

A. Arnold Book  $\Rightarrow$  1-5 & 17-25  $\Rightarrow$  Micro-economics

Attendance = 51%  $\Rightarrow$  2 class wave

Midterm = 40%

Final = 40%

Quiz (1 out of 2) = 15%

4 out of 5/6 Question  $\Rightarrow$  50-60 minutes

True/False

Fill in Blanks

Graphical Presentation

Simple Math from Elasticity

Chapter 2 & 5 (Partial Points)

Game Theory will not cover

20 minutes

Curve up to 1 mark.

## Syllabus

Quiz-1  $\Rightarrow$  Topic 1-4

Midterm  $\Rightarrow$  Topic 1-6

Quiz-2  $\Rightarrow$  Topic 7-

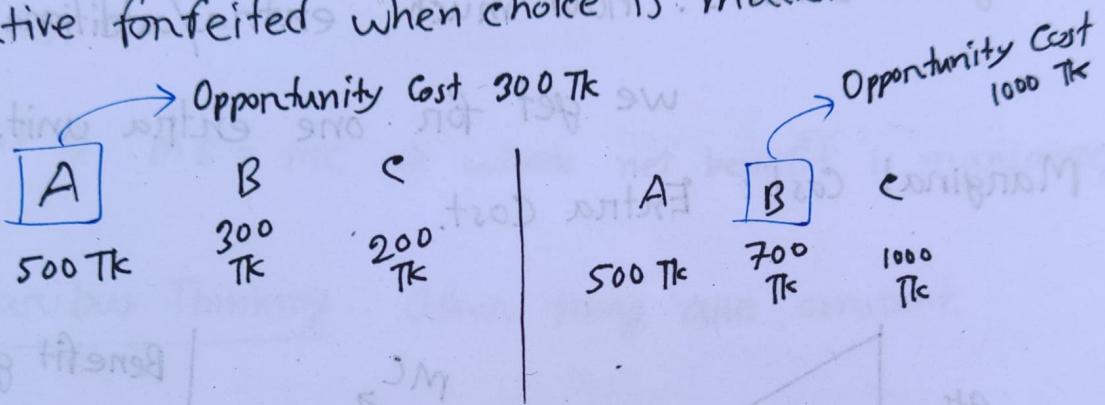
Final  $\Rightarrow$  Topic 7-10

- ⊗ Economics is a subject that,
  - $\Rightarrow$  deals with irrational behaviour
  - $\Rightarrow$  deals with scarcity
- ⊗ Rational  $\Rightarrow$  Logical
- ⊗ Scarcity  $\Rightarrow$  Lack of Limited resources
- ⊗ Because of scarcity we need to make a choice.
  - For choice, we need to trade off.
- ⊗ Scarcity  $\Rightarrow$  Choice  $\Rightarrow$  Trade off  $\Rightarrow$  Competition  $\Rightarrow$  Rationing
  - Opportunity cost  $\Leftarrow$  Device
- ⊗ Rationing Device  $\Rightarrow$  बन्टी वा बरादी
  - $\hookrightarrow$  Price  $\Rightarrow$  Suitable & Stable
  - Lottery
  - FCFS
  - Auction (Open/Blind)
  - Might / Strength / War
  - Beauty

Unstable  
Can make inequality in society

- Economy  $\Rightarrow$
- Pure market economy  $\Rightarrow$  Govt can't control
  - Command economy  $\Rightarrow$  Govt. control
  - Mixed economy  $\Rightarrow$  Mix control

Opportunity Cost: The most highly valued opportunity or alternative forfeited when choice is made.



- ④ Direct Cost Vs Opportunity Cost
- ④ Utility  $\Rightarrow$  Satisfaction
- ④ Disutility  $\Rightarrow$  Dissatisfaction
- ④ Goods vs Bads
- ④ Bads  $\Rightarrow$  Universal Bad  $\Rightarrow$  Population/Traffic/Load shedding  
Individual Bad  $\Rightarrow$  Smoking
- ④ A goods can turn into bads due to over consumption.

Land  $\Rightarrow$  Natural Resources needs for production.

Labour  $\Rightarrow$  Physical and mental talents that people contribute to the production

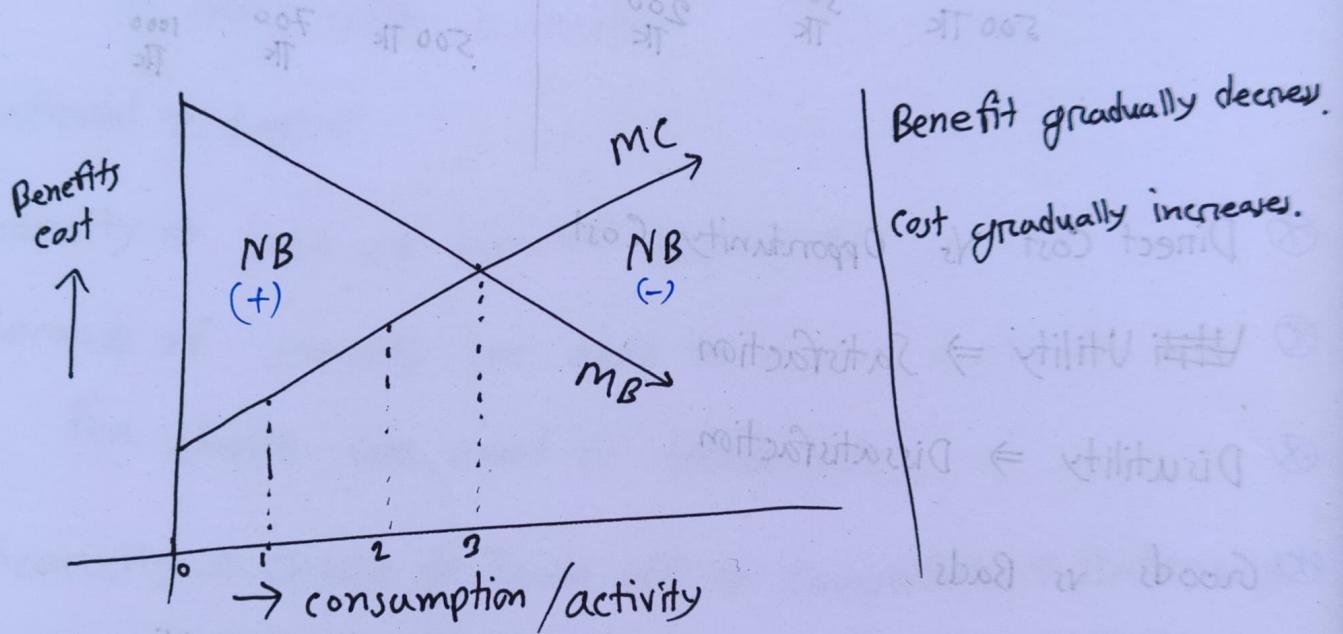
Capital  $\Rightarrow$  All kind of tools that used.

Entrepreneurship  $\Rightarrow$  Entity who organize, take risk and enjoy benefit.

