 \times 20 + 20 \times 100 + 100 \times 100$

$\sum p_1 q_0 = 2000 + 4000 + 2000 + 10000$ = 18000

Without increasing the output, income has increased in nominal terms. Then price level is:

$$\frac{\sum p_1 q_0}{\sum p_0 q_0} = \frac{18000}{9000} = 2$$

Then what is the real income for the second year is:

$$\frac{18000}{2} = \frac{\text{Income}}{\text{Price level}} = \frac{Y}{P} = \text{Real income } 9000$$

Therefore,

$$\text{Real income is } \frac{Y}{P} = \frac{\text{Nominal income}}{\text{Price level}}$$

$$\text{Real wage is } \frac{w}{p} = \frac{\text{Nominal wage}}{\text{Price level}}$$

Or in other words,

$$\text{Real income} = \frac{Y}{P} = Y \left(\frac{1}{P} \right) = \text{Income} \times \text{Value of money}$$

Then what is value of money?

$$\text{Value of money} = \frac{1}{P} = \text{Reciprocal of price level}$$