

Elasticity

Types of Elasticity

- ▶ **Price elasticity of demand**
- ▶ **Income elasticity of demand**
- ▶ **Cross elasticity**
- ▶ **Price elasticity of supply**

Price Elasticity of Demand (P.E.D)

- ▶ “The responsiveness of demand to changes in price”
or
- ▶ % change in demand due to % change in price

Demand can be **inelastic, unit elastic, or elastic,**
and can range from zero to infinity.

Price Elasticity of Demand (P.E.D)

➤ Demand can be inelastic, unit elastic, or elastic, and can range from zero to infinity.

➤ Degrees of P.E.D.

- Unitary elastic ($PED=1$)
- Elastic ($PED>1$)
- Perfect elastic ($PED=\text{infinity}$)
- Inelastic ($PED<1$)
- Perfect inelastic ($PED=0$)

Price Elasticity of Demand (P.E.D)

The Formula:

$$\text{Ped} = \frac{\% \text{ Change in Quantity Demanded}}{\% \text{ Change in Price}}$$

Mid point formula:

Price Elasticity of Demand

$$E_P = \frac{\Delta Q / Q}{\Delta P / P} = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

Linear Function

$$E_P = a_1 \cdot \frac{P}{Q}$$

Point elasticity along a linear demand curve

PED = lower segment of curve \div upper segment of curve

Price Elasticity of Demand & Total revenue

- ▶ The **total revenue** from the sale of good or service equals the price of the good multiplied by the quantity sold. $R = P \times Q$
- ▶ When the price changes, total revenue also changes.
Does a rise in price always increase total revenue ?
Does a fall in price always decrease total revenue ?

