

Understanding Consumer Worth

Understanding Demand

Price Elasticity of Demand (PED)

The Price elasticity of demand (PED) is the responsiveness of changes in the quantity demanded to changes in the price. It is calculated using the following formula;

$$\text{PED} = \% \text{ Change in Demand} / \% \text{ Change in Price}$$

The calculation of the PED will produce a value. This value will indicate the characteristics of the PED. For instance;

- **Zero (perfectly inelastic):** Quantity demanded does not change at all as price changes.
- **Between zero and one (inelastic):** Quantity demanded changes by a smaller percentage than price
- **One (unitary elasticity):** Quantity demanded changes by exactly the same percentage as the change in price
- **Between one and infinity (elastic):** Quantity demanded changes by a larger percentage than does the change in price
- **Infinity (perfectly elastic):** Buyers are prepared to purchase all they can obtain at a given price, but none at a higher price.

The following is an example of how to calculate the PED;

Original price = Rs.8

Original quantity = 20 units

New price = Rs. 7

New quantity = 25 units

It is evident that an Rs.1 fall in price results in a 5 unit increases in the quantity demanded. The price elasticity of demand is

$$\text{PED} = \% \text{ Change in Demand} / \% \text{ Change in Price}$$

$$= ((25-20) / 20 * 100) / ((7-8) / 8 * 100)$$

$$= 25 / -12.5$$

$$= -2.0$$

Note for normal goods the PED will be negative. Therefore, we tend to ignore the sign. In this case the PED is 2.00.

Therefore, the price elasticity of demand is 2.0, which is termed as relatively elastic.

Determinants of the Price Elasticity of Demand (PED)

The price elasticity of demand measures how responsive the quantity demanded of a good is to a change in its price. The value illustrates if the good is relatively elastic (PED is greater than 1) or relatively inelastic (PED is less than 1).

A good's PED is determined by numerous factors, these include;

- **Number of substitutes**: the larger the number of close substitutes for the good then the easier the household can shift to alternative goods if the price increases. Generally, the larger the number of close substitutes, the more elastic the price elasticity of demand.
- **Degree of necessity**: If the good is a necessity item then the demand is unlikely to change for a given change in price. This implies that necessity goods have inelastic price elasticity of demand.

- Price of the good as a proportion of income: It can be argued that goods that account for a large proportion of disposable income tend to be elastic. This is due to consumers being more aware of small changes in price of expensive goods compared to small changes in the price of inexpensive goods.

Let us discuss following examples in order to determine the price elasticity of demand for a good.

- The price elasticity of demand for supermarket own produced strawberry jam is likely to be elastic. This is because there are a very large number of close substitutes (both in jams and other preserves), and the good is not a necessity item. Therefore, consumers can and will easily respond to a change in price.
- Petrol is likely to be inelastic. This is because there are few substitutes and it is a necessity good with respect to private transport.

Interpreting the Price Elasticity of Demand (PED)

The PED is used to illustrate how the demand for a good will change for a given change in price. This is very useful for identifying the likely impacts on both consumers and producers.

A PED value of 0.3 can be interpreted as follows, a 1% increase in the price of the good will result in a 0.3% decrease in the demand for the good. Alternatively, a PED value of 1.5 implies that a 1% increase in the price of a good will result in a fall of 1.5% in the quantity demanded. It is clear that with an inelastic demand ($PED = 0.3$) then the change in the quantity demanded changes by proportionately less than the change in the price.

The PED is used to illustrate the slope of the demand curve. For instance,

- A PED, which is inelastic, is represented by a very steep demand curve. Where any change in the price will always be proportionately larger than the change in quantity.
- A PED, which is elastic, is represented by a very flat (shallow) demand curve. Where a change in the price will always be proportionately smaller than the change in quantity.

Interpreting the PED for consumers

Economists tend to suggest that the consumer wishes to maximise their utility by consuming the largest number of the highest quality goods at the lowest price.

A method of illustrating how the welfare of the consumer will change for a change in price with different price elasticity of demand is the concept of consumer surplus.

If the PED is relatively inelastic (less than one) then the quantity demanded will decrease by proportionately less than the price rise. Therefore, the consumer is worse off, as their total expenditure increases and they consume fewer goods. However, if the PED is elastic then the rise in price will result in a proportionately larger fall in the quantity demanded, therefore, the consumer will be worse off.

Interpreting the PED for producers

Economists assume that the aim of producer is to maximise their profit, when profit is calculated as total revenue minus total cost.

The value of the PED can be used to identify the consequences on the firm's total revenue.

For a given increase in price, if the PED is relatively inelastic (PED = 0.2) then the increase in price is proportionately larger than the decrease in quantity. If this occurs then total revenue will increase. However, if the PED is relatively elastic (PED = 2.0) then the increase in the price is proportionately smaller than the decrease in quantity. If this occurs, then the total revenue for the firm will increase.

