

# Indian Economy

National income accounting - we measure progress of economy.

GST (Goods and services Tax) - indirect taxes' substitute.

- Indirect
- Sale Tax
  - Service Tax
  - Customs duty

- Direct
- Income Tax
  - Wealth Tax
  - Corporate profit tax

How do we differentiate b/w the two?

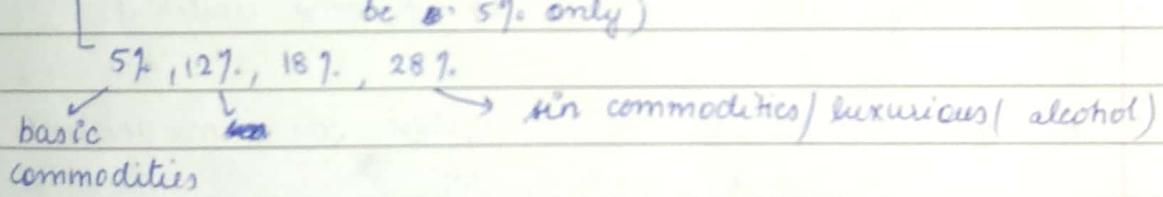
- incidence of tax (on whom the tax is levied)
- burden of tax (who actually pays)

Indirect tax - incidence and burden on 2 diff points

Direct tax - both incidence and burden at the same point.

Why GST?

- Cascading effect of tax - double tax
- uniform tax rates (whether I purchase a pen from WB or OD, it will be @ 5% only)



Cascading effect - tax on tax

Heritage paid	£ 100/- inclusive of all taxes	Service Tax 10% — 10/-
		Sale Tax 10% — 10/-
		10% on ST
Tea	200/-	(Tax on tax)
ST @ 10%	210 or	
Value added	100/-	we are paying on the tax Heritage paid
ST @ 10%	charged 220 or 210/-	

① Central GST

② State GST

③ Composite GST

- 90% of revenue comes from indirect taxes.

GST & SGST can't be different because it is levied on same commodities.

Difference lies in who collects the revenue.

- Composite GST - If my <sup>economic activity</sup> ~~revenue is less than~~ generates less than some threshold value, we need to only pay 5% of it and none of 5, 12, 18, 28 %.  
- smaller business plans can compete with larger ones.

per unit cost + ~~prices~~ tax — ~~prices~~

↓

decreases when product <sup>m</sup>increases

- Tax return - when my this year's revenue has decreased, I can claim for tax return for the taxes ~~return~~ I have already paid.
- GST is an origin based tax - levied where it is produced and not where consumed.
- most of agricultural items do not come under it.
- G-tag - Geographical tag (copyright for items unique to that area)  
Intellectual property rights  
eg - W B rasgulla, Dehradun Basmati rice, Assam tea

Origin based - advantages :

- mostly ~~the~~ better-off states are major manufacturers, hence, govt collects mainly from these states
- redistribution of money to poor states
- economic inequality.
- GST not on petrol and petrochemical products
  - L ~~the~~ otherwise max<sup>m</sup> tax <sup>govt</sup> we can take is 28%.
  - L now it is more than 100%.
- input tax credit - the tax paid by Heritage, it can claim it back

K.O!

## NATIONAL INCOME ACCOUNTING :

- measuring progress in economy
  - we set some standardisation to measure anything by defining few parameters for time and space
  - Gross domestic product (GDP)
- market / monetary value of all final goods and services produced within the domestic / political territory of a country within a specific time period (year)

value - utility (satisfaction derived by price - taxes (basic cost))

price - includes taxes.

depends on factors of production

### ① Market / monetary value :

- when a country produces ~~diversified~~<sup>ied</sup> commodities, we cannot swap the value generated by one with other (1 car ≠ 1 laptop)
- we cannot substitute one for the other
  - we could do this only when all are in same units
  - Diversified goods are services which are not perfect substitute

### ② monetary value facilitates to unify all these diversified goods & services ~~within one single unit~~<sup>measurement</sup>, so that we can aggregate it.

### ③ self consumption services (NOT a part of GDP)

~~if I wash my clothes, my services are not part of GDP.~~  
because it does not have market value (not marketed)  
but if a laundry boy washes it, his services are a part of GDP.

"If you marry your maid, you are reducing country's GDP."

### ④ Black market-

actual transactions ~~in~~ have value lesser than market value.

drugs sold at cheap price movie tickets & sold at higher prices

### (ii) final

Nalanda complex produced by IIT in 100 Cr.

so, the value of this complex should be a part of GDP. But during manufacturing, it used 20 cr cement, 20 cr labour, 10 Cr. steel

Therefore, the value of Nalanda complex is 100 Cr and not 50 Cr is not added again to calculate GDP - because it has already been included. Including this will cause double counting.

Cement, labour, steel - intermediate goods

Nalanda complex - final good.

To avoid this double counting, we take ~~as~~ final goods.

Q How do we say something is final? - difficult

It depends on who bought it for what purpose.

If I buy milk, it is final good.

But for tea vendor it is not " ".

Only self-consumption services are not in GDP but self-consumption goods are included esp agricultural good.

for eg - farmer keeps 10 kg <sup>rice</sup> for family is also included

### (iii) Domestic boundary

- Gross National Product ( factors of production / citizens of a country)

↳ depends on citizenship

- Gross Domestic product

↳ depends on territory / location / country

- GDP is more in every country that has more population because GDP is related with labour, factors of production available in

country.

Which is better depends on initial conditions.

measuring GNP better for countries like Switzerland where labour (human resources) is less

GDP better for countries like India

- If I'm producing oil in SL, the value generated is part of SI's GDP but the economic profit I get is my country's GNP.

because the value included

L rewards to labour - wages } factor of production  
L rewards to capital - interest } for SL, hence it is SI's  
GDP

- Abnormal profit - water bottles bought in movie tickets.



measuring  
3 types of GDP :

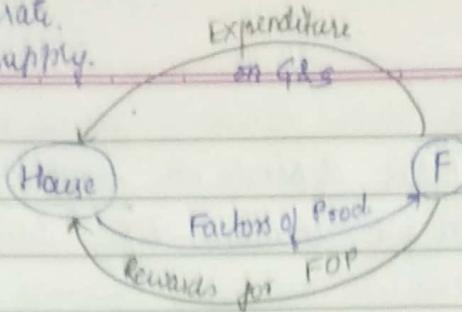


- i) Expenditure approach:

GDP  $M$  (at market prices)

land - any natural resource which we ourselves cannot regenerate.  
It is in limited supply.

### Income approach :



This reward is income from FOP.

For labour → reward is wages.

land → rent

capital → interest

entrepreneur → profit

In the income approach, we get  $\boxed{\text{wages} + \text{rent} + \text{interest} + \text{profit}} = \text{GDP}$

This gives mainly NNP<sup>F</sup>

net national product at factor cost

### Value added approach :

Each stage adds some value to previous stage of production.

