

Chapter 6

Elasticity

المرونة

Apr. 13. 20

Monday

* $P \uparrow \Rightarrow Q_d \downarrow$, by how much?

$\Rightarrow$ Elasticity: the degree of responsiveness, sensitivity of consumer to change in price.

$P \uparrow \Rightarrow Q_d \downarrow \downarrow \downarrow$ "elastic" $\rightarrow$ eg. perfume

$P \uparrow \Rightarrow Q_d \downarrow$ "less elastic" $\rightarrow$ eg. salt

(مستجيب نوع إسلطة) $\leftarrow$ الطلب على بقل ليس من درجة ما نستجيب به بقل

(خاصة الفخمة والغالية) $\leftarrow$ بقل الكمية المطلوبة بشكل أكبر
 $\rightarrow$ more elastic.

* Price elasticity of demand: the percentage change in the quantity demanded of a good in response to 1 percent change in its price

* If the consumer is relatively responsive to price change, demand is said to be elastic: perfume, restaurant meals

* If the consumer is relatively unresponsive to price change, demand is said to be inelastic: medicine; gasoline

eg: \$100 : 1000 units
(ازداد السعر) \$101 : 999 units $\rightarrow \frac{1}{1000} \Rightarrow$ inelastic (الطلب قليل)
500 units $\rightarrow \frac{1}{2} \Rightarrow$ elastic (الطلب كثير)

$$E_d = \frac{\% \Delta Q_d}{\% \Delta P}$$

①

منحل ① أو ②
"حسب السؤال"

$$E_d = \frac{Q_2 - Q_1}{Q_2 + Q_1} * \frac{P_2 + P_1}{P_2 - P_1}$$

②

أرقام

②

نسب

①

eg :-

Price	Qd
5	1
4	2
3	3
2	4
1	5

⇒ Calculate the price elasticity of demand for the price decrease from \$5 to \$4.

→ ②

$$\text{sol :- } \frac{2-1}{2+1} * \frac{4+5}{4-5} = \frac{1}{3} * \frac{9}{-1} = -3$$

Law of Elasticity

$$|E_d| = |-3| = 3$$

"خارج واحد"

e.g :- Suppose that the price elasticity of demand for perfume has been estimated at -5, if the Qd increase by 10%, by how much the price have change? → ①

$$\text{sol :- } E_d = \frac{\% \Delta Q_d}{\% \Delta P} \Rightarrow -5 = \frac{10\%}{\% \Delta P}$$

$$\% \Delta P = -2\%$$

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* Sensitive for change in price :-

$P \uparrow \Rightarrow Q_d \downarrow$: inelastic (like medicine)

$P \uparrow \Rightarrow Q_d \downarrow \downarrow \downarrow$: elastic (like perfumes, meals)

* $E_d = \left| \frac{-1}{3} \right| = \frac{1}{3} = \frac{\% \Delta Q_d}{\% \Delta P} \rightarrow$ If price increase by

3% ; Q_d will decrease by 1% $\Rightarrow$ Interpret .
or: decrease increase (عكس اتجاه السعر)

* $E_d = 3 \Rightarrow 3 = \frac{3}{1} = \frac{\% \Delta Q_d}{\% \Delta P}$

$\rightarrow$ If price increases by 1% , then Q_d will decrease by 3%.

* $E_d > 1$; demand is elastic ($\% \Delta P < \% \Delta Q_d$)

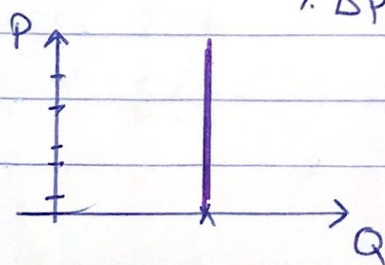
$E_d < 1$; demand is inelastic ($\% \Delta P > \% \Delta Q_d$)

$E_d = 1$; demand is unit elastic ($\% \Delta P = \% \Delta Q_d$)

* Extreme cases:

1. Perfect inelastic : (eg: insulin) $\rightarrow$ Whatever price change (even large), results no change in Q_d .

$E_d = \frac{\% \Delta Q_d}{\% \Delta P} = \frac{\text{Zero}}{\% \Delta P} = \boxed{\text{Zero}}$ (perfect)



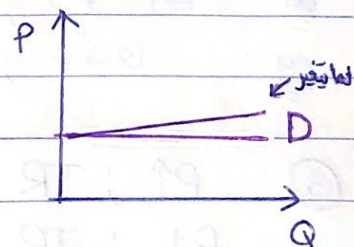
"vertical" عودي

2. Perfectly elastic :

$$E_d = \frac{\% \Delta Q_d}{\% \Delta P} = \frac{\text{large number}}{0.1\%} = \infty$$

Demand curve : "Horizontal أفقي"

التغير صغير كثير (الكمية بتغير قليلة كثير)



* Total revenue test (TR) : the total amount received by seller from a sale of product .

