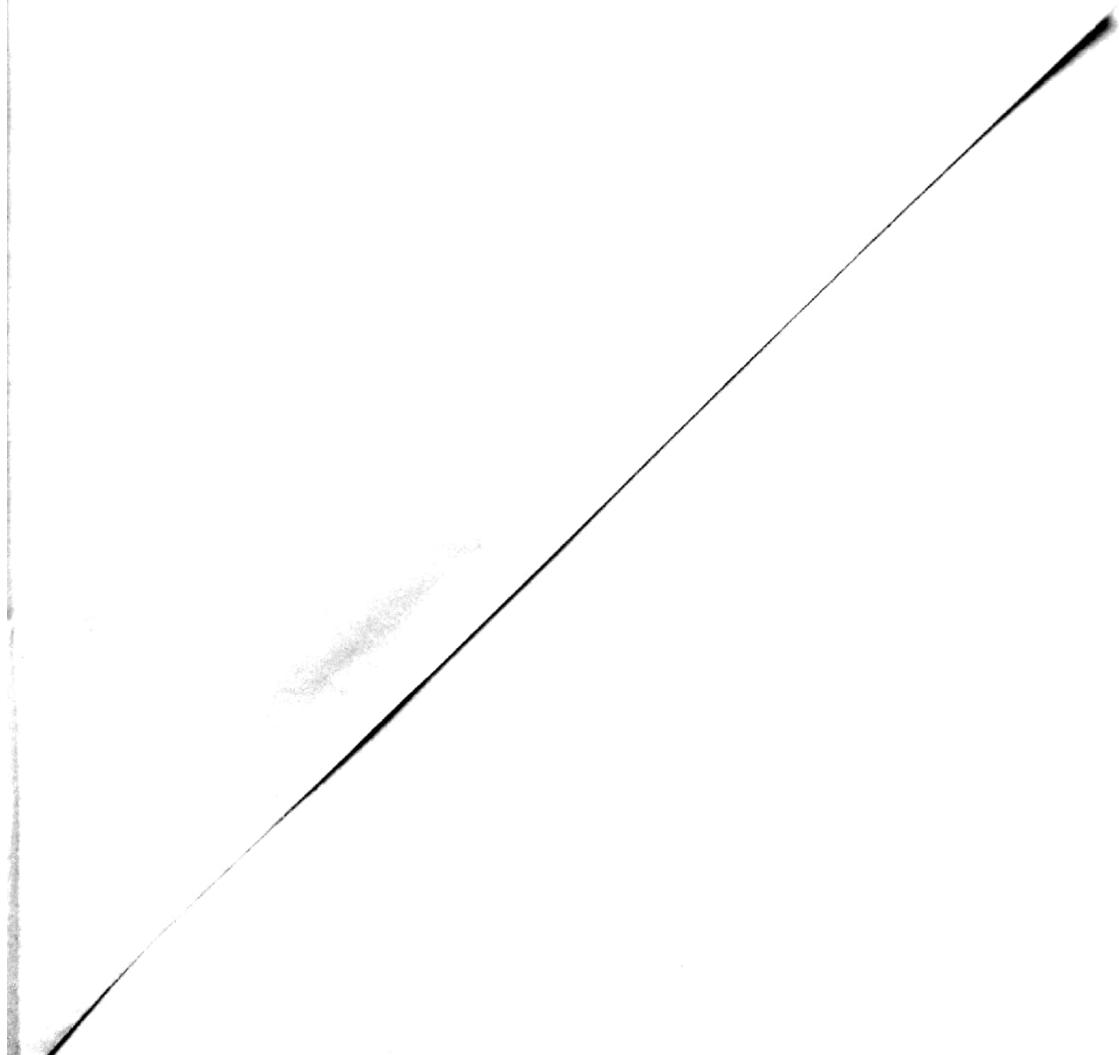


INDIAN
ECONOMICS

Prof. B.K. Sahoo.



18/7/2017

Incidence of Tax

where it is levied

Burden of Tax

who pays the tax

Tax

Direct

Incidence & Burden of tax
are on same individual

e.g., Income tax
Wealth tax
Profit tax

Indirect (origin Based)

Incidence & Burden of tax
are on different individuals

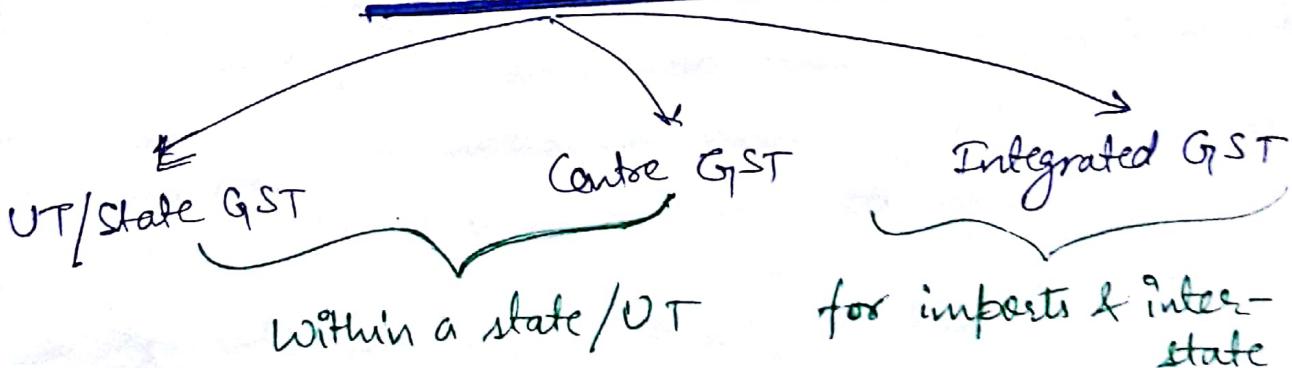
e.g., Sales tax
Services tax

Central excise duty

Cess

for ~~recovering~~
welfare schemes
funds

Goods & Services Tax (GST)



- * GST is introduced to tackle the different indirect taxes.
- * GST is a destination based tax system.

e.g., A manufacturer & makes bread. Actual value of bread is say ₹ 500 without applying any taxes.

Now,

Actual Value: ⚹ 500

After adding 10% Mfg tax: ₹ 550

After adding 10% sales tax : £ 605

Sales tax ~~tx~~ should've been applied on £500, but it is applied on £550. ∴ the consumer will have to pay £5 more because of ~~addit~~ applied tax on previously taxed value. This is called cascading effect of tax.

27/7/17

National Income Accounting

* For this topic, read macro-economics book.

* GDP: Gross Domestic Product

* Financial crisis worldwide took place in 2007. Only 3 countries managed to maintain a progressive economic rate, viz. India, China & Brazil. Out of these, India's economic growth was the highest (bright spot in the world economy).

* GDP growth is a measure of economic growth.

* GDP: Monetary / Market value of all final goods and services produced within the political boundary of an economy within a specific time period.

* Monetary Value:

① Diversified goods & services

(\because various measurement units are involved for measuring various goods & services. Hence it is difficult to aggregate them.)

② Self-services or family services

(Not a part of GDP. But this is a convention rather than a logic. Agricultural services are part of GDP, whether including self-produced agricultural products for family consumption.)

③ Black Market

(Not a part of GDP, since its transactions are not visible to economy.)

★ Final: (opp.) Intermediate

Nalanda Complex mfg. value 100 Cr.

Steel Used. 20 Cr. \Rightarrow Output of TATA

Cement Used 20 Cr \Rightarrow Output of Bisal.

Electricity Used 20 Cr

factors of production 40 Cr

\therefore 40 Cr is being double-counted.

Intermediate \Rightarrow inputs in actual.

① Avoid double-counting

(of intermediate goods & services)

e.g., Farm. Wheat & Sugarcane ₹ 10

Mill \rightarrow Flour & Sugar ₹ 20

Bakery Shop Bread ₹ 50
₹ 80

Here ₹ 50 already includes ₹ 10 & ₹ 20.

But if we add them again to ₹ 50, we'll get ₹ 80. \therefore ₹ 50 is the final value,

whereas ₹ 80 ~~is the intermediate~~ includes the double counting of intermediate goods.

* Political Boundary:

① GNP (Gross National Product)

A foreigner giving goods & services inside Indian boundaries & comes under GDP & not GNP.

An Indian giving goods & services ~~inside~~ outside Indian boundaries comes under GNP & not GDP.

* Specific Time Period:

① Re-sold of old items

e.g., A person buys a laptop for ₹ 50,000 in 2014. Now, he ~~sells~~ sells it for ₹ 20,000 in 2017. ∵ the ₹ 20,000 were already included in ₹ 50,000 while purchase in 2014, they won't be a part of GDP.

② Business Inventory

e.g., suppose Maruti ~~not~~ manufactures 100 cars in 2016 but manages to ~~not~~ sell only 70 of them in 2016. The rest 30 cars will be included ~~as~~ Business Inventory & ~~will not be counted~~ in the GDP of ~~2017~~ 2016.

* Read Economic Survey 2016-17 chapter 1 from finance ministry's website.

In 2017, let it manufactures 300 cars & sells them all along with the 30 cars in business inventory.

1/08/2017

$$\therefore \text{GDP}_{2016} = C_{70} + BI_{30} = 100 \text{ cars}$$

$$\text{constant GDP}_{2017} = C_{30, 2016} + C_{30, 2017} - BI_{30}$$

$$\text{MFP term 2} = C_{30, 2017} \quad \left\{ \begin{array}{l} ? \\ C_{30, 2016} = BI_{30} \end{array} \right.$$

$$= 30 \text{ cars}$$

* 3 ways to measure GDP:

1) Expenditure approach

2) Income approach

3) Value-added approach.

[DO NOT USE PRODUCT APPROACH!]

WRITE IN TEST/EXAM

* Expenditure approach:

Consumer spending: $C = C_d + C_m$

Consumers' domestic spending

Consumers' foreign spending

spending on domestic goods and foreign goods

Producer spending: $I = I_d + I_m$

Producers' investment on
domestic goods

Govt. spending: $G = G_d + G_m$

Foreign spending: X

Exports

$$\begin{aligned}
 GDP &= C + I + G + X - (C_M + I_M + G_M) \\
 &= C + I + G + X - M \rightarrow \text{Imports} \\
 &= C + I + G + (X - M) \rightarrow \text{net exports} \\
 &= GDP^M
 \end{aligned}$$

* Income approach:

Reward to factor of production = Income

(Land, Labour, Capital,
Entrepreneur).

Rent

Wages

Profit

Interest

$$GDP = \text{Wages} + \text{Rent} + \text{Interest} + \text{Profit} = NNP^F$$

* Value-added approach:

	Material Used	Material Produced	Value added
farmer	seeds £ 10	wheat £ 30	£ 20
Mill	flour £ 60		£ 30
Bakery		bread £ 100	£ 40
			£ 90 + 10

House

$$GDP^F = \text{GDP}^F + \text{House}$$

$$GDP^M = \text{GDP}^M + 10 = 90$$

$$GDP^M = \sum_{i=1}^n P_i q_i$$

p_i = price of i th commodity inclusive of indirect taxes

q_i = qty of i th commodity

$$GDP^F = GDP^M + \text{Indirect Taxes}$$

+ Subsidies

$$= GDP^M - \text{Net Indirect Taxes}$$

~~GDP~~ Value added approach measures ~~GDP~~ NDP^F .

Expenditure " GDP^M .

Income " ~~GDP~~. NNP^F .

~~Both~~ Tomato Producer Ketchup Producer

Wages = ₹ 15,000

Sold = ₹ 40,000

Household
₹ 15,000

Ketchup
Producer
₹ 25,000

Wages = ₹ 20,000

Sold = ₹ 60,000

(all to household)

Expenditure approach →

$$GDP = C + I + G + (X - M)$$

= C

$$= 15000 + 60000 = 75000$$

Income Approach →

$$GDP = W + P + I + X$$

$$= W + P$$

$$= (15000 + 20000) + (40000 + 60000 - 25000)$$

$$-(15000 - 20000) = 75000$$

Value added approach →

$$\text{GDP} = 40000 + (60000 - 25000)$$

$$= 75000$$

Hence, we can see that GDP calculated using all the 3 measures is coming the same ($\$75000$).

But we've also ignored many important factors of economy in this example: (closed market).

∴ it is not necessary that always the GDP calculated by using these 3 measures will be the same.

Product X (qty)	Price	GDP	2016	Country A (Population = 10)
			2017	
100	\$1	\$100		
200	\$1	\$200		

Product X (qty)	Price	GDP	Base Year Price	Country B (Population = 10)
			2016	
100	\$1	\$100		
200	\$2	\$400		

$$\text{Nominal GDP} = \sum_{t=1}^N P_t Q_t$$

P_t = price of ~~with~~ commodity during time period t

Q_t = qty of ~~with~~ commodity during time period t .

Nominal GDP aka Current Price GDP.

Real GDP aka Constant Price GDP aka Base Year GDP.

	Country A	Country B
2016's GDP	100\$	100\$
2017's GDP (keeping the base year's price same)	200\$	200\$ → Same

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{Price Index}}$$

$$\text{GDP deflator} = \frac{\text{Nominal GDP}_t}{\text{Real GDP}_t} = \frac{\sum p_t q_t}{\sum p_0 q_t} \approx \text{PI}(P)$$

(Not exactly PI(P) :: we ~~don't~~ ^{only} include common basket of goods in PI(P) but this includes all goods.)

* NDP = Net Domestic Product

$$= \text{GDP} - \text{depreciation}$$

NNP = Net National Product

$$= \text{GDP} - \text{Depreciation}$$

→ used up of fixed capital

NNP^f = National Income

10/08/2017

* Inflation \rightarrow continuous increase in general price level.

* Price \rightarrow per unit exchange value.

* Exchange value v/s Use value.

e.g., water: use value very high, exchange value low
diamond: " " " low, " " high

(Water-diamond paradox): this arises due to
scarcity of a commodity

* As significance of each commodity is different, different weights are assigned to various commodities as we can't calculate the avg. prices directly.

Commodity	Price	Weight
Rice	₹ 25/kg	0.2
Cloth	₹ 100/m	0.3
Laptop (w)	₹ 50,000/unit	0.5

$$\sum (\text{Price} \times \text{Weight}) = 25035 \text{ ₹}$$

* Inflation = $\frac{P_t}{P_0} = \frac{\text{Price at time } 't'}{\text{Base Year Price}}$

* P_{it} = Price of i^{th} commodity at time 't'

P_{i0} = Price of i^{th} commodity in base year

10/08/2017

$$\text{Price index} = \sum_{i=1}^n w_i \left[\frac{P_{it}}{P_{i0}} \right]$$

w_i = weight for i th commodity

$$w_i > 0 \quad i = 1 \text{ to } n$$

$$\sum_{i=1}^n w_i = 1$$

Criterion for a year to be base year —

① It ~~should~~ be a past year

② It should not be an abnormal year

A year that experienced some natural calamity or any economic crisis.

③ It should not be ~~too~~ far from the current year.

~~Ways to calculate weight (w_i)~~ —

① Share of i th commodity value in base year

$$w_i = \frac{q_{i0} p_{i0}}{\sum q_{i0} p_{i0}} \quad (\text{Laaple's Method})$$

$$\text{Laaple's PI} = \frac{\sum q_{i0} p_{it}}{\sum q_{i0} p_{i0}}$$

or
 $\text{PI}(L)$

$$\frac{\sum q_{i0} p_{it}}{\sum q_{i0} p_{i0}}$$

② Share of i th commodity value in current year

$$W_i = \frac{q_{it} p_{it}}{\sum q_{it} p_{it}} \quad (\text{Paasche's Method})$$

$$\therefore \text{Paasche's PPI} = \frac{\sum q_{it} p_{it}}{\sum q_{it} p_{io}}$$

NOTE:-

Year	Coffee	Tea	
	P	Q	P
2014	10	100	8
2017	20	80	10

While calculating $\text{PI}(L)$, we'll not be able to capture the ~~not~~ Substitution Effect. $\therefore \text{PI}(L)$ under-estimates the Substitution Effect.

While $\text{PI}(P)$ uses current year & that's why it over-estimates the Substitution Effect.

$$\text{Fischer's PI} = \sqrt{\text{PI}(L) * \text{PI}(P)}$$

\curvearrowright Ideal PI

- * In India, we calculate two kinds of PI -
- ① WPI: Wholesale Price Index (for monetary policies)
 - ② CPI: Consumer Price Index (for standard of living)
or
Living Standard Price Index
or Retail Price Index

NOTE:- RBI fixes 3 interest rates in India -

① Repo-Rate:

Short-term lending rate when ~~the~~ a Scheduled Commercial Bank borrows money from RBI.

② Bank-Rate:

Long-term lending ~~rate~~ rate when a Scheduled Commercial Bank borrows money from RBI.

③ Reverse Repo-Rate:

Short-term lending rate when the RBI borrows money from a Scheduled Commercial Bank.

These 3 rates decides the liquidity in the market. (How much money flow in market)

These are determined by ~~the~~ inflation.

22/08/2017

* Effective Income = Purchasing Power



WPI

- P, q info's from wholesale market

- Includes intermediate goods & services

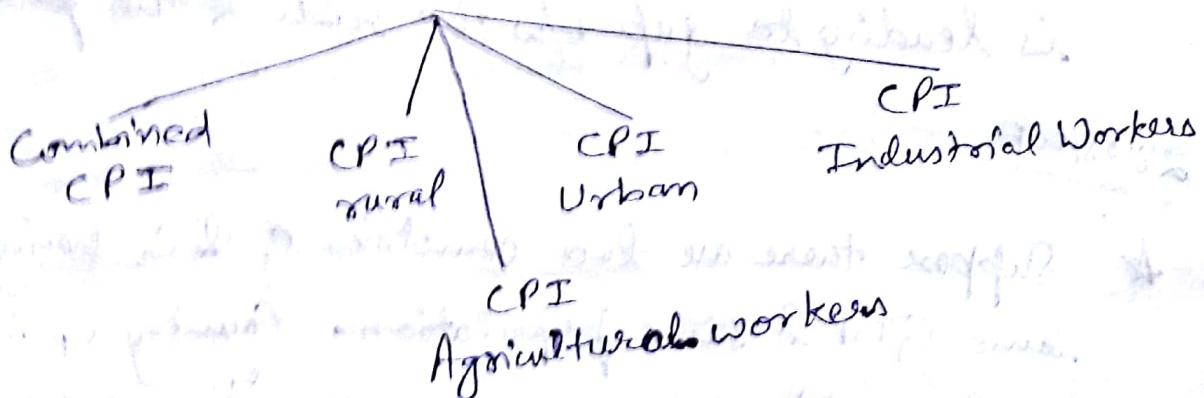
CPI

- P, q info's from retail market

- Does not include

<u>WPI</u>	<u>CPI</u>
• Includes imported goods & services	Does not include
• Does not include	Includes public services (like healthcare, transportation)

CPI (in India)



A structural Transformation
The pattern that a country has followed during its developing phase is called as structural transformations.

There are 3 phases acc. to GDP & employment -

Sector	Phase - I	Phase - II	Phase - III
Agriculture Sector	Highest (20%)	(15%)	(5%)
Industrial Sector	2nd (13%)	Highest (65%)	(20%)
Services Sector	3rd (7%)	(20%)	Highest (75%)

* All % data are for example only

In case of India, if we talk about GDP, we've shifted from Phase-I to Phase-III without experiencing Phase-II.

If we talk about employment, we are still in the Phase-I.

This difference b/w the phases of GDP & employment is leading to gap b/w the rich & the poor.

28/08/2017

* Suppose there are two countries G_1 & C_2 having same GDP & same population. Country G_1 is investing making only arms & ammunition whereas C_2 is making agricultural & industrial products.

Inspite of same financial condⁿs, we can clearly state that C_2 is better than G_1 to live in.

This simply means that financial wealth is not the ultimate factor to measure the wellness of an economy.

Here comes the factor of Human Development (def.: The process of enlarging human choices).

There are few basic factors upon which everyone agrees that they are must for human development. These indicators are—

- ① Income / Standard of Living
- ② Education / Knowledge ~~Education~~
- ③ Health

Education / Knowledge can be measured by Literacy Rate or by Gross Enrollment Ratio (GER) in primary schools or by Net Enrollment Ratio (NER) in primary schools.

But Sadly in India, it is measured by self-reported process. (Kya aap literate hain? Y/N).

In developed countries, an individual is asked to read / write / speak a given sentence which decides its literacy.

* Human Development Index was introduced in 1990 by United Nations' Development Programme (UNDP). At that time, ~~adult~~ Adult Literacy Rate & GER in pr. schools were the ~~measures~~ ~~indicators~~ used for education.

Since 2010, we've started using the measures of ~~no. of years of our's schooling~~, mean years of schooling & expected years of schooling.

* GER = $\frac{\text{No. of students in primary schools}}{\text{Population in the age grp. of 6 to 14}}$

NER = $\frac{\text{No. of students in primary schools in the age group of 6 to 14}}{\text{Population in the age grp. of 6 to 14}}$

It can be seen that GER may be > 100 .

★	Age	Years of schooling	Expected years of schooling (assumed each individual starts education at the age of six)
	20	10	14
	7	2	
	70	0	18 ← Till Masters
	40	0	18 ← Till Masters
	13	7	7

$$\text{Mean years of schooling, } E(x) = \frac{19}{5}$$

$$\text{Avg. expected years of schooling} = 58/5$$

★ Health can be measured by the measures of

- ① Avg. BMI
- ② Life Expectancy
- ③ Infant Mortality Rate (IMR)
- ④ Under-five Mortality Rate

Presently (since 2010), health is being measured by Life Expectancy at Birth.

★ Income can be measured by per capita income, purchasing power parity.

Since different indicators are measured in different units, \therefore we need to standardize them to see them in aggregate.

For the standardisation of health & education, the process used is

$$\frac{\text{Actual value} - \min^m \text{ value}}{\max^m \text{ value} - \min^m \text{ value}} \in [0, 1].$$

\min^m value & \max^m value are known as goalposts.

for income, the process used is

$$\frac{\ln(\text{Actual value}) - \ln(\min^m \text{ value})}{\ln(\max^m \text{ value}) - \ln(\min^m \text{ value})}.$$

We take natural log of income bcoz increasing income has a diminishing effect on choices, which is reflected through natural logarithm.

4/9/2017

$$\frac{\ln(\text{Actual income}) - \ln(\min^m \text{ income})}{\ln(\max^m \text{ income}) - \ln(\min^m \text{ income})} = \text{Income Index (I)}$$

Let α = mean yrs. of schooling and
 β = mean expected yrs. of schooling

$$\frac{\ln(\text{actual } \alpha) - \ln(\min^m \alpha)}{\ln(\max^m \alpha) - \ln(\min^m \alpha)} = \text{Education Index I (E_I)}$$

$$\frac{I_{\text{actual}} - I_{\text{min}}}{I_{\text{max}} - I_{\text{min}}} = \frac{E_{\text{actual}} - E_{\text{min}}}{E_{\text{max}} - E_{\text{min}}} = \frac{H_{\text{actual}} - H_{\text{min}}}{H_{\text{max}} - H_{\text{min}}} = \frac{I + E + H}{3} = \text{Education Index II (E)}$$

$$\text{Education Index (E)} = \frac{E_1 + E_2}{2}$$

Let $y = \text{life expectancy at birth}$

$$\therefore \frac{y_{\text{actual}} - y_{\text{min}}}{y_{\text{max}} - y_{\text{min}}} = \text{Health Index}$$

$$\therefore \text{Human Development Index} = (I \times E \times H)^{1/3} \quad (\text{HDI})$$

* Earlier, when Adult Literacy Rate & GER in pr. schools were used as ~~indicators~~ measures for education.

$$\text{At that time, } \text{HDI} = \frac{I + E + H}{3}$$

$$\text{where } E = E_1 + E_2$$

* Capabilities & Functionings Concept (by Amartya Sen)

\downarrow freedom of choices \rightarrow Achievements

Let x_i : commodity owned by individual 'i'

$c(\cdot)$: characteristic vector of commodity

$f_i(\cdot)$: personal utilization func' individual
- also actually used.

$I_f i(\cdot)$: set of ~~$f_i(\cdot)$~~ all possible $f_i(\cdot)$

X_i : Endorsement set

* Read Ch-2 from Commodities & Capabilities by Amartya Sen.