Adding all these values gives GDP.

Assume : only one wa

	Inputs	seeds collector (Intermediate goods)	Total value	Add value	Total value
①	seeds collector		₹ 10 (10x1)	₹ 10	
	→ labour involved in seed collection is 10 ₹, hence the value				
②	Farmer (has land & labour) → has used 2 FOP to convert seed to a value of	seeds (₹ 10)	₹ 110	₹ 100	₹ 110
③	Hour mill (has land, labour, capital, enp)	₹ 110	₹ 310	₹ 200	₹ 200
④	Bakery shop (1 FOP)	₹ 310 (flour)	₹ 510	₹ 200	

value of final product is GDP

Total value added = ₹ 510 = GDP

We did not use products as final / intermediate. We only look at how much value is added

NET NATIONAL PRODUCT

DOMESTIC

$$\text{NDP} / \text{NNP} = \underline{\text{GDP}} - \underline{\text{Depreciation}}$$

$$\text{NNP} = \text{GNP} - \text{Depreciation}$$

machines/plants

Depreciation: (w.r.t physical / fixed capital) (nothing to do with  
 - wear and tear of " for financial capital  
 - car (not used for personal use)

when we use physical capital like machines, (money invested in banks)  
 plants, ~~wear & tear~~ occurs

- A taxi driven over for 5 years, tyres get worn & torn out.
- We can calculate how much is depreciation but we cannot necessarily account for wear & tear for each & every part.
- We should know the life span of the taxi.
- If sewing machine life span of 10 years bought at 10000, we say per year 1000 used/1000 is depreciation. But this is not true for initial years.
- In case of land, we do not consider depreciation.  
 (with continuous use, land quality deteriorates but because land doesn't have life span if left for years, it will regain fertility)

Two types of GDP :Real GDP- Fixed price

	2010	2018	2009
10 individuals			
each one	g P	g P	10kg
is eating	100 1	100 2	
10 kg			(2) prices
	GDP = 100	GDP = 200	

Nominal GDPCurrent price GDP

- we use current year

our conclusion will be economy has progressed.

- individual consume <sup>same</sup> 10 kg now also.

we have assumed uniform distribution for each.

- All individuals are at same level as they now also consume 10kg but overall economy has progressed — paradoxical
- Better is to calculate from fixed price and not using current price of the year
- |       | 2009, base year | 2010 | 2018 |
|-------|-----------------|------|------|
| - GDP |                 | 200  | 200  |
| - GDP | 2010            | 100  | 100  |

} no progress.

Quantitative theory of money:

$$(supply) \text{ Minting of money} \xrightarrow{\text{velocity}} M V = P T \xrightarrow{\text{price}} \text{physical output}$$

- The year w.r.t which we ~~use~~ <sup>keep</sup> fixed prices & calculate other year's GDP.

∴ should be a normal year (no disaster, no economic disturbance)  
prices of <sup>←</sup> commodities will be very high.

eg - 2017 should not be used

∴ should not be far from current year

(as we move farther from current year, new commodities are also come in market)

\*  $GDP^R = GDP^N$

Price ~~which~~ index

• Price index =  $\frac{GDP^N}{GDP^R}$  is known as GDP deflator.

one way of measuring inflation.

• GDP at market prices

GDP at factor cost

$$GDP^F = GDP^M + \text{SUBSIDY} - \text{indirect taxes}$$

$GDP^F$  calculated using values added by FOP

$GDP^M$  " " market prices (inclusive of taxes)

$$\text{Subsidy} - \text{Indirect Tax} = \text{NET INDIRECT TAX}$$

- Income approach uses ~~FOP~~ Factor cost

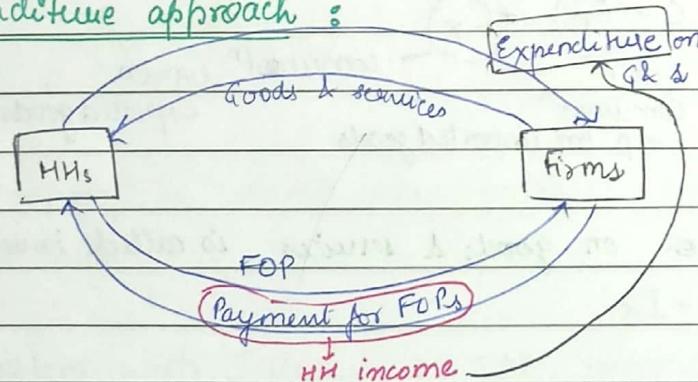
$$NNP^F = \frac{\text{national income}}{\# GDP} \quad (\text{because doesn't matter where is the person})$$

- Value added approach

$$NDP^M$$

30.01

### Expenditure approach :



In this system, no financial system

present  $\Rightarrow 0$  saving  
Hence,  $(\text{total income})_{HH} = (\text{total expenditure})_{HH}$

$\rightarrow$  Max<sup>m</sup> the household can spend is the total income

$$(\text{Total income})_{HH_1} = (\text{Total exp})_{HH_1}$$

$$(\text{Total income})_{HH_2} = (\text{Total exp})_{HH_2}$$

$$\text{Aggregate income} = \text{agg. expenditure}$$

(some notion of GDP)

spending for immediate consumption

When savings is non zero,

$$\text{income } Y = C + S$$

$$\text{Exp. } E = C \text{ - same}$$

(exp. on consumer goods)

spending for further production

$$+ I \quad \text{exp. on investment}$$

do not add exp with income to calculate GDP.

Types of expenditure :

1. Consumer expenditure - (C) (domestic consumption) + (Foreign goods)

$$C_F^I$$

$$C_F^{I, \text{consumption}}$$

citizen  
 $C_{\text{goods}}$

$C_I^I$ : Indian citizen spending on Indian goods

$C_F^F$ : Indian citizen spending on foreign goods

(1) Foreign consumer expenditure -  $C_F^F + C_I^F$

$C_I^F + C_I^I$  - gives spending on Indian goods by foreign & Indian

but we do not have  $C_I^I$  separately, we have info of C.

• Consumer expenditure on Indian goods & services

$$= C - C_M^I + C_I^I$$

$$= C - (C_M) + (C_X)$$

Consumpt<sup>n</sup> exp on imported goods

consumpt<sup>n</sup> exp on exported goods

• Producer expenditure on goods & services is called investment exp.

$$= I - I_M + I_X$$

• Govt. expenditure =  $G - G_M + G_X$

govt. exp. on imported goods.

Add all 3.

$$C + I + G + (C_X + I_X + G_X) - (C_M + I_M + G_M)$$

Total exports (X)      Total imports (M)

$$GDP^{\text{Market prices}} = C + I + G + (X - M)$$

net foreign spending/exp.

Because all exp. are in market prices.

• Structural Transformation - change in the composition of GDP and employment in the process of economic development.

