



Elasticities



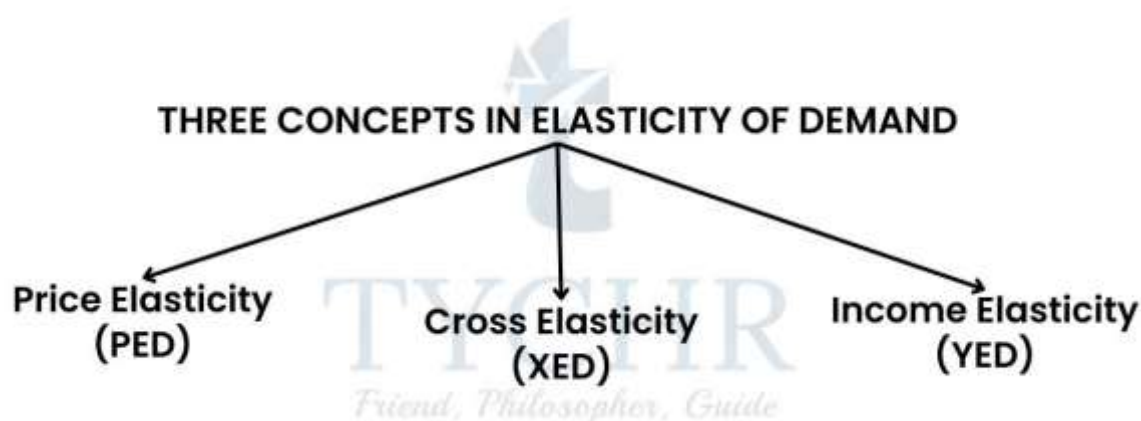
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ELASTICITIES OF DEMAND AND SUPPLY

1.1 Meaning Of Elasticity Of Demand

Elasticity of demand is a measure of the degree of responsiveness of quantity demanded of a good to a change in its price or income or price of related goods.

THREE CONCEPTS IN ELASTICITY OF DEMAND



1.2 Price Elasticity Of Demand, PED

PED is a measure of responsiveness of the quantity demand of a product to the change in its price.

Let the initial quantity demand of an item be represented by Q_D and its change be represented by ΔQ_D . Let the initial price be represented by P and change in its price be represented by ΔP . Hence, PED is measured by using the following formula, Let us try to understand this by following example- Suppose the price of a commodity falls from Rs.10 to Rs.6 and its quantity demand increases from 20 units to 30 units,

Q_D = Initial quantity demand = 20 units
 P = Initial price of commodity = Rs.10

ΔQ_D = Change in quantity demanded of the commodity = $30 - 20$
= 10 units

ΔP = Change in price of the commodity = 6 – 10 = Rs.4

$PED = \Delta QD / \Delta P \times P / QD$

= (10/4) * (10/20)

= 1.25

Note: The sign of PED is considered positive ignoring the negative sign. This is done to avoid confusion. The use of percentages
Elasticity is measured in terms of percentages for two reasons:

To measure in common units.

To measure in absolute terms.

Degrees Of Price Elasticity Of Demand

PERFECTLY ELASTIC DEMAND ($PED = \infty$):

When at a given price, the quantity demanded rises to any level, demand is said to be perfectly elastic. Items include Pizza, books, etc. (Refer Fig. E below)

PERFECTLY INELASTIC DEMAND ($PED = 0$):

If change in price causes no change in quantity demanded, demand is said to be perfectly inelastic. Items include basic necessities such as salt. (Refer Fig. D below))

UNIT ELASTIC DEMAND ($PED = 1$):

