

ELASTICITY

IN GENERAL CONCEPT,

ELASTICITY IS A MEASURE TO TELL US ABOUT SENSITIVENESS OF ONE VARIABLE TO A CHANGE IN ANOTHER VARIABLE.

ELASTICITY = $\frac{\% \Delta Y}{\% \Delta X}$ → PERCENTAGE CHANGE IN VARIABLE Y
→ PERCENTAGE CHANGE IN VARIABLE X

$Y_1 = 100$
 $Y_2 = 120$
 $\Delta Y = Y_2 - Y_1 = 120 - 100 = 20$
 $\% \Delta Y = \frac{Y_2 - Y_1}{Y_1} \times 100$
 $= \frac{120 - 100}{100} \times 100$
 $= 20$
 $\therefore Y$ RISES BY 20%

$= \frac{(Y_2 - Y_1)}{Y_1} \times 100$
 $= \frac{120 - 100}{100} \times 100$
 $= 20$
 $\therefore Y$ RISES BY 20%

ELASTICITY = $\frac{\Delta Y}{\Delta X} \cdot \frac{X}{Y}$

= SLOPE OR RATE OF CHANGE

RECALL THAT

$E = \frac{\Delta Y}{\Delta X}$

OBJECTIVE: WE WANT TO BE ABLE TO ANSWER THIS KIND OF QUESTION:

IF X CHANGES BY 1%, Y WILL CHANGE BY ? %.

OR IF X → 10%, Y → ? %.

EXAMPLE:

X → PRICE

Y → QUANTITY DEMANDED

IF PRICE (X) RISES BY 1%, QUANTITY DEMANDED WILL FALL BY ? %

$\% \Delta X = 10\%$
 $\% \Delta Y = 60\%$

vs.

$\% \Delta X = 10\%$
 $\% \Delta Y = 2\%$

$E = \frac{\% \Delta Y}{\% \Delta X} = \frac{60\%}{10\%} = 6$

$E = \frac{\% \Delta Y}{\% \Delta X} = \frac{2\%}{10\%} = 0.2$

Q: WHY ELASTICITY?

A: LOOK AT "THE RESPONSIVENESS OF QUANTITY DEMANDED FOR GOOD X WHEN PRICE OF GOOD X CHANGES..."

PRICE ELASTICITY OF DEMAND (E^p) = $\frac{\% \Delta Q_x^d}{\% \Delta P_x}$

$|E^p| = \left| \frac{\% \Delta Q_x^d}{\% \Delta P_x} \right|$

-50%
110%
↓
-5

IF $|\% \Delta Q_x^d| > |\% \Delta P_x|$, THEN $|E| > 1$

→ "DEMAND IS PRICE-ELASTIC", i.e., BUYERS ARE VERY RESPONSIVE TO CHANGE IN PRICE

EX: $|E| = 3 \rightarrow 10\%$ RISE IN PRICE LEADS TO MORE THAN 10% FALL IN Q^d . (HERE, 30%)

$|\% \Delta Q| > |\% \Delta P|$
 $|-30\%| > |10\%|$

IF $|\% \Delta Q_x^d| < |\% \Delta P_x|$, $|E| < 1$

Q DEMAND IS SAID TO BE **PRICE-INELASTIC**,
 i.e., BUYERS ARE NOT SENSITIVE TO
 CHANGE IN PRICE.

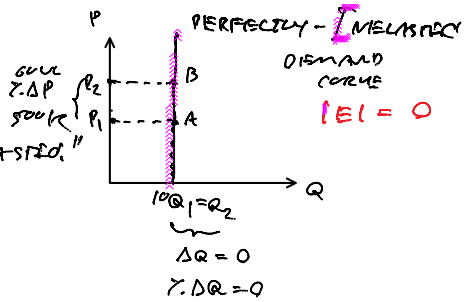
EX: $|E| = 0.1 \Rightarrow 10\% \text{ INCREASE IN } P$
 LEADS TO ONLY $1\% \text{ DECREASE IN } Q^d$
 OR
 $1\% \text{ INCREASE IN } P$
 LEADS TO ONLY $0.1\% \text{ DECREASE IN } Q^d$.

IF $|\% \Delta Q^d| = |\% \Delta P_x| \Rightarrow |E| = 1$.

DEMAND IS SAID TO BE "UNITARY-ELASTIC."

IF $|\% \Delta Q^d| = 0$ AND $|\% \Delta P_x| = \text{ANY VALUE}$,
 THEN $|E| = \frac{0}{|\text{ANY}|} = 0$.

DEMAND IS SAID TO BE "PERFECTLY-INELASTIC."




CONSUMERS PAY NO ATTENTION ON
 PRICE CHANGE.

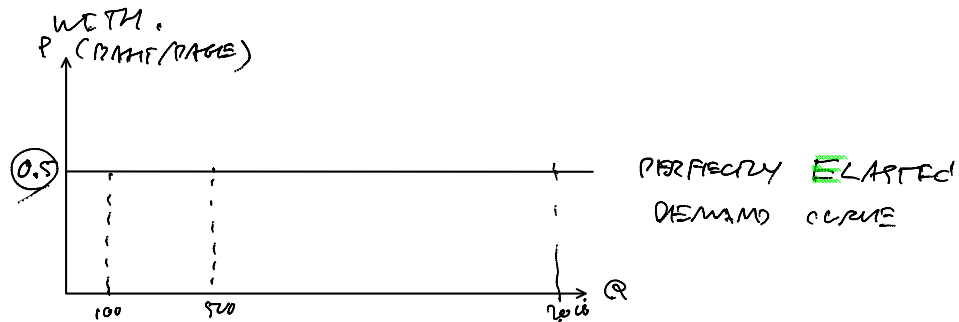
IF $|\% \Delta Q| = \text{"EXTREMELY LARGE"}$ AND
 $|\% \Delta P| = \text{"SMALL"}$, THEN

$$|E| = \frac{|\text{EXTREMELY LARGE}|}{|\text{SMALL}|} = \infty \text{ (INFINITY)}$$