GDP comes from

1. Agri / primary
2. Industry / secondary
3. Services / tertiary

Transition

Both  
GDP & emplo.

Phase I

Ag. (hi) ↓

Ind

serv.

Phase II

↓ Ag ↓

↑ (highest) →

↓ Ind ↓

serv ↑

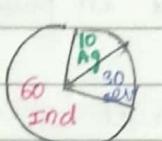
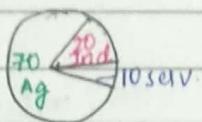
Phase III

Ag (Third)

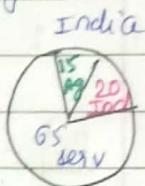
Ind (2nd)

serv (highest)

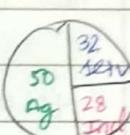
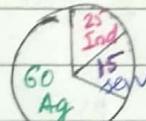
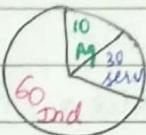
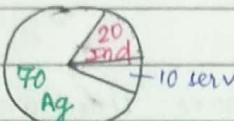
GDP



India



Emp.



Singapore : shifted from phase I to phase III (most services)

Germany : " " " to phase II (industrialisat<sup>n</sup>)

• Problem with India, as GDP contribut<sup>n</sup> from each sector changed, employment didn't show the same trend.

Over the years, inequality has increased.

→ Rising internal conflicts, rising problem of Macists

Because 60% GDP given by service sector but max<sup>m</sup> employed in Ag.

06-02

Inflation

$$\text{Price Index} = \frac{\text{PI}}{\text{real GDP}} = \frac{\text{nominal GDP}}{\text{real GDP}}$$

• Increase in general price level for some years (time period)

→ If prices of onion ONLY increase from 40€ to 100€, it cannot be called inflation because it is single price.

Single commodity prices can't be a substitute for general prices.

By general, we roughly mean average.

	<u>2016</u>	<u>2018</u>
$x_1$	2	1
$x_2$	5	2
$x_3$	8	7
$x_4$	1	9

fall in prices

We cannot say whether there is inflation or not.

$$PI = \frac{P_t}{P_0} \text{ (average price level at time 't') } \quad (\text{inflation}) \quad \frac{150}{100} = 150\%$$

(average price level at base year)

→ price of base yr is kept as 100.

Growth Growth in price index =  $\left( \frac{P_t - P_0}{P_0} \right) \rightarrow$  more used when we have fixed base. index.

- Avg can be simple and weighted → preferred when we have individual prices
- When avg price ↑ for one commodity, its consumpt<sup>n</sup>, hence product decreases.

so,

$$PI = \sum w_i \left( \frac{P_{it}}{P_0} \right) \quad w_i = \text{weights} \quad w_i > 0 \quad \sum w_i = 1$$

When  $w_i \downarrow$ , and  $P_{it} \uparrow$  it may happen that there is no net change, hence no inflation

- $P_{io}$  = i<sup>th</sup> commodity price at base year

$P_{it}$  = " " " at time 't'

$w_i$  = weight given to i<sup>th</sup> commodity

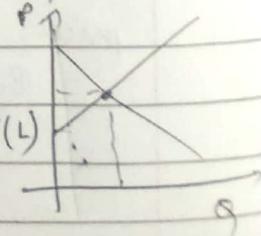
Value share of i<sup>th</sup> commodity in base year =  $\frac{q_{io} P_{io}}{\sum q_{io} P_{io}} = w_i$

$q_{io}$  = i<sup>th</sup> quantity in base yr.

[ $q_{io}$  is produced / demanded because in avg quality market product is considered as demand]

Kaapsayi's  
price index

$$PI = \sum \left( \frac{q_{io} P_{io}}{\sum q_{io} P_{io}} \right) \left( \frac{P_{it}}{P_{io}} \right) = \frac{\sum q_{io} P_{it}}{\sum q_{io} P_{io}} = PI(L)$$



Paasche's

$$\text{PI}(P) = \frac{\sum q_i p_i L}{\sum q_i p_{0L}}$$

- $\text{PI}(P)$  &  $\text{PI}(L)$  do not give same values and have **economic difference** as well.

	Base (2010)		current (2018)	
	P/q		P/q	
$x_1$	10	100	20	20
$x_2$	10	50	12	130

$\rightarrow$   $\sum q_i p_{0L}$  substituted

- If we use  $\text{PI}(L)$ , we are underestimating SE because we are using base yr quantity and not the current yr. (Larger PI)
- If we use  $\text{PI}(P)$ , we are overestimating SE due to price change because there can be substitution due to change in taste preferences also, but we are taking it as only due to change in prices.

$$\text{Fischer's Price Index} = \text{PI}(F) = (\text{PI}(P) * \text{PI}(L))^{0.5}$$

- GDP deflator =  $\text{PI} = \frac{\text{GDP}^N}{\text{GDP}^R} = \frac{\sum q_i p_i L}{\sum q_i p_{0L}}$  (Paasche's type)

In India

CPI (Consumer Price Index)

- cost of living of PI / standard of living index

- P/q taken for retail prices

Both have different uses

- represents cost for living index

- Final goods

Major policy decisions by RBI

WPI (wholesale)

- P/q taken for wholesale prices

- used for policy decisions

(govt increases DA twice in a year, influenced by WPI)

- includes intermediate goods because " "

- were bought in wholesale

- imported goods included

- domestic goods only included

- services included

## RBI rates

- (I) Repo-rates
  - (II) Reverse repo-rates
  - (III) Bank rates
  - (IV) Interest rates → SCBs lend money to individuals.
- } influence money supply in market

- Repo rates :- SCBs (scheduled commercial banks - SBI...) pay interest to RBI for loans taken. (short term lending) < 90 days
- Reverse repo-rates :- when RBI borrows from SCBs and has to pay back (short-term lending)
- Bank rates :- when RBI lends to SCBs for long term

## Quantity theory of money supply -

$$MV = P \cancel{Q} T \text{ goods & services}$$

↓  
velocity  
of money

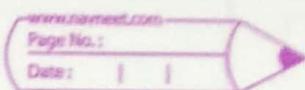
- ~~M~~ V & T generally constant.
- so, if M increases in market, P have to increase meaning inflation.

Eg- If RBI has set repo rates at 19%, banks will borrow more money & distribute to people. This increase of money supply will cause more prices.  
WPI increases.

- If repo rate ↑, interest rate will also be high.

V = velocity of money  
no. of times a single currency changes hands  
in b/w 2 to 3

when you've consumed something  
market price = 0



CPI

WPI

⇒ CPI - rural (e.g. house rent)

⇒ CPI - urban ←

⇒ CPI - industries

⇒ CPI - agricultural workers.

Why do we have diff CPI?

- When we measure CPI, we

have same fixed basket of goods

including house rent in rural area will

be misleading because it does not

add anything to their living.