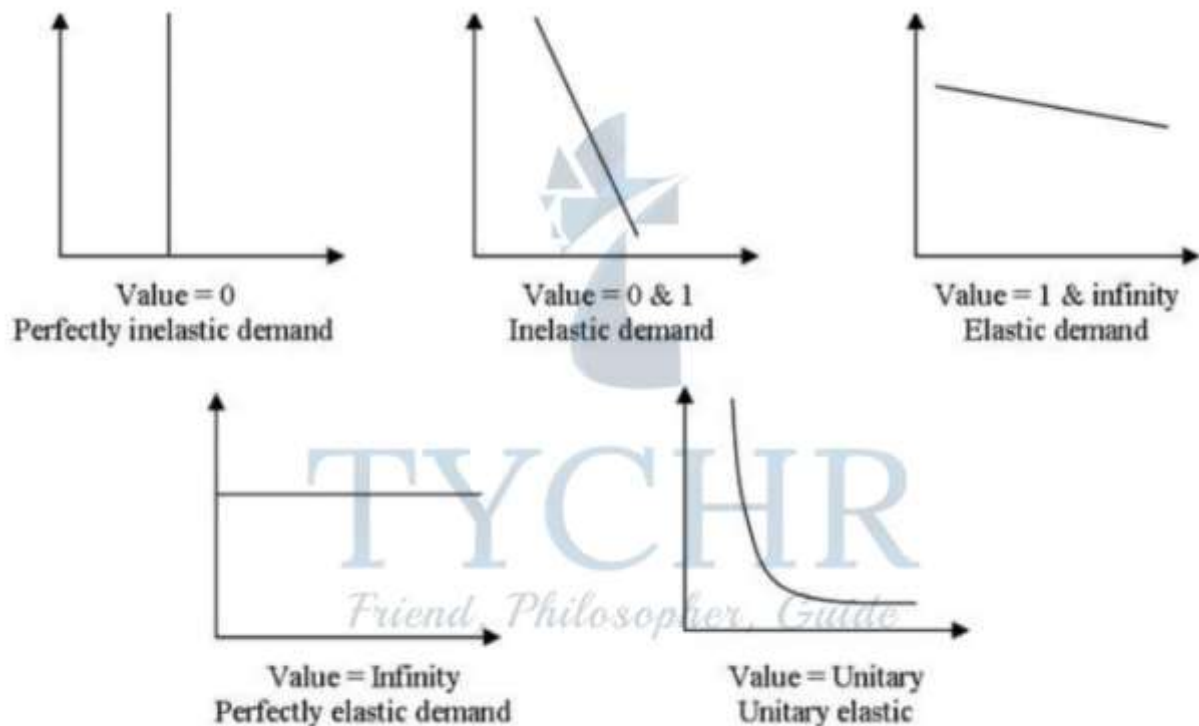
Demand is considered to be unit elastic if the percentage change in quantity demanded is the same as the percentage change in price. (Refer Fig. A below)

MORE ELASTIC DEMAND ($PED > 1$):

If percent change in price is less than the percent change in quantity demanded, demand is said to be more elastic. (Refer Fig. B below)

LESS ELASTIC DEMAND ($PED < 1$):

If percent change in price is more than the percent change in quantity demanded, demand is said to be less elastic. (Refer Fig. C below)



Variability Of PED Along A Straight Line Demand Curve

Relationship Between PED And Slope Of Demand Curve

Note: PED varies through the range of curve whereas slope is constant for a linear demand curve.

- Factors Affecting Price Elasticity of Demand

FACTOR	ELASTIC DEMAND	INELASTIC DEMAND
Nature of Commodity	Luxury	Necessities
Substitutes	More	Less
Proportion of Income	Spent is large	Spent is small
Addiction	If addicted	If not addicted
Time period	Long Run	Short Run

Examples for the above

- Luxury- a/c and cars.
- Necessity- medicines, etc
- Time- If there's an increase in the prices of cooking oil in short period, it's difficult to switch to cooking gas, but in the long term it is possible.
- Income- If income is more, expenditures such as family vacations, luxury travel, etc can be availed.

The Demand Curve's Steepness And PED:

Steeper demand curves are relatively less elastic or inelastic whereas flatter demand curves are more elastic.

So to compare 2 demand curves which one is more elastic just draw both curves on a single diagram and find the intersecting point. To the left of the intersecting point steeper curve is less elastic.



Applications Of Price Elasticity Of Demand PED And The Effects Of Price-Changes And Total Revenue:

Total revenue is in the amount of money received by firms when they sell goods or services.

$$TR = P \times R$$

TR and PED can be explained with the help of following 3 possibilities

Demand Is Elastic ($PED > 1$)

An increase in price means reduction in TR and vice-versa. In the preceding graph, TR1 equals A+C in the event of a rise in price from P1 to P2, whereas TR2 equals A+B in the event of a decrease in price.

Demand Is Inelastic ($PED < 1$)

An increase in price means an increase in total revenue (TR) A decrease in price results in decrease in TR. In the above figure, due to increase in price $TR1 = A + C$, and due to decrease in price $TR2 = A + B$. $TR1 > TR2$.

Demand Is Unit Elastic ($PED = 1$)

Change in price causes no change in total revenue. In the above fig, $TR1(A + C) = TR2(A + B)$.

