

Macro Economics

Micro - referring to individual economic behaviour

Macro - " " aggregate

It could be individual producer, consumer, market

- In economics, we say " I am consuming education "

- All of us are consumers, but not all are producers.

When someone is producing something, doesn't necessarily mean has produced it.

Employer - produces something

Employee - creates it / does not called producer.

4 Basic factors of production

1. land
2. labour
3. capital
4. entrepreneur - producer

Consumer behaviour

- we consume food, book

- buying a good means consuming it.

How much we will consume it depends on our satisfaction level, and every consumer wants to optimise its utility.

Initially, utility increases at an increasing rate, then it increases at a decreasing rate and finally it becomes negative utility.

Normal person is one who has limited amount of income/resources who utilises distributes this income in such a way that utility is maximised, by choosing a basket of goods.

Satisfaction level varies for individuals.

The goal of every producer is profit

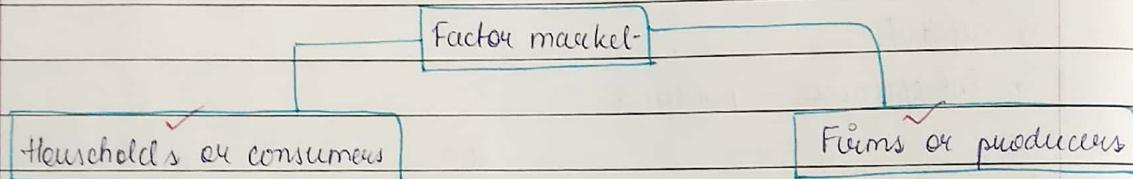
Players of economy -

1. Producer
2. Consumer
3. Government - is both a consumer and producer (in India)

India has a mixed economy - co-existence of private and public enterprises

But the govt. has compromised with profit (eg- Air India) and has had huge losses.

Macro Economics



Factors of production :

1. Land \rightarrow limited in supply, so vertical growth
2. Labour \rightarrow unskilled - agriculture (wage)
semi-skilled - electrician, plumber, construction (salary)
skilled - IT personnels (salary)
3. Capital \rightarrow improves productivity of labour
eg- using ^{bullock} ~~capital~~ to plough land or use a tractor
^{capital} ~~capital~~
- more machines complementary factor for labour
- computer in IT sector
4. Entrepreneurship \rightarrow combines above three to optimize their use for max^m profit.

All these 4 factors owned by the household ~~sector~~ sector.

People who are BPL do not have any of these. (22%)

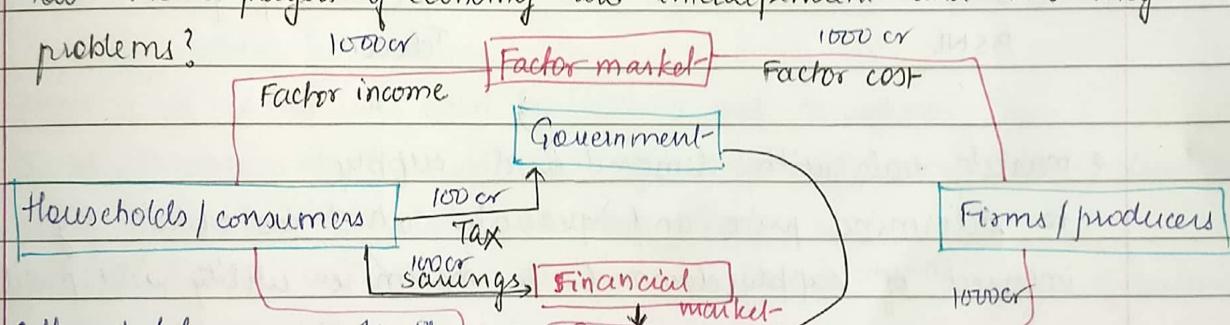
- Consumers diff. from producers in - we want to maximise ~~at~~ utility
 - we buy only when it satisfies us, from which we ^{derive} satisfying utility
 - in Eo, we say utility (diff from usefulness).
 - we may have

Water - diamond paradox - relative scarcity decides price
water is ^{much} cheaper but very useful
diamond is very expensive

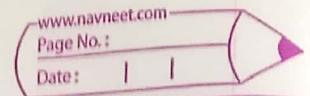
Free goods - which are in plenty so we get it for free. (river water)
"Economic" - which are not in " " and hence priced (water in bottle)

Today, everything is an economic good.