Decision at the Margin  $\Rightarrow$  Cost and Benefit analysis

Marginal Benefits: How much extra/additional benefits we get for one extra unit.

Marginal Cost: Extra cost.



$\Rightarrow$  Extra cost / MC is always constant but we are not getting same benefits. That means opportunity cost is increasing.

MC  $\Rightarrow$  Direct cost + Opportunity Cost

increasing

⊗ As well as  $MB \geq MC$ , we can consume.

⊗ Net Benefit  $\Rightarrow MB - MC$

From slide,

$$MB > MC$$

if we consume 3rd unit, we can maximize our net benefits.

Efficient Point  $\Rightarrow MB = MC \Rightarrow$  where net benefit is maximize.

⊗ Ceteris Paribus Thinking: Other thing are constant.

⊗ Relation between,

Price vs Quantity

Inverse/Negative Relation holding other thing constant.

→ Ceteris Paribus

Income vs Consumption

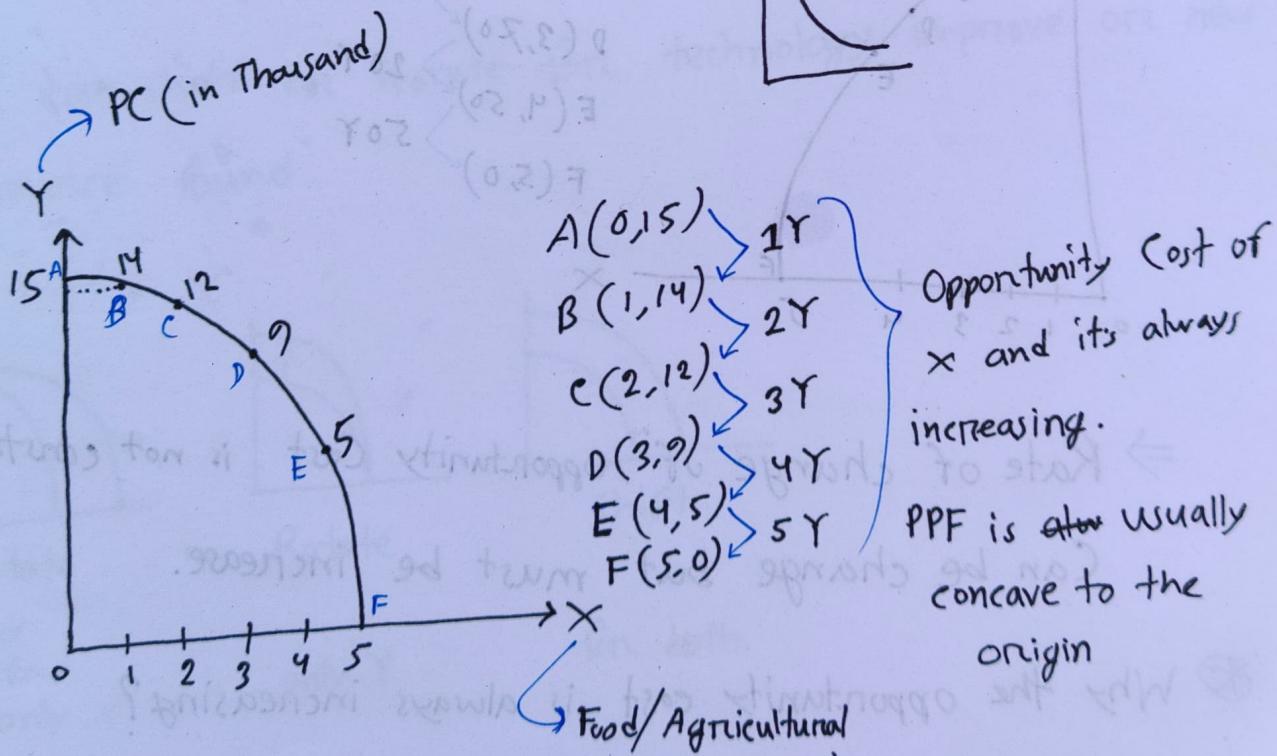
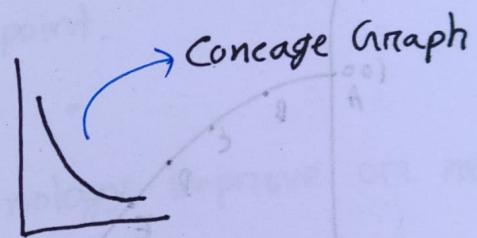
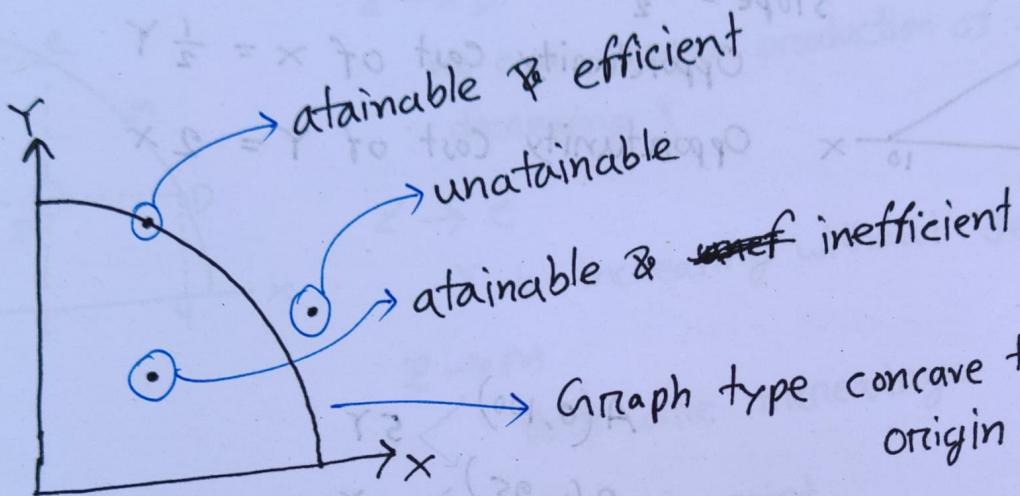
Positive Relation holding other thing constant.

- ⊗ Ceteris Paribus: Other thing remaining constant.
- ⊗ Economic Categories:
  - i Positive Economics  $\Rightarrow$  What is happening / what is the relationship
  - ii Normative Economics  $\Rightarrow$  What should be / Value judgment or Opinion.
- ⊗ Microeconomics: Individual behaviour, single service, single market, single industry, single factory etc.
- ⊗ Macroeconomics: Aggregate market, total production, total consumption, its a branch of economics.