- house rent a critical factor in  
urban areas because it changes  
for places & with time

agricultural product for rural areas - will be misleading because  
mostly they consume them after <sup>after production</sup> so  $M.P=0$ . We cannot tell this area has  
made no progress seeing only ag. product.

But if we include industrial product, it is a good measure because  
rural area, people pay more for indust prod. due to monopoly  
power of seller and transport charges.

Consumption patterns & behaviour differ for diff set of areas & people  
so the set of parameters should be used wisely to measure standard  
of living.

### 3 growth objectives for any country (economy)

1. Growth (GDP ↑)

2. Stabilise (constant inflation)

3. Full-employment (reduced unemployment)

## Unemployment

Labour force : number of individuals in the age group of 15-65 willing to work at the existing wage rate

A person is not unemployed until and unless he is willing to work at the existing wage rate.

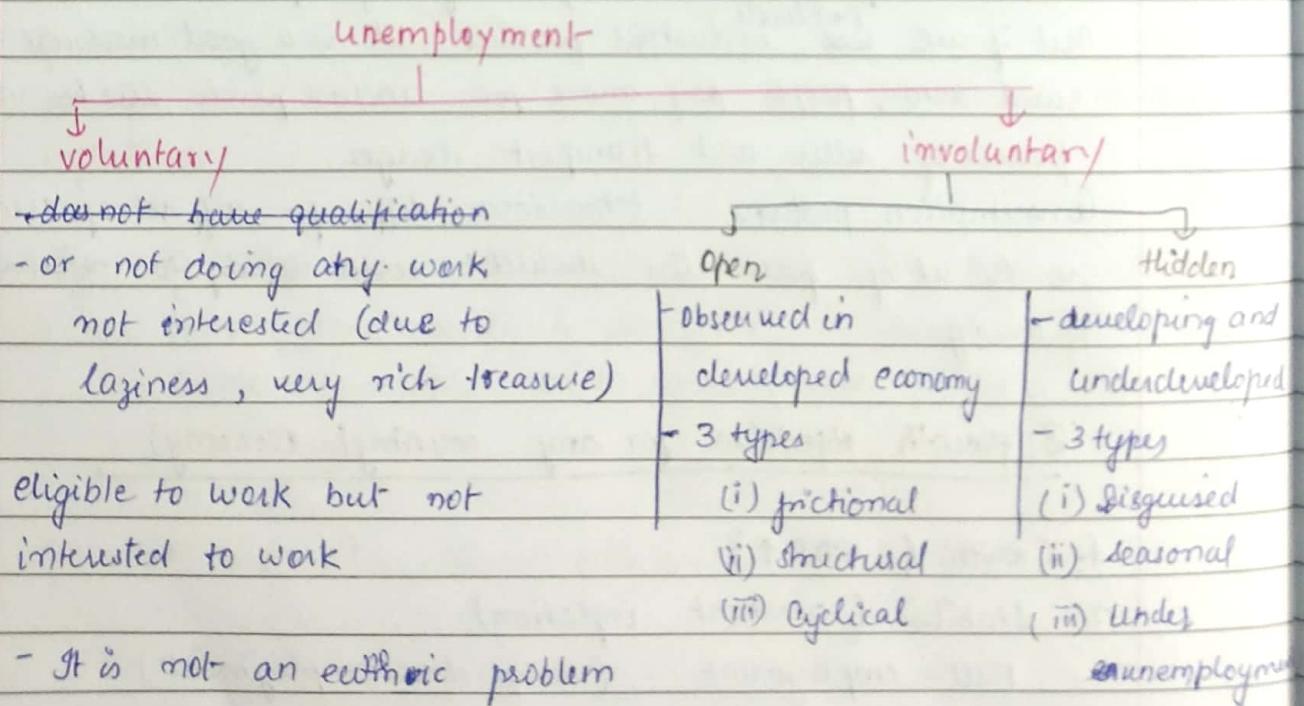
Labour force participation rate :  $\frac{LF}{\text{Population (of that age group)}}$  (LFPR)  
15-65

Work force : no. of individuals from LF are employed.

Work force participation rate :  $\frac{\text{employed}}{\text{population}} (E)$

(U) unemployed :  $LF - \text{employed} = LF - E$

(UR) Unemployment rate :  $\frac{LF - E}{LF}$



## Individual

- Frictional unemployment implies leaves one (current) job for other work. (may be for 2 months)
- short term in nature
  - Transitory.
  - decreases during recession
- Structural unemployment implies unemployed individuals during the tenure of their training, to develop industrial skills
- arises because of skill mismatch (skill required in industries are more diff. than that in agriculture)
  - short term
  - transitory
- Cyclical unemployment  
every country has these cycles.
- 
- Lay-off (giving pink slip that we no more need you), hence unemployed
- during recovery, they can again get employed
  - Seen in developed economy
  - short term, temporal.

06.03.

## Hidden

### (1) Disguised unemployment -

individual appears to be employed but actually not employed.

If 2 members leave, output  
only 8 present - their output = 100 units  
= 100 units

10 family  
members  
land

(equal to previous)

land

Hence, the contribution of 9th & 10th individual = 0

For 9th & 10th, marginal productivity = 0

Any individual whose marginal productivity = 0 are disguised unemployment.

- { 1. Mainly seen in agriculture
- 2. Example of small shop (old man/woman selling books, If one leaves, no effect on income/output)

Common in

↳ developing countries

↳ family business (self-employed)

- They are long term

### (i) seasonal unemployment

- arise because some economic activities are seasonal in nature.

- eg. producers of Holi colours employ more people during the Holi season.

eg. agriculture (In India, most of the agricultural employment season is from June to Dec)

### (ii) under employment

- people are employed below their caliber job

- eg Bihar govt asked for applicants upto 8th standard.

Applied - lakhs out of which thousands were BTech degree

- Hence, they if employed they are working below their max<sup>m</sup> potential or potential marginal productivity.

### Criteria used for measuring unemployment :

In India

- { (i) Time } we defined it using these 2 criteria
- { (ii) Willingness }
- { (iii) Income }
- { (iv) Productivity }

Income criteria - if person employed for even 1 month but ~~at~~  
with some income threshold, he is said to be  
employed throughout the yr.

**NSSO** - national sample survey organisation.

→ conducts employment & unemployment survey <sup>(household survey)</sup> in 5 yrs.

Recent (2011-12)

→ they do in 2 calendar years because we have 2 seasons - Rabi & Kharif to capture both employment trends.

Rabi - high unemployment

Kharif - no "

To avoid such situations (seasonal variations), it is done so.

~~usual status~~ info in 2 categories

Report, principal status : and subsidiary status

180 days or more

30-180 days

I<sub>1</sub>: Question asked ~~to~~ did you work for more than 180 days?

If yes, then the principal status is employed.

