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Elasticities

* An elasticity is a numerical measure of the responsiveness (i.e. the sensitivity) of variable Y following a change in variable X.

Y variable is dependent, X variable is independent

Elasticities

* Price Elasticity of demand (PED)
* Price Elasticity of supply (PES)
* Cross- Elasticity of Demand (XED)
* Income Elasticity of Demand (YED)

* Price Elasticity of demand (PED)

* The (own/Direct) Price Elasticity of Demand (PED) measures the proportionate response of the quantity demanded to a proportionate change in the price of the good or service.

$$PED = \frac{\%\ \Delta \text{ in } QD}{\%\ \Delta \text{ in } P} \quad — \quad \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

* Since demand curves are, (usually) downward sloping (i.e. inverse relationship) between price and quantity demanded, the PED is negative.

* PED less than 1 is inelastic
* PED more than 1 is elastic
* PED of 1 is unit- elastic.
* PED of 0 perfectly -inelastic
* PED is perfectly -elastic when its infinity

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Perfectly price inelastic | Unit-elastic | Perfectly price-elastic

0 Price inelastic Price elastic ∞

* Perfectly price elastic:

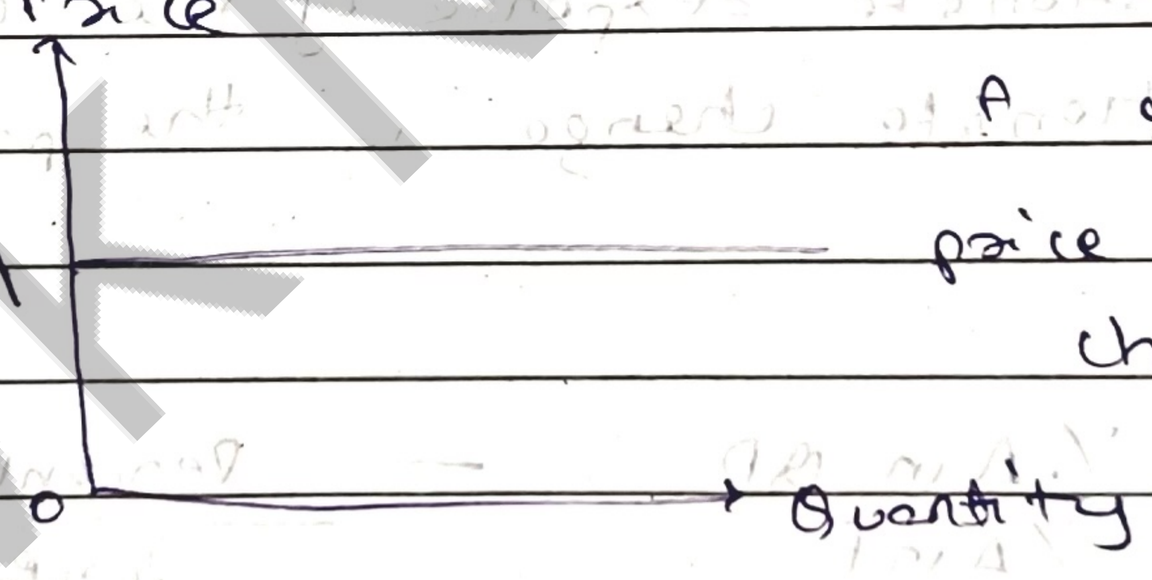
→ If the PED is infinite, then demand is said to b perfectly price elastic.

→ A very small decrease in price would lead to a infinite increase in quantity demanded, whilst a very small increase in price would lead to the quan demanded becoming zero.

→ If the PED is larger than 1, the demand is said be price-elastic.

→ A percentage change in price will bring about larger percentage change in quantity demanded

PED perfectly-elastic



A small change
price causes a hu
change in quan
demande

* Unit-price elastic

→ If the PED is equal to 1, then the demand is said of unit-price elastic

→ A percentage change in price will lead to an exact and opposite percentage change in quantity demanded

* Perfectly-price-inelastic

* If PED is equal to 0, then demand is said to be perfectly price-inelastic.