11/07/2017

$$P(X_i) = \{b_i \mid b_i = f_i(c(x_i)) \text{ for } x_i \in X_i\} \quad \underline{\text{functioning}}$$

$$\varphi(X_i) = \{b_i \mid b_i = f_i(c(x_i)) \text{ for } x_i \in X_i \text{ & } f_i \in F_i\} \quad \underline{\text{Capability}}$$

eg,

Individual 1

$$F_1 = \{\text{Reading ability, listening ability, cycling ability}\}$$

Individual 2

$$\{\text{Reading ability, cycling ability}\}$$

$$P(X_i) = \{\text{Job, Mobility}\} \quad \{\text{Job, Mobility}\}$$

$$\varphi(X_i) = \{\text{Job, Reading pleasure, listening pleasure,}\}$$

10/10/2017

Unemployment

* Challenges to an economy -

- (1) Raising GDP
- (2) Stabilized inflation (not zero, but not fluctuating highly)
- (3) Low level of unemployment

* ~~For~~ Some important terms -

(1) Demographic Population (P)

(2) Labour force participation Rate
(LFPR)

~~Population~~ LFPR = No. of individual willing to work at the existing wage rate (LF)

(3) Workforce (E) Participation Rate

WPR = No. of individual employed at the existing wage rate (E)

(4) Unemployment Rate = $\frac{LF - E}{LF}$

*

Unemployment

Voluntary

e.g., someone not willing to work

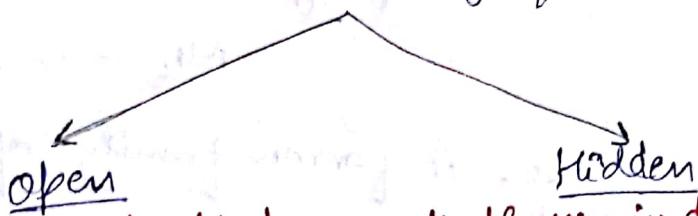
& have peace ~~at~~
24x7.

Involuntary

(Result of limited supply of jobs or non-availability of jobs)

e.g., willingness to work at

the existing wage rate
but can't due to unavail-
ability of jobs.



Mostly seen in developed countries & are short-term in nature usually.

- ⇒ Frictional
- ⇒ Cyclical
- ⇒ Structural

Mostly seen in developing countries & are long-term in nature usually.

- ⇒ Disguised
- ⇒ Seasonal
- ⇒ Under-Employed

Frictional ⇒ Unemployment arising due to leaving an existing job & searching for new jobs.
(aka Natural)

Cyclical ⇒ Unemployment arising due to business cycle or natural calamities.



Structural ⇒ Unemployment arising due to difference in the demand of skills & supply of skills during structural transformations

Natural Unemployment Rate: Any unemployment that leads to non-increasing inflation rate is natural unemployment rate.
eg, Open unemployment.

Disguised \Rightarrow Any ~~worker~~^{labour} whose Marginal Productivity is zero is considered as disguised unemployed, i.e.

$$MP_L = 0$$

e.g., A farmer family of 10 members all working on a piece of land having requirement / productivity of only 5 members. The rest 5 members are disguised unemployed.

Seasonal \Rightarrow Unemployment arising due to seasonal nature of some economic activities.

e.g., Agriculture (Rabi' season, Kharif season), Construction workers (generally construction is avoided in rainy season).

Under-employment \Rightarrow Unemployment arising when an individual works less than its MP_L .

17/10/2017

Poverty

(i) Identification problem: Who is poor?

→ (i) Income approach

→ (ii) Nutritional approach

Three different ~~levels~~ thresholds of income by

World Bank

- a. \$ 1/- (PPP) per day / per person Under-developed
- b. \$ 1.25/- (PPP) " " Developing
- c. \$ 2/- (PPP) " " Developed
↳ Purchasing Power Parity

Whereas Indian standards are -

Rural: ₹ 22/-

Urban: ₹ 32/-

Rural + Urban: ₹ 29/-

for developing & under-developed countries' households, income information is unknown. ~~rather~~ Instead, Household Consumption Expenditure is known.

Here comes nutritional approach in picture.
Calorie intake can be taken as a measure of poverty -

Rural: 2400 kcal/day

Urban: 2100 kcal/day

An individual will be considered poor, if they consume less than the recommended level of calorie intake.

In India, the calorie intake standards are converted into Monthly Per-capita Consumption Expenditure (MPCE) to measure poverty.

~~NSO~~ NSSO conducts surveys in India to find out the MPCE.

ICMR provides per-unit nutritional value of each food item.

In the survey, each household is questioned about how much of each product they have consumed in the last 30 days & in last 365 days.

$$C_i = \frac{1}{N_i} \sum_{j=1}^K q_{ij} p_j$$

C_i = per-capita calorie intake of Household i

N_i = family-size of i th household

q_{ij} = qty of j th food item consumed by i th household

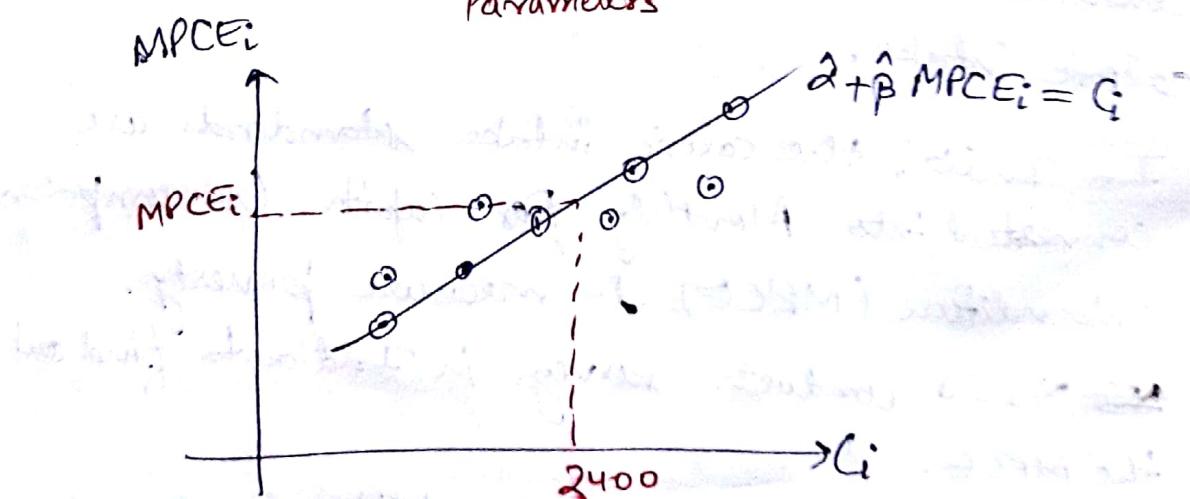
p_j = per-unit calorie intake of j th food item

Now, we have C_i & $MPCE_i$ values.

By regression, we can consider that

$$C_i = \alpha + \beta MPCE_i + u_i$$

\swarrow Parameters \nwarrow Error Term

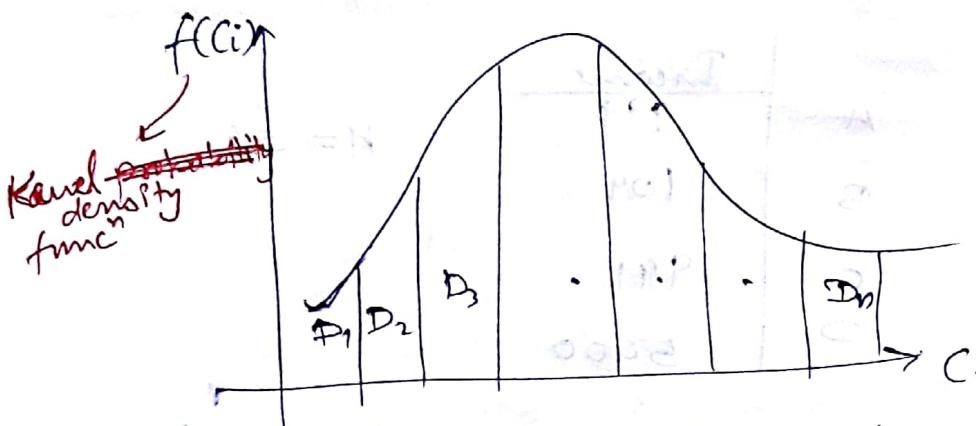


By this method, we can convert the calorie intake into monetary term. The $MPCE_i$ calculated

by this manner is called Poverty Line.

~~MPC_{Ei} for rural:~~
~~MPC_{Ei} for urban:~~

In India, a slightly more different method is used.



Finding means of each desile groups, i.e.

$$\bar{C}_i^{D_1}, \bar{C}_i^{D_2}, \bar{C}_i^{D_3}, \dots, \bar{C}_i^{D_n}$$

Now let say $\bar{C}_i^{D_j} \approx 2400$, \therefore corresponding MPC_{Ei} value will be benchmarked for poverty line. Here the D_j is called poverty desile group.

24/10/2017 Aggregation Problem

(2) Aggregation Problem

→ (i) Head Count Ratio (H)

$$\text{Head count ratio} = \frac{q}{N} \quad q = \text{No. of poor} \\ N = \text{population size}$$

	Income	PL = 1000
A	999	
B	999	$H = \frac{q}{N}$
C	1001	$= \frac{2}{4} = \frac{1}{2}$
D	5000	$= 0.5$

But there is no significant difference b/w A & C, also who is how much poor. ∴ we are not able to capture the **Depth of Poverty**.

Now let us transfer some income from C (richer) to B (less richer).

	Income	$H = 3/4$
A	999	
B	109	
C	9.91	
D	5000	

Now let us transfer some income from B (& poorer) to A (less poorer).

	Income	$H = 1/4$
A	1009	
B	89	
C	1001	
D	5000	

These all violates Dalton's Principle ↓

- ⦿ When we are transferring income from poorer (richer) individual to non-poorer (non-rich) individual, then the incidence of poverty should increase (decrease).

However, we ~~have do not~~ have anonymity in this case (who owns what income should not matter).

One more thing is that if we clone the existing population with the same individual income as of now, the head count ratio will not be affected.

~~→ (ii) Poverty Gap~~

It can also be written as,

$$H = \frac{1}{N} \sum_{i=1}^N I_i (Y_i < Z)$$

where Z = Poverty Line

Y_i = i th individual's income

$I_i (Y_i < Z)$ = Identification funcⁿ

$$= \begin{cases} 1, & Y_i < Z \\ 0, & \text{otherwise} \end{cases}$$

~~→ (iii) Poverty Gap~~

$$G_i = (Y_i - Z) I_i (Y_i < Z) \rightarrow \text{measures depth of poverty}$$

$$PG = \frac{1}{N} \sum_{i=1}^N \left(\frac{G_i}{qZ} \right)$$

$$= \frac{1}{N} \sum_{i=1}^N \left\{ \frac{(Y_i - Z) I_i (Y_i < Z)}{qZ} \right\}$$

~~→ (iv) Square Poverty Gap~~

$$SPG = \frac{1}{N} \sum_{i=1}^N \left(\frac{G_i}{qZ} \right)^2$$

Here, we are giving more weightage to larger poverty gaps.

still, it violates Dalton's Principle.

→ (iv) ~~SGT~~ ~~Poverty~~ Foster's Index

FTG

* ~~SGT~~

$$FTGP \text{ } \cancel{\text{SGT}} = \frac{1}{N} \sum_{i=1}^N \left(\frac{g_i}{g_Z} \right)^{\alpha}$$

$$\alpha = 0 \Rightarrow H \quad \alpha = \text{penalty coeff.}$$

$$\alpha = 1 \Rightarrow PG$$

$$\alpha = 2 \Rightarrow SPG$$

→ (v) Sen's Poverty Index

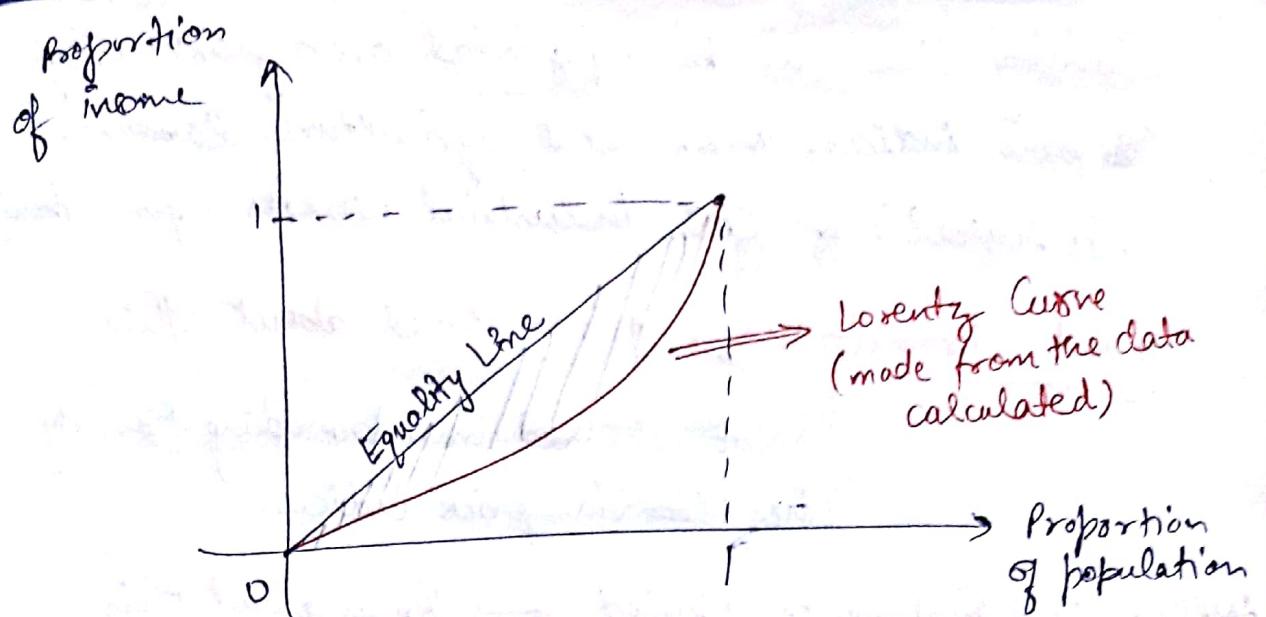
$$P_S = H \left(\left(1 - (1 - G^P) \right) \frac{\mu^P}{Z} \right)$$

G^P = Gini-coeff. among the poor

μ^P = Mean Income of poor

Let $y_1, y_2, \dots, y_m < Z$

y_i	frequency	Cumulative proportion of income	Cumulative proportion of population
y_1	f_1	y_1/y	f_1/q
y_2	f_2	$(y_1 + y_2)/y$	$(f_1 + f_2)/fq$
:	:	:	:
y_n	f_n	$(y_1 + \dots + y_n)/y$	q/q
$\sum y_i = Y$	$\sum f_i = q$		



Gini-coeff. = Area bounded by Lorenz Curve & Equality Line

Area bounded by Equality Line
(= 0.5)

Gini-coeff. $\in [0, 1]$

Sen's Poverty Index captures Depth of Poverty as well as follows Dalton's Principle.

31/10/2017

* Poverty Measurement In India →

1979 (Expert Group)

1993-94 (Khandelwal Committee)

2004-05 (Tendulkar ")

2014-15 (Rangarajan ")

→ Read about them

Expert Group converted ICMR into PL(MPCE) in

$$\begin{cases} R = 2400 \\ U = 2100 \end{cases}$$

$$\begin{cases} 70\% \\ 60\% \end{cases}$$

1979 for the year 1973.

Uniform Recall Period (URP). ← Read about this
(Food \rightarrow 30 days, Non-Food \rightarrow 30 days)

Poverty line can be upgraded over years using
price indices, viz. CPI agriculture labourers
(for rural) & CPI industrial workers (for urban).

Food-Transitions. → Read about this

Not captured in upgrading Poverty
lines via price indices.

(MRP) Mixed Reference Period → Read about this
(Food → 30 days, Non-Food → 365 days)

Direct & Indirect Poverty → Read about this.

NSSO conducts surveys for measuring consumption expenditure.

The consumption expenditure info used in $GDP = C + I + G + (X - M)$ comes from National Accounts Statistics (NAS).

It appeared that data from NSSO & NAS were not similar, rather they were quite different from each other.

One of the reason for this is Outside Home Consumption is not properly reported to NSSO.

Other reason is that most of our welfare schemes are provided only to poor households. So people have tendency to report their income & consumption lower than in reality to ~~come under~~ fall under the label of "POOR".

Other reason is Calorie-Consumption Puzzle.

$$\left\{ \begin{array}{l} \text{PCI} \uparrow \quad \text{BUT} \quad \text{Calorie} \downarrow \\ \text{MPCE} \uparrow \end{array} \right\}$$

Per Capita Income

In ~~pite~~ with development, manual labour is getting replaced by mechanised ~~as~~ tools, so the requirement of calorie intake has declined.

Modified Mixed Reference Period (MMRP) + Read about this

(Easily perishable food \rightarrow 7 days,

~~Non-~~ perishable food \rightarrow 30 days;

Non - Food \rightarrow 365 days)

At present, the poverty line in India is -

$$R = ₹ 2190 \text{ and } U = ₹ 2050$$

We can't compare the different poverty lines suggested by different committees bcz they all used different methods & reference periods.

7/11/2017

Balance of Payments (BoP)

Closed Economy

No transactions with the rest of the world.

Exports (X)

Domestic goods & services sold to foreigners.

Open Economy

Transactions are not limited to the citizens of a country.

Imports (M)

Foreign goods & services purchased by domestic individual / firm / govt.

Balance of Payments \rightarrow Accounting statement of all international transactions.

Record

Accounting Statement	
Credit	Debit
Inward cash flow.	Outward cash flow.

Export goes in credit & Imports goes in debit.

$X < M \Rightarrow$ Deficit

$X > M \Rightarrow$ Surplus

$X = M \Rightarrow$ Balance

\because there are millions of transactions, \therefore it is ~~too~~ very tedious to make records of every cash flow.

\therefore classification is done under Accounting statement as -

- Current Account
- Capital Account
- Forex Account

	Credit	Debit	
Current A/c (i) Goods Trade	X^G	M^G	(i) Trade Deficit Surplus Balance
(ii) Invisibles (a) Services Trade	X^S	M^S	(ii) Invisible Deficit Surplus Balance (a) Surplus/Deficit/Balance in services in trade
(b) Income	X^I (Inward Income)	M^I (Outward Income)	
(iii) Unilateral Transport (Aid)	Inward UT	Outward UT	

$$\begin{aligned}
 \text{Current A/c} &= X^G - M^G + X^S - M^S + \text{Net UT} \\
 (\text{CA}) &= (X^G + X^S) - (M^G + M^S) + \text{Net UT} \\
 &= X - M + \text{Net UT} \\
 &\approx X - M \quad \left. \begin{array}{l} \text{Net UT is very} \\ \text{negligible} \end{array} \right\}
 \end{aligned}$$

$$\begin{aligned}
 \text{GDP} &= C + I + G + CA \\
 &= \text{Aggregate Expenditure}
 \end{aligned}$$

$$\begin{aligned}
 Y &= C + S + T \\
 &= \text{Aggregate Income}
 \end{aligned}$$

$$\begin{aligned}
 \text{Aggregate Expenditure} &= \text{Aggregate Income} \\
 \Rightarrow \text{GDP} &= Y \\
 \Rightarrow C + I + G + CA &= C + S + T \\
 \Rightarrow I + G + CA &= S + T
 \end{aligned}$$

$$\Rightarrow CA = (S - I) + (T - G)$$

$$\Rightarrow (S - I) = CA + (G - T)$$

$G > T$ Budget deficit

$G < T$ Budget surplus

$G = T$ Budget balance

Case 1: $S = I$

and govt. follows deficit budget

$$\cancel{G = T} \quad G - T = -CA > 0$$

$$\Rightarrow CA < 0$$

$$\Rightarrow X - M < 0$$

$$\Rightarrow X < M$$

\Rightarrow Current A/c deficit (CAD)

$$100 - 80 + 30 = 50$$

positive CAD

Trade Deficit

Trade Deficit

Capital inflow creates a current account deficit

* C
* Ca.

MICRO
ECONOMICS

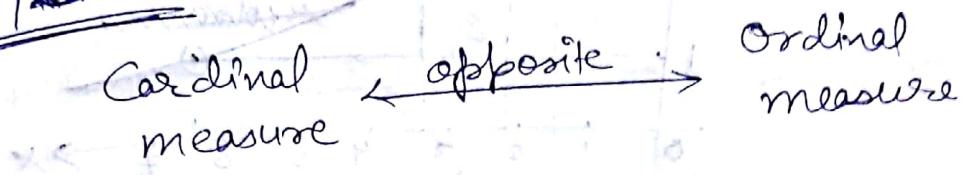
Prof. K. Goswami

17/7/2017

* Cardinal measure

* Cardinalist: ~~a person~~ an economist who believes in cardinal theory.

24/7/2017



Cardinal measure

MU = Marginal Utility

$$\frac{\Delta TU}{\Delta C}$$

ΔTU = Total Utility

ΔC = Total Consumption

$MU_x = P_x \cdot MU_m$ MU_x = Marginal utility of 2

$$\text{or } \frac{MU_x}{P_x} = MU_m$$

Commodity X

P_x = Price of commodity X

MU_m = MU of money

* Assumption: MU_m is constant.

Ordinal measure

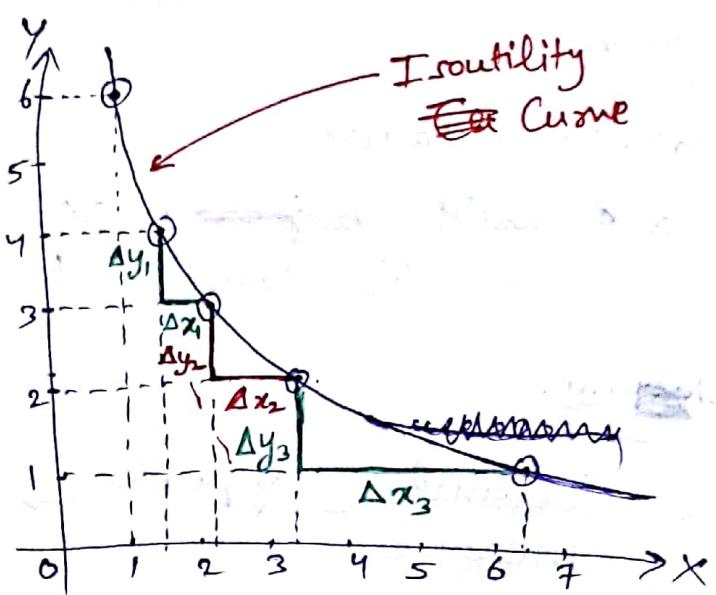
* MU_m can't be constant (beggar & billionaire example).

* Consumer is rational.

* Utility is transitive ($A > B$ & $B > C \Rightarrow A > C$):

* Utility is relative, it can't be quantified.

* Suppose X and Y are two commodities. Every point on the following graph will represent some combⁿ of X & Y to be consumed.



Suppose there are some pts. where the consumer feels indifferent, i.e. their utility is same.

All such pts. lie on a curve called as indifference curve or isouility curve.

Indifference curves are based on substitution.

Substitution curves are always nely sloped, and convex to the origin;

Property ①

Property ②

$$\frac{\Delta y_1}{\Delta x_1} > \frac{\Delta y_2}{\Delta x_2} > \frac{\Delta y_3}{\Delta x_3} \quad \left\{ \begin{array}{l} \text{Diminishing Rate} \\ \text{of substitution} \end{array} \right\}$$

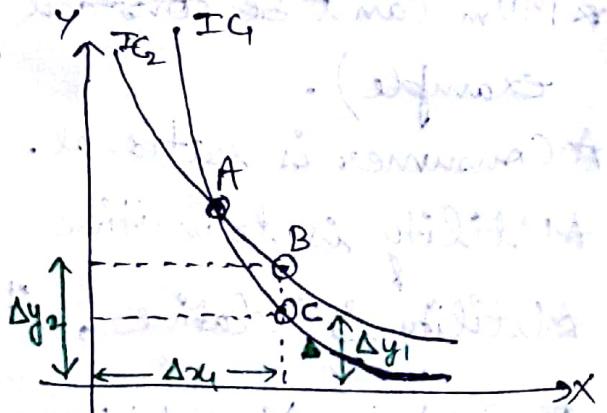
Two isouility curves never intersect.] Property ③

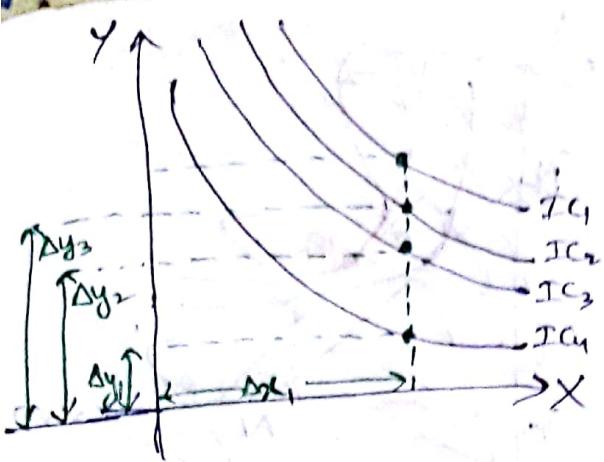
Proof:- IG_1 & IG_2 has a common point A. Now,

$$A = B \text{ & } A = C \Rightarrow B = C$$

(in terms of utility)

But $B \neq C \therefore$ for same Δx_1 , $\Delta y_2 > \Delta y_1$. That means utility at B > utility at C.