If worked less than 180, subsidiary status is unemployed.

ie

I<sub>2</sub>: for all students, principal status is unemployed - student - subsidiary " " employed (during intern)

We can have ~~as~~ both status for same individual.

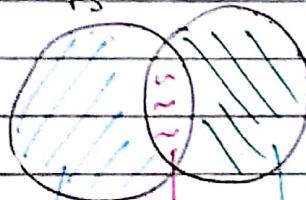
I<sub>3</sub> Farmer : PS - employed

due to MNREGA scheme SS - employed

Employment

PS

SS



student (only SS is employed)

professor

(no SS for them as

they're employed throughout the year)

## Current Daily Status - (CDS) - intensity of work also recorded

Info for last 7 days prior to the day of survey is taken

- if individual has worked for  $> 4$  hrs - employed (1)
- $< 4$  hrs - half employed (0.5)
- 0 hrs - unemployed (0)

	D <sub>1</sub>	D <sub>2</sub>	...	D <sub>7</sub>
hrs	6	3		0
score	1	0.5		0

~~Total~~ Current daily status  
employed only where Total score  $> 3.5$

## Current weekly status - (CWS)

if ind. worked for atleast 1 day in the week, that is atleast 4 hrs, then the CWS is employed.

PS + SS = usual principal status (UPSS)

- subsidiary

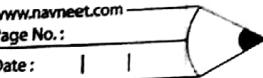
Diff b/w UPSS & CDS

gives info about disguised unemployment.

- just gives an extent of " "

UPSS - ind. may seem employed throughout the year

CDS - <sup>when</sup> asked, he might not have worked for last week, hence was disguisedly ~~employed~~.



## HUMAN DEVELOPMENT

Why the country wants GDP to be large?

Is it

- just for the sake of GDP/income to be large? - they are end objectives
- OR - you want to use them as means for something else!

What is this something else?

- improvement of Real wealth of country



real wealth of a country is its people.

\* GDP does not measure this (improvement) in real wealth.

<u>Country</u>	A	B	(same GDP)
arms	ag. products / industrial		

We would choose B to live in, despite same GDP because there is value judgement attached.

Economic progress has value judgement - cannot be captured through economic progress (GDP)

\* To understand this val. progress in real wealth - we should see progress in human development.

①

Human development - a process of enlarging people's choices or or substantive freedom

② improves their choices.

How to measure?

- Human development index

We can add every individual's choices but it will be impossible to aggregate such large no. of choices, choices can also be contradictory.

To avoid this, we can choose some dimensions

L should be universally agreed.

L they reflect the choices of all

e.g. - free mobility of females

- even though it is ideally desirable, there will be some communities which will disagree.

18.03.18

Dimensions: measuring progress in these through diff indicators

① standard of living

① per capita income

(purchasing power parity)

② knowledge

② (i) Gross enrollment ratio in PS-primary

③ Health

(ii) Adult literacy rate

③ Life expectancy at birth

② i), ii) used from 1990 - 2009.

Since, 2010 these have changed to avg years of schooling and

because ALR in many countries are self reported.

In India, it is reported by census.



asked to write their names ← they say 'yes'.

Hence, it becomes inflated because.

But in countries like Switzerland, they ask to read one sentence in own language, able to do some basic arithmetic, then only you are considered literate.

Hence, ALR not comparable for all countries. Hence, UNDP (1990) dropped these 2 indicators; introduced

- ② i) average years of schooling
- ii) expected years of "

Geon enrollment ratio = no. of students in Primary school population in the age group of 6-14.

Net enrollment ratio = NER =  $\frac{\text{no. of students in PS in the age group 6-14}}{\text{popn in the age of 6-14}}$

GER  $> 100$  but NER  $\leq 100$   
(%) (%)

We want aggregate figures, so we've to standardise them.

-PPP \$

school

## ii) knowledge and health

$$\left( \frac{\text{actual value} - \text{min value}}{\text{max value} - \text{min value}} \right) \text{ given}$$

Hence, the indicators lie b/w 0, 1 obtained from large for data across years

i) per capita income, we use

$$\frac{\ln(\text{actual value}) - \ln(\text{min value})}{\ln(\text{max}) - \ln(\text{min})}$$

? The objective of this standardisation

why log?

→ income is very distributed

Economic reason Statistical reason

→ After H will show relative increase in choices

converting income to choices  
1000 choices 2 choices  
1500 choices 4 choices  
2000 choices 5 choices

{ 1000 to Ambani not much " " "  
1500 to poor much " " "

1000	2
1500	4
2000	5

→ Transforming income to choices go on diminishing law of diminishing returns applies and is reflected through taking of ln.

increase in income will increase choices lesser & lesser

Goal post

	<u>Max</u>	<u>Min</u>	
PCI	75000 (PPP \$)	100	observed over a
AYS	15	0	perd of 40 yrs.
EYS	13	0	
Life exp. at Birth	85	20	

Using these, we can convert each indicator b/w 0 & 1,  
hence, we get index (indices)

Income index =  $I$

$$\text{Educa index } - I = E_1 \rightarrow E = \frac{E_1 + E_2}{2}$$

$$\text{Edu index } - II = E_2$$

Health index =  $H$

These indices  $\in (0,1)$  and are unitless.

Hence, they can be aggregated and we can calculate  
Human Development Index

$$HDI = \frac{I+E+H}{3} \Rightarrow \text{(arithmetic mean of individual indices)}$$

Now, it is avg. w/  $\frac{1}{3}$  weight given to each index

Perfect substitute

we can substitute one

for other

	HDI	I	E	H
Country I	0.5	0.7	0.3	0.5
	0.5	0.3	0.7	0.5

Which country is better?

I is better in PPP (standard of living)

II " " " in Education

but in aggregate both are equal.

Fixed

If we decrease life exp. by 1 yr, and avg years of  
schooling  $\uparrow$  by 1 year, then HDI will be same.

So, our ~~is~~ we must have value judgement - we must value one more than other.

To avoid this, since 2010, we use

perfect substitutability

$$\frac{I}{18^{\frac{1}{3}}} \quad \frac{H}{27^{\frac{1}{3}}} \quad HDI = (I \times E \times H)^{\frac{1}{3}}$$

↓      ↓  
weightage      increased

difference b/w 2 is reduced even if originally ~~the~~<sup>one</sup> value was more than 3 times the other

lower value will get more weightage  
hence, focus should be on these indicators. now, less than 2 times

$$G_1 \quad 0.8 \quad 0.27 \quad 0.3 \quad \text{more weightage}$$

$$G_2 \quad 0.5 \quad 0.7 \quad 0.8$$

more weightage

Measurement of HDI is borrowed from the concept of ...

~~1993~~ Capabilities and functionings by Amartya Sen used in HDI



increase in choices / achievements  
substantive freedom

→ 2 individual given same food, but outcome diff.  
because absorption potential for both are diff.

Individuals differ in their utilisation set.