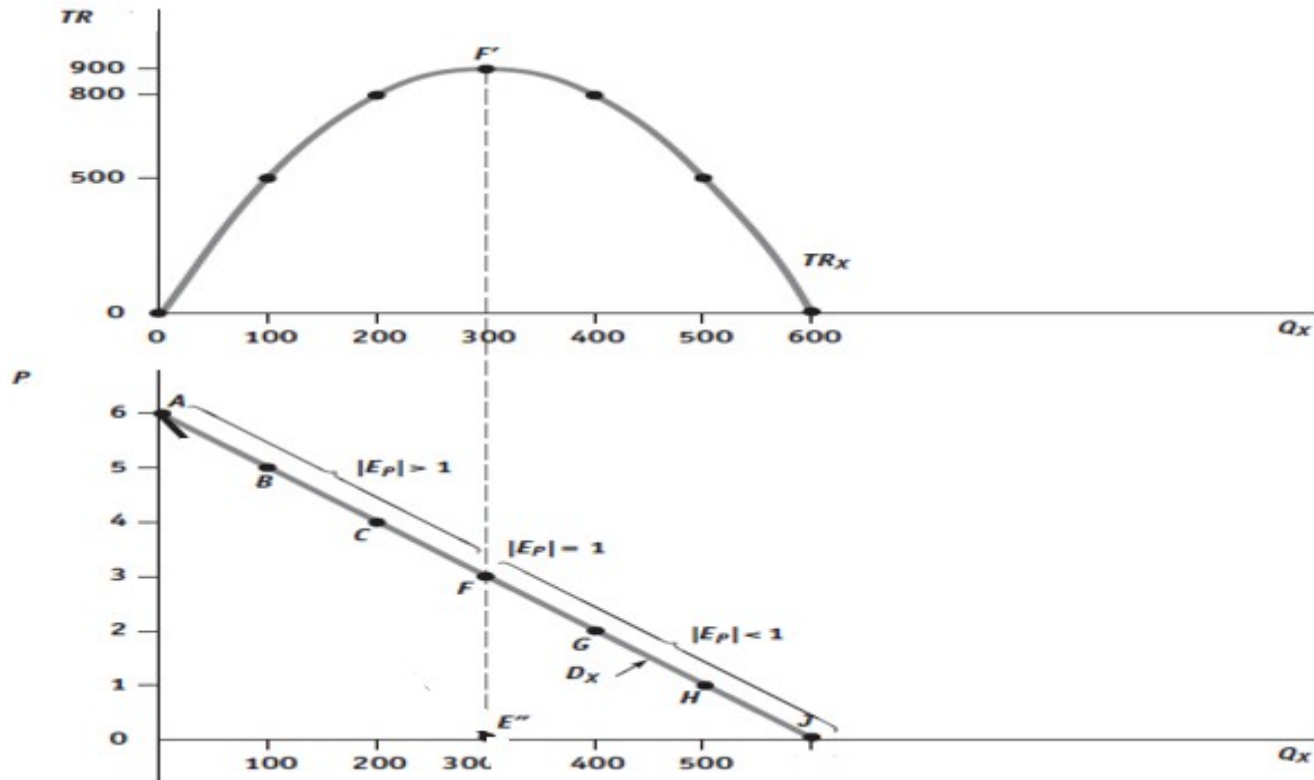
Price Elasticity of Demand

- ▶ The **total revenue test** is a method of estimating the price elasticity of demand by observing the change in total revenue that results from a price change (when all other influences on the quantity sold remain the same).
 - If a price cut increases total revenue, demand is **elastic**.
 - If a price cut decreases total revenue, demand is **inelastic**.
 - If a price cut leaves total revenue unchanged, demand is **unit elastic**.

Total Revenue and Elasticity

Price	Qd	TR	Elasticity
10 5	5 6	50 30	(PED<1)
10 5	5 10	50 50	(PED=1)
10 7	5 20	50 140	(PED>1)