Total Revenue Test of Price Elasticity of Demand

IF	Fall in price	LEADS TO	Increase in Total Revenue	THEN DEMAND IS	ELASTIC
	Fall in price		Decrease in Total Revenue		INELASTIC
	Gain in price		Decrease in Total Revenue		ELASTIC

Gain in price	Increase in Total Revenue	INELASTIC
A change in price	No Change in Total Revenue	UNIT ELASTIC

PED And Firm Pricing Decisions

The pricing decisions are taken by the firm keeping the type of demand a product has (elastic, inelastic or unit elastic).

PED In Relation To Primary And Manufactured Products

Many primary commodities have a low PED (Price inelastic demand) because they are necessities and have no substitutes. Eg- medicines, agricultural products, etc.

Whereas, manufactured products have high price elastic demand because they have substitutes.

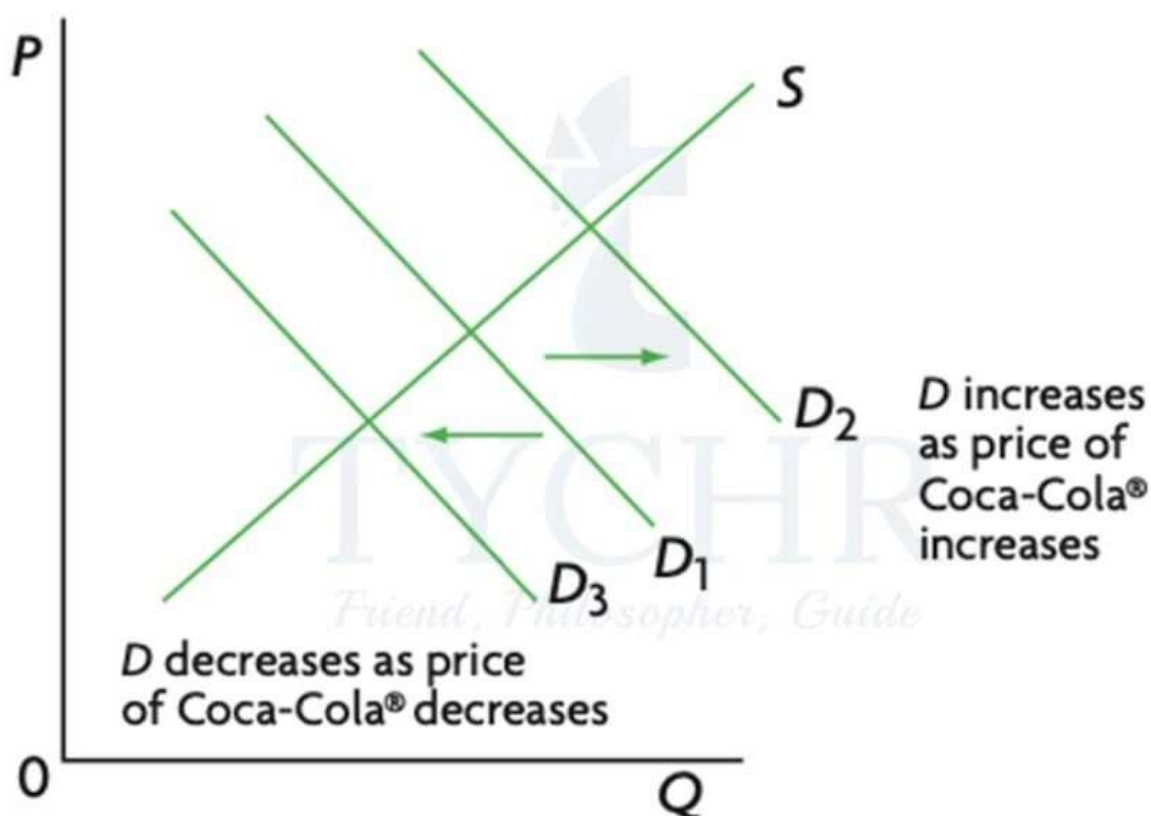
PED And Indirect Taxes

The lower the price elasticity of demand for the taxed goods, the greater the government tax revenues and vice-versa.

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1.3 Cross Elasticity Of Demand, XED

(a) Substitutes and positive XED: demand for Pepsi®



XED is a measure of responsiveness of the quantity demand of a product to the change in price of related products or substitute products.

Let the initial quantity demanded of an item be represented by QD and its change be represented by ΔQD . Let the initial price of a related/substitute good be represented by P and change in its price be represented by ΔP .

Hence, XED is measured by using the formula,

Note: The sign of XED can be positive or negative. Sign is not ignored.

Positive XED: Substitute Goods

In case of substitute goods, demand for one good and price of another good change in the same direction.