These items have some desirable properties.

[Food - satiety, gathering (social) characteristics, nutritional value]  
as well as personal utilisation function.

Someone may suffer from diseases, hence diff requirement.

NOTE: Let  $x_i$  : vector of commodities individual 'i' has.

(a) : characteristic vector of commodity

desirable characteristics for which we demand a commodity.

bicycle - "transport"; exercising

food - social gathering, nutritional value

$f_i()$ : Personal utilisation of individual which he/she actually uses.

Ind - personal utilisation differ for 2 diff individuals  
i.e. the outcome of both will differ.

$F_i()$ : set of  $f_i()$

- all possible personal utilisation of individual

Ex say, book is the commodity.  $\alpha_i = \{ \text{BOOK} \}$

- book has some desirable characteristics like [knowledge, entertainment]  
(K) (E)

$C(i) = \{ K, LP, RP, H \}$

Listening pleasure  
(LP)  
Reading  
(RP)

$f_i()$ : {RAY}, this person has reading ability

$F_i()$ : {RA, LA, MF}

[reading ability] - will depend on individual to provide him reading pleasure, knowledge

[listening ability]

[mental factor] / making free

achievements —  $b_i = f_i(c(\alpha_i))$

$b_i$ : achievement of i.

Ind. reads book to gain knowledge using reading ability to get a job.

Job = RA (K(Book))

Out of many characteristics, ind. is interested in knowledge of book. He uses his reading ability to gain knowledge and get a job.

$b_i$  can be obtained by using diff characteristics of the book and abilities of individual.

It can be {job, entertainment, getting rid of cold}

Possible set for  $b_i$   $P(\alpha_i) = \{ b_i | b_i = f_i(c(\alpha_i)) \text{ for } f_i \in F_i \}$

Functional achievements given the personal utilisation set

$X_i = \text{endowment set} \rightarrow (\text{All commodities/resource set})$   
all resources that ind. has.

$x_i = \{ \text{Book, Bicycle} \}$   
~~book~~

**Freedom set / capabilities**  $\rightarrow Q(x) = \{ b_i | b_i = f_i(c(x_i)) \text{ for } f_i \in F_i \text{ and } x_i \in X_i \}$   
alternative achievements indiv. can achieve

these are the freedom ind. has from which the individual can choose.

given the set  $Q$ .

[heat]  
(H)

Freedom may be lesser even though you want to achieve more, the best possible outcome, means you have less capabilities.

$v_i$ : valuation function

ind. can value / evaluate  $v_i(b_i)$   
the alternate achievements

e.g. The best possible outcome out of Job, E, heat car for an ind is to get a job.

$Q(\text{book}) = \{ \text{Job, } E_R, E_L, H \}$

Ind can value different achievements differently. He thinks getting a job is best possible outcome. Even though, ind. gets best possible outcome, his freedom set can be less.

Say, person has listening disability, then

$Q(\text{book}) = \{ \text{Job, } E_R, H \}$

Even two ind. achieving same thing, capabilities are diff.

$\therefore$  Ind 2 is poorer than, ind 1, because ind 1 has larger choice set than ind 2.

Rich ind. have large  $X_i \Rightarrow$  large endowment set.  $\Rightarrow$  smaller  $Q_x$  or large  $F_i$  (personal utilisation)

If a country's ind. capabilities are larger, then it is better.

Ex for girl candidates may be smaller than boys due to social constraints

limited by  
social  
constraints

## Poverty

- i) Identification problem - who is poor?
- ii) aggregation problem - how can we add all poor.

① income - benchmark - poverty line

used by international organisations

for under developed countries - \$1 / per day / per person

World Bank

IMF

UN

\$1.25 / per day / per person - for developed countries.

Income information of individual is not available. So, for India using income benchmarking is not feasible because we have no information of income.

② nutritional norms / calorie norms

i) Benchmark of calorie : ICMR give the caloric required for individuals in rural & urban areas

rural area = 2400 Kcal / per day / per person

7 - 1973

urban area = 2100 Kcal / per day / per person

2014 revised calorie norms.

Difference in benchmark arises due to diff calorie expenditure

- In rural areas, expenditure of calorie is more, as there is more physical activity
- Urban areas - there is less calorie requirement.

In case of India, we have NSSO (National Sample Survey Organisation) who convey "consumption" expenditure in every house and asks how many quantity of food items are consumed by individual family

Food items	Quantity (monetary value)	per unit nutritional value
Rice	10 kg	100 gm
wheat		
Oil	30 days	
Salt		
milk		
non food items	365 days	

to get per unit nutritional value of each food item

$$C_i = \sum q_{ij} p_j$$

$C_i$ : per capita calorie intake of household

$N_i$ : household size of HH

$p_j$  : per unit calorie value

of  $j$ th food items

$q_{ij}$  : quantity of  $j$ th food items

per capita calorie consumption

$C_i = 1900$  means the households consumes this amt of calorie per person. (1900 kcal / per day / per person)

We are ignoring intra-household food distribution. This is a serious limitation as we are assuming equal distribution of food among the household members.

We do not have info of individual members.

say,  $C_i = 2430$ , females calorie intake can be: < 2400  
males may be > 2800

some family members may be poor. We are not able to capture this.

In India, we use Monthly per capita consumption expenditure  
MPCE (Rupees)

- Calorie norms - monetary value

We have poverty line in calorie and we are reporting them in Rupees

We get total expenditure in 30 days

Food items	Quantity (monetary value) per unit nutritional value	Value
Rice	10 kg	
wheat		100 gms
Oil	30 days	
Salt		10 mg per day
milk		
non food items	365 days	of nutritional value of each food item

$$C_i = \frac{1}{N_i} \sum q_{ij} p_j$$

$C_i$ : per capita calorie intake of household

$N_i$ : household size of HH

$q_{ij}$ : quantity of  $j$ th food items

per capita calorie consumption

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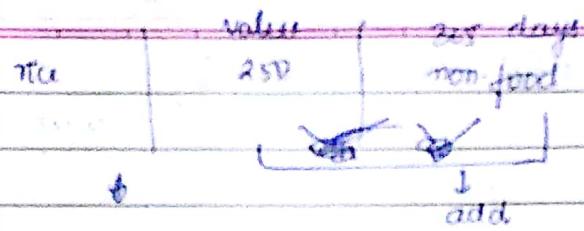
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In India, we use Monthly per capita consumption expenditure MPCE (Rupees).

- Calorie norms - monetary value

We have poverty line in calorie and we are reporting them in rupees.