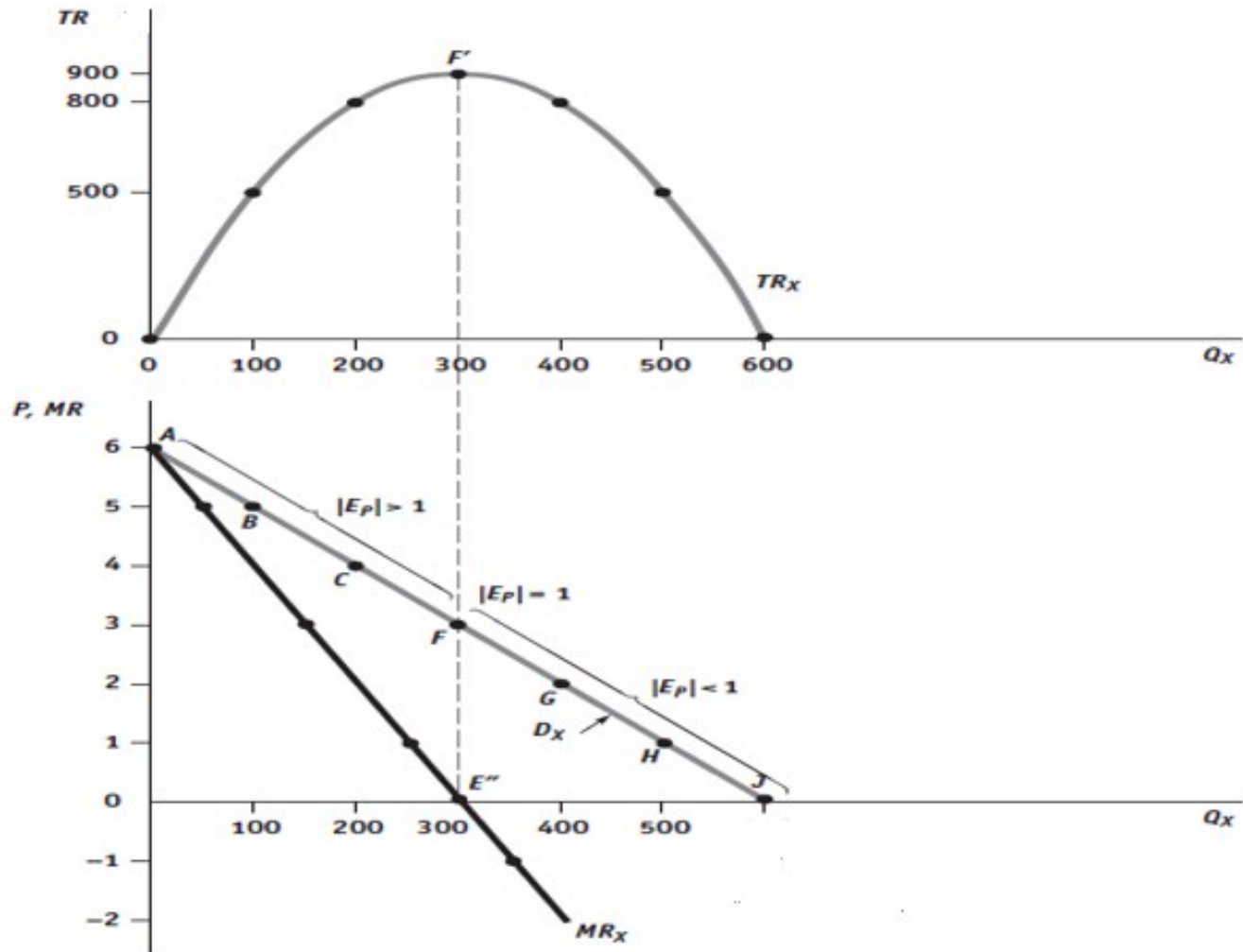
Total Revenue and Elasticity



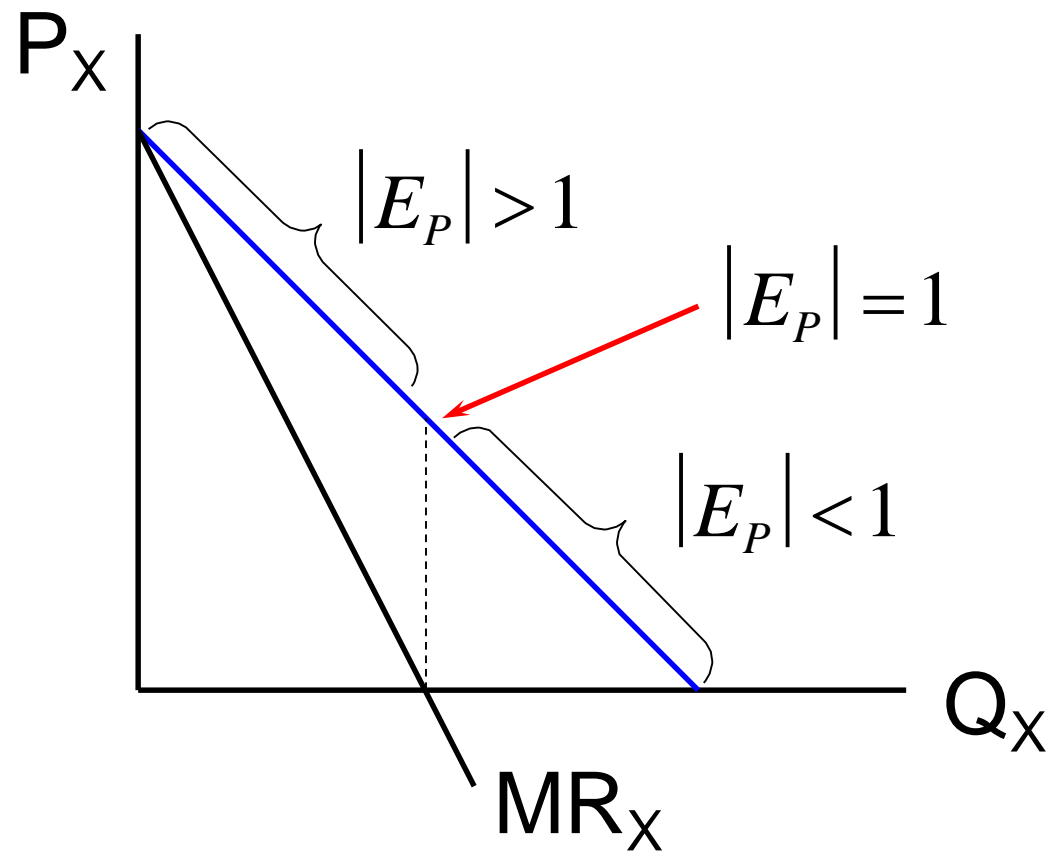
Marginal Revenue and Price Elasticity of Demand