Advertising Elasticity of Demand (AED)

The advertising elasticity of demand (AED) measures the responsiveness of changes in the quantity demanded to changes in the level of advertising. It is calculated using the following formula;

$$\text{AED} = \% \text{ Change in Demand} / \% \text{ Change in Advertising Expenditure}$$

The calculation of the AED will produce a value. This value will indicate some of the characteristics of the good. For instance;

- A value over 1 implies a relatively elastic demand. In other words, an increase in the level of advertising will cause a proportionately greater increase in the demand for the good.
- A value less than 1 implies a relatively inelastic demand. In other words, an increase in the level of advertising will cause a proportionately smaller increase in the demand for the good.

The sign indicates how advertising influences the demand. For most goods, an increase in the level of advertising should cause the demand curve to shift to the right. The magnitude of the shift will depend on the value of the AED. For instance, if the AED is relatively elastic (greater than 1) then the change in the quantity demanded will be proportionately larger than the change in the level of advertising.

The following is an example of how to calculate the AED:

Original level of advertising = Rs.100

Original quantity = 50 units

New level of advertising = Rs.120

New quantity = 75 units

It is evident that an Rs.20 increase in the level of advertising results in a 25 unit increase in the quantity demanded. The advertising elasticity of demand is:

AED = % Change in Demand / % Change in Advertising Expenditure

$$= ((75-50)/50*100) / ((120-100)/100*100)$$

$$= +2.5$$

Therefore, the advertising elasticity of demand is 2.5, which is termed as relatively elastic. In other words, a 1% increase in the level of advertising will cause a 2.5% increase in the quantity demanded.

Cross Price Elasticity of Demand (CPED)

The cross price elasticity of demand (CPED) measures the responsiveness of changes in the quantity demanded to changes in the price of a different good. It is calculated using the following formula;

$$\text{CPED} = \% \text{ Change in Quantity of B} / \% \text{ Change in Price of Good A}$$

The calculation of the CPED will produce a value. This value will indicate the characteristics of the CPED. For instance;

- Between zero and one (inelastic) - quantity demanded of good B changes by a smaller percentage than the change in price of good A
- Between one and infinity (elastic) - quantity demanded of good B changes by a larger percentage than the change in price of good A

The sign indicates if the goods are substitutes or complements. For instance, substitutes have a positive sign and complements have a negative sign.

The following is an example of how to calculate the CPED:

Original price of good A = Rs.8

Original quantity of good B = 20 units

New price of good A = Rs.7

New quantity of good B = 25 units

It is evident that an Rs.1 fall in price of good A results in a 5 unit increase in the quantity demanded of Good B. The price elasticity of demand is

$$\begin{aligned}\text{CPED} &= \% \text{ Change in Quantity of B} / \% \text{ Change in Price of Good A} \\ &= ((25-20)/20*100) / ((7-8)/8*100) \\ &= -2.0\end{aligned}$$

Therefore, the cross price elasticity of demand is -2.0, which is termed as relatively elastic. The sign implies that the two goods are complements.

Income Elasticity of Demand (YED)

The income elasticity of demand (YED) measures the responsiveness of a change in the quantity demanded to a change in the level of consumer income. It is calculated using the following formula;

$$\text{YED} = (\text{Original Income} / \text{Change in Income}) / (\text{Original Quantity} / \text{Change in Quantity})$$

The value will indicate some characteristics of the good. For instance;

- Between zero and one (inelastic) - quantity demanded of good A changes by a smaller percentage than the change in consumer income.
- Between one and infinity (elastic) - quantity demanded of good A changes by a larger percentage than the change in consumer income.

The sign indicates the relationship between two goods. For instance, normal / luxury goods have a positive sign and inferior goods have a negative sign.

Many economists suggest that if the value is greater than 1, then the goods are likely to be luxury items (very sensitive to changes in level of household income, while if the value is less than 1 then they tend to be normal goods.

The following is an example of how to calculate the YED:

Original income = Rs.800

Original quantity of good B = 20 units

New income = Rs.900

New quantity of good B = 25 units

In other words, an Rs.100 increase in income will result in a 5-unit increase in the quantity demanded. The income elasticity of demand is

$$\begin{aligned} \text{YED} &= (\text{Original Income} / \text{Change in Income}) / (\text{Original Quantity} / \text{Change in Quantity}) \\ &= (800 / (900-800)) / (20 / (25-20)) \\ &= (800/100) / (20/5) \\ &= +2.0 \end{aligned}$$

Therefore, the income elasticity of demand is +2.0, which is termed as relatively elastic. The sign and value imply that the good is a luxury item.



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