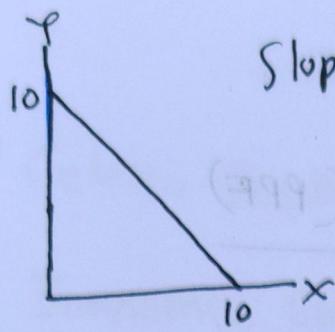
## Chapter - 2

### Production Possibilities Frontier (PPF)

⊗ PPF on PPC



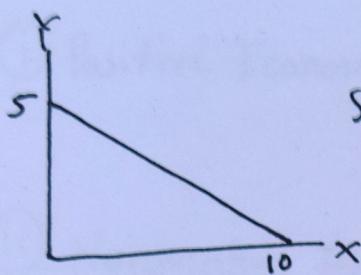
⊗  $X, Y$  can be any goods.



Slope =  $-1$

Opportunity Cost of  $X = 1Y$

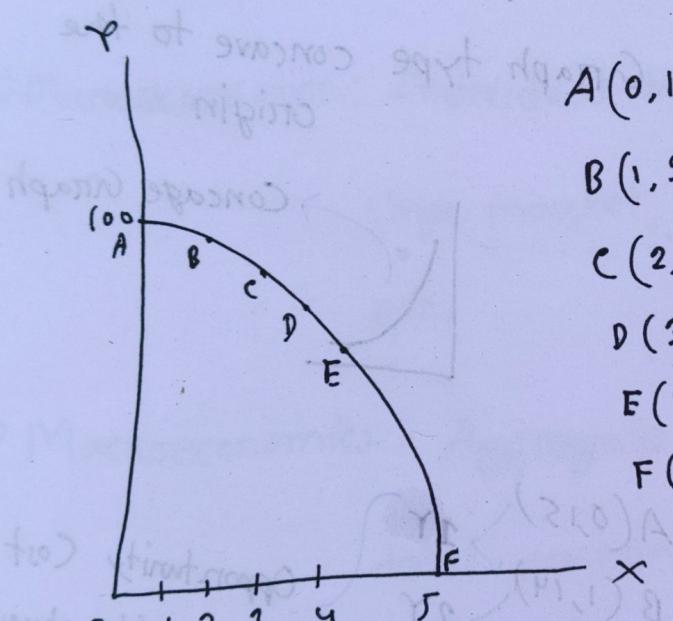
Opportunity Cost of  $Y = 1X$



Slope =  $-\frac{1}{2}$

Opportunity Cost of  $X = \frac{1}{2}Y$

Opportunity Cost of  $Y = 2X$



- $A(0, 100)$   $\rightarrow 5Y$
- $B(1, 95)$   $\rightarrow 10Y$
- $C(2, 85)$   $\rightarrow 15Y$
- $D(3, 70)$   $\rightarrow 20Y$
- $E(4, 50)$   $\rightarrow 50Y$
- $F(5, 0)$

⇒ Rate of change of Opportunity Cost is not constant.

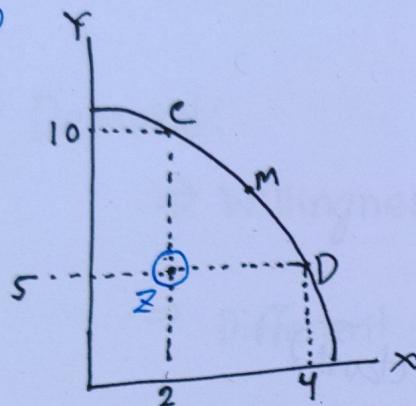
Can be change but must be increase.

Why the opportunity cost is always increasing?

What is PPF? Explain the shape of a PPF.

What is Opportunity Cost?

Law of Increasing Opportunity Cost.



Z → D

We can increase production of X without decreasing Y.

Z → C

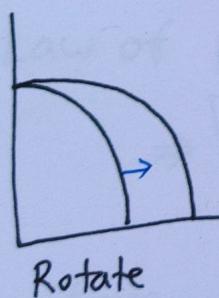
Y is increasing without decreasing X.

Z → M

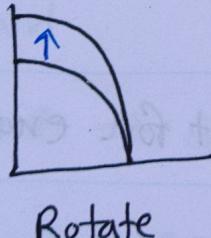
Both are increasing.

Then, Z is not efficient point.

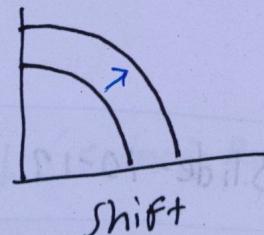
PPF can shift or rotate for technology improve or new resource found.



New technology  
is applicable for  
only X



only Y



for both.

PPF can shift to inward for natural disaster or supply short.



Outward shift  $\Rightarrow$  economic growth

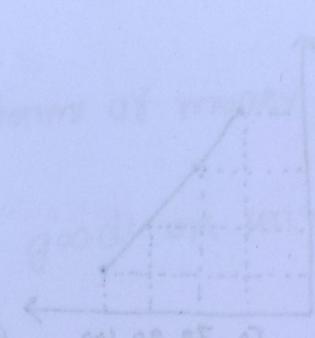
Inward shift  $\Rightarrow$  Negative Growth

Three Economic Questions (most important)

- i. Availability of resource
- ii. Resource & Technology
- iii. Who can pay the price

Depends on Rational Device

Slide-10-13 not for exam

Chapten-3Supply, Demand and Price

(\*) Demand:

⇒ Willingness and ability to pay

⇒ Different Quantity at different price

⇒ A specific period of time.

(\*) Want ⇒ willingness and desired.

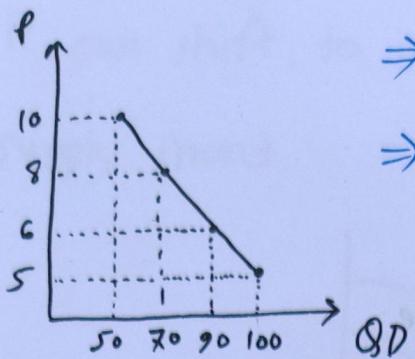
(\*) Quantity Demanded ( $Q_D$ )

⇒ is the quantity that an individual is willing and able to buy at a particular price.

(\*) Law of Demand

⇒ Price ↑ ⇒  $Q_D \downarrow$  (ceteris paribus)

Price	$Q_D(A)$	$Q_D(B)$
10	50	40
8	70	45
6	90	50



⇒ Downward Slope

$$\Rightarrow \frac{\Delta Y}{\Delta X} = -\frac{2}{20} = -\frac{1}{10}$$

✳ Why Law of Demand works?

✳ Why demand curve is downward?

⇒ i) Substitution Effect: want to switch to alternative cheap goods.

ii) Income Effect: Real Income decreases.

iii) Law of Diminishing Utility:

→ If I consume successive units of a good without any interruption at a given time period, then additional satisfaction eventually falls. ~~that that~~ is known as law of Diminishing Utility.

Then, we ~~will~~ not buy additional unit to get less satisfaction.

- Income
- Nominal Income = \$10k (in terms of money)
  - Real Income ⇒ in terms of goods or services.