① $TR = P \cdot Q \Rightarrow$ If total revenue changes in opposite direction from price, Demand is elastic .

$P \downarrow \Rightarrow TR \uparrow \Rightarrow$ Demand is elastic

for example :- $TR_1 = 10 \times 10 = 100$ لأنوا Q زادت
 $TR_2 = 5 \times 40 = 200$ نسبة أكبر من نسبة
 التي قل فيها السعر (Price)

$$\% \Delta Q_d \uparrow > \% \Delta P \downarrow$$

$$300\% > 50\% \rightarrow \text{elastic}$$

eg

P	Q	TR
2	10	20
1	40	40

$\rightarrow P \downarrow ; TR \uparrow$
 $(2 \rightarrow 1) ; TR (20 \rightarrow 40)$

elastic .

(الأسهم عكس بعض ← elastic)

② If price and TR change in same direction $\Rightarrow$ inelastic
(الأسعار بنفس الاتجاه $\leftarrow$ inelastic)

$\Rightarrow P \downarrow ; TR \downarrow$

eg: $(2 \rightarrow 1) ; (20 \rightarrow 14)$ inelastic.

③ $P \uparrow ; TR : \text{no change}$
 $P \downarrow ; TR : \text{no change}$ } $\Rightarrow$ Unit elastic

* Determinants of price elasticity of demand:

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1- Substitute of product, more sub., more elastic

$\Rightarrow P_p \uparrow \rightarrow Q_d \downarrow \downarrow \downarrow \downarrow$ "elastic"

eg: P cigarettes (سجائر) $\uparrow \Rightarrow Q_d \downarrow$: ليس من كثر
مشايح مائي - المشايح بالرائل.

P salt $\uparrow \Rightarrow Q_d \downarrow$ "inelastic"

P medicine $\uparrow \Rightarrow Q_d \downarrow$ "inelastic"

2- Proportion to price relative to income : $\rightarrow$

مقدار النسبة الى الدخل

$\frac{\text{Price of salt}}{\text{income}} = \frac{15}{4000} \downarrow$ (for example) $\rightarrow$ inelastic

$\leftarrow$ عندما ارتفع سعر الملح ، مارج بالتركيش ، لأن سعره

منخفض بالنسبة للدخل ، أم لا :

$\frac{\text{Price of cars}}{\text{income}} = \frac{50,000}{48,000} \uparrow \rightarrow$ elastic

move

elastic $\leftrightarrow$ Budget النسبة الى expenditure $\leftrightarrow$

⇒ more expenditure relative to one budget ⇒ more elastic

⇒ Proportion ↓, elasticity ↓ (eg: salt)
↳ "less expenditure"

⇒ Proportion ↑ "more expenditure", elasticity ↑ (cars)

3- Whether the product is luxury or necessity.

more elastic ← → less elastic
eg: Vacations & electricity
 $P \uparrow, Q_d \downarrow \downarrow$ $P \uparrow, Q_d \downarrow$
⇒ Relatively elastic, ↳ less elastic

4- The amount of time involved, the larger the time period involved more elastic

$P_x \uparrow \Rightarrow$ "short run" $\Rightarrow$ "inelastic"

$P_x \uparrow \Rightarrow$ "long run" $\Rightarrow$ "elastic"

⇒ The larger the time period ⇒ more elastic.

* Price elasticity of supply:

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$$E_s = \frac{\% \Delta Q_s}{\% \Delta P}, \quad P \uparrow \Rightarrow Q_s \uparrow, \quad E_s > 0$$

(تأني)

$\Rightarrow Q_s$ responsive to price change $\Rightarrow$ supply is elastic

$\Rightarrow Q_s$ is unresponsive to price change $\Rightarrow$ supply is inelastic