$IC_4 < IC_3 < IC_2 < IC_1$

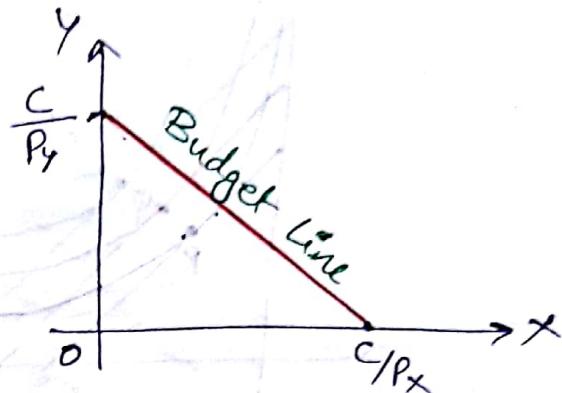
Utility
Property ④

Let C = amount of money to be spent by customer

$$\therefore C = X \cdot P_x + Y \cdot P_y$$

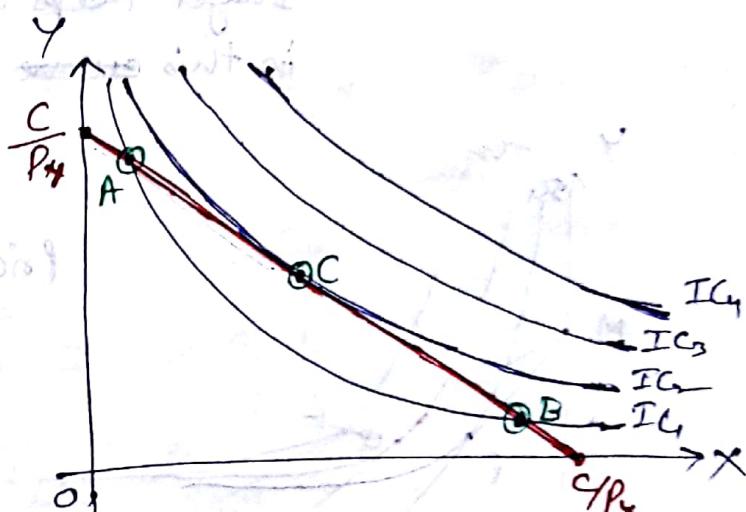
$$\text{or } X = \frac{C}{P_x} - \frac{P_y}{P_x} \cdot Y$$

$$\text{or } Y = \frac{C}{P_y} - \frac{P_x}{P_y} \cdot X$$



At point C, the consumer is using its whole amount of money along with it utilising it to its max^m.

This condⁿ is called consumer eq^m.

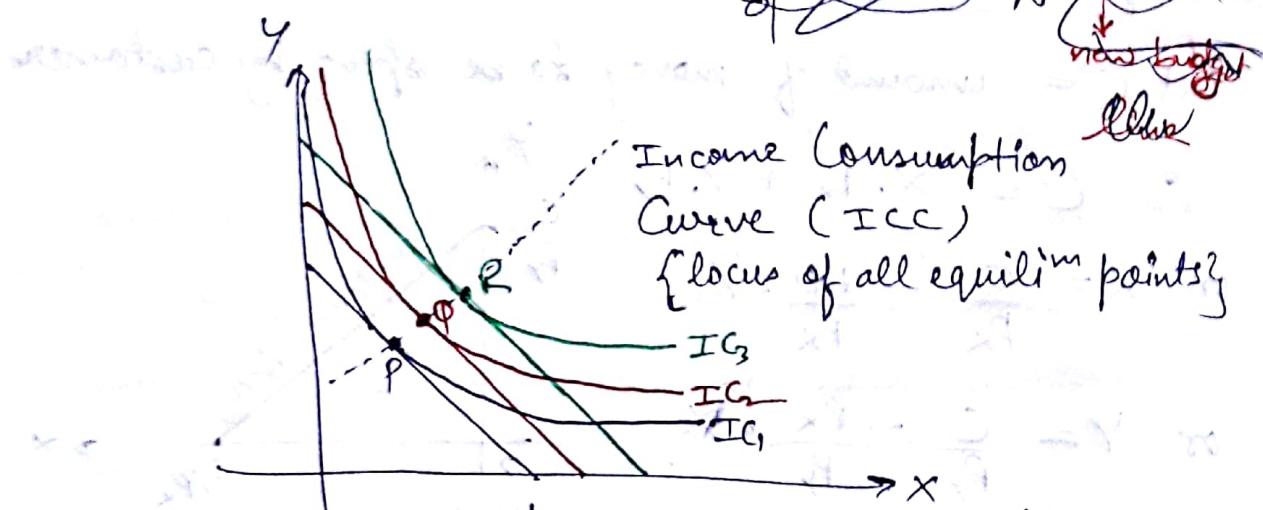


Two necessary condⁿs for this situation are —

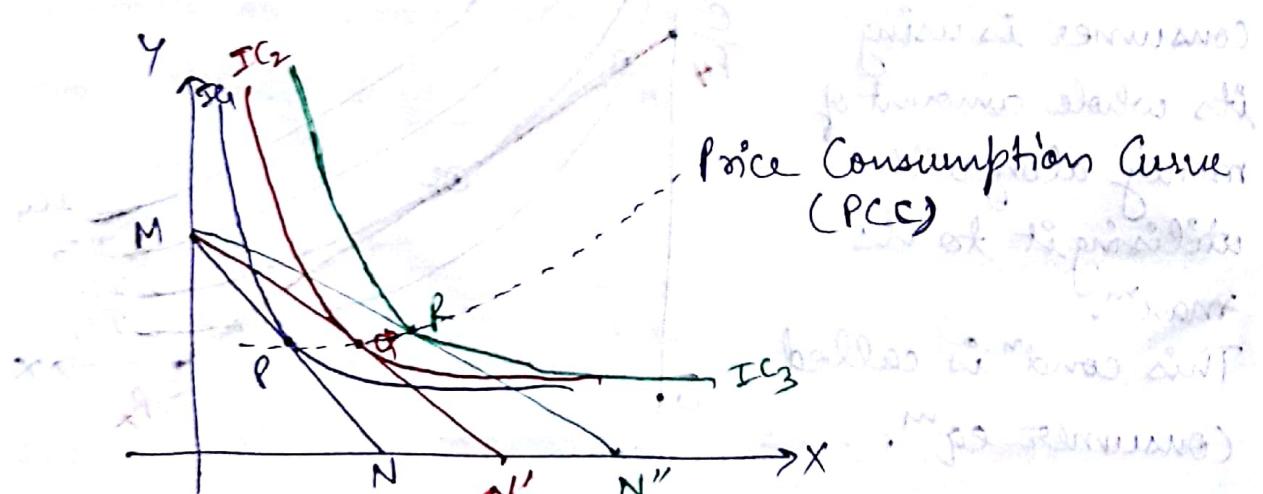
- ① $MRS = \frac{P_x}{P_y}$ i.e. slope of IC & Budget line must be same.
- ↳ Marginal Rate of Substitution

- ② The IC curve satisfying higher utility must be selected.

31/7/17



Budget keeps on increasing /decreasing in this ~~plot~~ plot.

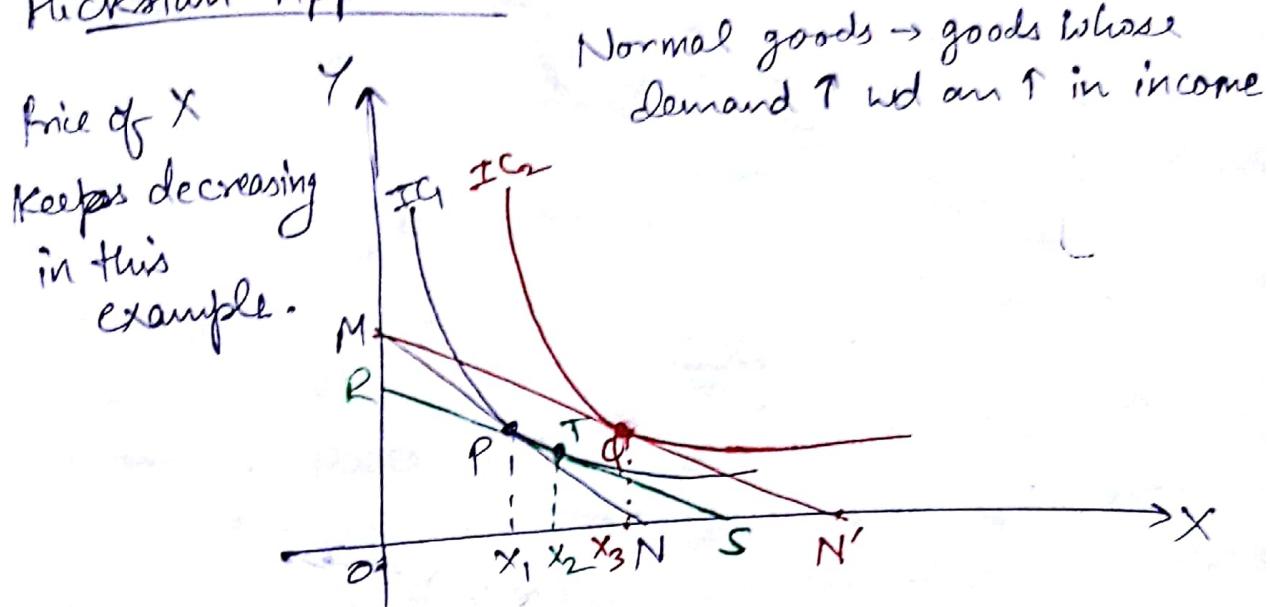


Price of X keeps on changing in this plot.

* Income effect: Due to change in the price of a commodity, the consumer feels a change in their income (though it is not in reality, but the excess or lack of income makes them feel so.)

\therefore substitution effect: A consumer always tries to substitute cheaper item for costlier item if quality is more or less the same.

Hicksian Approach



Price effect, $PE = x_1 x_3$ (the length of the line segment)

~~Now let's fix the budget~~

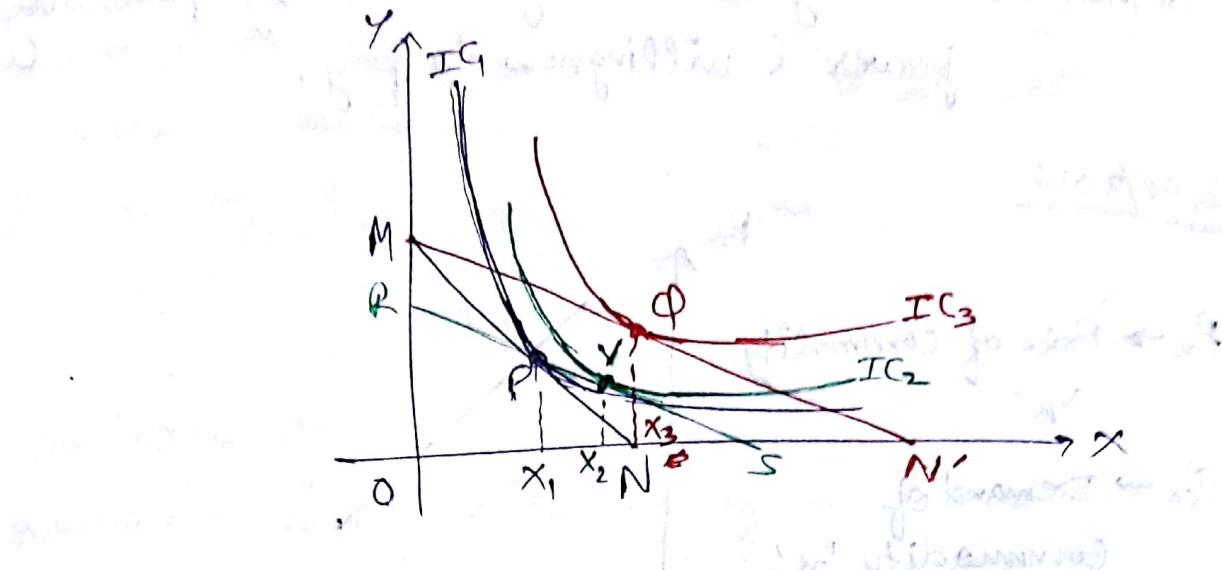
Earlier, we're at IC_1 at P . Now let say price of X ~~↑~~ & we reach IC_2 at Q .

Now assume that the budget ~~↓~~. So the budget line will come down parallelly to ~~MN'~~ MN' . Also assume that the downfall is such that we reach ~~↑~~ back to IC_1 at T .

Income effect, $IE = x_2 x_3$ (the length again)

Substitution effect, $SE = x_1 x_3 - x_2 x_3$
 $= x_1 x_2$,

Slutsky's Approach



Price effect, $-PE = x_1 x_3$.

from P, price of $X \downarrow$. So we reached Φ .

Now he assumed that the income \uparrow in such a way that the consumer can still purchase the original combination of X & Y at P.

$$IE = x_2 x_3$$

$$\therefore SE = PE - IE = x_1 x_2$$

~~original combination of X & Y~~ = xP

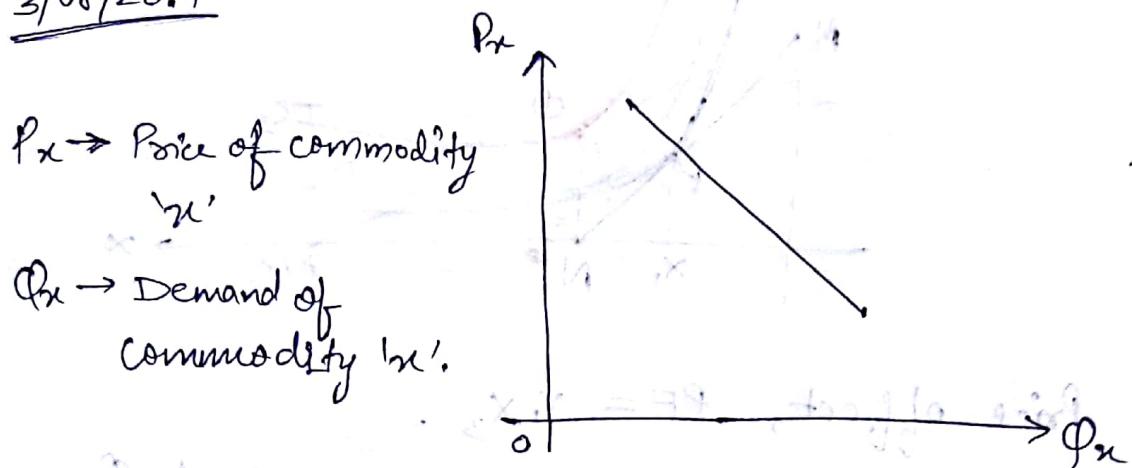
So, ~~original combination of X & Y~~ = without

income effect, ~~original combination of X & Y~~ = xP

Original effect of ~~original combination of X & Y~~ = xP

Demand: ~~willingness~~^{Desire} to buy backed by purchasing power & willingness to pay.

3/08/2017



Law of Demand: When ~~all~~ other factors are constant, price is less implies that demand will be more & vice versa.

There may be following relⁿ bw P_x & Q_x :

$$Q_x = a - bP_x$$

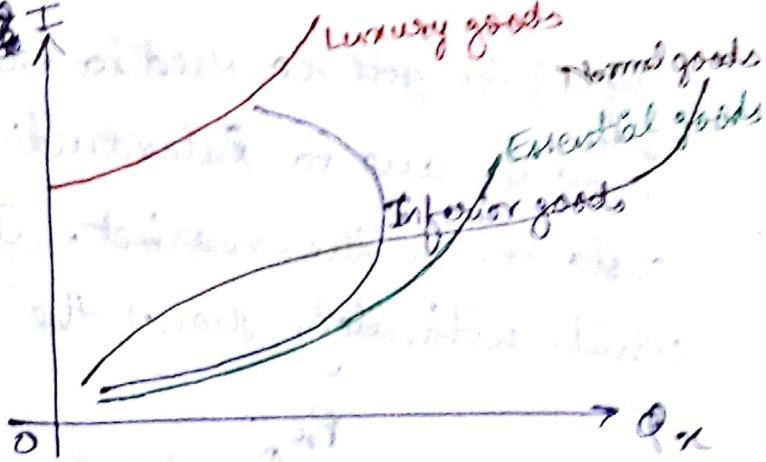
$$Q_x = \frac{a}{P_x} - b$$

$$Q_x = \frac{a}{P_x + c} \cdot b, \quad a, b, c > 0$$

exception: gift items, luxury items, ~~giffen goods~~

It may be any commodity ~~consumed~~^{essential} major fraction by poor households & it takes ~~part~~ of their income.

Normal goods are those that comes in b/w essential goods & luxury goods.



* Bandwagon effect:

Purchase of luxury commodity by some individual having the purchasing power to ↑ its social status encourages other individuals having the purchasing power to buy it. (+ve effect on demand)

Snob effect:

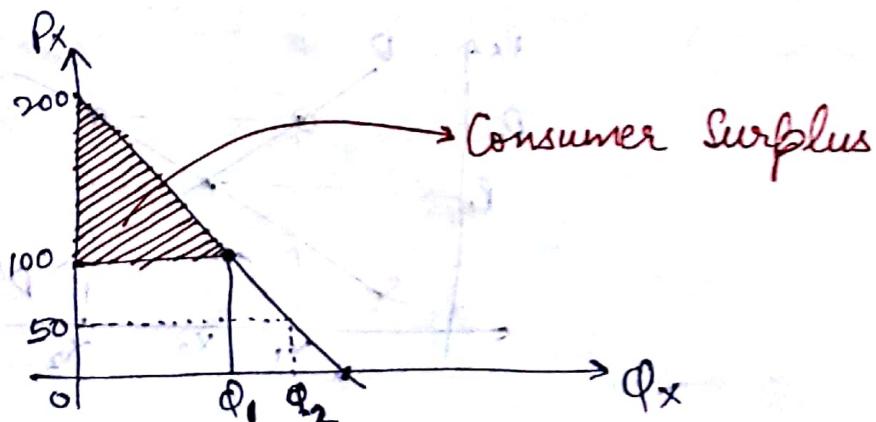
Increased income with time generates a feeling of dropping off common goods used by many of the common people & switching on to a better or expensive good. (-ve effect on demand)

$$Q_x = f(P_x, I, \underline{P_{c,s}}, T)$$

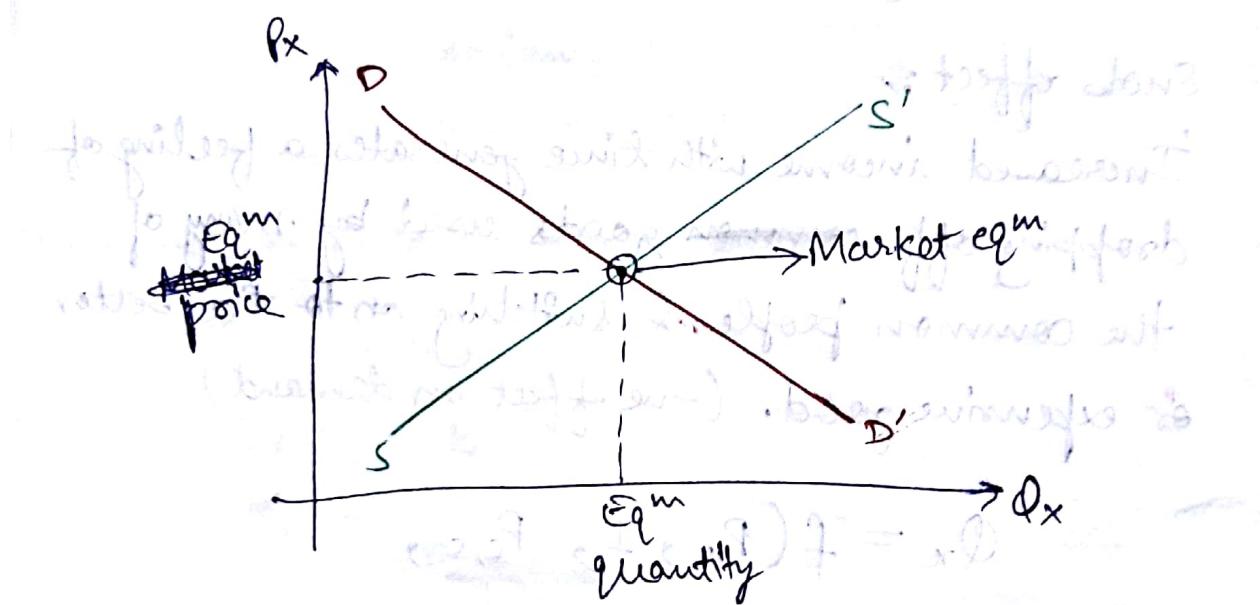
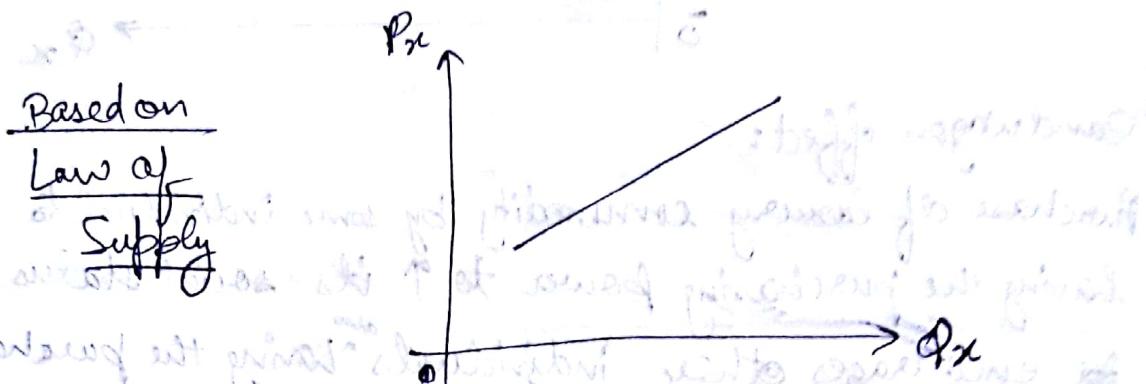
Price of complementary or substitutional goods

8/08/2017

Based on
law of
Demand

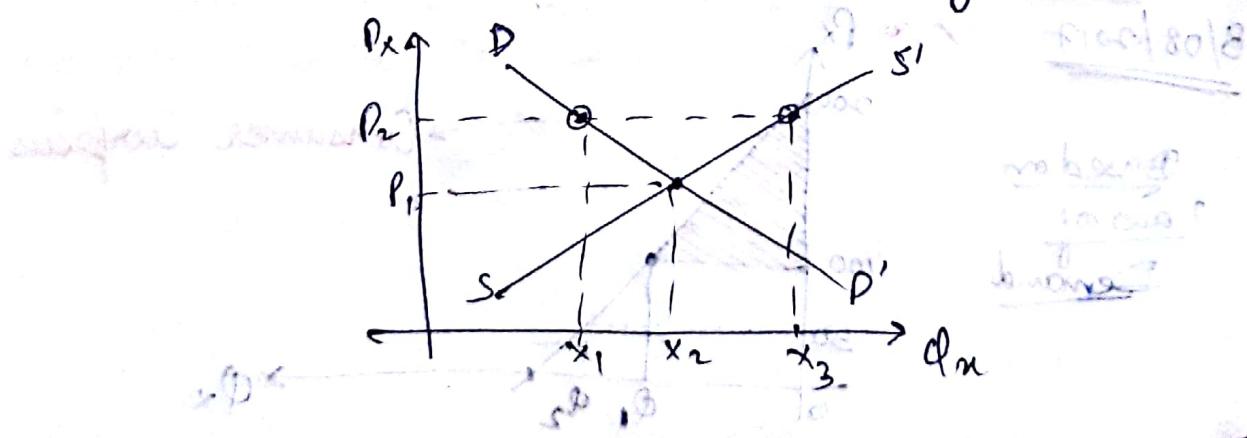


If price gets lowered to 50, the demand will ↑ to Q_2 due to introduction of new customers in the market. Consumer surplus which ultimately shows the welfare of the society.