Nominal Income = 100 Tk

$$\text{Price}_x = 10 \text{ Tk}$$

$$\Rightarrow \text{Real Income} = 10x$$

Real Income decreases

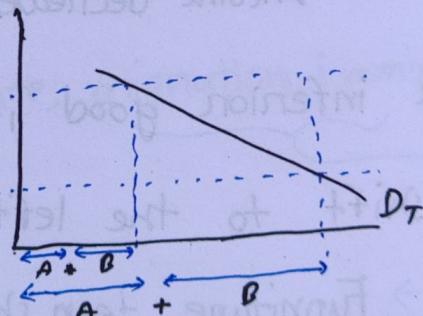
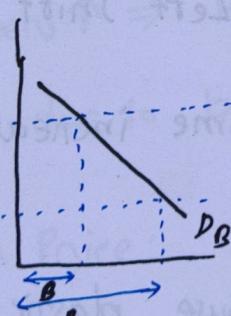
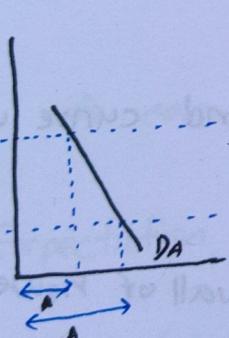
$$\text{Price}_x = 20 \text{ Tk}$$

$$\Rightarrow \text{Real Income} = 5x$$

Market Demand Curve:

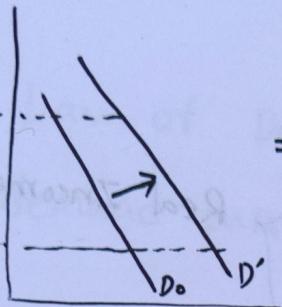
Good - X

$P_x$	A	B	Total A+B
	$\partial D_x$	$\partial D_x$	
5	20	30	50
10	15	20	35
15	7	10	17



⇒ Horizontal Summation

- ⊗ Changing QD  $\Rightarrow$  movement along the curve
- ⊗ Change in Demand  $\Rightarrow$  can be change due to income increase, personal preference etc.



$\Rightarrow$  Right Shift

- ⊗ Change in QD  $\Rightarrow$  Due to goods price
- ⊗ Movement along the curve  $\Rightarrow$  change in goods or service price.

Shift in Demand curve  $\Rightarrow$  change in other factors.

⊗ Shift in Demand Curves:

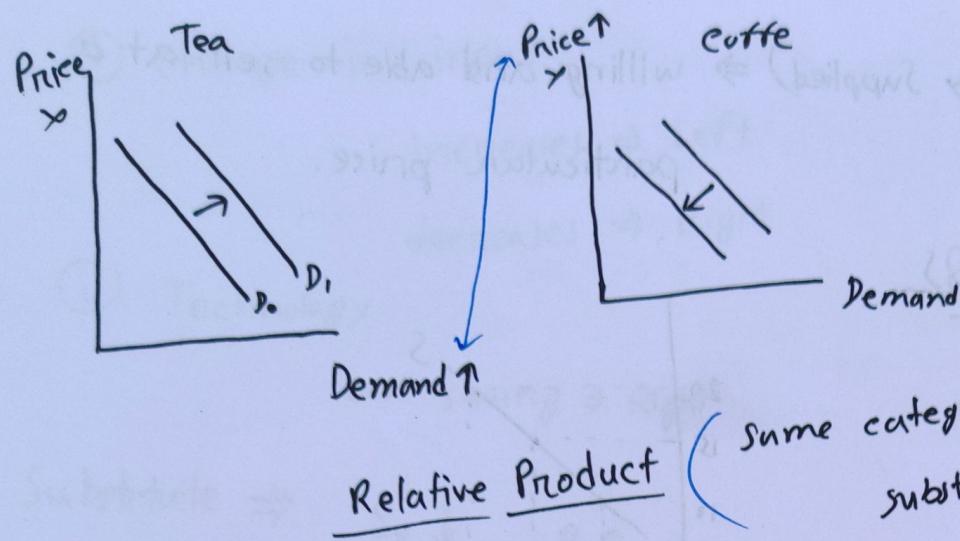
income increase  $\Rightarrow$  Right shift

Income decreases  $\Rightarrow$  Left shift

- ⊗ For inferior good if income increase Demand curve will shift to the left.
- Furniture, teen sheet house, plastic item, wall of house,

- ⊗ Preference: can be influenced by religion.

## (\*) Price of related Good:



⇒ For complementary product,

$$Y \uparrow, D_x \downarrow$$

$Y$  is needed for  
producing  $X$

⇒ Like Lettuce used in Burger

## (\*) Number of Buyers:

Buyers  $\uparrow \Rightarrow$  Demand  $\uparrow$

⇒ can change due to birth rate, migration, immigration

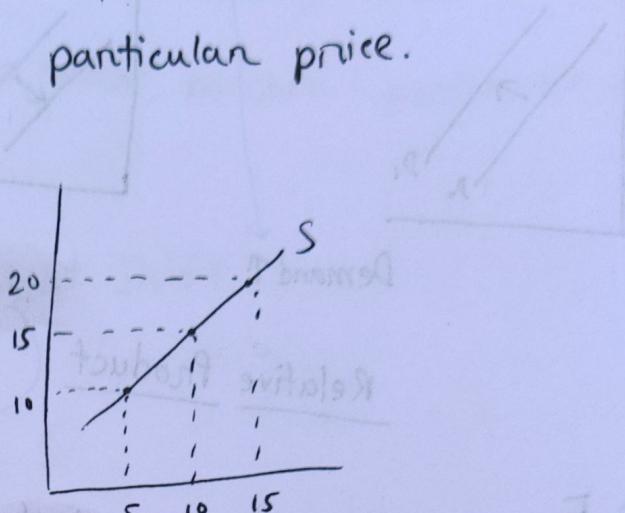
## (\*) Expectation of Future Price:

in future, if price will increase, demand increase right now.

## ⊗ Supply (As a seller)

⇒  $Q_S$  (Quantity Supplied) ⇒ willing and able to sell at a particular price.

P	$Q_S$
10	5
15	10
20	15



## ⊗ Law of supply:

$P \uparrow, Q_S \uparrow, \text{ceteris paribus}$

## ⊗ Why supply curve increases?

### i) Diminishing marginal returns:

⇒ production cost always increases, profit decreases.

⊗ If we don't have enough input or input is constant then curve will be vertical.

⊗ If we don't get enough time, curve will be vertical.

⊗ Market supply curve ⇒ Horizontal summation.