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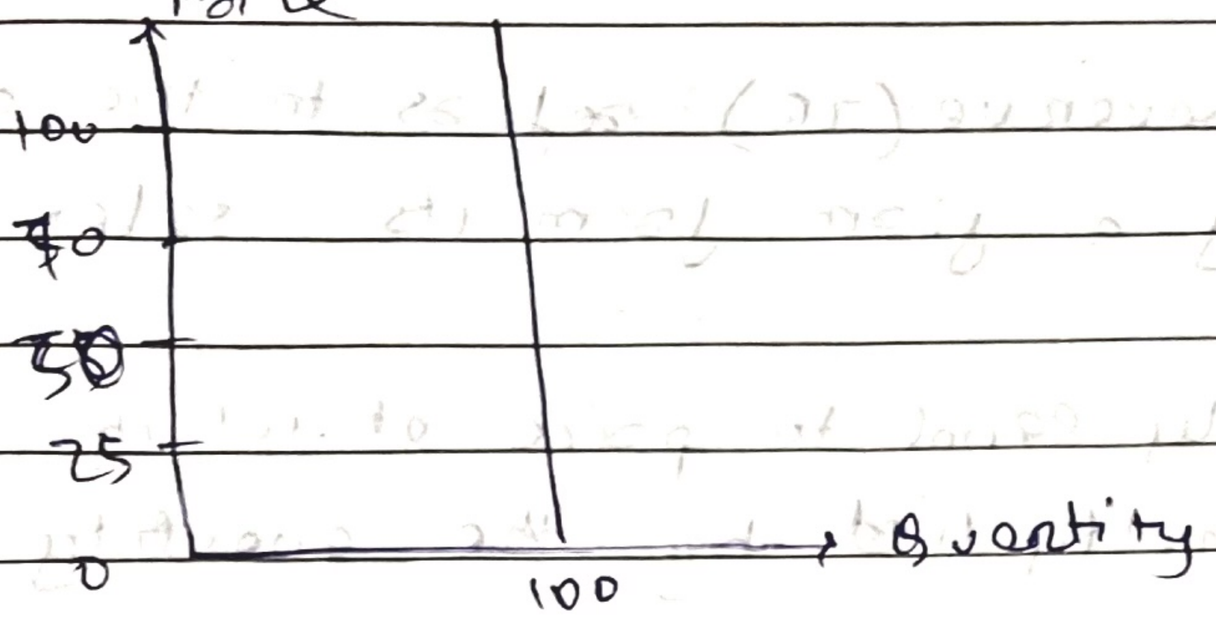
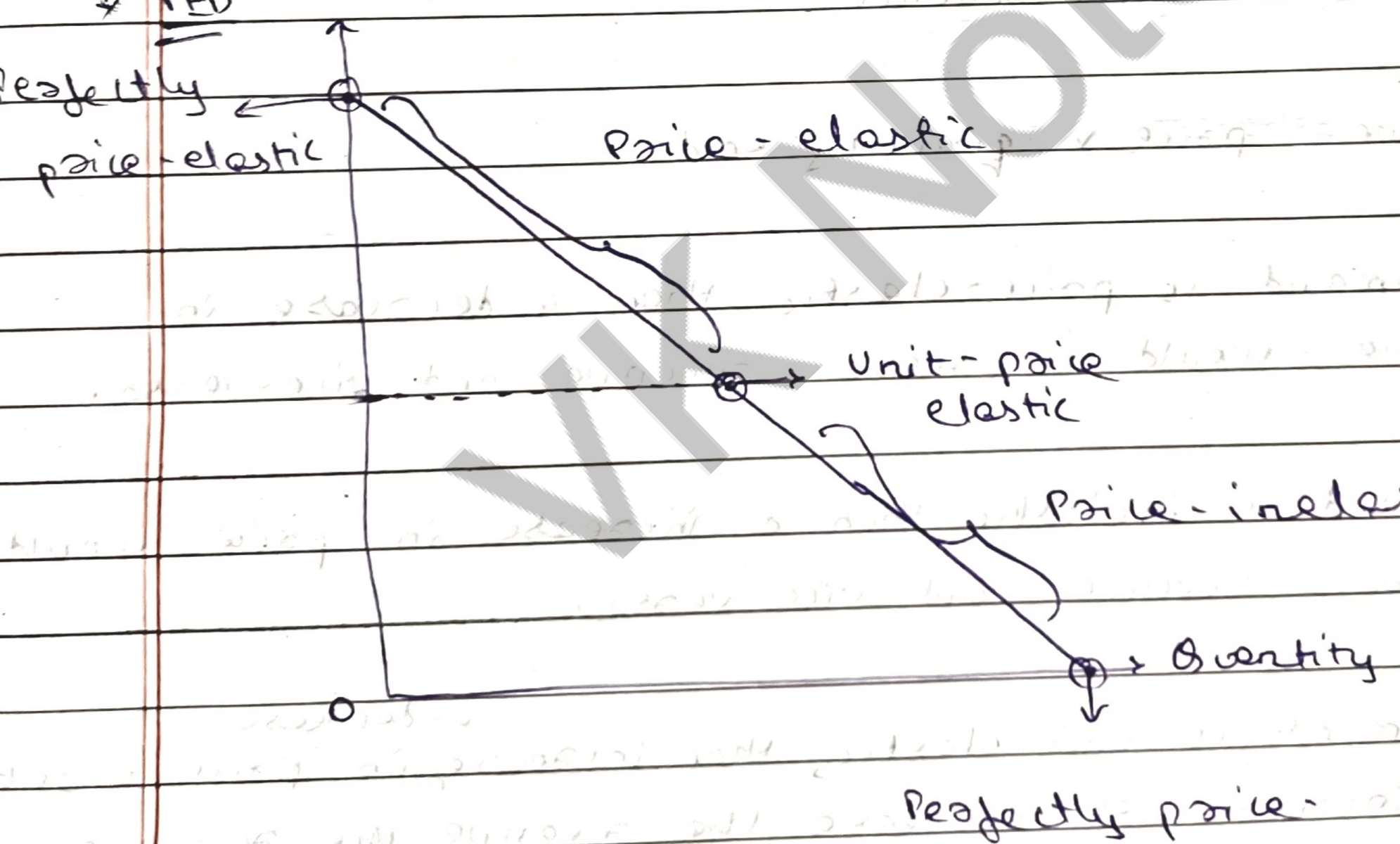
* The change in price has no effect on quantity demanded