- Q. How the 3 players of economy are interdependent and how they solve problems? 1000 cr Factor market 1000 cr Factor cost



- Household means family sover market Goods market
 - BPL people only have labour (landless labour) (factor of production - zero)
 - Capital can be created to money capital
 - I am depositing my saving means I am lending it.
 - Ratan Tata borrowed it from bank (my money) and establishes a capital good (e.g. steel)
 - I am myself not creating capital directly, but helping others.
 - household does not own blast furnace, but owns money capital that helped in ~~of~~ its production.
 - there are households which own entrepreneurs (one who takes risks)
 - a farmer is a small entrepreneur and businessman a big entre. -
 - wrong to say ↗



- Producers demand 4 factors by demanding from household
- there is transfer of income
- I do not own land but I want to cultivate. I will pay rent for the land.
- rent - first factor cost. (land cost)
- wage/salary cost - 2nd factor cost (labour cost)
- capital interest - 3rd " (capital cost) (borrowing from banks)
- profit - (entrepreneur cost)

Total income of a country is total factor cost

factor market is where buying and selling of factor cost occurs.

- market diff from physical market - invisible institution
- deals with demand and supply. (e.g. - telecom market)
- market also called industry

producer	company	firm	industry	producers
	IBM		sum total of firms	
	BSNL		Telecom	

• market deals with demand and supply to determine price and quantity which we obtain by intersectⁿ of supply & demand to maximise utility and profit.

- ~~producers~~ buy ⁱⁿ factor market ~~to~~ and pay ^{cost} what is called cost of production.

Total cost of " is factor income to household sector.

- Tax leakage is a form of outflow of income earned.
- When we have tendency to save our income, it forms financial market.
- In goods market, role reversed as ~~but~~ from factor market -
- Govt. buys goods equal to ~~to~~ tax (govt's revenue = govt's expenditure
leakage = injection (G = E))

- Investment = savings, when financial market invest on goods market
 - If sum total of demand = sum total of supply, economy is in eq^m

16.01

Equilibrium income

Keynesian Theory (J.M. Keynes) - tells how?

- Income - total value of the output in a year

Stocks, flow

wealth is stock

- income is a flow

- bicycle for poor

- income is generated when resources are

- Mercedes for rich

solol.

wealth doesn't change its value over time

- income is defined for a time period

The income that is generated must be demanded.

Income is about day to day daily requirements, wealth is not

Anything which is ~~not~~ flow

- Income is what we earn by selling our resources.
 - Total income is the sum total of income of every individual.
 - Money is what circulates in transactions.
 - 2nd; 3rd hand will not be income, because it was ^{now} sold once. value of output

$$MV = PY$$

Money supplied \times velocity of circulation = Avg price of product \times
(How many times physical output
money changing hands)

National ~~is~~

$$Y = C + S + T \quad \text{identity} \quad \text{--- (1)}$$

Y-income

S - Savings

c - consumption

T - tax

$$AD = C + I + G$$

- eq^m → ① I = Inverse testing

Geographical expenditure

For

aggregate,

$$S + T = I + G$$

or som

- sum total of leakages must be equal to sum total of injection,
- more the AD, more is AS, hence more national income.

Consumption function

AD < AS, indication of recession.

occurs when there is deficiency of demand

=> produce less

=> fall in employment

vicious cycle

recession \longrightarrow deep recession (1930s)
(depression)

As long as govt doesn't intervene in the ^{free play} market of goods & services, either in terms of
- communist
- socialist ideology
- free field market

Economic reforms - LPG (liberalisation, privatisation, globalisation)

\rightarrow 1990s - privatisation in India.

In China, \rightarrow liberalisation first

Classical economics

Till 1930s, govt. will be there but will ^{only} protect the citizens from external dangers, it will not produce.

Failed ideology.

Keynes ideology suggested a completely diff. ideology.

Current consumption is a ^{linear} function of current income (not of past / future income) with a positive ~~step~~ intercept

current income

$$C = a + bY$$

$$b = \frac{dc}{dY}$$

a: Autonomous consumption

b: Induced consumption

Before Keynes, $C = f(Y)$

rate of interest

$S = f(Y)$ (my consumption is decreasing, saving ↑)

- Any individual has to have both of these.

"consumpt" is a fⁿ of current income & hence, current income is also a fⁿ of income and not rate of interest.

$$C = a + bY$$

$$S = -a + (1-b)Y$$

When rate of Interest is very high, people will not take

- Total income of India ~ 2500

- You allow the people to -

$I \propto 1$

rate of interest

○ current income can be past / future

○ consumer durables - bought from saved or from

Properties :

short run economics

i) marginal propensity to consume (MPC) is constant

ii) The value of ~~MPC~~ MPC

$$0 < MPC < 1$$

iii) At zero level of income, average propensity to consume (APC) is ∞ and then it declines but will always remain above MPC.

○ Marginal propensity to consume = slope of consumption fⁿ

$$b = MPC = \frac{dC}{dY}$$

with increase in income of 1 R \Rightarrow how much consumption is increasing (+ve slope)

change in consumption with 1 unit change in income remains constant.

○ If 0, implies nothing is consumed

○ If 1, " " " " saved.

These ~~consequences~~ of 2 types - short run, long run

short run - 2, 3, 4, 5 years } depend on certain properties /
long run - characteristics.

- If time period is short, atleast one variable is fixed
- " " is long, none of the " " is " ".
eg - land size may remain fixed but quality changes
vertical expansion of land with time.
particularly for individual, it is variable as I can
buy more, have vertical expansion.