## Change in supply:

### i) Change in input:

increases  $\Rightarrow$  Left

decreases  $\Rightarrow$  Right

### ii) Technology:

cost saving  $\Rightarrow$  Right

### Substitute $\Rightarrow$

$S_x \downarrow, P_y \uparrow$

Complementary  $\Rightarrow S_x \uparrow, P_y \uparrow$

Expectation of future price  $\Rightarrow P \uparrow, S \downarrow$  (Right Now)

Tax  $\uparrow, S \downarrow$

Subsidy  $\uparrow, S \uparrow$

Number of sellers  $\uparrow, S \uparrow$

Price will increase  
 $\rightarrow$  Buyers change margin for up price

$\rightarrow$  Buying firm's buying process

or legal procedures are modified

$\rightarrow$  to transact with firms to whom

$\rightarrow$  Perfect competition Price will automatically

other firms willing to work for it

$\rightarrow$  value for buyers will change and it

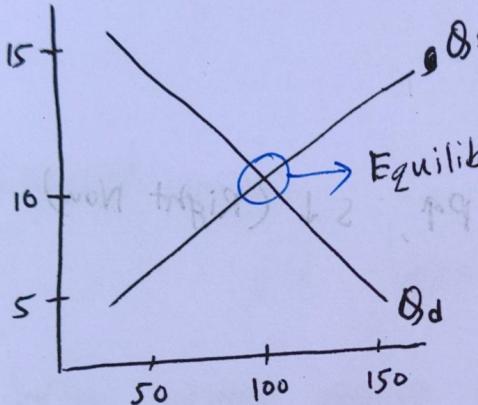
$\rightarrow$  will be affected by other firms willing to work for it

$\rightarrow$  mixed effect on buyers and sellers

$\rightarrow$  buyers have

## The Market

⇒ Market ⇒ is a mechanism where buyers and sellers interact with each other to buy and sell goods and services.



P	$Q_s$	$Q_d$
15	150	50
10	100	100
5	50	150

- ⊗ Equilibrium Price: Price at which ~~quantity~~  $Q_d$  is equal to  $Q_s$ .  
OR,  
Market clearing price.
- ⊗ Equilibrium Quantity: Quantity at which the amount of the good that buyers are willing and able to buy equals the amount that sellers are willing and able to sell and both equal the amount ~~not actually bought~~ and sold.

 Surplus: A condition at which quantity supplied is greater than the quantity demanded is called surplus.

⇒ Price = 15

$$Q_d = 50 \quad } \quad Q_d < Q_s$$

$$Q_s = 150 \quad }$$

$$\text{Surplus} = 150 - 50 \\ = 100$$

⇒ for surplus, price of goods will fall.

⇒ for price falls,  $Q_d$  will increase and  $Q_s$  will fall.

⇒ Price will drop until the curve reach to the equilibrium position.

### Shortage:

$Q_d > Q_s \Rightarrow$  Price will increase.

⇒ Buyers are the reason for up price.

⇒ There can be a betting process.  
or, illegal buy-sell.

⇒ Perfect competition: Price will automatically  
restor to equilibrium.

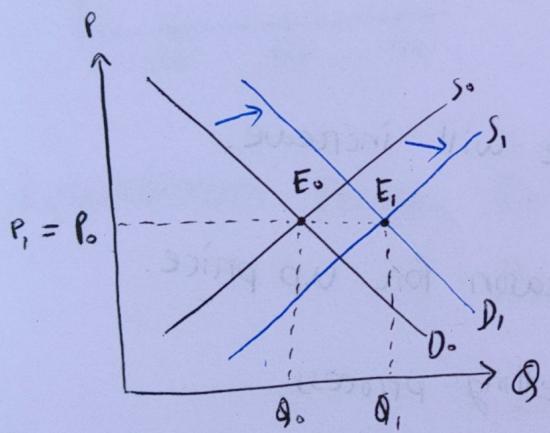
⇒ In other system, it will take time to restone.

- Why does the price fall when there is a surplus?
- Why does the price rise when there is a shortage?

⇒ Mutually beneficial exchange drives the market towards equilibrium.

- What happens?

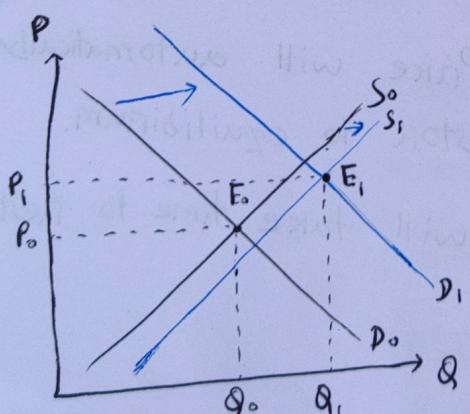
# buyers ↑  
# sellers ↑



shift of demand = shift of supply

Price Same

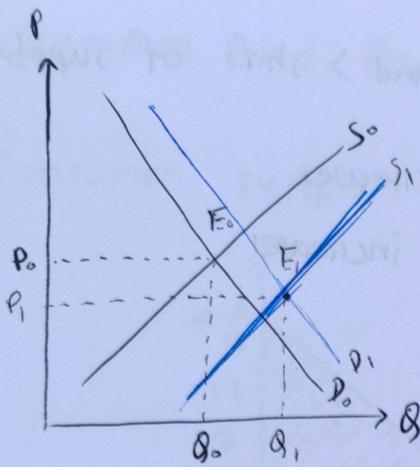
Quantity increases



shift of demand > shift of supply

Price increases

Quantity increases



shift of demand < shift of supply  
 Price decreases  
 Quantity increases.

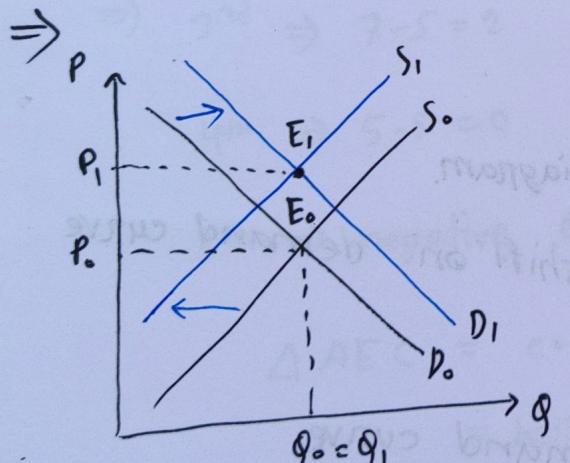
Conclusion: Quantity will increase and price might be increase or decrease or remain same.

✳ We need to draw all three cases and gives a conclusion.