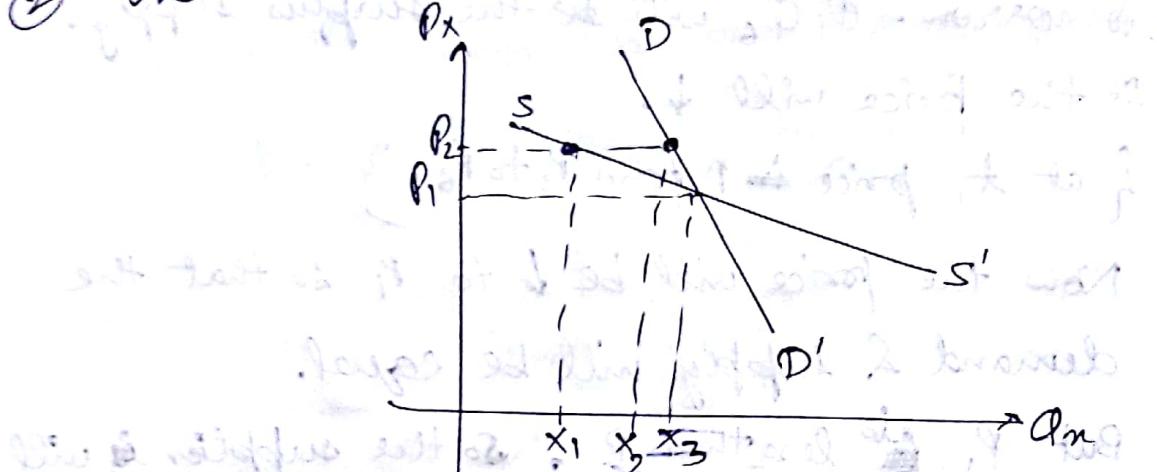
Eq^m under static Economy -

① Stable eq^m under static economy

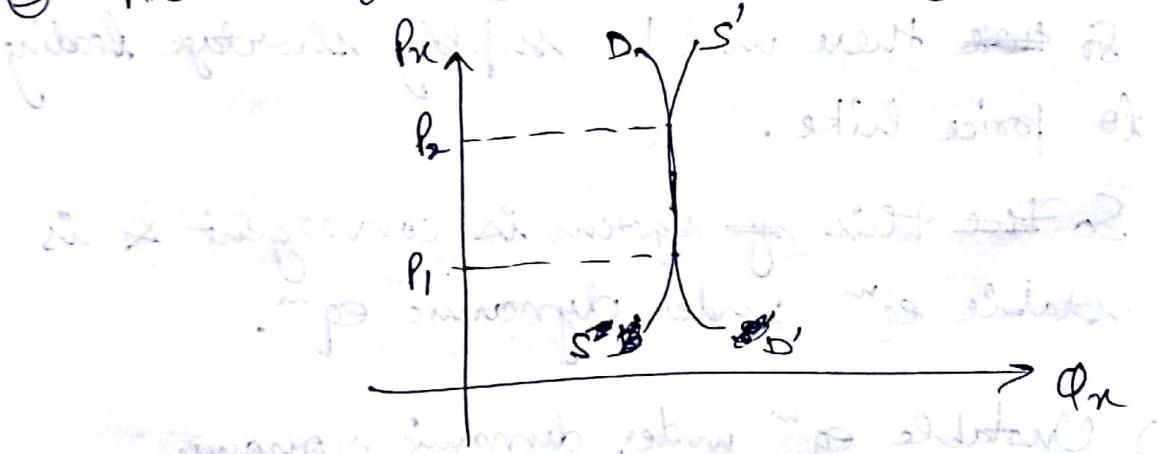


If price P to P_2 , there is a surplus supply.
So price \downarrow . So we again come to P_1 .

② Unstable eq^m under static economy



③ Neutral eq^m under static economy

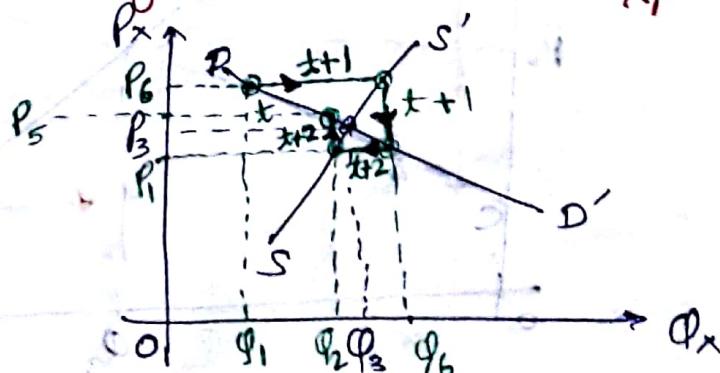


14/08/2017

Eq^m under Dynamic Economy

① Stable eq^m under ~~static~~ dynamic economy
Supply is a lag funcⁿ of price, demand changes spontaneously

Cobweb Theorem



~~slope of demand curve < slope of supply curve~~

OQ_1 is the demand today. OQ_6 will be the supply tomorrow. $Q_1 Q_6$ will be the surplus supply. So the price will ↑.

{ at t, price ↑ from P_3 to P_6 . }

Now the price will be ↓ to P_1 so that the demand & supply will be equal.

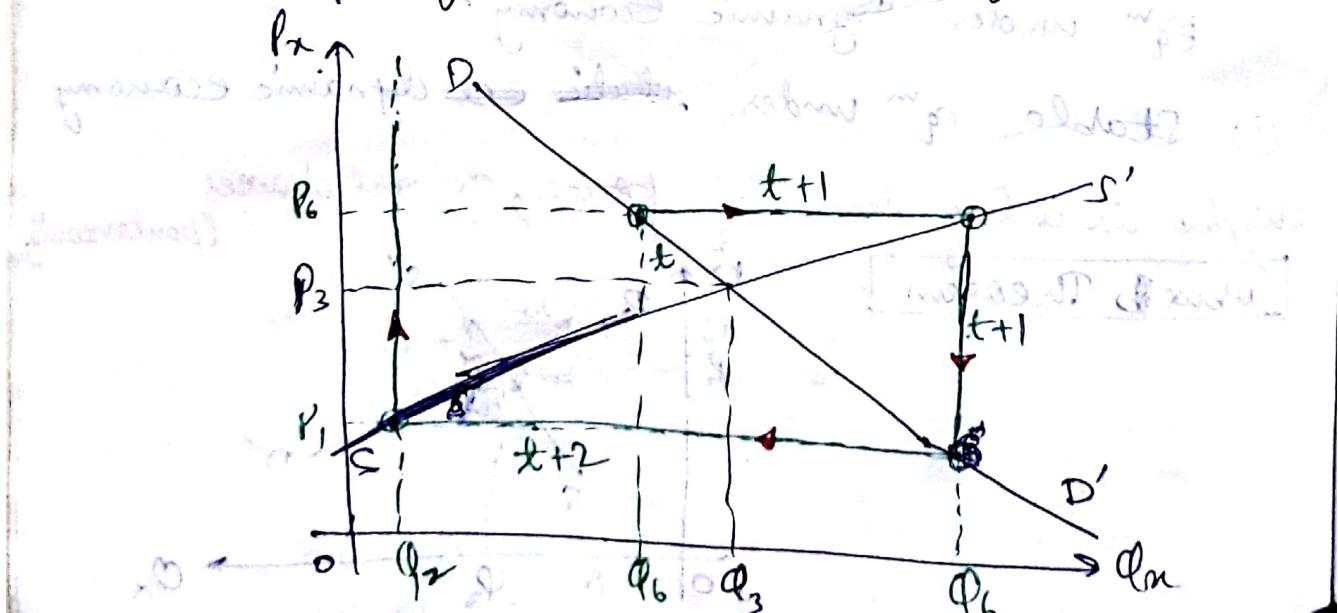
But P_1 is less than P_3 ; So the supplier will supply less the next day (at $t+2$).

But now, OQ_2 is supply & OQ_6 is demand. So ~~there~~ there will be supply shortage leading to price like.

So ~~this~~ this system is convergent & is stable eq^m under dynamic eq^m.

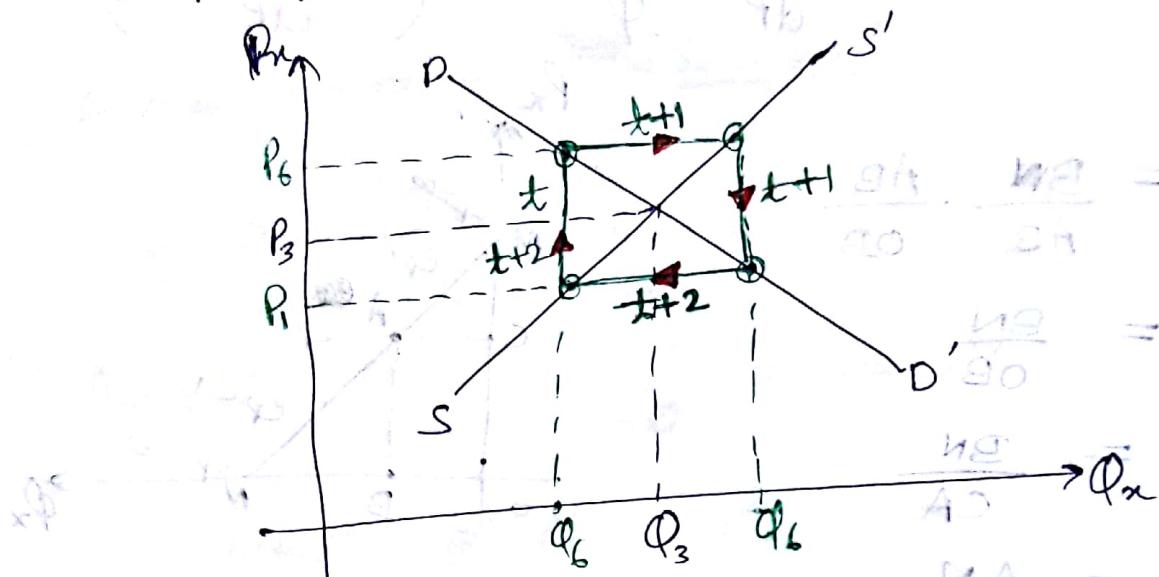
② Unstable eq^m under dynamic economy

slope of demand curve > slope of supply curve



We will never return to (Q_3, P_3) .
So this system is unconvergent & unstable.

- ② ~~neutral eq^m~~^{oscillation} under dynamic economy
slope of demand curve = slope of supply curve.



We'll keep on rotating around (Q_3, P_3) .
So this is neutral eq^m.
In some books, this is also termed as undamped oscillating eq^m under dynamic economy.

* Elasticity - sensitivity or responsiveness of change of one parameter of a commodity w.r.t other parameters.

① Price Elasticity

$$e_p = \frac{\% \text{ change in Q.fy demanded}}{\% \text{ change in price of the commodity}}$$

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

This is also called 'arc elasticity'.

22/08/2017

② Point Elasticity

$$e_p = -\frac{d\phi}{dP} \cdot \frac{P}{\phi} \quad (\because \frac{d\phi}{dP} < 0)$$

$$\therefore e_p = \frac{BN}{AB} \cdot \frac{AB}{OB}$$

$$= \frac{BN}{OB}$$

$$= \frac{BN}{CA}$$

$$= \frac{AN}{MA}$$

$$= \frac{\text{Lower Segment}}{\text{Upper Segment}} \quad \begin{matrix} \leftarrow \text{Do not use this} \\ \text{approach.} \end{matrix}$$

$$\text{Prefer } e_p = -\frac{d\phi}{dP} \cdot \frac{P}{\phi}$$

$e_p = 1 \Rightarrow$ unitary elastic

$e_p = 0 \Rightarrow$ perfectly inelastic

$0 < e_p < 1 \Rightarrow$ relatively inelastic

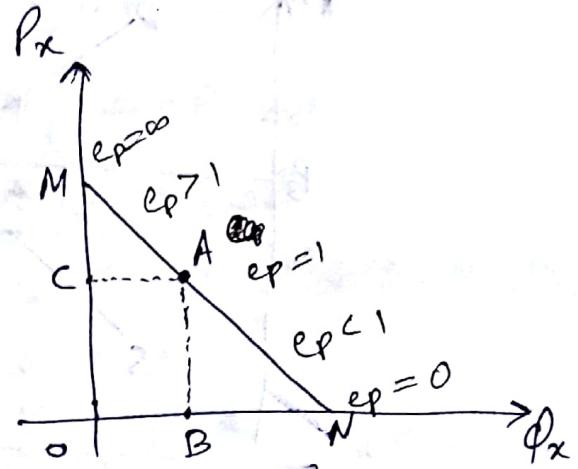
$1 < e_p < \infty \Rightarrow$ highly elastic

~~$e_p = \infty$ (not defined) \Rightarrow not defined~~

$e_p = \infty$ (not defined) \Rightarrow perfectly elastic

Factors affecting $e_p \rightarrow$

Nature of commodity, Proportion of Income spent,
Price of Substitute Goods, Alternative Uses of



a Commodity

$$\text{Total Revenue} = \text{Price} \times \text{Qty.}$$

or $TR = P \cdot Q$

$$\text{Profit} = \text{Total Revenue} - \text{Total Cost}$$

or $\pi = TR - TC$

$$\text{Average Revenue} = \frac{\text{Total Revenue}}{\text{Qty.}}$$

$$\text{or } AR = \frac{P \cdot Q}{Q} = P$$

$$\text{Marginal Revenue} = \frac{d(TR)}{dQ} = \frac{d(P \cdot Q)}{dQ}$$

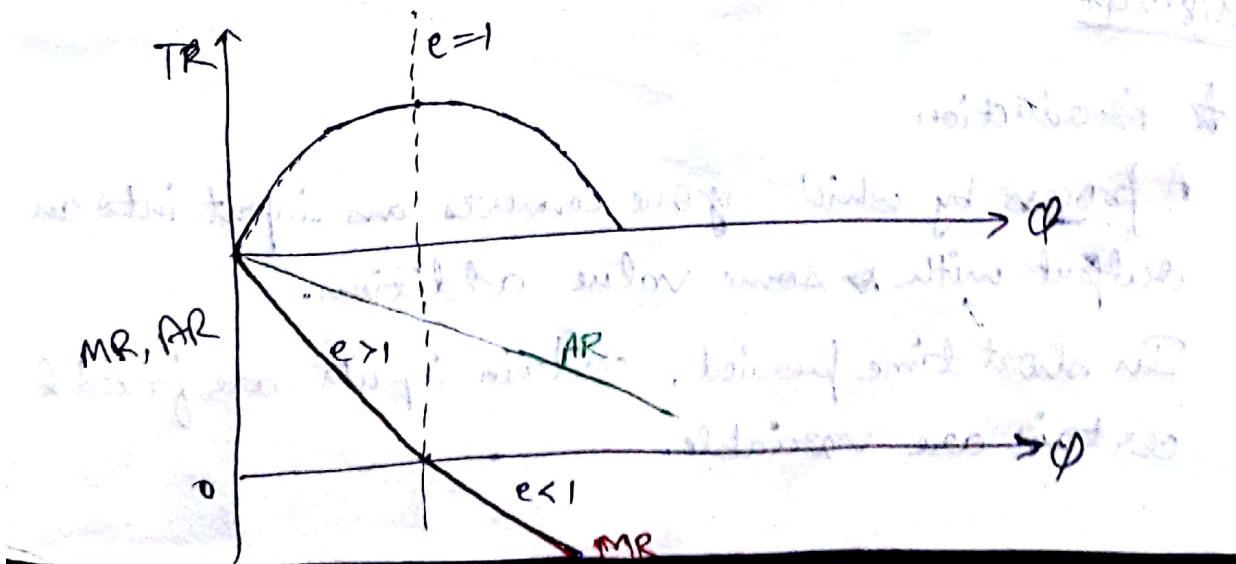
$$\Rightarrow MR = \frac{dP}{dQ} \cdot Q + P$$

$$= P \left(1 + \frac{Q}{P} \cdot \frac{dP}{dQ} \right)$$

$$= AR \left(1 + \frac{1}{e} \right)$$

$$\text{or, } MR = AR \left(1 - \frac{1}{e} \right) \quad (e = -\frac{dP}{dQ} \cdot \frac{P}{Q})$$

$$\text{or, } AR = MR \left(\frac{e}{e-1} \right)$$



③ Income Elasticity

$$e_i = \frac{d\phi}{dM} \cdot \frac{M}{\phi}$$

M = Disposable Income

④ Cross Elasticity of Demand

$e = \frac{\% \text{ change in qty. demanded}}{\% \text{ change in price of its substitutes or}}$

$\frac{P_A}{P_B} - \frac{Q_A}{Q_B} = \text{Complementary goods}$

e.g. $e_{x,c} = \frac{dQ_x}{dP_c} \cdot \frac{P_c}{Q_x}$

for substitute products, $e_{x,c} > 0$.

for complementary products, $e_{x,c} < 0$.

⑤ Elasticity of Supply

$$e_P = \frac{d\phi}{dP} \cdot \frac{P}{\phi}$$

Here ϕ is qty. supplied
not qty. demanded.

29/8/2017

* Production

A process by which one converts an input into an output with some value addition.

In short time period, certain inputs are fixed & certain are variable.

In long time period, almost all inputs are variable.

Certain factors can act as both variable & fixed.

e.g., Rain & heavy rain for agriculture.

In long run, $\varphi = f(L, K)$

Capital

Labour

Qty. produced / Total Product (TP)

short run production funcⁿ, $\varphi = f(L, K)$

fixed

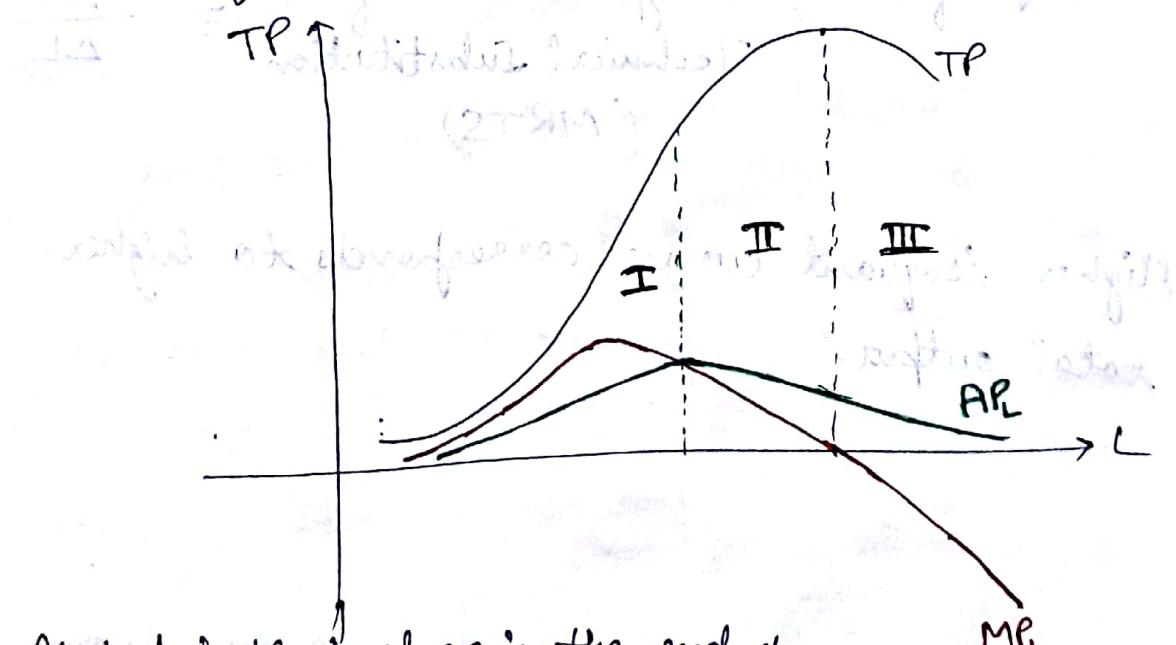
Capital

~~Arg. product of labour~~

Arg. product wrt labour, $AP_L = \frac{TP}{L} = \frac{\varphi}{L}$

Marginal product wrt labour, $MP_L = \frac{d(TP)}{dL}$

Law of Diminishing Marginal Return



Most desirable stage is the end of stage I & start of stage II.

5/09/2012

In long run, $\varphi = f(L, K)$

~~Q is measure~~

φ is plotted in

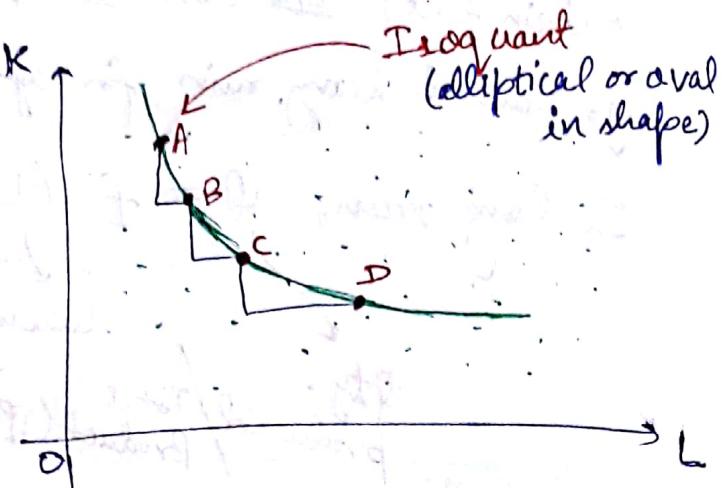
Z-axis.

All points on isoquant
correspond to different

Combinations of

capital & labour

such that the total output remains same.



~~Δx. MP~~

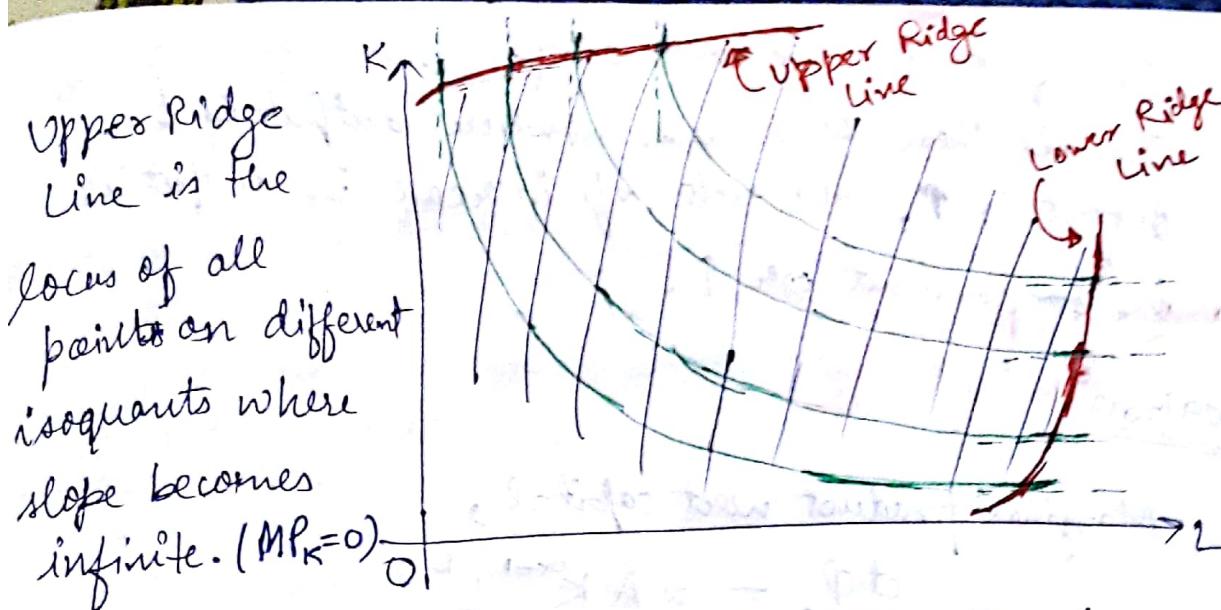
$$-\Delta K \cdot M_P_K = \Delta L \cdot M_P_L$$

$$\Rightarrow -\frac{\Delta K}{\Delta L} = \frac{M_P_L}{M_P_K}$$

(moving from
A to B, less
due to capital must
be compensated
by gain due to
labour.)