$$MR = P \left(1 + \frac{1}{E_P} \right)$$

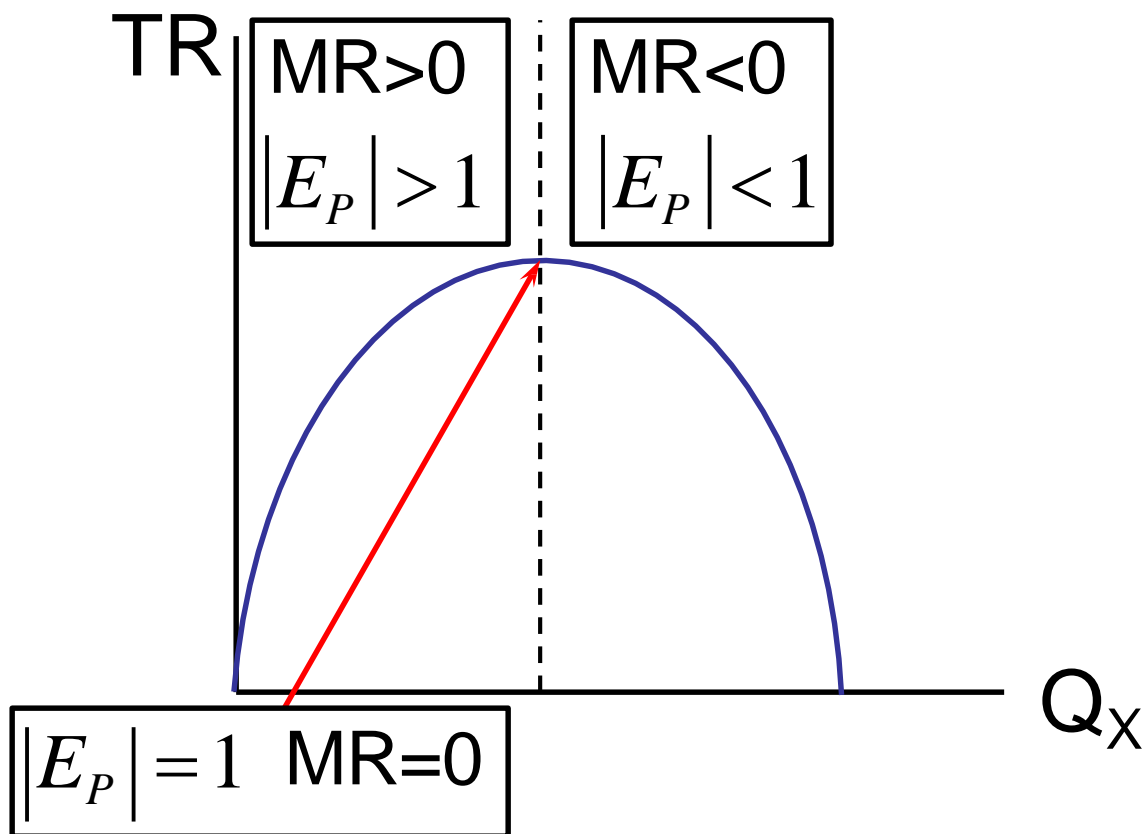
Marginal Revenue and Price Elasticity of Demand



Marginal Revenue and Price Elasticity of Demand



Marginal Revenue, Total Revenue, and Price Elasticity



Determinants of Price Elasticity of Demand

- ▶ **The Factors Affecting price Elasticity of Demand:**
 - The closeness of substitutes
 - The proportion of income spent on the good
 - Nature of commodity
 - The time elapsed since a price change
 - Range of alternative uses of commodity

Income Elasticity of Demand

- ▶ “percentage change in demand due to percentage change in income”
- ▶ **Normal Good** – demand rises as income rises and vice versa
- ▶ A positive sign denotes a normal good
- ▶ **Inferior Good** – demand falls as income rises and vice versa
- ▶ A negative sign denotes an inferior good

Cross Elasticity of Demand

- ▶ percentage change in demand for x good due to percentage change in price of Y good.
(in the price of a related good – either a substitute or a complement)



$$\text{Ced} = \frac{\% \Delta \text{ demand of good } x}{\% \Delta \text{ Price of good } y}$$

Cross Elasticity of Demand

- ▶ **Goods which are complements:**
 - ▶ Cross Elasticity will have negative sign (inverse relationship between the two)
- ▶ **Goods which are substitutes:**
 - ▶ Cross Elasticity will have a positive sign (positive relationship between the two)

Using Elasticities in Managerial Decision Making

$$Q_x = 1.5 - 3P_x + 0.8I + 2P_y - 0.6P_s + 1.2A$$

$$P_x = 2, I = 2.5, P_y = 1.80, P_s = 0.50, A = 1$$

What is total demand (sales)?

Find elasticity of each.

Price Elasticity of Supply

- ▶ “The responsiveness of supply to changes in price”

$$P_{es} = \frac{\% \Delta \text{Quantity Supplied}}{\% \Delta \text{Price}}$$

Elasticity of Supply

- ▶ The Factors That Influence the Elasticity of Supply
 - ▶ The elasticity of supply depends on
 - Resource substitution possibilities
 - Time frame for supply decision
 - ▶ **Resource Substitution Possibilities**
 - ▶ The easier it is to substitute among the resources used to produce a good or service, the greater is its elasticity of supply.

Elasticity of Supply

- ▶ **Time Frame for Supply Decision**
- ▶ The more time that passes after a price change, the greater is the elasticity of supply.
- ▶ *Short-run supply* is somewhat elastic.
- ▶ *Long-run supply* is the most elastic.

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