* PED and linear demand
* When demand is linear (i.e. represented by a straight line) then the absolute value of the point PED decreases as we move down along it.



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* Factors affecting PED *

→ If the good is necessity, the demand for it is price-inelastic.

→ If the good is a luxury good, the demand is *generally* price-elastic.

→ The demand for goods which form a relatively low proportion of total expenditure tend to be less price inelastic than the demand for goods which form a more significant proportion.

→ The more substitutes there are, the more price-elastic the demand is.

→ the longer the time period considered, the more price-elastic the demand. If the product is less urgent, more price-elastic the demand, and vice-versa.

→ Habit-forming products are products capable of leading to physiological or psychological dependence. The demand for habit-forming products is likely to be relatively price-inelastic.

→ the demand for products that have a strong brand image is likely to be more price-inelastic.

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* Total Revenue

→ The total revenue (TR) refers to the revenue received by a firm from its sales.

→ TR is simply equal to price at which each is sold multiplied by the quantity sold.

→ TR = P x Q

Total Revenue = Price x Quantity.

* PED and total revenue

~~Revenue = price x quantity sold~~

→ If demand is price-elastic then a decrease in price would increase revenue and vice-versa

→ If demand is inelastic then a increase in price w increase revenue and vice-versa.

→ If demand is unit-elastic, then increase or decrease in price will not increase or decrease the revenue, the revenue will remain unchanged.

* PED and government

→ If ~~demand~~ government wants to increase tax it will tax price-inelastic goods and vice-versa
Eg:- cigarettes, alcohol.

→

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→ During a period of recession, sale of inferior goods rises, whereas normal goods which are luxuries tend to decrease and vice versa.