We get total expenditure in 30 days



total expenditure in 30 days  $\rightarrow$  MPCE (includes both food & non-food)  
 $N$

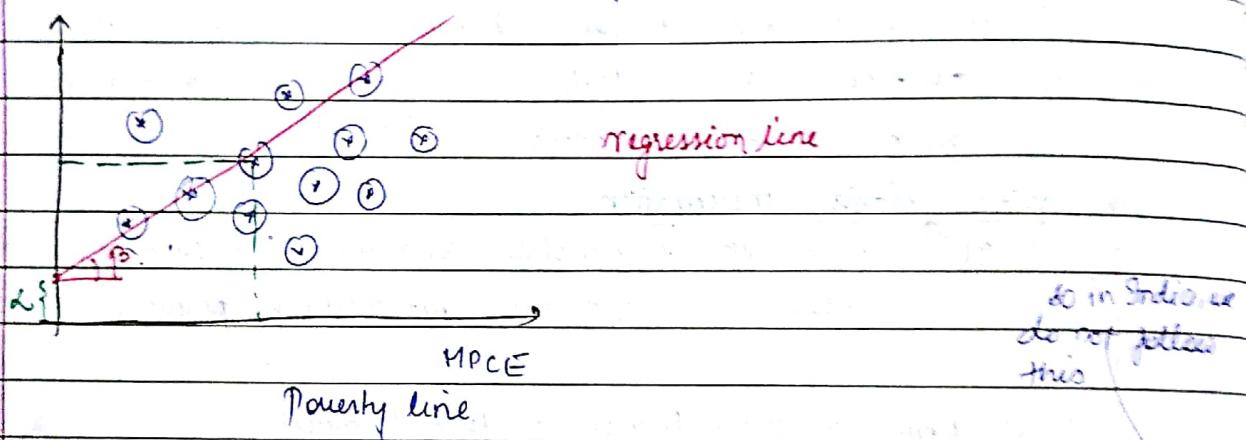
$$C_i = \alpha + \beta \text{MPCE}_i + U_i$$

$$G = 1500 + 0.7(\text{MPCE})$$

( $\alpha, \beta$  - parameters)

$U_i$  - error term

We are interested in calculating  $\alpha, \beta$ .

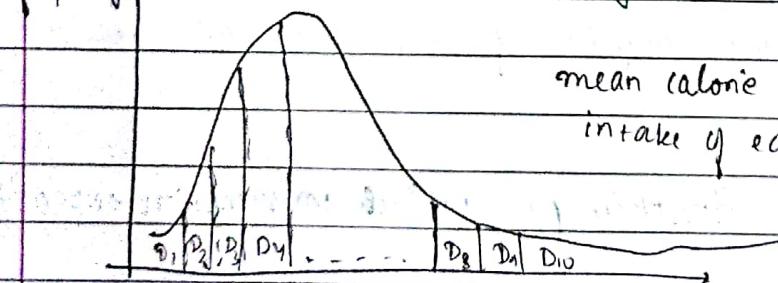


- line will be different for rural & urban areas.

- We make assumption regression line as we have done by OES

Consuming 2450 Kcal is equivalent to spend 50 /per food/ per day  
 In India we plot:

frequency      Kernel density  $f^n$



mean calorie -  $\bar{C}_{D_i}$

intake of each decile group

divide into 10 decile groups

D<sub>1</sub>

D<sub>2</sub>  
D<sub>3</sub>

$\bar{C}_{D_i}$

$\bar{C}_{D_1} = 1800$

$\bar{C}_{D_2} = 2000$

$\bar{C}_{D_3} = 1900$

$\bar{C}_{D_4} = 2100$

} mean intake of each  
decile group

$\bar{C}_0Y = 2400$  - calorie benchmark  
poverty decile group

$D_4 \rightarrow$  poverty decile group

6000 households in  $D_4$ , so they represent our poverty line in MPCE also.

$D_4 \rightarrow$  cal MPCE

avg

represent our poverty line

### Aggregation Problem :

To get a macro view on the extent of poverty

2 indicators:

#### (i) Head-Count Ratio ( $H$ )

count the no. of poor heads and divide it by total population to get the ratio.

$$H = \frac{q}{N} \quad \begin{matrix} \text{---} \\ \text{no. of poor} \end{matrix} \quad \begin{matrix} \text{---} \\ \text{population} \end{matrix}$$

Say,  $Z = 500$

But  $I_3$  of  $G$  is more poor because he is farther from poverty line

	$G_1$	$G_2$
$I_1$	20	120
$I_2$	10	10
$I_3$	501	501
$I_4$	499	509
	poor	poor
	401	100
	1000	1000
	new $H = \frac{3}{4}$	$H = \frac{1}{4}$

depth of poverty in  $G$  is high

but on the basis of  $H$ , incidence of poverty is same.

disadv: does not consider capture depth/intensity of poverty.  
Who is more poor among poor?

Head Count Ratio does not satisfy Dalton Principle. A measure of poverty must satisfy this principle.

If you transform income from a richer/poorer individual to a non-rich/non-poor individual, the incidence of poverty should fall/decrease/increase.

This principle is satisfied somewhere but most of the cases, it fails.  
Hence, as it fails to capture seriousness of poverty.

Any method following this principle captures the seriousness.

(ii) Poverty gap (PG) measure :

$$PG = \frac{1}{N} \sum_{i=1}^N [(z - y_i) I(z > y_i)]$$

will be counted q times for  
no. of poor only  
(0 for non-poor)

$z$  = poverty line

$y_i$  = individual income / consumption exp.

$I(z > y_i) = 1$  If it is ~~poor~~ — (poor)

= 0 if  $z < y_i$  (not poor individual)

(iii) Square poverty gap :

$$SPG = \frac{1}{N} \sum_{i=1}^N [(z - y_i)^2 I(z > y_i)]$$

(iv) Foster-Greer-Thorbecke (FGT) : measure of poverty index.

$$FGT \text{ (similar to SPG)} = \frac{1}{N} \sum_{i=1}^N \left[ \frac{(z - y_i)^\alpha}{z} I(z > y_i) \right]^\alpha$$

$\alpha$ : penalty coefficient

(generally  $\alpha = 2$  is considered best)

[as  $\alpha$  increases, you give more importance to the gap b/w poverty line & income]

↳ adv : (i) →

(ii) computationally easier.

$$\alpha = 0, FGT = H$$

$$\alpha = 1, FGT \Rightarrow PG$$

$$\alpha = 2, FGT \Rightarrow SPG$$

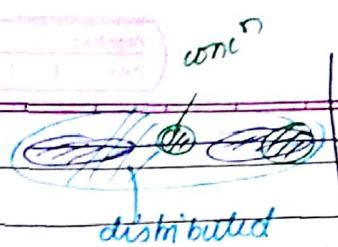
These poverty indicators do not take into account inequality among the poor.

- Most of the countries report H. Although it does not capture seriously the trend or pattern of poverty exhibited by all indicators are same. It is easier to compute.