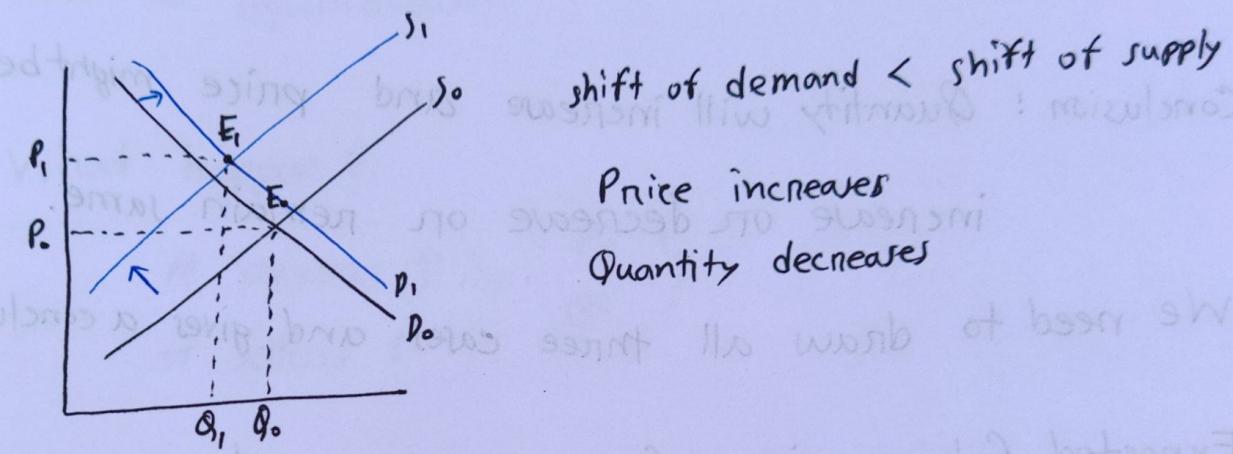
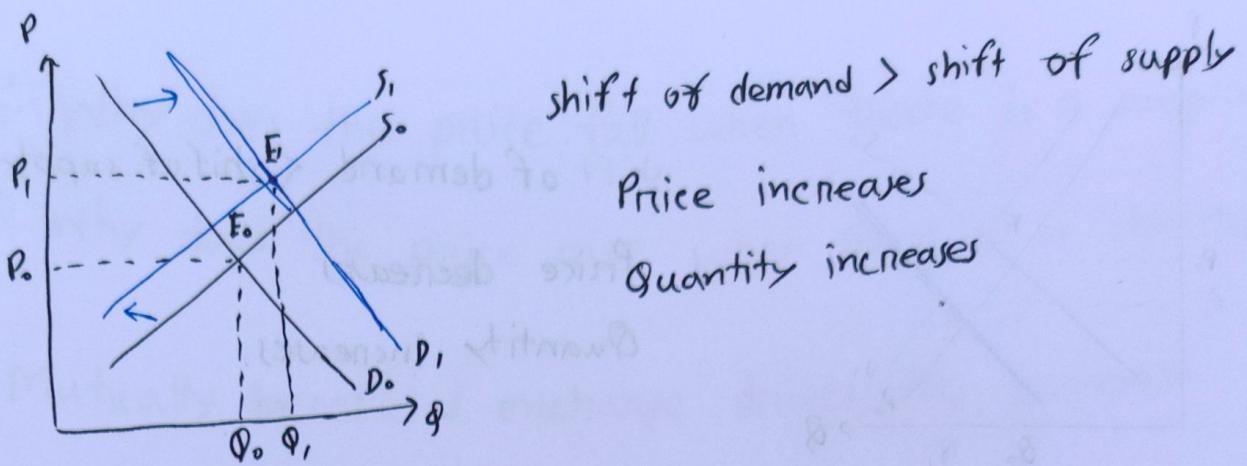
✳ Expected future price of X has increased.

$\Rightarrow$  Demand curve will shift to the right

$\Rightarrow$  Supply curve will shift to left



Shift of demand = shift of supply  
 Price increases  
 Quantity remain same



Conclusion: Equilibrium price will increase and the quantity might increase, same or decrease.

### \* Buyer increase:

⇒ There will be only one diagram.

⇒ There will be a right shift on demand curve

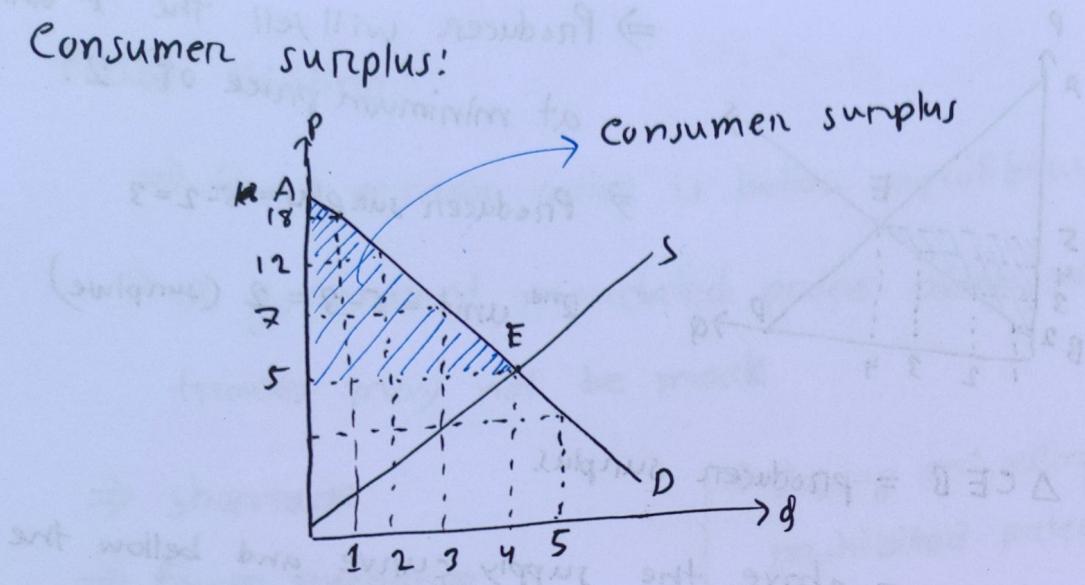
### \* Substitute Price decreases:

⇒ left shift on the demand curve

⇒ only one diagram.

## Consumer and Producer Surplus

### Consumer surplus:



⇒ for first unit, consumer willing and able to pay 18, but market price is 5.

$$\text{Then consumer surplus} = 18 - 5 = 13$$

⇒ for 2<sup>nd</sup> unit,

$$\text{consumer surplus} = 12 - 5 = 7$$

$$\Rightarrow 3^{\text{rd}} \Rightarrow 7 - 5 = 2$$

$$4^{\text{th}} \Rightarrow 5 - 5 = 0$$

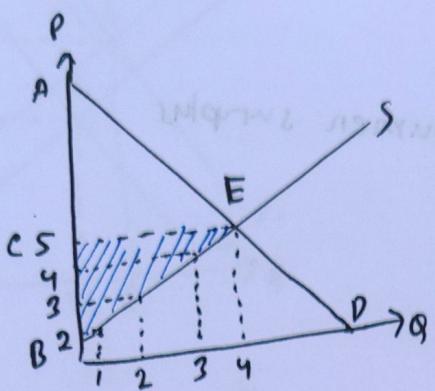
5<sup>th</sup> ⇒ negative, don't want to buy

$\triangle AEC$  = consumer surplus.

= below the demand curve and above the price line

Diff<sup>n</sup> ⇒ Maximum buying price - Price paid.

## ④ Producer surplus:



⇒ Producer will sell the 1<sup>st</sup> unit at minimum price of 2.

⇒ Producer surplus = 5 - 2 = 3

2<sup>nd</sup> unit = 5 - 3 = 2 (surplus)

⇒  $\triangle CEB$  = producer surplus.

= above the supply curve and below the price line.

Diff' ⇒ Price received - Minimum selling price

$$\$1 = 2 - \$1 = \text{minimum selling price}$$

⑤ Total Surplus = Consumer surplus + Producer surplus

⑥ Dead Weight Loss (DWL): missing from maximum surplus.