Eg- Coke and Pepsi.



Note: In substitute goods Larger XED= Greater substitutability between 2 goods= Larger shift in demand curve due to price change.

Eg- A good having XED=+0.7 is a stronger substitute than a good having XED=+0.3 .

Negative XED: Complementary Goods

In case of complementary goods, the demand for one good and the price of the other good change in opposite directions.

In the above figure, when the price of a tennis racket decreases, the demand for tennis balls increases (Demand shifts from D1 to D2) and vice versa.

Note: In complementary goods, Larger the -ve value of XED, Greater the complementarity between 2 goods, larger the shift in demand curve.

Eg- Goods having XED -0.8 are stronger complements than goods having XED - 0.5.

Zero XED: Unrelated Goods

If XED is zero, then the two goods are unrelated, XED is zero. Eg- Umbrella and onions.

Application Of Cross Price Elasticity Of Demand

Incase Of Substitute Goods:

Goods of a single business:

Let's take an example of coke and sprite. It's important for the business to consider XED while making pricing decisions. Eg- Coke Price Sprite Demand.

Whether the coke price should be cut or not is based on 2 main points

PED of coke to know whether in coke prices will or Total revenue.

Degree of XED for coke and sprite: If XED is positive but low substitutability, then percentage reduction of coke prices will lead to small percentage change in sprite demand and vice-versa.

Goods of rival businesses

Eg- Coke and pepsi. A large XED between coke and pepsi means a fall in the price of coke will lead to a large fall in demand for pepsi.

Incase of Complementary Goods

XED for complementary goods is also helpful in pricing decisions. Eg- A product with high negative XED means reducing the price of one good will lead to large increase in demand of the other good.

1.4 Income Elasticity Of Demand, YED

Eg- sports clothings and sports equipment.

YED is a measure of the responsiveness of demand to changes in income, and involves demand curve shifts. It provides information on the direction of change due to change in income and on the size of the change.

Note: When $YED > 0$ (positive), it is a normal good. Eg- new car, new clothes. When $YED < 0$

Let the initial quantity demanded by the consumer be represented by QD and its change be represented by ΔQD . Let the initial income of that consumer be represented by Y and change in its price be represented by ΔY .

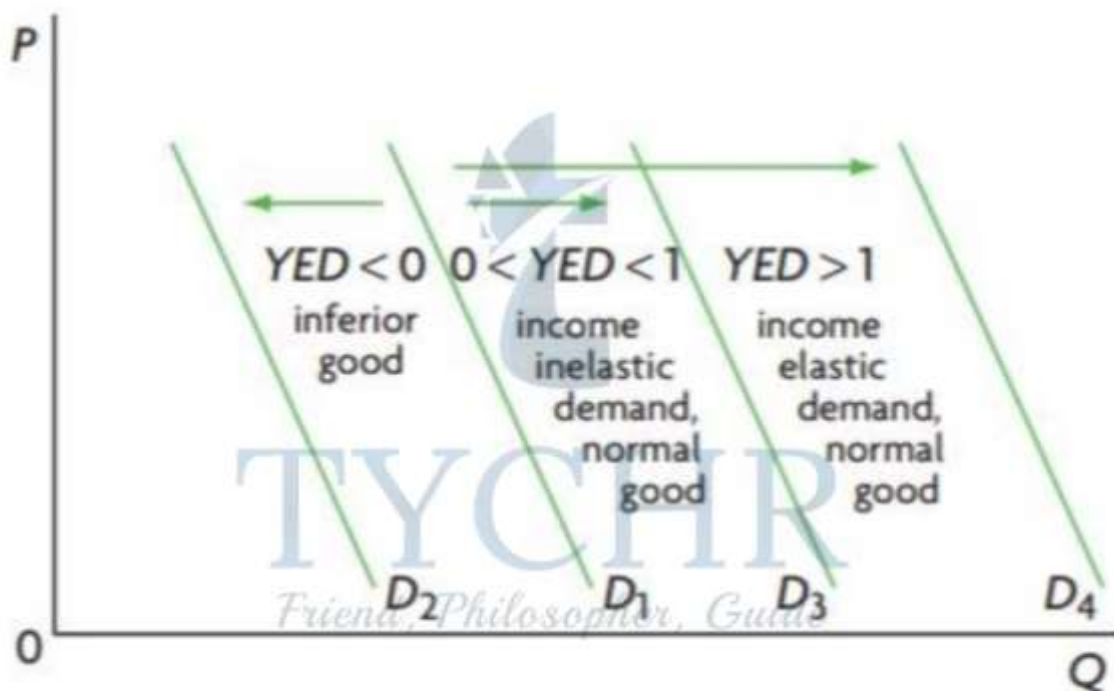
Hence, YED is measured by using the formula,

$$YED = \frac{\% \text{ Change in Quantity demanded}}{\% \text{ Change in Income}}$$
$$= \frac{\Delta QD}{QD} \times \frac{Y}{\Delta Y}$$