* Slope of Curve / Marginal Rate of Technical Substitution $= -\frac{\Delta K}{\Delta L}$
(MRTS)

Higher isoquant curve corresponds to higher total output.



Upper Ridge line is the locus of all points on different isoquants where slope becomes infinite. ($MP_K = 0$)

Similarly, Lower Ridge Line is when slope becomes zero. ($MP_L = 0$)

The shaded area (////) b/w the two ridge lines is called the Economic Region of Production.

Law of Returns To Scale

(Cobb-Douglas production funcⁿ,

$$Q = A K^\alpha L^\beta, \quad A = \text{constant}$$

Suppose $K \rightarrow RK$ & $L \rightarrow RL$

$$\therefore Q \rightarrow hQ$$

$$\begin{aligned} \therefore hQ &= A(RK)^\alpha A(RL)^\beta \\ &= R^{\alpha+\beta} A K^\alpha L^\beta \end{aligned}$$

If $\alpha + \beta > 1 \Rightarrow h > R \rightarrow$ Increasing returns to scale
(Homogeneous of degree more than 1)

$\alpha + \beta = 1 \Rightarrow h = R \rightarrow$ constant returns to scale
(Homogeneous of degree 1)

$\alpha + \beta < 1 \Rightarrow h < R \rightarrow$ Decreasing returns to scale
(Homogeneous of degree less than 1)

By default we assume $\alpha + \beta = 1$.

In all these three cases, nowhere output is ↓.
Output is ↑, the rate of increase in output is
↓, constant or ↑.

12/09/2017

Marginal product w.r.t capital,

$$\frac{d\phi}{dK} = \alpha A K^{\alpha-1} L^\beta$$

$$= \alpha A K^{\alpha-1} L^{1-\alpha} \quad (\text{for } \alpha + \beta = 1)$$

$$\text{Marginal product w.r.t capital} = \alpha A \left(\frac{K}{L}\right)^{\alpha-1}$$

Marginal product w.r.t labour,

$$\frac{d\phi}{dL} = \beta A K^\alpha L^{\beta-1}$$

$$= \beta A \left(\frac{K}{L}\right)^{1-\beta} \quad (\text{for } \alpha + \beta = 1)$$

Cobb-Douglas production funcⁿ is homogenous & degree of its homogeneity depends on sum of the powers of its factors.

$$\frac{d\phi}{dK} \cdot \frac{K}{\phi} = \alpha A K^{\alpha-1} L^\beta \cdot \frac{K}{\phi} = \alpha \frac{A K^\alpha L^\beta}{\phi} = \alpha$$

\uparrow
elasticity

$$\text{Similarly, } \frac{d\phi}{dL} \cdot \frac{L}{\phi} = \beta$$

* also represents relative distributive share of capital in Φ .

Actual cost & Opportunity cost:

The cost we are ~~getting~~ incurring actually in business

↳ Not actually a cost.

It is actually the returns from ~~your~~ next best alternative

Business Cost &

whatever cost you are incurring in your business (fixed cost + variable cost).

Full ~~cost~~ cost:

Opportunity cost & Normal Profit:

+ Business cost

amount of profit you expect to remain in a business (some desirable minimum profit.)

Explicit cost & Implicit cost

↓
whatever is actually happening in one's book of records.

↳ While working in ~~your~~ factory/company/firm, you yourself manage certain jobs for which you may not take any money. But if you hire some other employee for those jobs, you'll have to pay them.

Private Cost &

↓
whatever I'm incurring as an individual for my business.

Social cost

↳ Private cost & External cost

~~External~~ External cost

↓
the cost that the society has to bear due to waste generation from your production. (or externality)

3/10/2019

Cost

$$TC = TFC + TVC$$

i.e. Total cost = Total Fixed cost + Total Variable Cost
(In short term).

e.g. $TC = 10 + 15\phi + 2\phi^2 + \dots$

Here $TC(\phi=0) = 10$,

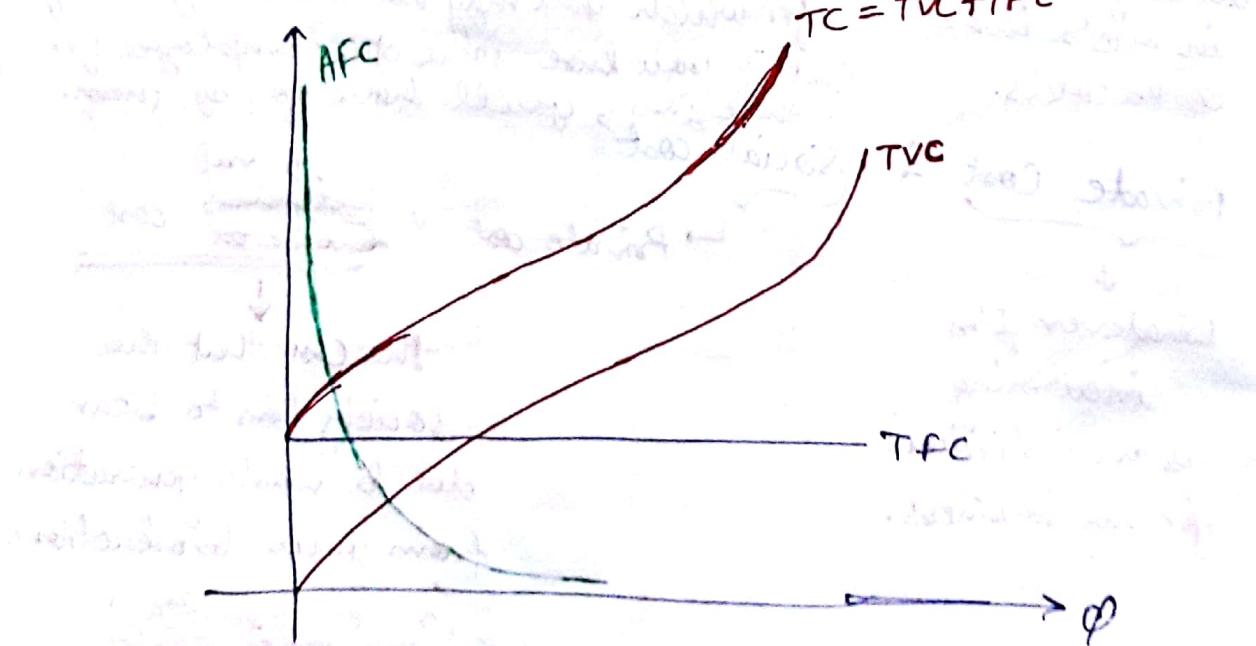
$\therefore 10$ is the TFC.

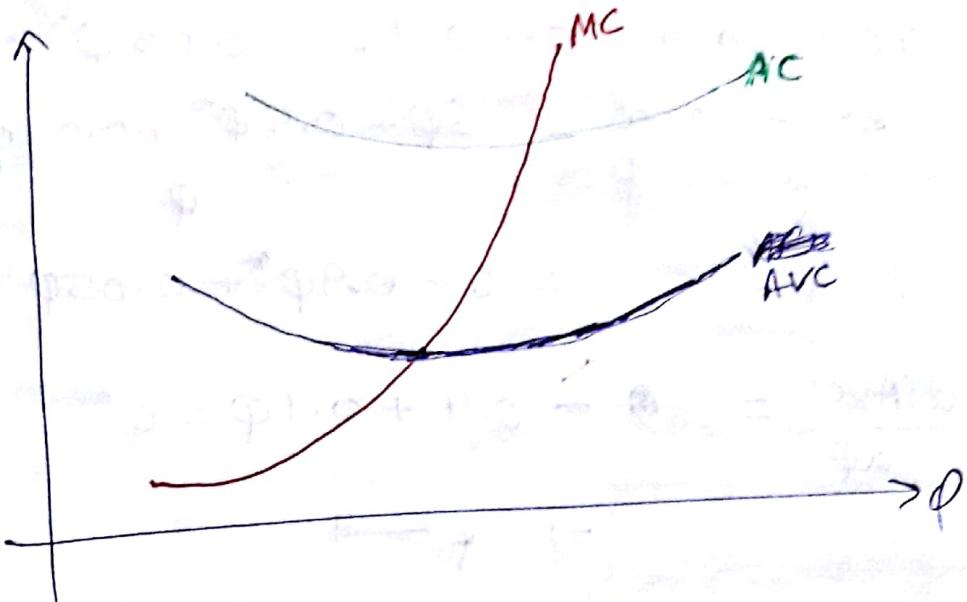
Average Cost, $AC = \frac{TC}{\phi}$

Avg. Fixed Cost, $AFC = \frac{TFC}{\phi}$

Avg. Variable Cost, $AVC = \frac{TV C}{\phi}$

Marginal Cost, $MC = \frac{d(TC)}{d\phi}$





$$MC = \frac{d(TC)}{d\phi} = \cancel{\frac{d(TVC + TFC)}{d\phi}}$$

$$= \cancel{\frac{d(AC \cdot \phi)}{d\phi}}$$

$$= AC + \phi \frac{d(AC)}{d\phi}$$

$$\Rightarrow \frac{d(AC)}{d\phi} = \cancel{\frac{1}{\phi}} (MC - AC)$$

16/10/2017 : Case 1: $MC < AC$

$$\Rightarrow \frac{d(AC)}{d\phi} < 0$$

Case 2: $MC = AC$

$$\Rightarrow \frac{d(AC)}{d\phi} = 0$$

Case 3: $MC > AC$

$$\Rightarrow \frac{d(AC)}{d\phi} > 0$$

Critical value of Output : The value of output where
not AC / AVC value of AC / AVC is min.

$$q, \quad TC = 10 + 6\varphi - 0.9\varphi^2 + 0.05\varphi^3$$

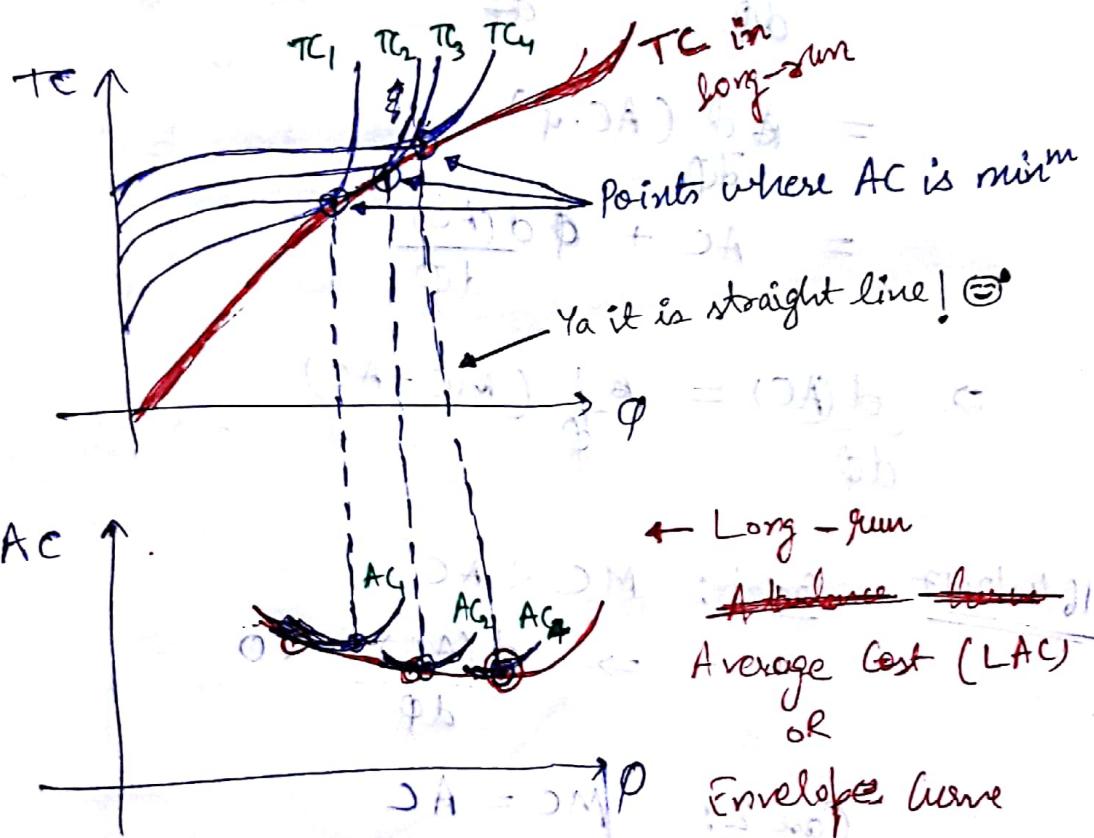
$$AVC = \frac{TC}{\varphi} = \frac{6\varphi - 0.9\varphi^2 + 0.05\varphi^3}{\varphi}$$

$$= 6 - 0.9\varphi + 0.05\varphi^2$$

$$\frac{d(AVC)}{d\varphi} = 0 - 0.9 + 0.1\varphi = 0$$

$$\Rightarrow \varphi = 9$$

\therefore Critical value of output wrt $AVC = 9$.



$TC_1, TC_2, TC_3, \dots \rightarrow$ Total Cost curves for every prodⁿ cycle (1 week / 1 month / 1 year / blah blah)

$AC_1, AC_2, AC_3, \dots \rightarrow$ Corresponding Avg. Cost Curves of TC_1, TC_2, TC_3, \dots

Read about "reserved capacity".

When is $AVC > AC$ for exm.

23/10/2017

Economics & Dis-economies of Scale

Economics of scale means mostly bcoz of large scale prodⁿ & increase in efficiency, avg. cost of prodⁿ is coming down.

Dis-economies of scale means when with increase in the scale of prodⁿ, avg. cost of prodⁿ increases rather than remaining constant or decreasing.

Internal Economy & External Economy

It is internal to your production environment. You are directly controlling most of these parameters.

Economics & Dis-economies of Scale are discussed under Internal Economy.

Economics of production: Due to increase in your level of production, avg. cost of production comes down. This is bcoz you are getting more & more output, but cost is not increasing proportionately.

In addition to this, many of your fixed inputs will be then ~~better~~ utilized better.

Dis-economies of production: Now you start producing such level of output that needs investment in ~~one or~~ one or more of the fixed inputs. Initially,

the newly invested ~~rain~~ fixed input will be not completely utilised. So there'll be rise in the avg. cost of prodⁿ.

Managerial Economy:

When you start expanding your business, you (or a person you've hired) can manage it efficiently & thus with an increase in the level of output, avg. cost of prodⁿ goes down.

Managerial Diseconomies:

Now the output is at such level that it is not smooth anymore to efficiently manage the business. As a result, output increases, but at a decreasing rate. ∴ avg. cost of prodⁿ goes up.

Economics of Buying & Selling:

~~Duration~~ Frequency of buying & selling of the raw material is such that the fluctuation in market price of that raw material in the market doesn't affect you for a good duration of time (may happen due to the storage & advanced buying).

Diseconomics of Buying & Selling:

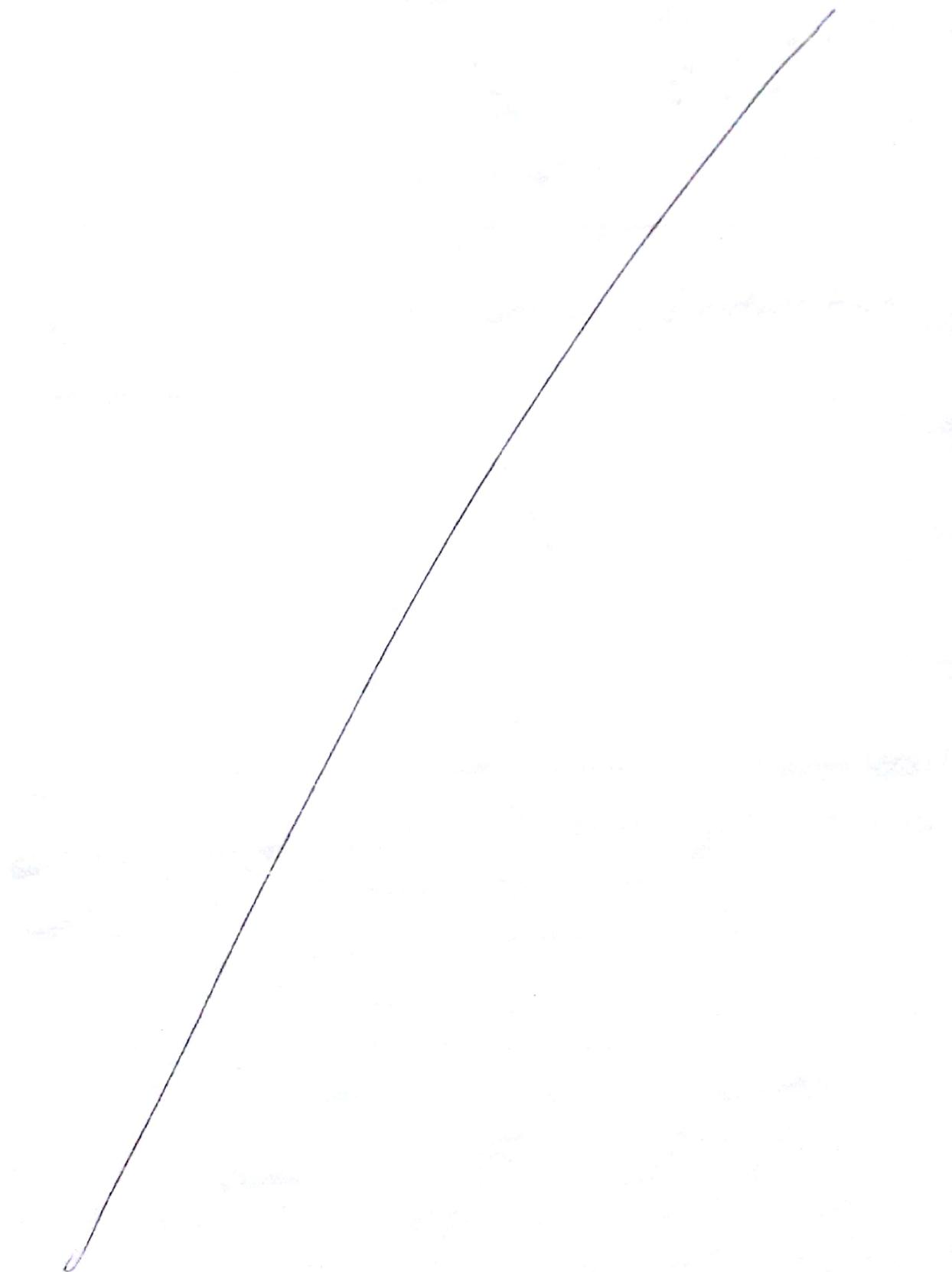
Frequency of buying & selling ~~the~~ of the raw material is such that change in market price of that raw material affects you frequently. Thus, avg. cost of prodⁿ will ~~go~~ go up.

Economies of Transportation

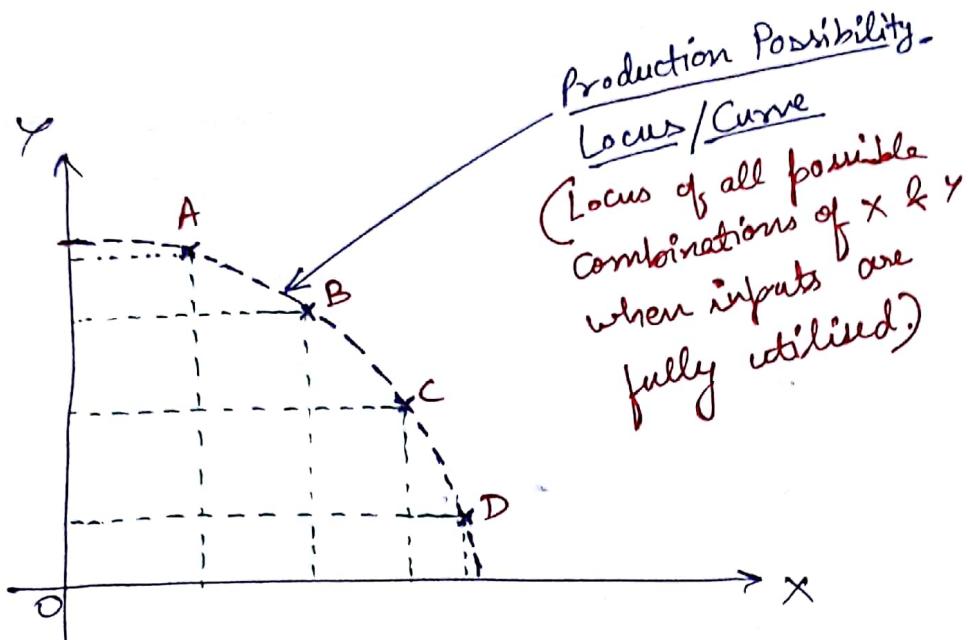
Diseconomies of Transportation.

Economies of Storage

Diseconomies of Storage



6/11/2017

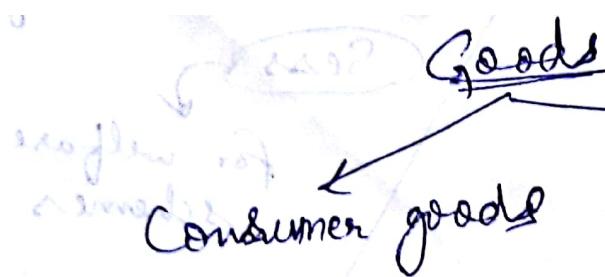


* X & Y are two products being produced by a producer.

Reason of changes in this curve are technology changes (wrt X , wrt Y , wrt some input and many more),

MACRO
ECONOMICS

Prof. N. C. Nayak.



Producer ~~or~~ goods or
Capital goods

(not consumer but above)

Factors of Production :

T 2 P

- ① Land → Rent
- ② Labour → Wage/Salary
- ③ Capital → Interest
- ④ Entrepreneurship → Profit

Labour

```

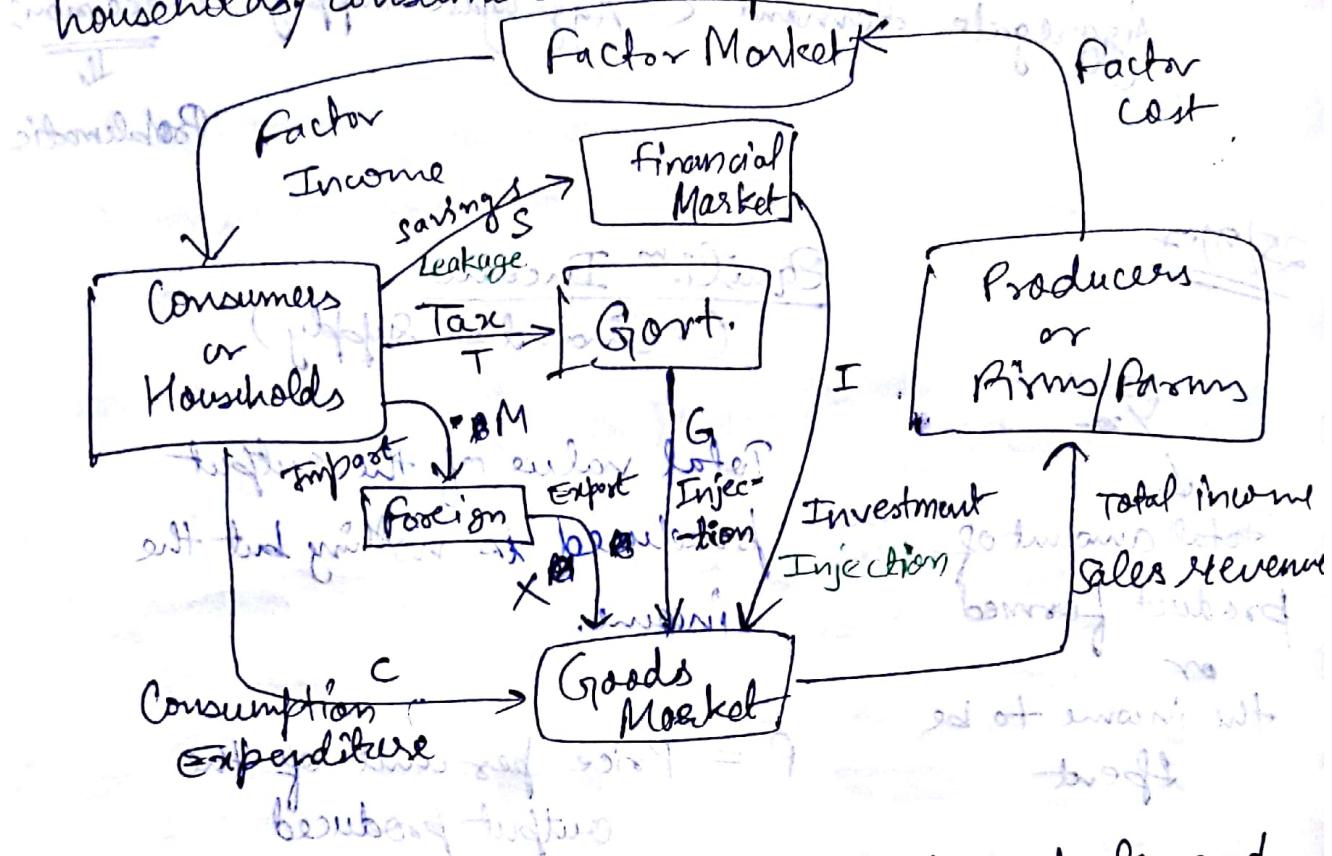
graph TD
    Labour[Labour] --> Skilled[Skilled]
    Labour --> Unskilled[Unskilled]
    Labour --> SemiSkilled[Semi-skilled]
  
```

~~Consumers or Households~~

~~Govt.~~

~~Producers or Firms/Farms~~

All the factors of production are generated from the households/consumers to the producers.