* Cross Elasticity of Demand (XED)

$$XED = \frac{\text{Percentage change in quantity demanded of A}}{\text{Percentage change in price of B}}$$

$$XED = \frac{\%\ \Delta QD \text{ of } A}{\%\ \Delta P \text{ of } B}$$

→ The Cross Elasticity of Demand (XED) measures the proportionate response of quantity demanded of good X to a proportionate change in the price of good Y.

→ The sign of XED indicates whether the good X and Y are substitutes or complements.

→ If XED is 0, the goods are unrelated.

→ Indeed, if good X and good Y are substitutes in consumption, then the XED is positive. Indeed, an increase in price of good Y leads to an increase in quantity demanded of good X and vice-versa.

→ Higher the value of the XED, ~~higher~~ stronger the substitutability and vice-versa.

→ If good X and Y are complements in consumption, then the XED is negative. Indeed, an increase in price of good Y leads to a decrease in the quantity demanded of good X and vice-versa.

→ Higher the value of XED (ignoring the sign), greater the complementarity.

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* Income Elasticity of Demand (YED) Y = Income

$$YED = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}} = \frac{\%\Delta QD}{\%\Delta Y}$$

→ The Income Elasticity of Demand measures the proportionate response of quantity demanded to a proportionate change in the buyer's income.

→ YED can be either positive or negative, unlike PE

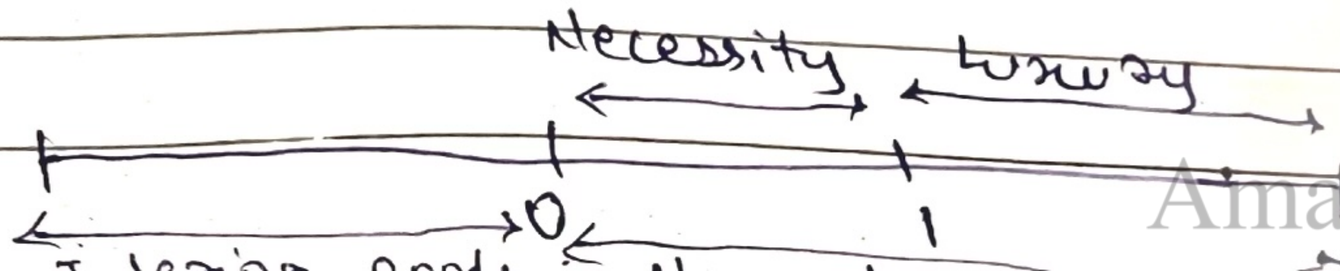
→ If the YED is positive, it is a normal good as increase in income, leads to increase in dem

→ If the YED is negative, it is a inferior good as increase in income, leads to decrease in demand.

→ If the YED is more than 0 but less than 1, it is a necessity good as increase in income increase the demand but not by a greater perc

→ If the YED is more than 1, it is a luxury good increase in income leads to greater increase in the quantity demanded of the product.

→ If YED is greater than 1, the good is said to be income-elastic or luxury good. If YED less than 1 but greater than 0, the good is said to be income-inelastic, or necessity goo If YED is less than 0, the good is inferior good



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→ Perfectly inelastic supply is when the PES = 0, as the quantity supplied cannot be increased (in the short run), so the supply is fixed and there is no change in supply due to a change in price.

→ when the PES = ∞, the supply is said to be perfectly price-elastic
A very small increase in price brings an infinite change in supply, whilst a very small decrease in price would lead to the quantity supplied becoming zero.

→ when PES = >1, the supply is said to be price-elastic.
A percentage change in price will bring about a larger percentage change in quantity supplied.

→ when PES = 1, the supply is said to be unit price-elastic
A percentage change in price brings an identical change in percentage of quantity supplied.

→ when PES = <1, the supply is said to be price-inelastic
A percentage change in price will bring about a smaller percentage change in quantity supplied.