Diagram from slide - 29

Consumer surplus = 1 =  $\triangle CEA$

Producer surplus = 2,4

DWL for society = 3,5

## Price Control strategies:

### Price Ceiling:

⇒ Govt max price is below equilibrium.

⇒ a government mandated price above which legal trades may not be made.

⇒ shortage

⇒ Fewer exchange

⇒ Non-price rationing device

⇒ Buying and selling at a prohibited price

⇒ Tie in sales (Like BOGO)

⇒ To help buyers

### Price floor:

⇒ Govt minimum price is above the equilibrium.

⇒ Government mandated minimum price below which legal trades cannot be made.

⇒ Surplus

⇒ fewer exchange

⇒ Dead Weight Loss

⇒ To help supplier

## Elasticity

### Price Elasticity of Demand:

- A measure of the responsiveness of quantity demanded to changes in price.

- measured by dividing the percentage change in the quantity demanded of a good by the percentage change in its price

Economists compute price elasticity of demand using midpoints as the base values of changes in prices and quantities demanded.

$$E_d = \text{Elasticity of Demand}$$

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

$$= \frac{\frac{\% \Delta Q_d}{Q_d \text{ average}}}{\frac{\Delta P}{P \text{ average}}}$$

~~(\*)~~  $\frac{P}{Q_d}$   $\leftarrow Q = P\right.$   
 \$5 P\_1 20 Q\_1  
 \$10 P\_2 10 Q\_2

$$E_d = \frac{\frac{Q_2 - Q_1}{Q_d \text{ average}}}{\frac{P_2 - P_1}{P \text{ average}}} = \frac{\frac{Q_2 - Q_1}{\frac{Q_1 + Q_2}{2}}}{\frac{P_2 - P_1}{\frac{P_1 + P_2}{2}}}$$

$$= \frac{\frac{-10}{15}}{\frac{5}{7.5}} = -1$$

~~(\*)~~ Five types of elasticity  $= 1$   
 $E_d > 1 \Rightarrow$  demand is elastic.  
 $E_d < 1 \Rightarrow$  demand is inelastic  
 $E_d = 1 \Rightarrow$  quantity demanded changes proportionally to a change in price.  
 $E_d = \infty \Rightarrow$  quantity demanded is extremely responsive to a change in price.

$E_d = 0 \Rightarrow$  perfectly inelastic

quantity demanded is completely unresponsive to changes in price.



$E_d > 1$ :  
- Elastic  
-  $\Delta Q_d$  changes proportionally

Slide Page - 56

(\*) Slope Vs Elasticity

$$\text{Slope} = \frac{\Delta \text{ Variable on vertical axis}}{\Delta \text{ Variable on horizontal axis}}$$

$$E_d = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$



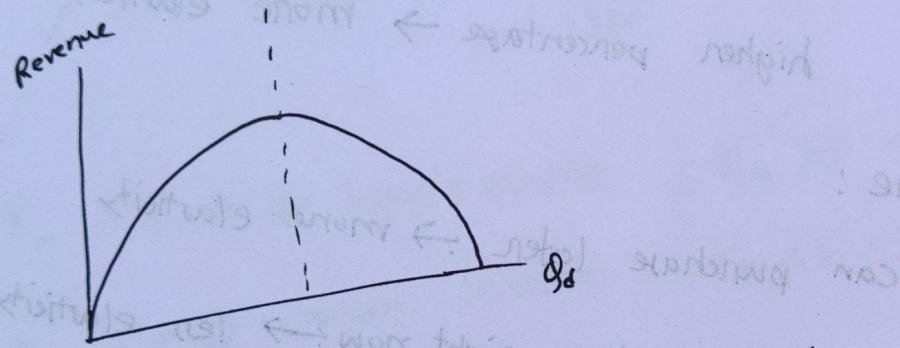
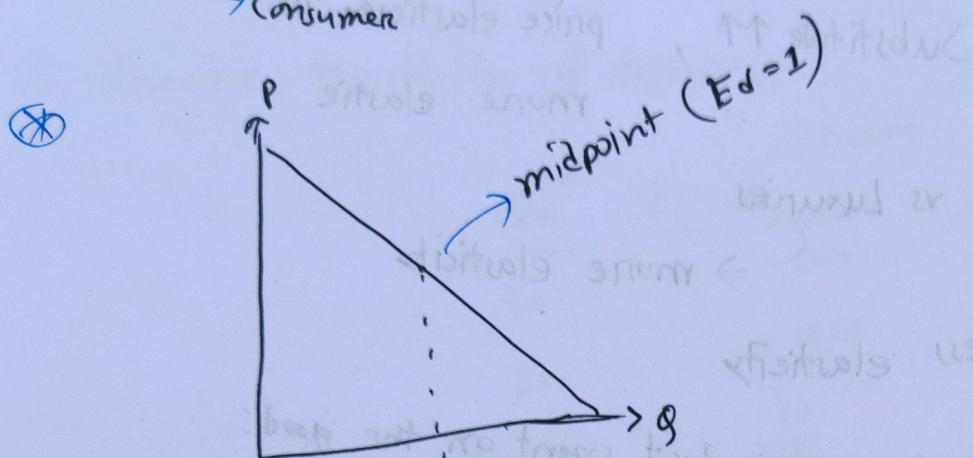
$$E_d = 2.14 :$$

- due to 1% change in price quantity demanded will change 2.14%.

(\*) Show that  $E_d$  at midpoint is 1.

(\*) Revenue = Price \* quantity

Expenditure = Revenue (Seller)



$\Rightarrow Ed = 1$ , Total revenue will be max.

(\*)  $Ed > 1 \Rightarrow P \uparrow, TR \downarrow$

$P \downarrow, TR \uparrow$

$Ed < 1 \Rightarrow P \uparrow, TR \downarrow$

$P \downarrow, TR \uparrow$

$Ed = 1 \Rightarrow P \uparrow, \overline{TR}$

$P \downarrow, \overline{TR}$

## (\*) Determinants of Price Elasticity of Demand:

- Number of substitutes

Substitute ↑↑, price elasticity ↑↑  
more elastic

- Necessities vs Luxuries

↳ more elasticity  
less elasticity

- Percentage of our budget spent on the good:

higher percentage → more elasticity

- Time:

can purchase later → more elasticity

need to purchase right now → less elasticity

## (\*) Cross Elasticity of Demand:

$$E_c = E_{d_{x,y}} = \frac{\alpha \cdot \Delta Q_d x}{\Delta P_y}$$

Elasticity of x due to changes in price of y.