Market: Anything that serves the purpose of demand & supply of a good or service. It may or may not exist physically.

The price for a commodity depends on the relative strength of demand & supply. Laws of demand & supply.

$$\begin{aligned}
 \text{Total } Y &= C + I + G \\
 \left. \begin{array}{l} \text{Incomes} \\ \text{Expenditure} \end{array} \right\} Y &= C + S + T \quad \left. \begin{array}{l} \text{Investment} \\ \text{Government} \end{array} \right\} Y \\
 S &= I \quad I = I \\
 T &= G + I = Y \\
 S + T &= I + G = Y \\
 M &= X
 \end{aligned}$$

(I = Investment, G = Government Expenditure, S = Savings, T = Tax, Y = Total Income, X = Exports)

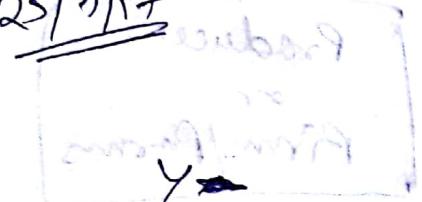
$$Y = C + I + G + X - M$$

~~$$S + T + M = I + G + X \quad (\text{Ideal})$$~~

Aggregate demand > Aggregate supply (Prosperity)

Aggregate demand < Aggregate supply (Recession)

25/7/17



total amount of product formed
or
the income to be spent

Equilibrium Income

(Demand = Supply)

Total value of the output produced is nothing but the income.

P = Price per unit of the output produced

Q = Total qty (physical) of the output produced.

Total income to be spent is equal to the total value of output produced or the total demand is equal to the total supply. This is called equilibrium income, i.e.

$$P + I + S = Y$$

$$Y = C + S + T + I + X - M \quad \{ \text{Assuming no govt.}\}$$

$$S = I \quad I = Z$$

$$\Rightarrow Y = C + I + T + X - M$$

Aggregate demand = Aggregate supply.

Keynesian Theory

Gives by J. M. Keynes

$Y = \text{disposable personal income}$

$$C = a + bY \quad \{ \text{consumption func'n} \}$$

$$Y = C + S$$

Properties \rightarrow propensity to consume (MPC)

- ① Marginal propensity to consume (MPC) is constant. (in short terms)
- ② $0 < MPC < 1$.
- ③ Average propensity to consume (APC) is always at zero unit of income & then it declines but will remain above MPC.

$$b = MPC = \frac{dc}{dy}$$

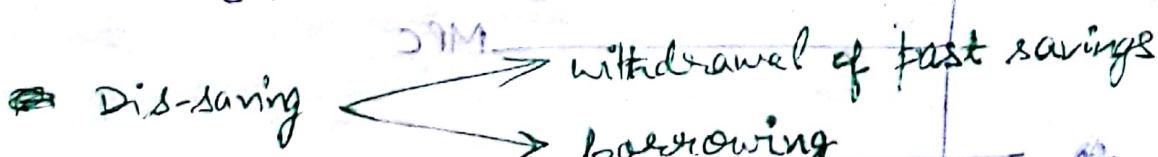
$$APC = \frac{c}{y}$$

eg,	y	0	40	80	120	160
	c	20	50	80	110	140

s	-20	-10	0	10	20
-----	-----	-----	---	----	----

dis-savings

$$MPC = \frac{dc}{dy} = \frac{50 - 20}{40 - 0} = \frac{30}{40} = \frac{3}{4}$$



a = autonomous consumption

bY = Induced consumption

~~Autonomous consumption:~~

The consumption that is independent of one's income. This is required to meet the basic requirements. It will be there even if at ~~the income~~ zero unit of income.

~~Induced consumption:~~

The consumption that is dependent on one's income.

In the above eq, $C = -20 + \frac{3}{4}Y$

$$C = a + bY$$

$$\therefore APC = \frac{C}{Y} = \frac{a}{Y} + b = \frac{a}{Y} + MPC$$

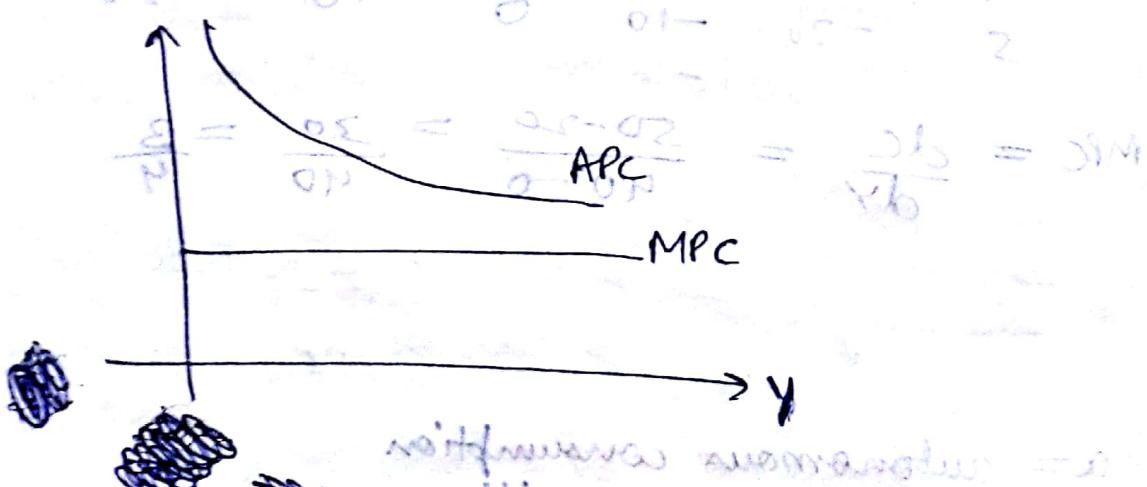
As income \uparrow , fraction of income consumed \downarrow ,

~~saving~~ \uparrow fraction of income saved \uparrow .

\therefore investment must \uparrow to cater ~~leakage~~^{this leakage},
~~recession~~
otherwise ~~leakage~~ can't be ~~avoided~~^{avoided}.

In long run, $C = bY$.

$$\Rightarrow APC = b = MPC$$



1/08/2017

Investment funcⁿ

Investment \Rightarrow addⁿ to capital stock.

\Rightarrow Investment \neq Capital
(flow) (stock)

* Income is a flow, wealth is stock.
" " " " , money " "

Income = money \times velocity
= total money supplied \times rate of
of change of hands experienced
by that money.

* Anything that is flow variable, changes its value
in short times.

* Stock variables ~~has~~ has constant value over
a long time interval, after which they too may
have a change in their value.

$$\Delta_t^g = K_t^g - K_{t-1}^g$$

* i.e., gross investment ~~is~~ = gross capital stock in time
in time period t - period $(t-1)$

$$I_t^n = I_t^g - D$$

i.e., net investment = gross investment - Depreciation
in time period t . in time period t

Similarly, $K_t^n = K_t^g - D$.

* In context of net capital stock or infrastructure, talking about net investment is better.

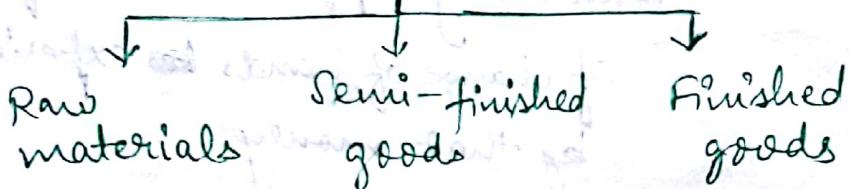
While in context of generating employment, talking about gross investment is better.

Types of investment →

1) Business Fixed Investment

2) Residential Investment

3) Inventory Investment → Stock piling activity



8/08/2017

$$I = f(MEC, \gamma)$$

Marginal Efficiency

of
Capital

Annual rate of return or cost in the capital investment

Rate of Interest / Cost of raising capital / Cost of borrowing

MEC is that discount rate which equalises the present value of value of the perspective yield with the initial amount of capital income.

NOTE:- Three reasons due to which money value changes over time are -

- 1) Interest
- 2) Inflation
- 3) Risk

1) Interest

$$\text{future value} = \frac{\text{present value}}{1 + \text{rate of interest}} \times (1 + \text{nominal rate})$$
$$\Rightarrow FV = PV(1 + r)$$

$$FV_n = PV(1 + r)^n \quad \begin{cases} \text{Assuming Compound interest} \\ \text{Interest is compounded annually} \end{cases}$$

$$\text{or } FV_n = PV(1 + nr) \quad \begin{cases} \text{Assuming simple interest} \\ \text{Interest is added every year} \end{cases}$$

2) Inflation

$$\text{Nominal rate} = \frac{\text{Real interest rate} + \text{Inflation rate}}{\text{of interest}}$$

$$PV = \frac{FV}{1 + r} \quad \rightarrow \text{Real interest rate}$$

~~Real~~ Inflation adjusted
rate of interest

3) Risk

Ease of doing business.

$$PV = \frac{FV}{1 + r}$$

~~Real~~ Risk adjusted
inflation adjusted rate
of interest

$$= \frac{\text{Nominal rate}}{\text{inflation rate}} - \text{risk rate}$$

$$\sum_{t=1}^n \frac{R_t}{(1+i)^t} - \sum_{t=1}^n \frac{C_t}{(1+i)^t} = 0$$

$i = MEC$

If $i > \sigma \Rightarrow$ accept

$i < \sigma \Rightarrow$ reject

$i = \sigma \Rightarrow$ neutral

e.g., Suppose TATA wants to invest 1000 Cr. on a steel plant in some state in 2017. The expected revenues are (for a 5 yr. term)

2018	2019	2020	2021	2022
300 Cr.	400 Cr.	500 Cr.	400 Cr.	600 Cr.

∴ for calculating MEC,

$$\frac{300}{1+i} + \frac{400}{(1+i)^2} + \frac{500}{(1+i)^3} + \frac{400}{(1+i)^4} +$$

$$\frac{600}{(1+i)^5} - C_0 = 0 \quad [C_0 = 1000 \text{ Cr.}]$$

$$\Rightarrow i = ?$$

Let say $\sigma = 3\%$ in 2017.

If $i = 4\% (\geq \sigma)$, then the project will be accepted.

Acc. to Classical Economics

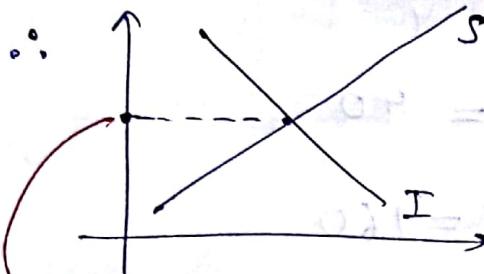
Classical economics

$$S = f(\sigma)$$

$$I = f(\sigma)$$

$$I \uparrow, \sigma \downarrow$$

$$S \uparrow, \sigma \uparrow$$



rate of equilibrium

$\therefore \sigma$ can be adjusted

so that $S = I$.

factors affecting MEC :-

- Infrastructure
- Governance

• Labour standard

• Location

21/8/17

Multipplier

Identity $\Rightarrow Y = C + S$

Econ income $\Rightarrow Y = C + I$

Wicksellian $\Rightarrow I = S$

$\therefore S = f(Y)$ & $I = f(\sigma, MEC)$

$\therefore S = I$ is ~~an exception rather than~~ a rule, acc. to Keynes.

Keynesian Economics

$$C; S = f(Y)$$

$$I = f(i, \sigma)$$

$$\therefore S = I$$

$$\text{or } S \neq I$$

both are possible.

∴

∴

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Suppose India's consumption at present is given by

$$C = 20 + \frac{3}{4} Y$$

$$\text{and } I = 20$$

for eq^m income, $Y = C + I$

$$= 20 + \frac{3}{4} Y + 20$$

$$\Rightarrow \frac{1}{4} Y = 40$$

$$\Rightarrow Y = 160$$

\therefore the total income of India should be 160 Billion \$ to ensure eq^m (ideal income)

Suppose actual income at present in India is

$$Y_A = 200 \text{ billion \$}$$

$$\therefore C = 20 + \frac{3}{4} \times 200 = 170 \text{ billion \$}$$

$$I = 20 \text{ billion \$}$$

$$\therefore C + I = 190 \text{ billion \$}$$

$$\text{i.e., } Y \neq C + I$$

\therefore demand < supply

Let's assume that the producers will produce to 190 billion \$ to meet the demand exactly, after some time maintaining 200 b. \$.

$$\therefore Y'_A = 190$$

$$\therefore C = 162.5 \text{ & } I = 20$$

$$C + I = 182.5$$

$$\text{Now } Y_A'' = 182.5$$

$$\therefore C = 20 + \frac{3}{4}(182.5) =$$

~~* * *~~ & ~~Eqm~~
 \therefore the gap b/w Y & $(C+I)$ keeps on closing
& Eqm is attained in some time.

$$\text{Now suppose } Y_A = 120 \text{ billion \$}.$$

$$\therefore C = 20 + \frac{3}{4}(120) = \cancel{20} - 110 \text{ b. \$}$$

$$\therefore C + I = 130 \text{ b. \$}$$

~~because demand > supply~~

~~therefore i.e., demand > supply~~

$$\text{Now } Y_A' = 130 \text{ b. \$}$$

$$\therefore C = 137.5 \text{ b. \$}$$

$$C + I = 157.5 \text{ b. \$}$$

$$\text{Now } Y_A'' = 157.5 \text{ b. \$}$$

Boom in
Economy
(Prosperity)

$$\therefore C = 20 + \frac{3}{4}(157.5)$$

=

$$C + I = 182.5 \text{ b. \$}$$

\therefore ~~Eqm~~ can be again attained.

Now, let us assume

$$(I = a_1 + b_1 Y)$$

Now in charge of balance of recession, I must, to attain eq^m (which will be a new eq^m).

$\therefore b, Y$ is profit induced, which is less during recession. \therefore investment in this must be desirable. \therefore govt. should come to invest in autonomous investment.

$$\text{i.e. if } I = 20 + \frac{1}{4} Y$$

$$\text{then } I_1 = 30 + \frac{1}{4} Y, \quad (\text{say})$$

$$I_2 = 40 + \frac{1}{4} Y \quad (\text{say})$$

investment changed due to investment by govt

Govt. should invest in public utilities.
(e.g., public infrastructure projects)

$$\text{Now, } Y_1 = C_1 + I_1$$

$$= a + bY_1 + I_1$$

$$\begin{aligned} \text{and } Y_2 &= C_2 + I_2 \\ &= a + bY_2 + I_2 \end{aligned} \quad \begin{array}{l} \text{(increased income but} \\ \text{attained another} \\ \text{new eq^m)} \end{array}$$

$$Y_2 - Y_1 = b(Y_2 - Y_1) + I_2 - I_1$$

$$\Rightarrow \Delta Y = \left(\frac{1}{1-b} \right) \Delta I = K \cdot \Delta I \quad \begin{array}{l} (\Delta Y = Y_2 - Y_1) \\ (\Delta I = I_2 - I_1) \end{array}$$

K = multiplier.

$$0 < b < 1$$

$$\Rightarrow 1 < K < \infty$$

$b = MPC$

$$1 - b = MPS \quad (MPS + MPC = 1)$$

Higher the MPC, higher will be value of K .
or " MPS, lower " " " " "

We ~~can assume~~ that $C = a + bY$ $a = \text{autonomous consumption}$
(i.e. every demand funcⁿ has $I = a_1 + b_1 Y$ $a_1 = \text{autonomous investment}$
a slope coeff.) $G = a_2 + b_2 Y$ $a_2 = \text{autonomous govt. purchases}$

Consider suppose it's a closed economy in which there are 3 players, consumers, investors & govt.

Theoretically, if $I = a_1 + b_1 Y$ changes to

$I_1 = a'_1 + b_1 Y$ & leads to change in Y , then C changing from $a + bY$ to $a' + bY$ or G changing from $a_2 + b_2 Y$ to $a'_2 + b_2 Y$ (keeping other two players' funcⁿ ~~stable~~) will also have the same impact on Y .

i.e. for $I = a_1 + b_1 Y \rightarrow I_1 = a'_1 + b_1 Y, \Delta Y = K \Delta I$

for $C = a + bY \rightarrow C_1 = a' + bY, \Delta Y = K \Delta C$

for $G = a_2 + b_2 Y \rightarrow G_1 = a'_2 + b_2 Y, \Delta Y = K \Delta G$

or, in general, $\Delta Y = K \cdot \Delta D_a$

↳ change in autonomous demand

In this case, $0 < b + b_1 + b_2 < 1$

$$\text{and } K = \frac{1}{1 - b - b_1 - b_2}$$

$$= \frac{1}{1 - \text{marginal propensities}}$$

29/08/2017 To follow and have a good understanding of the topic.

eg, Period	ΔI	$\Delta C = b\Delta Y$ [Let assume $b = 0.5$]	ΔY ($y = C + I$)	$\Sigma \Delta Y$
Period 1	10,000	-	10,000	10,000
Period 2	-	5,000	5,000	15,000
Period 3	-	2,500	2,500	17,500
Period 4	-	1,250	1,250	18,750
Period 5	0	0	0	20,000

$$\text{therefore } K = \frac{Y_1 + Y_2 + Y_3 + Y_4}{4} = 18,750$$

Now $K = \frac{1}{2}(b + \frac{1}{2})I$ \Rightarrow $\frac{1}{2}(0.5 + \frac{1}{2})I = 18,750$

$$I = \frac{18,750 \times 2}{0.75} = 48,000$$

If ΔI is permanent / once-over type,
 \leftarrow $I_{initial} \rightarrow I_{final}$

let's assume $C = 20 + \frac{3}{4}Y$

$\Delta Y = \Delta A$ $\Delta C = 20$
 $\Delta I = 160$

and $Y = C + I$ (at equilibrium)

$160 = 160$

Period	C	I	ΔC $= \frac{3}{4}\Delta Y$	ΔI	Total spending (demand)	Total supply (output)	Y'	ΔY	Planned I	Realised I
1	140	20	-	-	160	= 160	160	-	20	= 20
2	140	20	-	10	170	> 160	160	-	30	20
3	140	20	7.5	-	167.5	< 170	160	10	20	22.5
4	140	20	5.6	-	165.6	< 167.5	160	7.5	20	21.9
⋮	with regard to convergence → 1									
t	140	20	0	-	160	= 160	160	0	20	= 20
										$\sum \Delta Y = 40$

~~Realised I~~ = Planned I + Unplanned I

If ΔI is permanent/continuous,

Period	C	I	ΔC	ΔI	Total Spending	Total Output	Y	ΔY	Planned I	Realised I
1	140	20	-	-	160	= 160	160	-	20	= 20
2	140	20	-	10	170	> 160	160	-	30	> 20
3	140	20	7.5	10	177.5	> 170	160	10	30	> 22.5
4	140	20	13.1	10	183.1	> 177.5	160	17.5	30	> 24.4
t	140	20	30	10	200	= 200	160	40	30	= 30

If ΔI is temporary

$$\Delta Y_1 = \Delta I$$

$$\Delta Y_2 = \Delta G = b\Delta Y_1 = b\Delta I$$

$$\Delta Y_3 = \Delta C_2 = b\Delta Y_2 = b^2\Delta I$$

$$\Delta Y_t = b^{t-1} \Delta I$$

If ΔI is permanent

$$\Delta Y_1 = \Delta I$$

$$\Delta Y_2 = \Delta I + b\Delta I = \Delta G + \Delta I$$

$$\Delta Y_3 = \Delta I + b\Delta I + b^2\Delta I$$

$$\Delta Y_t = \Delta I + b\Delta I + b^2\Delta I + \dots + b^{t-1}\Delta I$$

5/09/2017

Capital Budgeting / Investment Project Appraisal

Processes involved -

- 1) To estimate the cost of the project & identify the sources of raising capital.
- 2) To derive net cash flows over the life of the project.
- 3) To apply suitable methods of evaluation.

for eg,

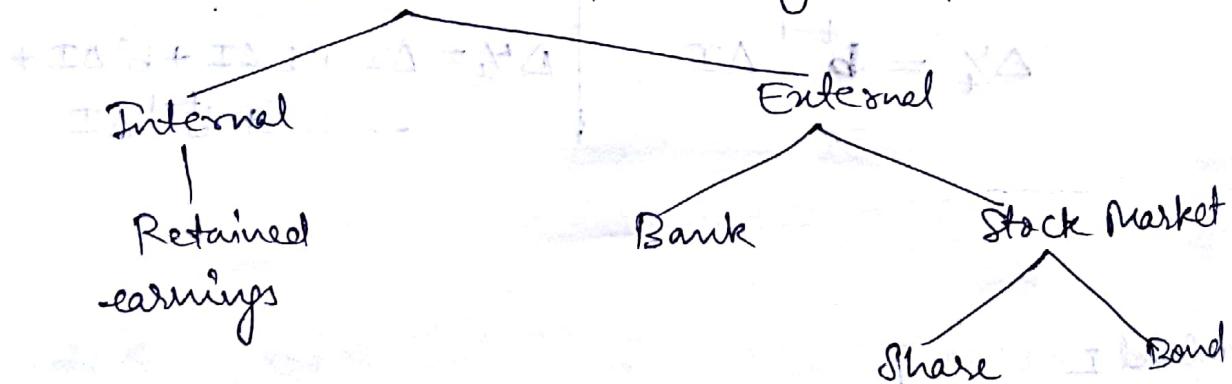
$$C = 1000 \text{ Cr.}$$

Machinery cost = 500 Cr.

Reorganisation of the activities = 300 Cr.

Land acquisition cost = 200 Cr.

Sources (for raising capital)



Part of profit distributed among the shareholders is aka dividend. The undistributed profit is called retained ~~ea~~ earnings.

12/09/2017

Net Cash Flows

Let's assume initial capital required,

$$C = 1000 \text{ Cr.}$$

which includes Machinery cost = 500 Cr.

Reorganisation of the activities = 300 Cr.

Land acquisition cost = 200 Cr.

Let's assume the life of project to be 5 years.

	R ₁	R ₂	R ₃	R ₄	R ₅
Gross Sales Revenues (P. Q) [Expected to ↑ by 10% annually (say)]	1000 Cr.	1100 Cr.	1210 Cr.	1331 Cr.	1462 Cr.
(-) Variable Cost (say 30% of Gross Sales Revenues)	300 Cr.	330 Cr.	363 Cr.	399 Cr.	438 Cr.
(-) Fixed Cost (say 100 Cr.)	100 Cr.	100 Cr.	100 Cr.	100 Cr.	100 Cr.
(-) Depreciation [Machinery Cost - Salvage Value (say 50 Cr.)]	90 Cr.	90 Cr.	90 Cr.	90 Cr.	90 Cr.
Profit before Tax	570 Cr.	580 Cr.			
Tax (say 30%)	153 Cr.	184 Cr.			
Profit after Tax	357 Cr.				
(+) Depreciation	90 Cr.				