Gini coefficient :  $G$  |  $G = 0.5$

$G$  |  $G = 0.1$

mean income	$H = 0.3$	$M = 230$
	$H = 0.29$	$M =$

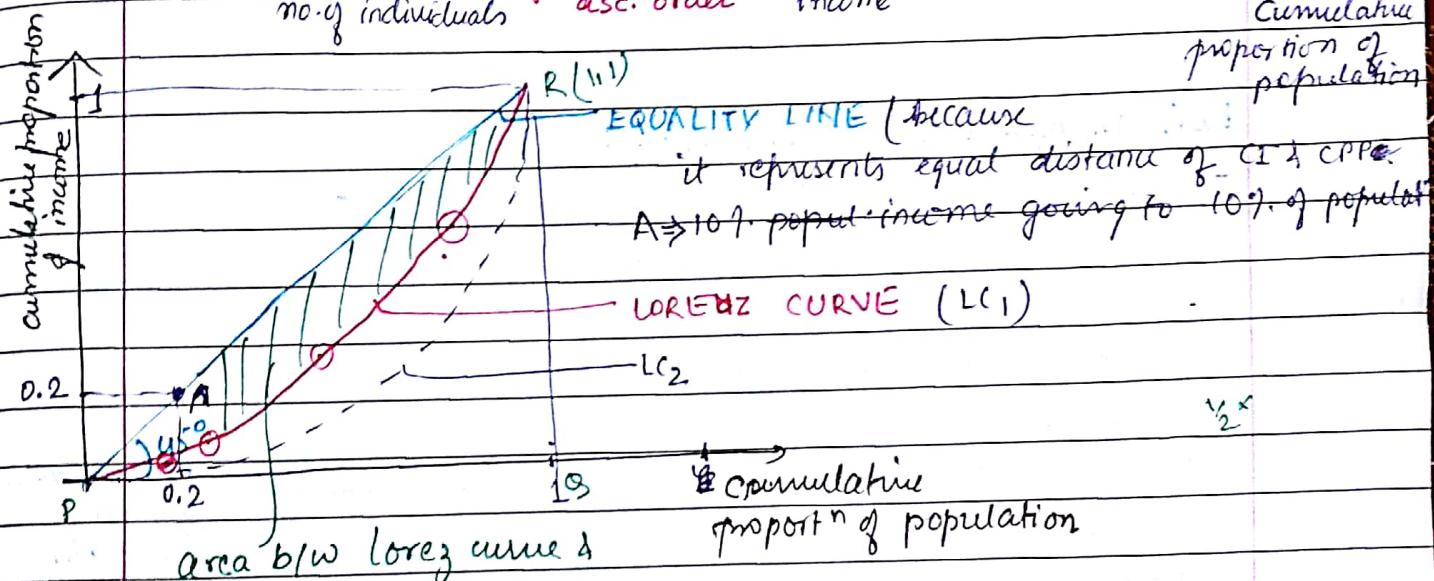


$G=0.5$  means scattered distribut<sup>n</sup>  
less  $G$  means concentrated poor in one region.

### Lorenz - curve :

		(CI)	cumulative proportion	CP	CPP
I <sub>1</sub>	400	1	10	1	$\frac{1}{530}$
I <sub>2</sub>	10	1	20	1	$\frac{20}{530}$
I <sub>3</sub>	20	1	100	1	$\frac{100}{530}$
I <sub>4</sub>	100	1	400	1	$\frac{400}{530}$
					$\frac{1}{4} = 0.25$
					$\frac{2}{4} = 0.5$
					$\frac{3}{4} = 0.75$
					$\frac{4}{4} = 1$

income (f) freq. of no. of individuals arrange income in asc. order cumulative income



$$G = \frac{\text{area of } \triangle PQR}{\text{area of } \triangle PQR} (=0.5) \rightarrow G=0 \text{ (no inequality)} \\ \Rightarrow \text{Lorenz curve coincides with equality line})$$

$\rightarrow$  inequality  $\Leftrightarrow (LC_2 > LC_1)$

$\rightarrow G=1$  (when curve coincides with x-axis)

Q2010

$$H=0.2$$

$$G=0.9$$

$$M=100$$

Tots of poor &

Q2017

$$H=0.2$$

$$G=0.1$$

$$M=450$$

extent of poverty is high.

All can live if our H is same, our country is progressing  
 say,

Economics is the study of resources and extracting max<sup>m</sup> utility from limited form these resources.

Most important <sup>major</sup> problem of economics is scarcity of resources

What to produce? How? For whom? What we can do to maximize the welfare of society?

Commodities - tangible , intangible , capital

(books)

<sup>services</sup> (education)

(raw materials)

(Intermediate goods)

Basic assumptions of cardinal theory:

- utility can be quantified
- marginal utility of money is constant  
(utility derived from last unit of money is same irrespective of income)
- law of diminishing MU - with successive commodities, MU increases at a decreasing rate.
- o MU can be 0 or -ve

• marginal =

Units      Total utility

Marginal utility

0            0

→

1            20

20

2            35

15

3            45

10

4            50

5

5            53

3

6            55

2

7            56

1

8            56

0

9            55

-1

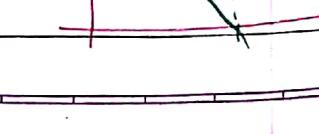
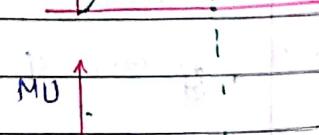
10          53

-2

11          50

As a consumer goes on increasing consumption, the utility

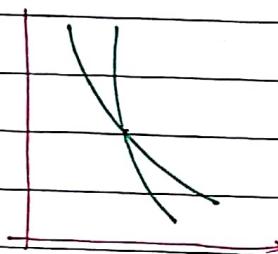
derived from each successive commodity diminishes.



Law of equi-marginal utility - states that consumer will distribute his money income b/w the goods in such a way that the utility derived from the last rupee spent on each commodity is equal.

Indifference curve - it is the locus of those points that give same level of utility for 2 goods.

- with increasing utility, line away <sup>higher</sup> from
- no two curves can intersect



~~0.8 62~~

$$P_{\text{movie}} = \$8$$

\$20 - total amt.

$$P_{\text{bowling}} = \$4$$

Qty

MU of movie

$$\frac{8}{2} = 4$$

$$1$$

MU of Bowling

$$\frac{4}{1} = 4$$

$$3$$

$$8x + 4y = 20$$

$$1 \rightarrow \$8$$

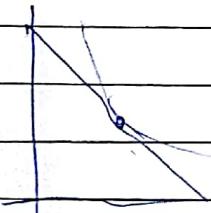
$$1 \rightarrow \$4$$

$$2 \rightarrow \$16$$

$$2 \rightarrow \$8$$

$$MU = \frac{8}{1} = 8$$

$$MU = \frac{4}{1} = 4$$



law of equimarginal utility

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

$$\frac{MU_x}{8} = \frac{MU_y}{4}$$

$$MU_x = 2 MU_y$$

$$\frac{2}{8} = \frac{1}{4}$$