* $E_s > 1$; Supply elastic

$E_s < 1$; Supply inelastic

$E_s = 1$; Unit elastic

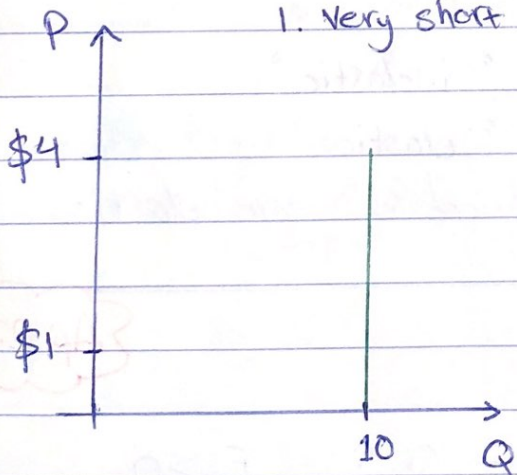
$$E_s = \frac{\% \Delta Q_s}{\% \Delta P} = \frac{2\%}{1\%} \Rightarrow \text{Elastic}$$

لأن التغير في السعر أعقبه
تغير في Q_s ونسبة أكبر من 1

$$E_s = \frac{0.5\%}{1\%} \Rightarrow \text{inelastic}$$

~~✱~~ Immediate market period; time is too short for producer to respond with a change in Q_s (1 night).

1. Very short run :-



$\frac{0}{\% \Delta P} \Rightarrow$ Perfect inelastic

لأنه لا يتغير

أردت الإنتاج (Q_s)

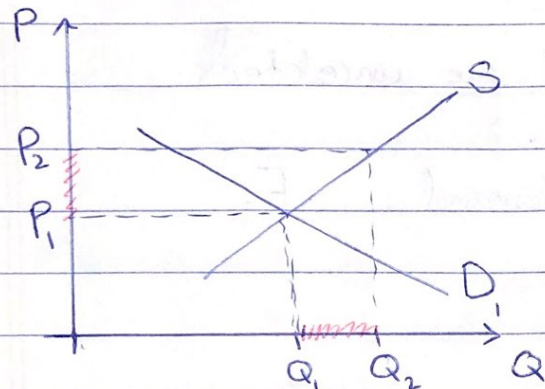
في يوم وليلة

بعد ارتفاع الأسعار

(مثل الزراعة مثلاً)

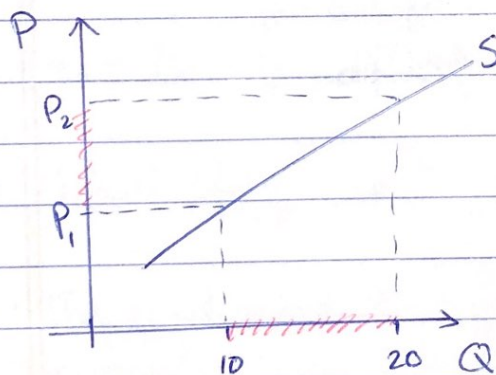
Impact time on supply : الوقت
elasticity : 1, 2,

2. Short run: too short to change plant capacity but long enough to use the fixed size more or less intensively ($\bar{a}, \bar{b}, \bar{c}, \bar{d}, \bar{e}, \bar{f}, \bar{g}, \bar{h}, \bar{i}, \bar{j}, \bar{k}, \bar{l}, \bar{m}, \bar{n}, \bar{o}, \bar{p}, \bar{q}, \bar{r}, \bar{s}, \bar{t}, \bar{u}, \bar{v}, \bar{w}, \bar{x}, \bar{y}, \bar{z}$).



$P \uparrow \Rightarrow Q_s \uparrow$
elastic

3. Long run: time long enough to change even plant size ($\bar{a}, \bar{b}, \bar{c}, \bar{d}, \bar{e}, \bar{f}, \bar{g}, \bar{h}, \bar{i}, \bar{j}, \bar{k}, \bar{l}, \bar{m}, \bar{n}, \bar{o}, \bar{p}, \bar{q}, \bar{r}, \bar{s}, \bar{t}, \bar{u}, \bar{v}, \bar{w}, \bar{x}, \bar{y}, \bar{z}$) $\Rightarrow$ more and more elastic.



* Cross elasticity of demand:-

x, y : goods.

$$E_{xy} = \frac{\% \Delta Q_y}{\% \Delta P_x}$$

- ① $E_{xy} > 0$; $\frac{\% \Delta Q_y \uparrow}{\% \Delta P_x \uparrow}$; $\therefore x, y$ are substitutes.

⇒

① $E_{xy} > 0$; x, y are subs. ... PoP, KFC

② $E_{xy} < 0$; x, y are complements مثل الطماطة والخيار

③ $E_{xy} = 0$; x, y are unrelated.

* Income elasticity of demand : E_I

$$E_I = \frac{\% \Delta Q_d \uparrow}{\% I \uparrow}$$

⇒ ① $E_i > 0$; normal "superior" (المتفرد، في الاتجاه)

② $E_i < 0$; inferior (المتدني، عكس الاتجاه)