Hence, it can be said that YED will be positive for normal products like branded items where an increased income leads to higher demand for that product in the market. However, for inferior/cheap products like local brands, the same is exactly opposite and YED shall be negative, where an increased income leads to lesser demand of that product in the market.

Interpretation Of YED Coefficient:

- **Elastic:** If a product's quantity demand changes significantly with a percent change in income. Eg: a need for hybrid vehicles
- **Inelastic:** if a small percentage change in a product's quantity demand will result from a change in income. Eg: popularity of fast food
- **Unit Elastic:** If percent change in income is same as percent change in quantity demand of a product. Eg: demand for normal goods



Application Of YED

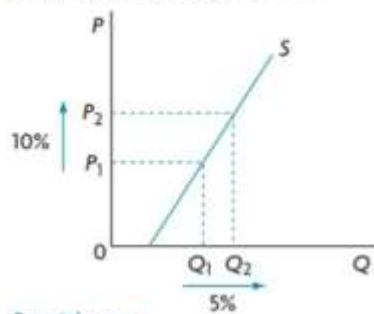
- YED and rate of expansion of industries.
Higher the YED for a good, the greater the marked expansion in future.
- On the contrary when recession is there $YED > 1$ will experience fall in sales, $YED < 0$ will experience increase in sales.
- YED and the economy.

Elasticity of supply is the degree of responsiveness of supply of a commodity due to change in its price.

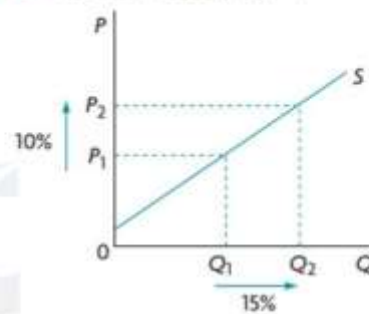
It is measured by using the formula, $E_s = \frac{\% \text{ Change in Quantity supplied of a product}}{\% \text{ Change in Its Price}}$

2.1) Type Of Price Elasticity Of Supply

a Price inelastic supply: $PES < 1$

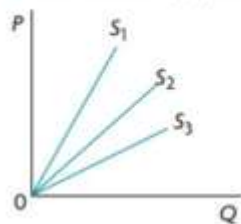


b Price elastic supply: $PES > 1$

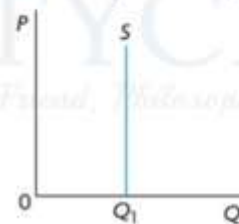


Special cases

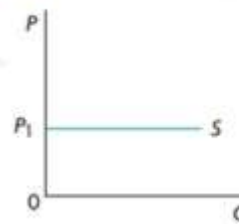
c Unit elastic supply: $PES = 1$



d Perfectly inelastic supply: $PES = 0$



e Perfectly elastic supply: $PES = \infty$



Elasticity Coefficient	Type Of Elasticity	Relationship Between Price & Supply
$E_s = 0$	Perfectly Inelastic	No change in Supply
$E_s < 1$	Less than Unitary Elastic	Change in Supply < Change in Price
$E_s = 1$	Unitary Elastic	Change in Supply = Change in Price
$E_s > 1$	More than Unitary Elastic	Change in Supply > Change in Price
$E_s = \infty$	Perfectly Elastic	Extremely large change in Supply with no change in Price

Determinants Of PES

Length of Time Short Period	Short period Highly Inelastic	Long period Elastic supply
Quantity of stock	Firms with high stock High PES	Firms with low stock Low PES
Mobility of factors of production	Immobile resource low PES	High mobility resources High PES
CAPACITY OF FIRMS SPARE(UNUSED)	Greater spares capacity High PES	Lesser spares capacity Low PES

2.2) Factors Affecting Elasticity Of Supply

- Nature of Commodity
- Time Period
- Nature of Inputs used
- Technique of Production

2.3) Importance Of Elasticity Of Supply

Determination Of Rent:

When perfectly inelastic, entire earnings of the factor would be rent.

Determination Of Price:

It helps in determining the price of a commodity.



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