Every good has some second hand value even if it is completely depreciated. This is called as Salvage

Value / End Value / Scrap Value (of the machinery,
if talking about machinery).

Total Revenue = Profit after Tax + Depreciation
generation

Returns at the end of project = R_s + Salvage Value
(last year's returns) + Recovery of working
capital

3/10/2017

~~Methods of accepting / rejecting
a project~~

Methods of Evaluation of a Capital
Budget

8.5 P

Non-discounting

Pay-Back Period
(PBP)

Discounting

Net Present Value
(NPV)

Internal
Rate of
Return
(IRR)

Capital Rationing
(CR)

Profit = ~~Present Returns - Cost~~

Outflow = Capital invested

Inflow = Returns forthcoming

PBP

Least possible time to recover the capital invested.

e.g., There are two projects A & B which have same
initial requirement of capital, $C = 1000$ Cr.

<u>Project</u>	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9
A	300	300	400	400	500	-	-	-	-
B	200	300	400	500	600	700	800	900	1000

Now project A reaches breakeven point ($\text{profit} = \text{loss} = 0$) at the end of three years (initial capital invested is totally recovered) while project B takes more than 3 years. So, project A will be approved & not project B.

Drawbacks: (or limitations)

- ① We don't consider the life of a project, & thus the total returns from a project.
- ② We are comparing uncomparables.

(Simply adding up R_1, R_2, \dots, R_n is not valid)

~~bcz~~ bcoz they are not standardised to the present value [future value is not discounted to derive the present value.]
 {can be eradicated by adding the present value of consecutive returns.}

Why it is used:

- ① Indian entrepreneurs want to invest in a project which gives them returns ~~as~~ ASAP, \therefore mfg sector is not preferred over IT sector for investment.
- ② Longer the time period over which economy happens, greater is the risk of doing the business.
- ③ India faces lots of political instabilities which leads to business uncertainties.
- ④ That's why business houses like to reach breakeven point ASAP.
- ⑤ Small companies/startups will like to reach breakeven ASAP bcoz unlike big/established companies able to float shares & bonds in market, cannot raise capital from market & works with limited

Capital.

NPV

$$NPV = \sum \frac{R_t}{(1+r)^t} - \frac{C_0}{(1+r)^0}$$

risk adjusted inflation adjusted interest rate

= Present value of the Net Cash Flows
- Present value of the Initial Capital

Invested

$$= R_0 - C_0$$

$NPV > 0 \Rightarrow \text{Accept}$

$NPV < 0 \Rightarrow \text{Reject}$

$NPV = 0 \Rightarrow \text{Neutral}$

Compounding Method

When present value of all money is converted into future value.

9/10/2013

IRR

$$\text{at which the net cash flows are zero}$$
$$\sum \frac{R_t}{(1+i)^t} - \sum \frac{C_t}{(1+i)^t} = 0$$

$i = IRR \Rightarrow$ it is an annual rate of return

$i > r \Rightarrow \text{Accept}$

$i < r \Rightarrow \text{Reject}$

$i = r \Rightarrow \text{Neutral}$

for a single project, both NPV & IRR ~~will~~ will

have same accept/reject ~~result~~ proposition.

Now suppose ~~that~~ there are two projects under consideration which are mutually exclusive, i.e. the company can ~~allow~~ pass only one of them. let the initial capital required for both the projects be same.

The NPV & IRR value ~~be~~ ~~definitely~~ ~~incongruous~~ ~~but~~ ~~it~~ ~~will~~ ~~not~~ ~~allow~~ ~~both~~ ~~to~~ ~~exist~~ ~~at~~ ~~the~~ ~~same~~ ~~time~~.

Proj	NPV	IRR	* Hypothetical data
Project A	150 Cr.	15%	Now here both NPVs > 0
Project B	160 Cr.	12%	& both NPVs > 0 IRRs > r

Going by NPV, we should select project B but going by IRR, we should select project A. So what to do? We must go with the proposition of NPV in this case. This is bcoz generally the time period involved in calculation of IRR is long & the data is fluctuating, which leads to unreliable value as a result of IRR. One more thing is that we are over-estimating the returns to the re-investable amount ~~Capital Budget~~ in case of IRR.

Capital Rationing

$$\text{PIR} = \left\{ \frac{\text{NPV}}{C_0} = \frac{PV - C_0}{C_0} \right\} \begin{array}{l} \text{Net Profit-Cost Ratio} \\ \text{Net Benefit-Cost Ratio (NBCR)} \end{array}$$

Can be calculated in two ways.

$$\left\{ \frac{PV}{C_0} \right\} \begin{array}{l} \text{Benefit-Cost Ratio} \\ (\text{BCR}) \end{array}$$

$$\text{NBCR} > 0 \Leftrightarrow \text{BCR} > 1 \Rightarrow \text{Accept}$$

$$\text{NBCR} < 0 \Leftrightarrow \text{BCR} < 1 \Rightarrow \text{Reject}$$

$$\text{NBCR} = 0 \Leftrightarrow \text{BCR} = 1 \Rightarrow \text{Neutral}$$

$$C = 100 \quad (\text{capital constraint}) \quad \{ \text{let} \}$$

And suppose the projects considered are -

Project	A	B	C	D	E	F
Capital req.	50	80	20	30	70	90
BCR	1.5	1.7	1.3	1.2	1.5	1.1

∴ we can choose combinations of projects such that the capital constraint is satisfied & the average BCR corresponding to that combo will be the criteria for deciding which set of project(s) to be approved.
eg, BC (BCR = 1.5), DE (BCR = 1.35), ACD (BCR = 1.33), etc.

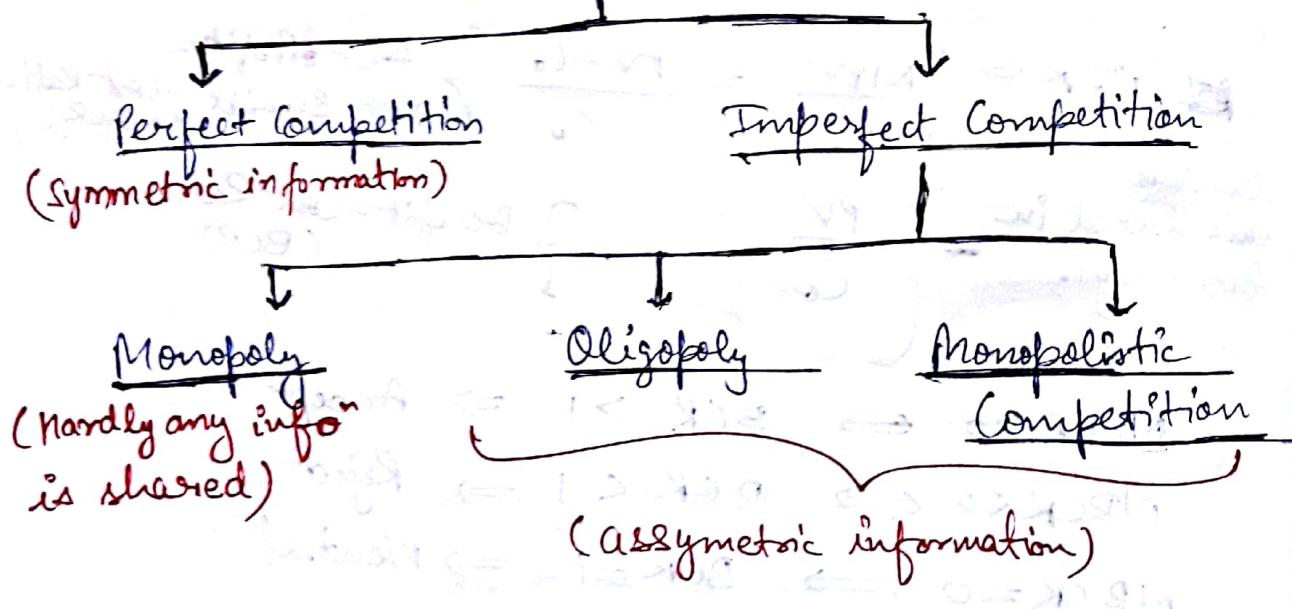
10/10/2017

Market forms (Topic of Microeconomics)

- * Market is not a physical place where some product or service is bought or sold. It is an invisible institution dealing with demand & supply.

- * ~~Monopoly & Oligopoly~~ \therefore it is the nature of demand & supply, how many people are selling & how many people are buying which decides the market form.
- * ~~Perfectly competitive~~

* Market forms



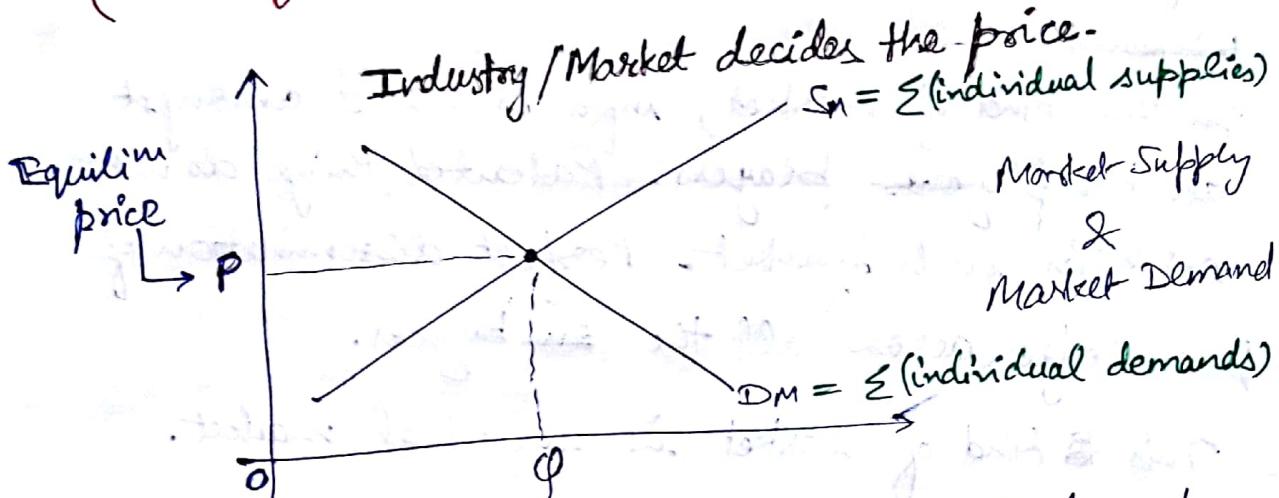
- * Perfect Competition

Attributes:

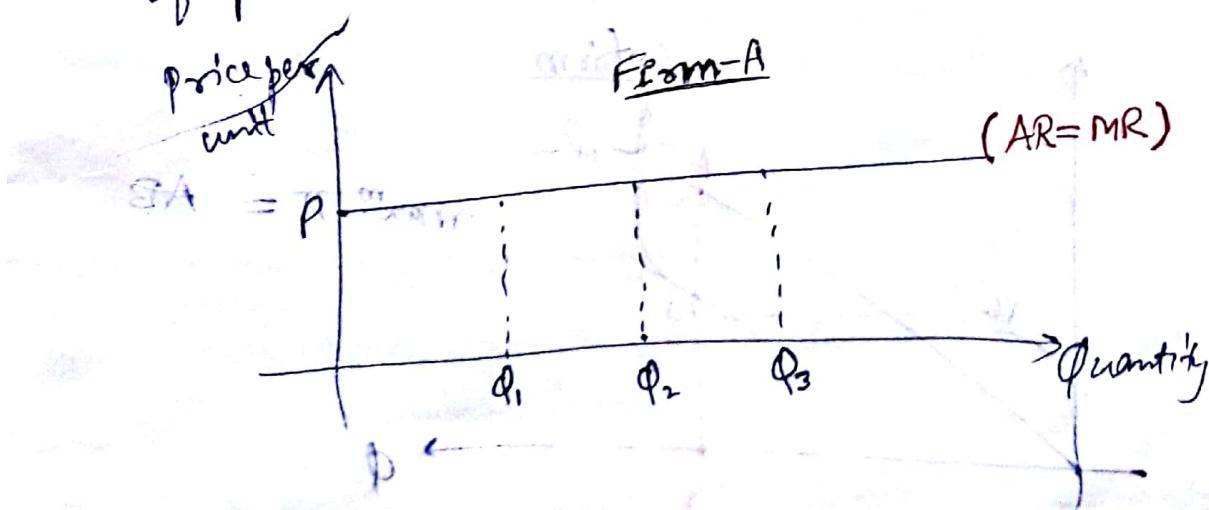
- (1) Large number of buyers & sellers.
- (2) There is product homogeneity.
- (3) Free entry & exit.
- (4) Perfect knowledge about the market.
- (5) Perfect mobility of the products & factors.

There is complete absence of rivalry among the producers.

Note: (Firm/ Producer) Supplier / Company / Seller → all same
 Consumer / Buyer / Demander → all same
 Industry \Leftrightarrow Firm ; Industry = $\sum_{i=1}^N$ firms;



Agriculture is a perfect example of such form of market. (Shimla apple & Kashmiri apple example)
 (No further differentiation in Shimla/Kashmiri apples of two vendors.)
Product Product is not standardised in these forms of market (dynamic fare example) i.e., there is no question of differentiation in the prices of ~~for~~ the same products (no price discrimination)



17/10/2017

Any individual firm can ~~not~~^{new} enter in a business, and any existing firm can exit whenever they wish to.

for any product, free ~~not~~ entry & exit are possible only in the long run, not in short run.

~~between there is~~

In this kind of market, info is shared amongst all the ~~players~~ players. Patented things do not exist in such market. Perfect dissemination of knowledge across all the ~~the~~ buyers.

This ~~is~~ kind of market is an ideal market.

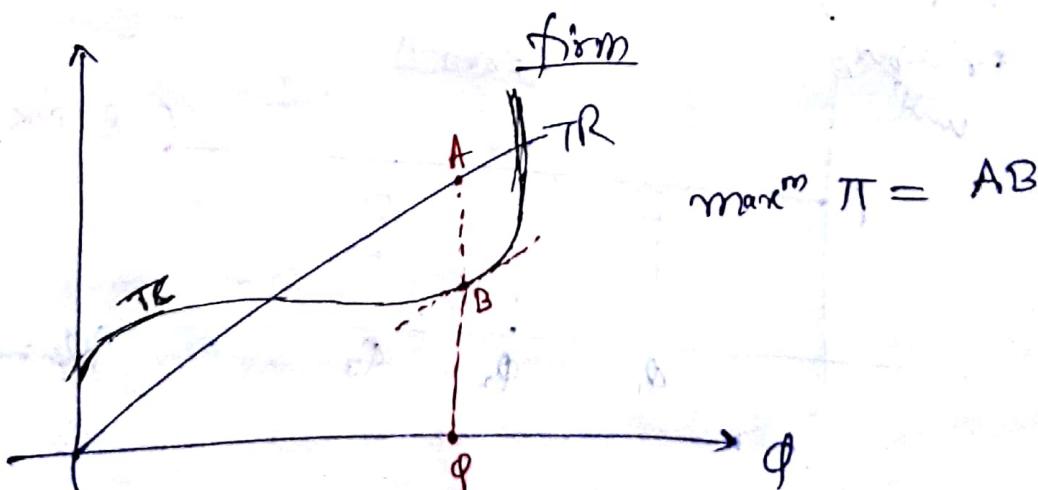
Stock market is another example of such market.

Such markets do not exploit the ~~large~~ consumers.

Equilibrium Condⁿ / Cond^{ns} of Profit Maximisation:

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

$$\Rightarrow \pi = R - C$$



$$\max^m \pi = AB$$

~~at~~ for max^m π , $\frac{d\pi}{d\varphi} = 0$ (necessary)

$$\Rightarrow \frac{dR}{d\varphi} - \frac{dc}{d\varphi} = 0$$

$$\Rightarrow MR = MC. \quad \text{--- (1)}$$

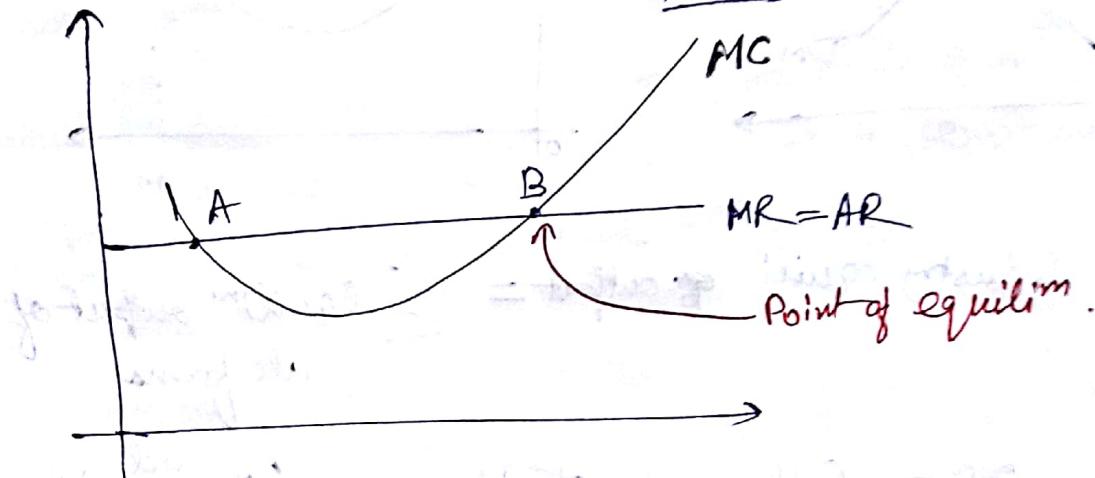
Also, $\frac{d^2\pi}{d\varphi^2} < 0$ (sufficient)

$$\Rightarrow \frac{d^2R}{d\varphi^2} - \frac{d^2C}{d\varphi^2} < 0$$

\Rightarrow slope of $MC >$ slope of $MR \quad \text{--- (2)}$

eqⁿ ① & ② gives the cond^{ns} of equilim or cond^{ns} of profit maximisation

From



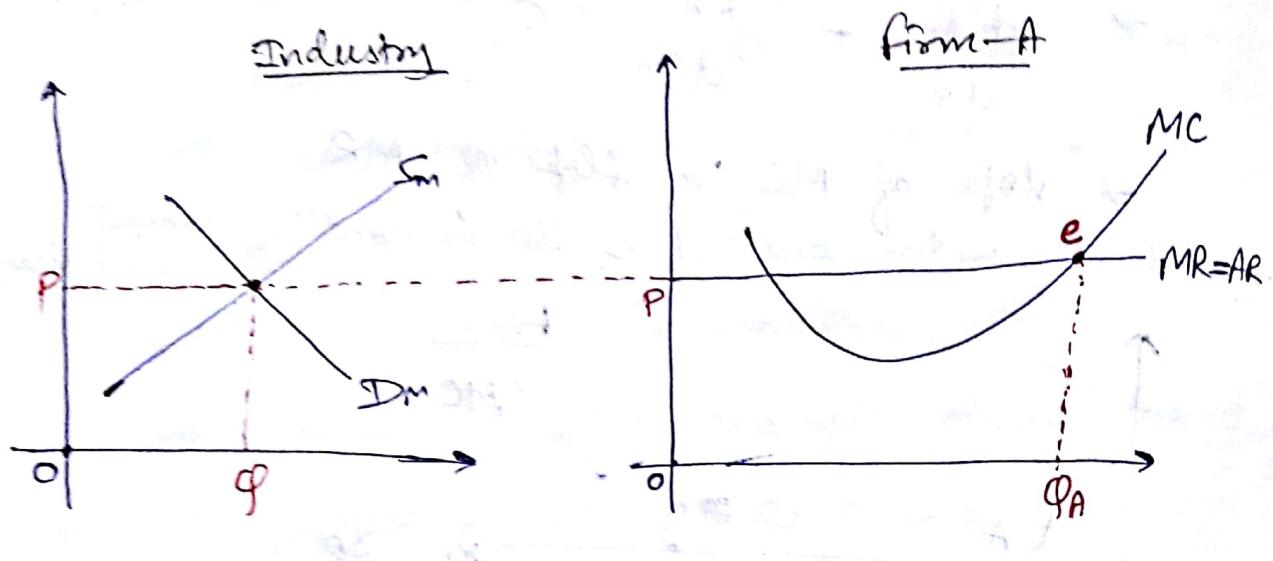
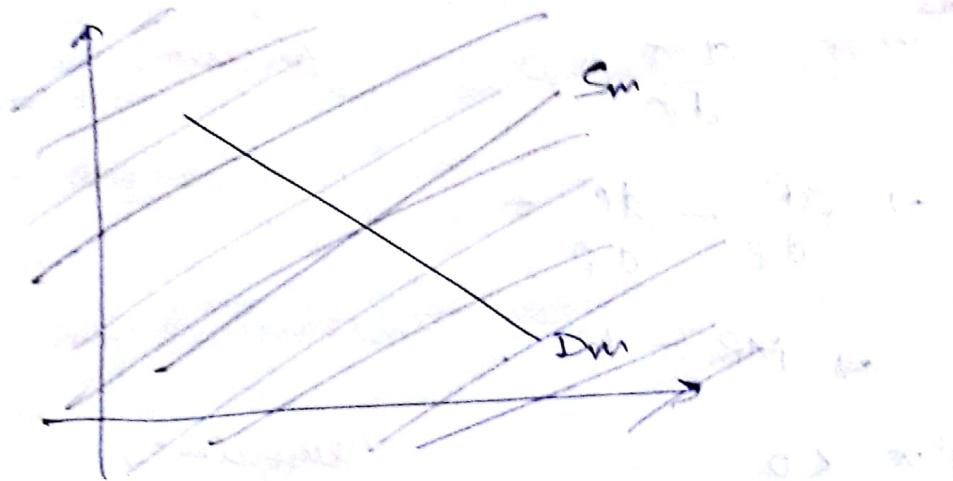
$$TR = AR \cdot \varphi \\ = \sum MR,$$

$$TC = AC \cdot \varphi \\ = \sum MC$$

24/10/2017

short-run Equilibrium:

- (1) In short-run, atleast one of the factors of prodⁿ will be ~~variable~~ fixed.
- (2) In short-run, practically speaking, free entry & exit do not exist.