$$\begin{array}{r} P_x \\ 10 \\ \hline 15 \end{array} \quad \begin{array}{r} Q_d^x \\ 8 \\ \hline 25 \end{array} \quad \begin{array}{r} P_y \\ 20 \\ \hline 22.5 \end{array}$$

$$E_c = \frac{\frac{-2}{7}}{\frac{5}{22.5}} = -1.4$$

(\*)  $E_c > 0 \rightarrow$  Goods are substitutes

$E_c < 0 \rightarrow$  Goods are complements

### Income Elasticity of demand:

$$\frac{\frac{Q_d}{P_x} \cdot M}{\frac{500}{1000}} \xrightarrow{\text{Income}}$$

10	$\frac{10}{15}$	$\frac{500}{750}$
20	$\frac{20}{15}$	$\frac{1000}{750}$

$$E_y = E_m = \frac{\Delta Q_d}{\Delta M} = \frac{\frac{10}{15}}{\frac{500}{750}} =$$

(\*)  $E_m > 1 \Rightarrow$  income elastic

$E_m < 1 \Rightarrow$  income inelastic

$E_m = 1 \Rightarrow$  unit elastic

$E_m > 0 \rightarrow$  Normal good

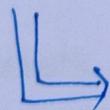
$E_m < 0 \rightarrow$  Inferior good

Next class  
Quiz-1  
T 2-04

(\*)  $\frac{Q_d}{P_x} \frac{P_x}{P_y} \frac{P_y}{M} \frac{\text{Income}}{1000} \Rightarrow |E_{dx}| = ?$

10	50	25	1000
20	30	90	2000

$E_c = ?$   
 $E_y = ?$



Inferior or normal?

what inverse or positive?

substitute or complement?

## ⊗ Price Elasticity of Supply

- measure the responsiveness of quantity supplied to changes in price.
- defined as the percentage change in quantity supplied of a good divided by the percentage change in the price of good
- five type.
  - elastic
  - inelastic
  - unit elastic
  - perfectly elastic
  - perfectly inelastic

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$$E_s = \frac{\frac{1}{\Delta P} \cdot \Delta Q_s}{\frac{Q_{avg}}{P_{avg}}} = \frac{\frac{\Delta Q_s}{Q_{avg}}}{\frac{\Delta P}{P_{avg}}}$$

## ④ Price elasticity of supply and time:

- more additional time, more elasticity

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## ⑤ Cross elasticity $\Rightarrow$

$$E_{CJ} = \frac{\% \Delta Q_x}{\% \Delta P_y}$$

## ⑥ Who will pay the tax?

$\Rightarrow$

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- Depends on demand elasticity & supply elasticity

- if demand curve is perfectly inelastic then full tax will be paid by buyers.

$\Rightarrow$  Perfectly elastic !

i. demand  $\Rightarrow$  seller

ii. supply  $\Rightarrow$  buyer

$\Rightarrow$  Perfectly inelastic :  $H^o$

i. demand  $\Rightarrow$  buyer

ii. supply  $\Rightarrow$  seller

Midterm Syllabus END

Next offline class on Friday

## Chapter-20

### The logic of consumer choice

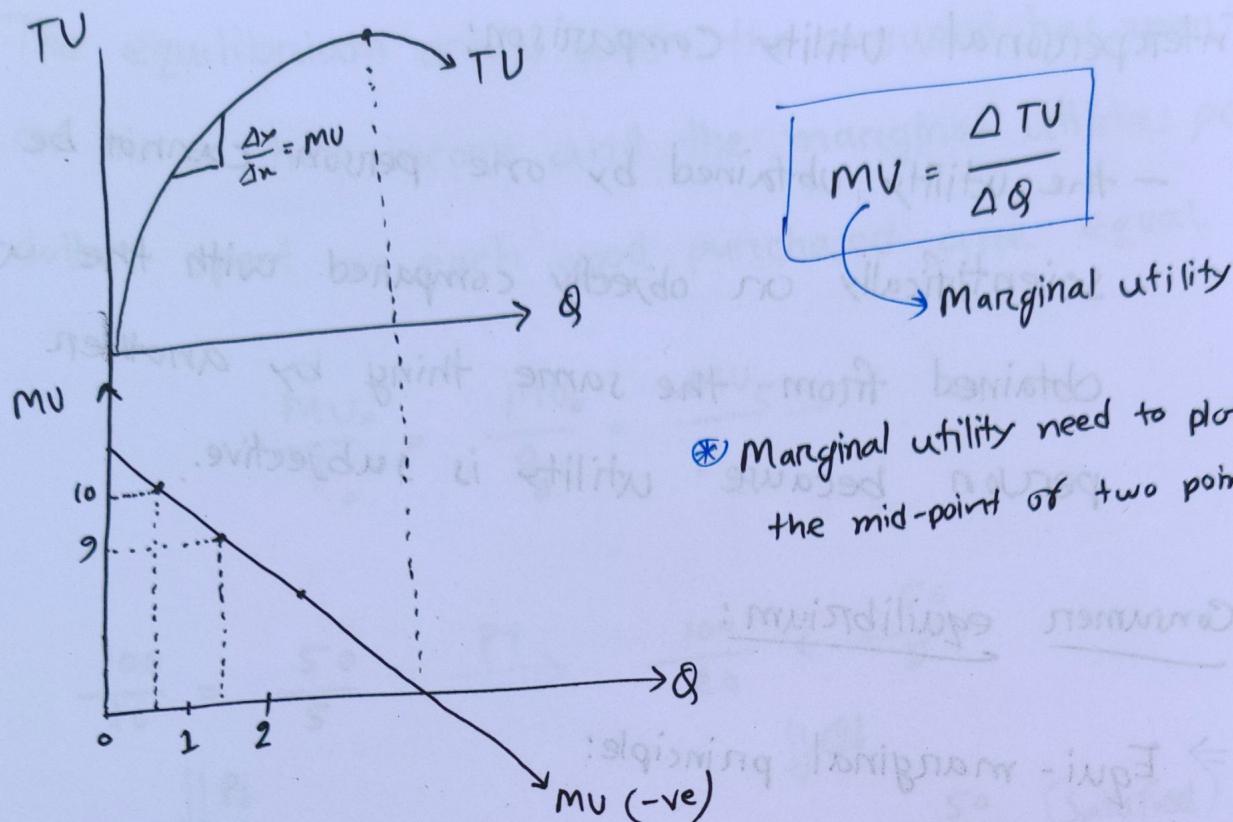
#### Utility Theory:

- A good that gives you utility is one that has the power to satisfy wants, or that gives you satisfaction.
- Utils is the unit to measure utility.
- Total Utility (TU) is the total satisfaction a person receives from consuming a particular quantity of good.
- Marginal Utility (MU): additional utility gained from consuming an additional unit of some good.

$$- MU = \frac{\Delta TU}{\Delta Q}$$

#### The law of diminishing marginal utility:

- for a given time period, the marginal utility gained by consuming equal successive units of a good will decline as the amount consumed increases.



\* Marginal utility need to plot in the mid-point of two point

### Measurement of Satisfaction (Utility):

- Money
- utils → cardinal approach

- Rank/Order/Ratings → indifference curve  
Ordinal approach

\* Money, addiction don't follow marginal diminishing utility.

\* The law of diminishing marginal utility is based on the idea that if a good has a variety of uses but only one unit of the good is available, then the consumer will use the first unit to satisfy his/her most urgent want.