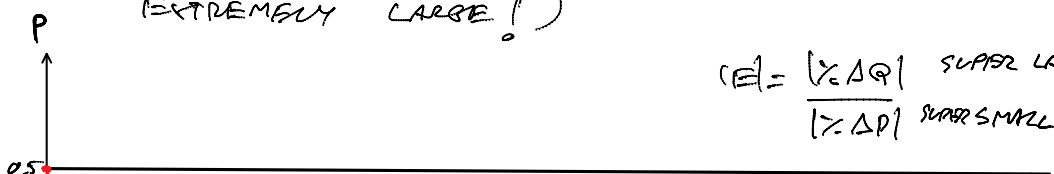
DEMAND IS SAID TO BE "PERFECTLY ELASTIC."

= BUYERS ARE SUPER SENSITIVE TO A PRICE CHANGE.

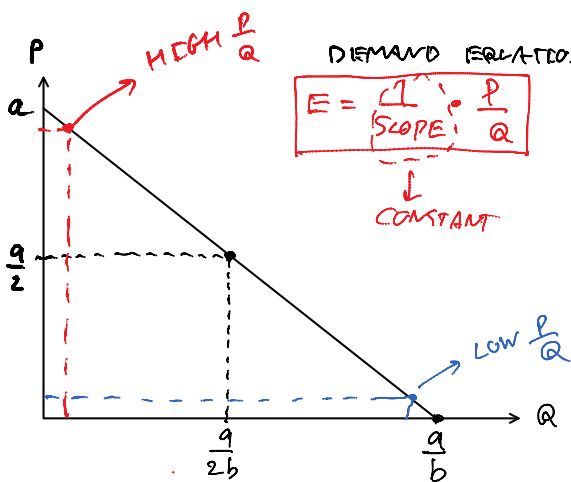
EX:  OWNER OF PHOTO-COPY SHOP DOWNSTADS,
 HE FACES W/ A LARGE NUMBER OF BUYERS.
 THERE ARE MANY SELLERS TOO.
 THE PRODUCT IS NON-DIFFERENTIATED.
 LOOK AT THE DEMAND CURVE HE IS FACED



- AS LONG AS HE SELLS AT $P = 0.5$ BAH/ PAGE, HE CAN SELL AS MUCH AS HE WANT
- IF HE CHARGES HIGHER THAN 0.5 BAH/ PAGE, HE FINDS NO SALES ($Q^d = 0$) ☹️
- IF HE CHARGES LOWER THAN 0.5 BAH/ PAGE, HIS SHOP WILL BE EXPLODED, (Q GETS EXTREMELY LARGE!)



$$|E| = \frac{|\% \Delta Q| \text{ SUPER LARGE}}{|\% \Delta P| \text{ SUPER SMALL}} = \infty$$



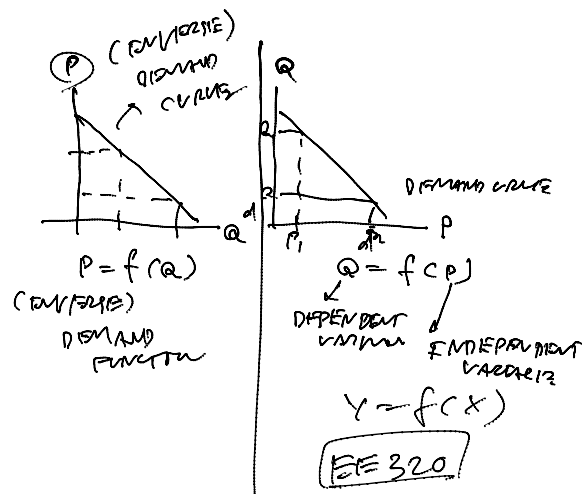
DEMAND EQUATION $P = a - b \cdot Q$

$E = \frac{1}{\text{SLOPE}} \cdot \frac{P}{Q}$

CONSTANT

INTERCEPT SLOPE

$\frac{\Delta P}{\Delta Q} = -b = \text{SLOPE}$



$$E = \frac{\% \Delta Q}{\% \Delta P}$$

$$= \frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta P}{P} \times 100}$$

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

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

SINCE $\frac{\Delta P}{\Delta Q} = \frac{\text{SLOPE}}{1} > \frac{\Delta Q}{\Delta P} = \frac{1}{\text{SLOPE}}$

PRICE ELASTICITY OF DEMAND FORMULA CAN BE REWRITTEN AS

$E = \frac{1}{\text{SLOPE}} \cdot \frac{P}{Q}$ OR $|E| = \left| \frac{1}{\text{SLOPE}} \cdot \frac{P}{Q} \right|$

FACT #1 ELASTICITY AND SLOPE OF THE DEMAND CURVE ARE **NOT** THE SAME THING. SLOPE IS JUST A PART OF THIS FORMULA.

FACT #2 PRICE ELASTICITY OF DEMAND CURVE **VARIES** ALONG A DEMAND CURVE, I.E., **DIFFERENT POINTS** ALONG THE CURVE GIVES **DIFFERENT VALUE** OF PRICE ELASTICITY OF DEMAND.