Industry equilibrium output = \sum Equilibrium output of all firms

i.e., $OQ = OQ_A \times \text{no. of firms}$ (if ~~each~~ all firms are identical)

Profit max^m

$$MC = MR$$

Profit

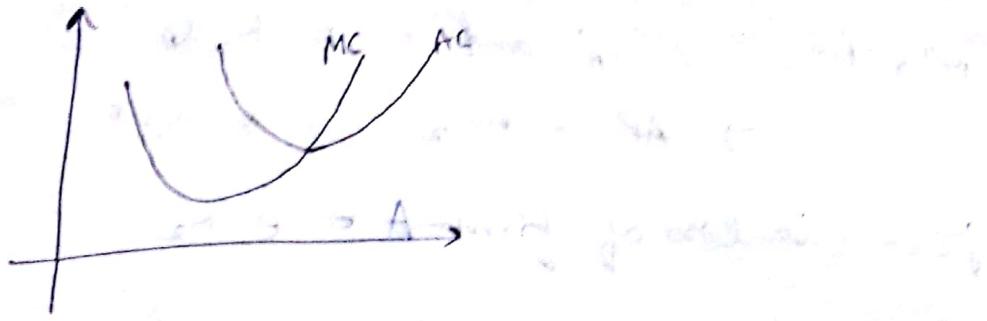
$AR > AC \Rightarrow$ super normal profit
or abnormal profit

$AR < AC \Rightarrow$ loss

$AR = AC \Rightarrow$ normal profit

(no profit, no loss)

other case: $AR > MC$ \Rightarrow more output and (s)
more tax and less \downarrow



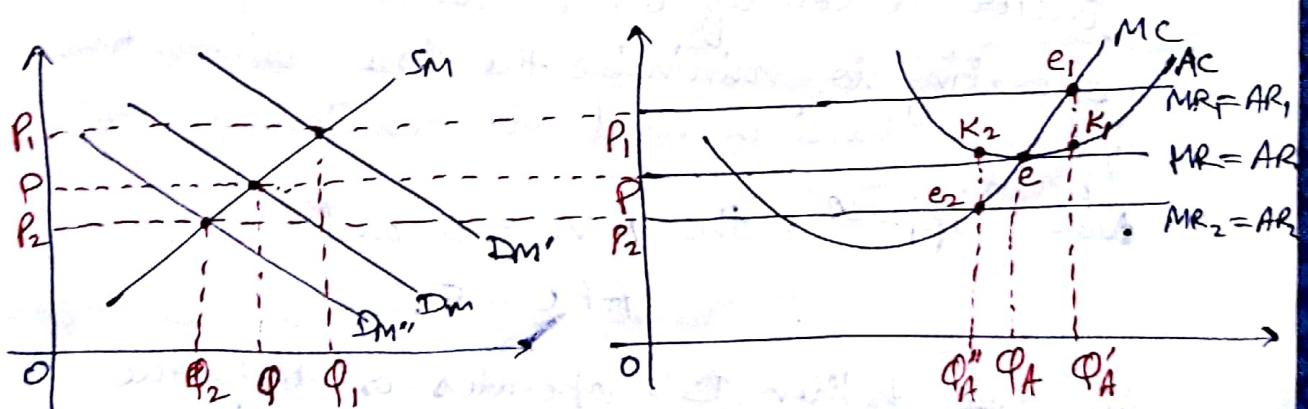
Let $AR = AC = 10$

$$AC = \frac{1}{2} \text{ Avg. wage} + \frac{1}{3} \text{ Avg. rent} + \frac{1}{3} \text{ Avg. interest}$$

+ $\frac{1}{2}$ Avg. Normal rate of return to Entrepreneur

~~Normal profit is the ~~best~~ amount of money that is at least (~~otherwise~~) assured of.~~

Normal profit is the amount of profit that the entrepreneur is otherwise assured of (at least he will be paid that much amt. of money).



for DM , $AR = AC = e_1 \varphi_A$ * normal profit *

for DM' , $AR_1 = e_1 d_A'$ and $AC_1 = K_1 d_A'$

$\Rightarrow AR_1 > AC_1$ * supernormal profit *

Supernormal profit of firm A = $e_1 K_1 * OQ_A'$

for D_M'' , $AR_2 = e_2 Q_A''$ and $AC_2 = k_2 Q_A''$
 $\Rightarrow AR_2 < AC_2 \quad * \underline{\text{loss}} *$

per-unit loss of firm-A = $e_2 k_2$

Here, MC & AC curve don't change bcoz prod["] func["] & thus cost func["] is a func of capital & labour & not demand.

Now, should a firm ~~stop~~ stop the business if it is incurring loss?

Eg, let Big Bazaar is having $AR = 5$ and $AC = 10$ where $AVC = 4$ and $AFC = 6$

~~Now~~ At present BB is incurring loss of 5.

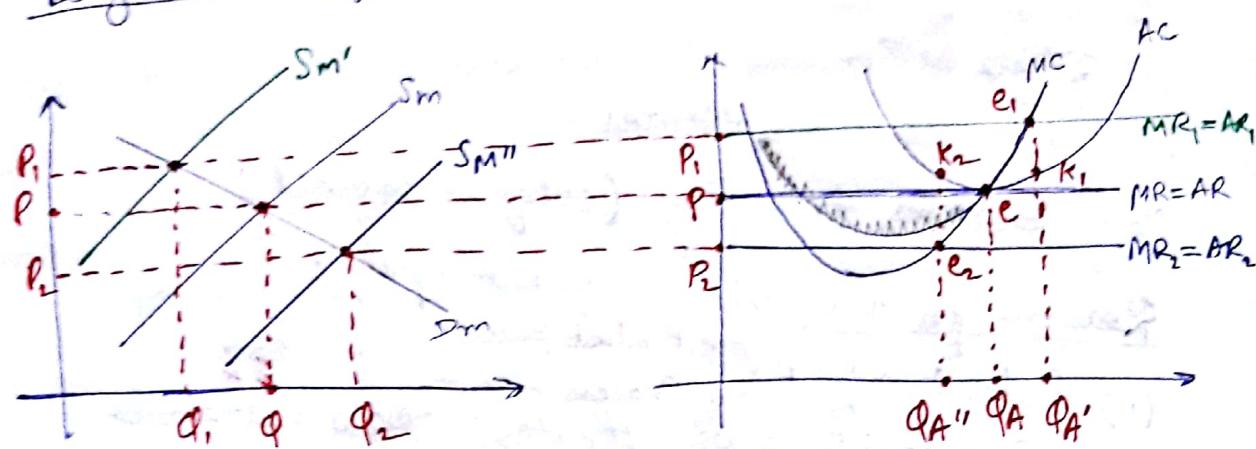
But if it stops the business, it'll be still paying the $AFC = 6$. In which case it will incur a loss of 6. ∴ it'll keep on operating to minimise the loss. Minimisation of loss goes hand in hand with maximisation of profit.

Now suppose, the $AVC = 5$ and $AFC = 5$.

Now, whether BB operates or stops the business, it'll incur loss of 5. This is called shut-down point. It is a signal that any further decrease in price or increase in AVC will lead to shut-down of business for ~~loss~~ ~~is equal to the fixed costs~~.

\therefore condⁿ for shut-down of business,
 $AVC > AR$.

Long-run Equilibrium:



for ~~SM~~, Sm , normal profit.

for Sm' , supernormal profit \Rightarrow new firms will enter

Supply curve shifts right \Leftarrow Price \downarrow \Leftarrow supply \uparrow while demand remains same

\Downarrow
restores to $Sm \Rightarrow$ normal profit.

for Sm'' , loss \Rightarrow existing firms will leave

Supply curve \leftarrow Price \uparrow \Leftarrow supply \downarrow while demand remains same
will shift

left
 \Downarrow
restores to $Sm \Rightarrow$ normal profit.

\therefore A perfectly competitive firm experiences
B (i) supernormal profit, normal profit or loss* in short-run equilibrium

(ii) only normal profit in long-run equilibrium

* in case of loss, it'll try to minimise it.

31/10/2017

* Monopoly

Attributes:

- (1) Single seller.
- (2) No close substitutes
- (3) Barrier to entry (entry is blocked)

Reasons for the existence of monopoly:

- (1) Patent right → Product patent
→ Process patent
- (2) Ownership over strategic raw materials
- (3) Natural monopoly (economics of large scale production)

* (4) ~~Limit Pricing Policy~~

* (5) Mergers & Acquisitions

* Inverse strategy.

(1) When a company enjoys some patent right(s) on ~~one~~ a product over a stipulated period of time, no other company can manufacture or sell the product without the permission of one who enjoys the patent right(s).

(2) Now this happens when the manufacturing of a product requires some raw material which is mined out. Generally, mines are leased out to companies for a fixed period of time. If there is only one mine of say Barites which is leased out to company A ~~comps~~ for a period of say 20 years, company A will enjoy monopoly over ~~production~~ Aluminium industry for 20 years.

(3) If you produce output in large qty^s at one place, the overhead cost relatively is lesser & as a result the avg. cost of production will be lower which then reflects in the price of the product & thus the consumer is benefitted. So when we realise that there are some products which have the natural tendency to reduce the cost if produced in large volume at one place so that the price can become lower, we take the decision to monopolise it.
eg, Indian Railways.

(4) Limit pricing policy is a ~~policy~~ ^{price strategy} adopted by the existing monopolist to discourage the ~~tendency of~~ entry of the new firms into the existing business.

(5) Merger is a situation where the two companies merge together such that there is sharing of ~~the states~~ their resources, shares etc.

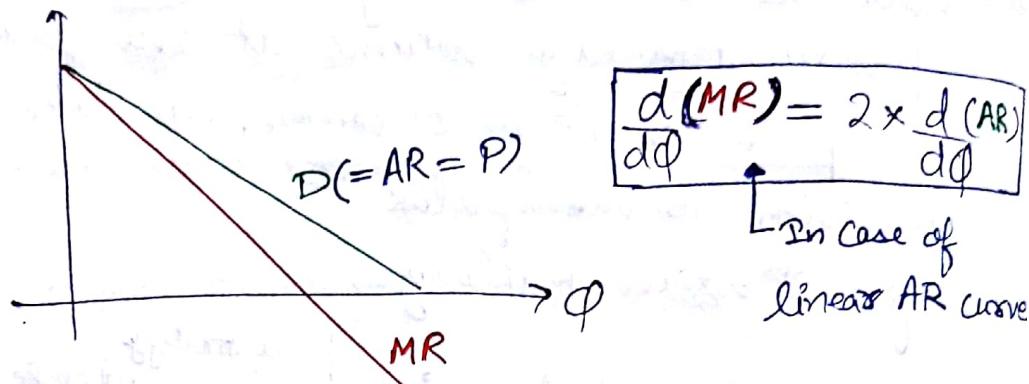
In terms of acquisition, one company acquires the assets of the other company which then ceases to ~~exist~~ exist.

Merger happens among two ~~eg~~ almost equal level of companies while in acquisition, a big company ~~buys~~ buys the assets of small company. But in ~~the~~ both the cases, it leads to monopoly power.

7/11/2017

Equilibrium:

In monopoly, ~~the~~ a firm is itself the industry.
⇒ market demand curve is -vely sloped (for normal goods).



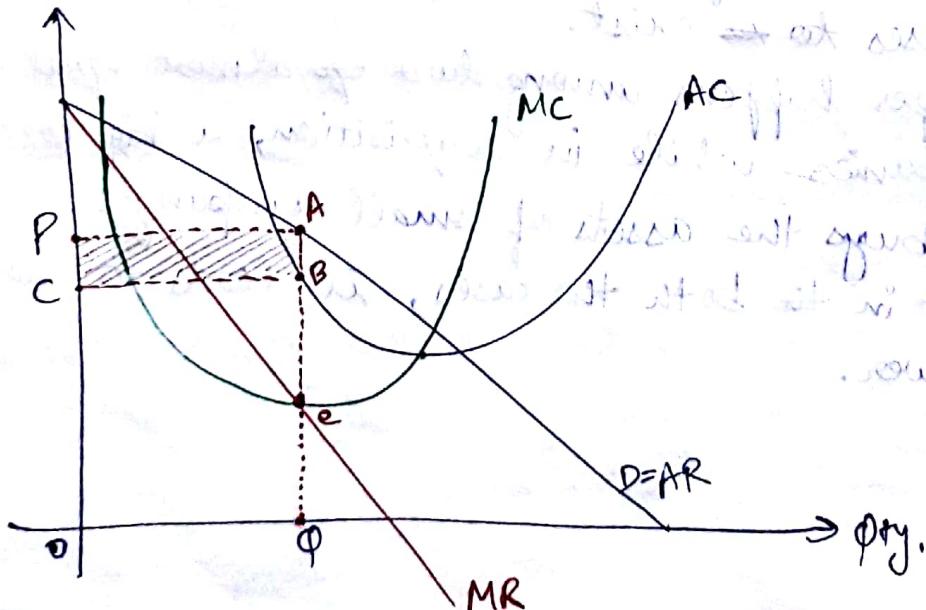
A monopoly firm can either fix price or qty. but not both simultaneously.

Cost is a derived funcⁿ from the production funcⁿ.

∴ cost curve will remain same.

There is a need to advertise products in monopoly, though not on a large scale/aggressively.

Short-run Equilibrium:



$$\text{Equilibrium output} = O\varphi$$

$$\text{Equilibrium price} = A\varphi = O\varphi = AR$$

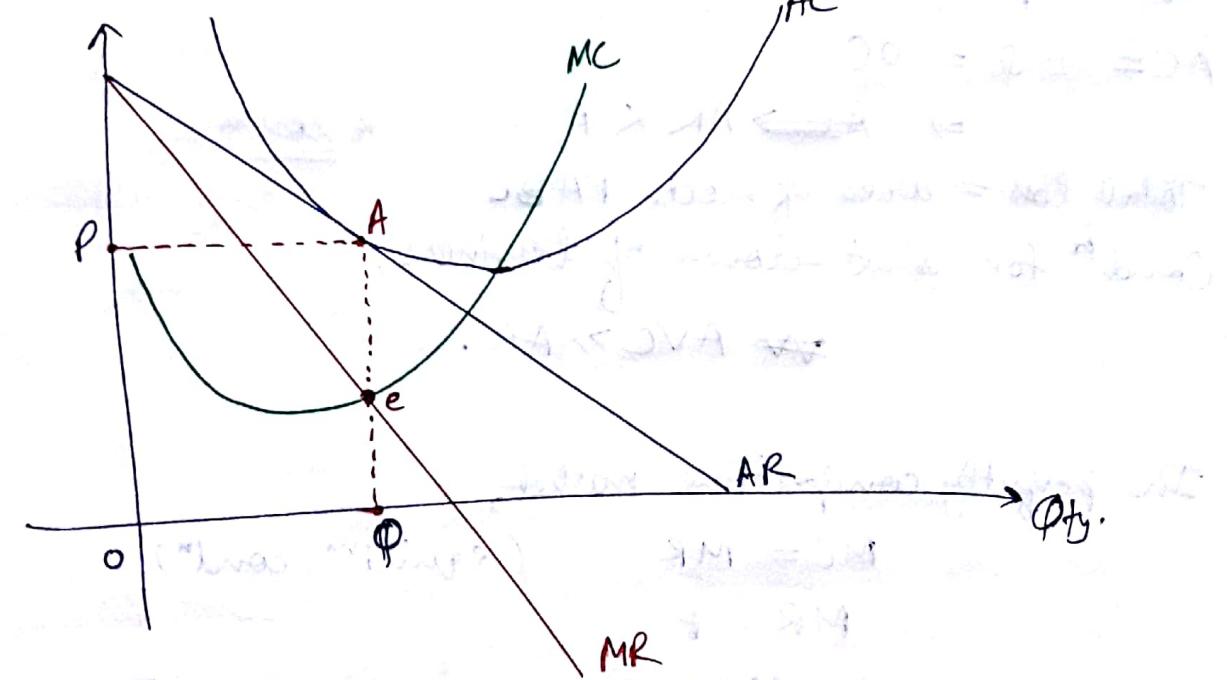
$$AC = B\varphi = OC$$

$$\Rightarrow AR > AC \quad * \underline{\text{supernormal profit}} *$$

$$\text{Per unit supernormal profit} = CP$$

$$\text{Total supernormal profit} = CP * O\varphi$$

= area of recd. AB CP



$$\text{Equilibrium output} = O\varphi$$

$$\text{Equilibrium price} = A\varphi = O\varphi = AR$$

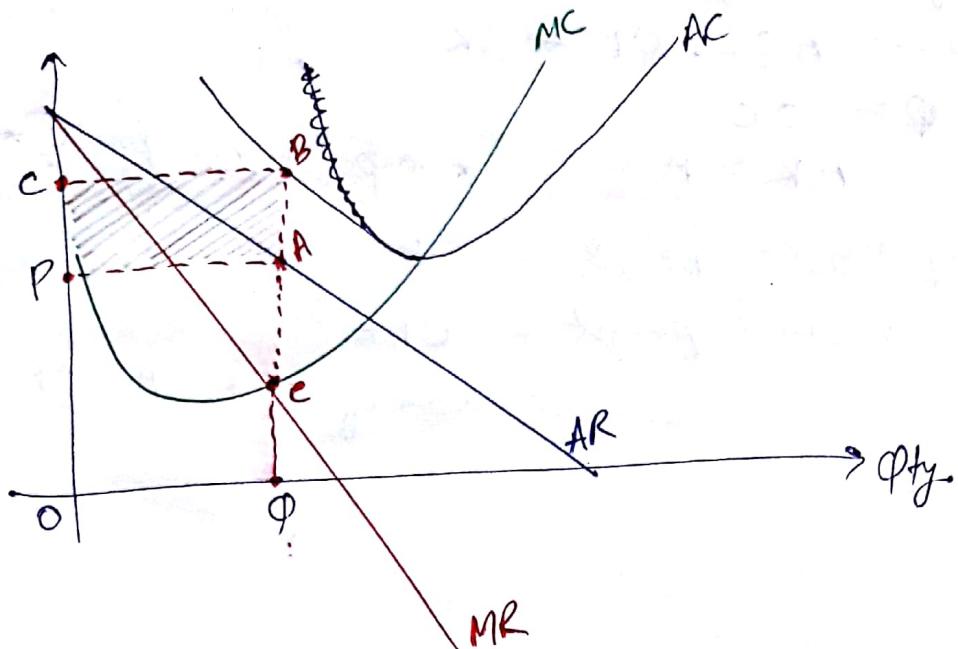
$$AC = A\varphi \quad \cancel{= O\varphi}$$

$$\Rightarrow AR = AC \quad * \underline{\text{normal profit}} *$$

$$\text{Total revenue} = \text{Total cost} = \text{area of recd. } OPA\varphi$$

at most sufficient output in every plausibility

with sufficient profit



Equilibrium output = OQ

Equilibrium price = $AO = OP = AR$

$$AC = BO = OC$$

$$\Rightarrow \text{AR} < AC \quad * \underline{\text{loss}} *$$

Total loss = area of rect. $PABC$

Condⁿ for shut-down of business,

$$\cancel{AVC} > AR.$$

In perfectly competitive market,

$$MC = MR \quad (\text{equilibrium cond}^n)$$

$$MR = P$$

$$\Rightarrow MC = P$$

In monopoly market,

$$MC = MR \quad (\text{equilibrium cond}^n)$$

$$MR < P$$

$$\cancel{P > MC} \Rightarrow MC < P$$

\Rightarrow * Monopoly price is always higher than the perfectly competitive price.

But monopoly qty is lower than perfectly competitive qty.

∴ a consumer is exploited in a monopoly both in short and long run but not in perfectly competitive market.

A perfectly competitive market operates at the min^m of AVC curve at the point of shut-down optimally utilising its variable factors of production. While a monopoly always ~~want~~ to operate at the point where its resources are under-utilized.

Long-run equilibrium:

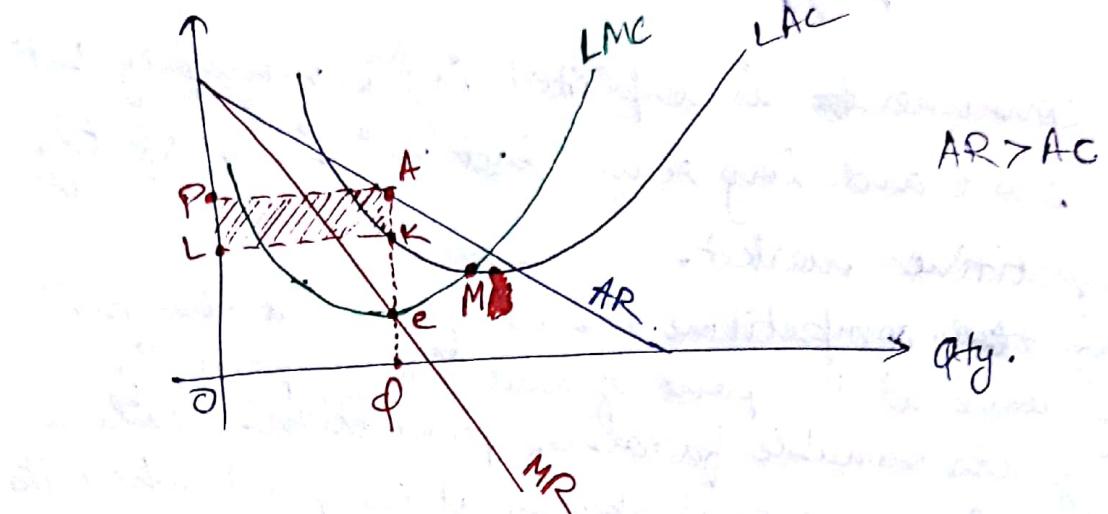
Even in the long-run, entry is blocked.

AC curve is same as AVC, ∵ there is no fixed cost. So a monopoly will always earn supernormal profit in the long-run.

If it was enjoying supernormal profit in the short-run, it will continue to enjoy it in the long-run.

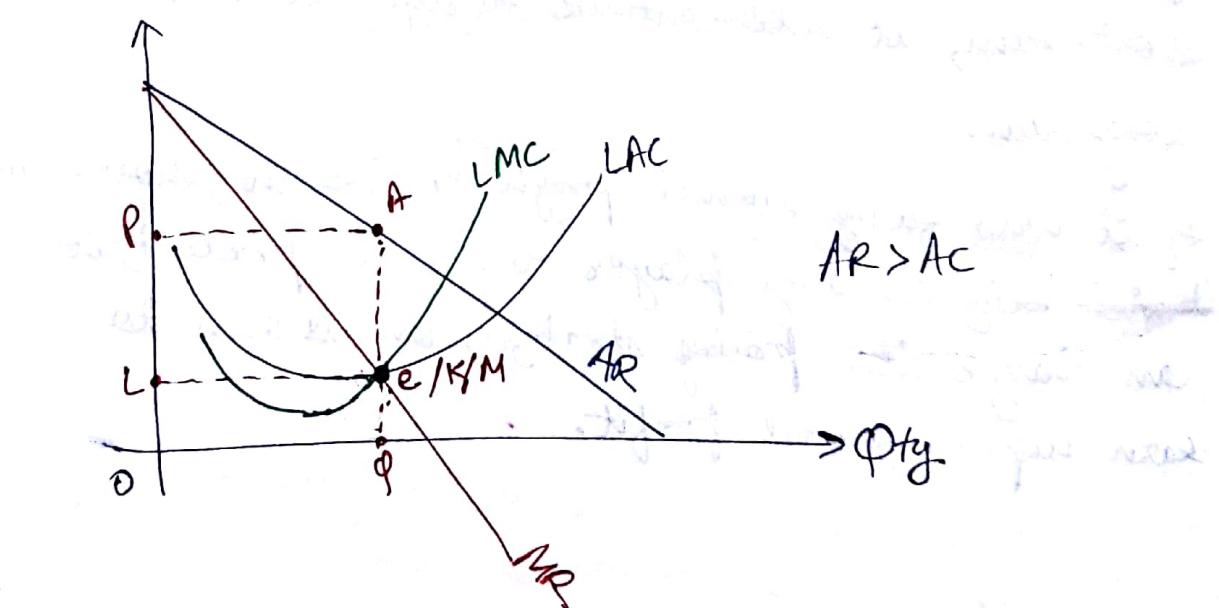
If it was facing normal profit or loss in short-run, it will being the only player to sell the product, it can change its pricing strategies on its own to earn supernormal profit.

14/11/2017

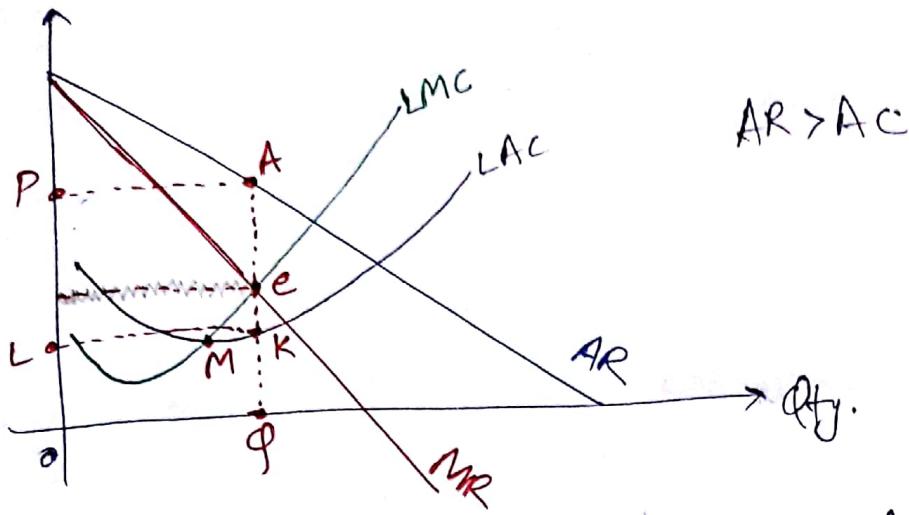


q_f = Output produced

This is the case of sub-optimal output bcoz we are operating left to the \min^m point of LAC curve.



This is the case of optimal output bcoz we are operating at the \min^m point of LAC curve.



This ~~case~~ is the case of above-optimal output
bcz we are operating ~~at~~ right to the min^m point of
LAC curve.

Human ~~consequence~~ consequence.

★ Oligopoly & Monopolistic Competition	
	Oligopoly
size →	few sellers
type →	<ul style="list-style-type: none"> Pure oligopoly (identical products) Differentiated oligopoly (close substitutes)
	Monopolistic Competition
	Many sellers
	Differentiated which are close substitutes