Answer on Question #55276, Economics / Finance

A) Suppose the monthly income of an individual increase from Rs. 20000 to 25000 which increase his demand for clothes from 40 units to 60 units. Calculate the income elasticity of demand.

B) Quantity demanded for tea has increased from 300 to 400 units with an increase in the price of the coffee powder from Rs 25 to Rs 35. Calculate the cross elasticity of demand between tea and coffee.

Solution:

A)

In given problem, we have the following data: $\mathrm{Q_f} = 60 \text{ units}, \mathrm{Q_i} = 40, \mathrm{I_f} = \text{Rs } 25000,$ $\mathrm{I_i} = \text{Rs } 20000.$

The Income Elasticity of Demand measures the rate of response of quantity demand due to a raise (or lowering) in a consumer's income. The formula for the Income Elasticity of Demand is given by:

$$\text{Income Elasticity of Demand} = \frac{\%\text{ Change in Quantity Demanded}}{\%\text{ Change in Income}} = \frac{\mathrm{Q_f} - \mathrm{Q_i}}{(\mathrm{Q_f} + \mathrm{Q_i})} \div \frac{\mathrm{I_f} - \mathrm{I_i}}{(\mathrm{I_f} + \mathrm{I_i})}$$

Where,

$\mathrm{Q_f}$ and $\mathrm{Q_i}$ are the final and initial quantities demanded of product A, respectively;

$\mathrm{I_f}$ and $\mathrm{I_i}$ are the final and initial incomes of consumer.

Now, we can substitute the values into the formula noted above:

$$\text{Income Elasticity of Demand} = \frac{(60 - 40)}{(60 + 40)} \div \frac{(25000 - 20000)}{(25000 + 20000)} = \frac{20}{100} \div \frac{5000}{45000} = 1.8$$

Since clothes have positive income elasticity of demand, they are normal goods. Given model is therefore a normal good with elastic income elasticity coefficient equal to 1.8.

B)

In accordance with the task, we have the following given data: $\mathrm{Q_f} = 400 \text{ units}, \mathrm{Q_i} = 300, \mathrm{I_f} = \text{Rs } 35,\ \mathrm{I_i} = \text{Rs } 25.$

Our task is to determine the cross elasticity of demand between tea and coffee powder.

In order to find the cross elasticity of demand between tea and coffee, we apply the following formula:

$$\text{Cross Elasticity of Demand}_{\mathrm{E_{A,B}}} = \frac{\%\text{ increase in quantity demanded of A}}{\%\text{ increase in price of product B}}$$

Percentage changes in the above formula are calculated using the mid-point formula which divides actual change by average of initial and final values.

The formula to calculate cross elasticity thus becomes:

$$E_{A,B} = \frac{Q_f - Q_i}{(Q_f + Q_i)} \div \frac{P_f - P_i}{(P_f + P_i)}$$

Where,

Q_f and Q_i are the final and initial quantities demanded of product A, respectively;

Pf and Pi are the final and initial prices of product B.

Then, we substitute the given value into the formula noted above.

$$E_{A,B} = \frac{(400 - 300)}{(400 + 300)} \div \frac{(35 - 25)}{(35 + 25)} = \frac{100}{700} \div \frac{10}{60} = \frac{1}{7} \div \frac{1}{6} = \frac{1}{7} \cdot \frac{6}{1} = \frac{6}{7} \approx 0.857$$

Since the cross elasticity of demand is positive, product A and B are substitute goods. Substitute goods have positive cross-price elasticity: as the price of one good increases, the demand for the other good increases. Based on the obtained results, it can be denoted, that with an increase in the price of the coffee powder the demand for tea has increased. The two commodities are considered as substitutes.