Perfectly price-inelastic | Unit Price-elastic | Perfectly Price-elastic

0 Price inelastic Price elastic ∞

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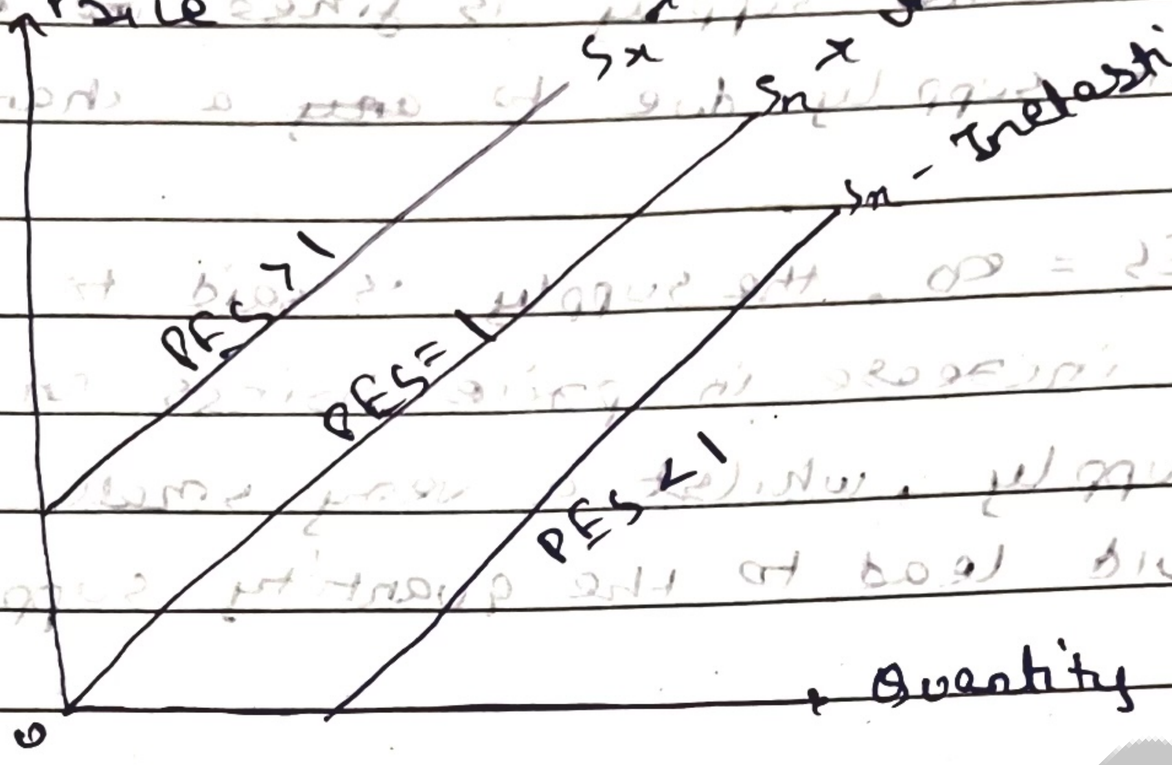
* PES and linear supply



* the Determinants of the PES

+ Time - The longer the time period considered to produce the less price-elastic the supply is. Eg:- agricultural products.

+ the ability to hold stock - is when the product can be held for a longer time, the more elastic the supply. Goods that cannot be stocked have a inelastic supply. Eg:- breads.

+ Availability of inputs - The more readily your input is available, the more elastic the supply is.

+ Availability of substitutes in production - The more substitutes in production the more price-elastic the supply.

+ the existence of barriers to entry or exit - the easier or cheaper it is for sellers to enter or leave the market, the more price-elastic the supply.

* Applications of XED

→ Substitutes produced by the same business - Eg:- Coca-cola and thumbs up in India.

→ Substitutes ~~beg~~ of rival products to help in deciding the prices to be charged. Eg:- Coca and Pepsi.

→ mergers and takeovers : firms would like to take or merge with a business with a higher x so that they eliminate competitiveness in market.

→ complements, so that if the complementary goods increase the prices, the prices of the other goo can be decreased, to minimise the impact on dem

* Price-elasticity of supply

$$PES = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

$$PES = \frac{\%.\Delta QS}{\%.\Delta P}$$

→ The price elasticity of supply measures the ~~responsiveness~~ proportionate response of quantity supplied to a proportionate change in the price the good or service.

→ PES will ~~also~~ always be positive.