• In the short run, there are 2 types of costs $\left[\begin{array}{l} \text{variable} \\ \text{fixed} \end{array} \right]$
Total cost = Total var + Tot fixed

• In the long run, only variable cost.

$$\text{Total cost} = \text{Total variable}$$

• Fish as a product

7 am 150 £

12 pm 100 £

because perishable good

• TV today 50000
after 5 yrs 40000

because durable product.

• If I believe my MPC = $\frac{1}{2}$, it will remain so for years even if my income increases. Because income increases gradually.

$$(10,000, \frac{6 \text{ mnts}}{6 \text{ months}} 15000 \frac{6 \text{ months}}{12 \text{ months}} 20000)$$

• Ratio is same \Rightarrow with every increase of 2 £ in income, my consumption increases by 1 £.

• In absolute term, consumption increased but relatively fixed

→ Empirically true purely based on introspection.

	20 st.	50 st.	10 st.			
average	Y	0	40	80	120	160
	C	20	50	80	110	140
	S	-20	-10	0	10	20
$\frac{10}{40}$						

$$\rightarrow \text{MPC is constant} = \frac{(40-0)}{(50-20)} = \frac{3}{4}$$

• Average behaviour of this class - out of 4 Rs income, 3 Rs consumed & 1 Rs is saved.

MPS - marginal propensity to save = $\frac{1}{4}$

$$\boxed{\text{MPC} + \text{MPS} = 1}$$

All that is consumed is not saved and vice versa.

• MPC constant over a short run means during the time we've planned to spend in that ratio, we maintain it but beyond that threshold, we may not follow it.

Eg. my income is 50,000, then in 10 yrs, it increases to 150,000, my MPC is $\frac{3}{4}$ upto here. After this, ~~it~~ I make it $\frac{1}{2}$. Hence, for one short run it was $\frac{3}{4}$.

After this, for another short run, it is changed to $\frac{1}{2}$.

• gradual rise of income - ^{if buy} same type of commodities

• jump - there is change of list of items and also increase.

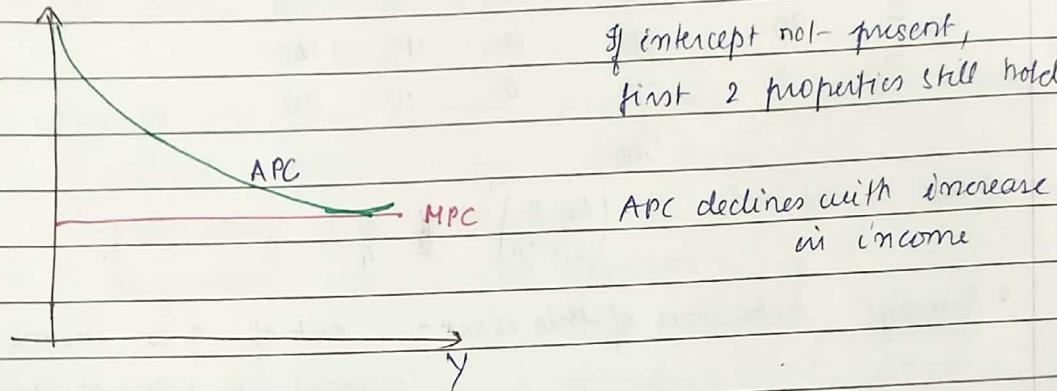
• When we say MPC is constant doesn't mean same across countries. for India not same as in USA.

• $\text{APC} = \frac{C}{Y}$ fraction of income consumed (not change / change) but absolute

$$\text{APC} = \infty, \frac{5}{4}, \frac{1}{2}, \frac{11}{12}, \frac{19}{16}$$

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

always greater than MPC.



In long run, $C = bY$, as income increases, APC declines.

~~but (a)~~

Autonomous: A: That amt of consumption which is independent of income.

Consumptⁿ - Dis savings

Borrowing withdrawal of past savings

In the short run, we have possibility to have the autonomous income obtained by 2 sources.

Income is a direct source of consumption

Income is a flow, wealth is a stock

↓
eg - I earn for now, spend lavishly — then told that "we
no more need u for job", ~~\$~~ I still have some money
to consume for 6 months, then I depend on my friend.
then after some ~~0~~ years, no source of income and it
becomes long run.

29.01

- ① ~~"~~ "As an economy ~~is~~ prospers, there is possibility of recession."
in terms of income

fraction of consumptⁿ ↓ \Rightarrow fractⁿ of investment/saving ↑
 until ^{all} the savings ~~are~~ are out/invested, the economy is bound to recession because there is decline in demand (no eq^m)

① US ~~inward~~ economy is a saturated economy.

↳ very rich, high GDP

education $\begin{cases} \text{consumer good} & - \text{primary educat}^n \\ \text{producer good} & - \text{IIT (quality educat}^n \end{cases}$ (not functionally literate, $\frac{\text{not functional literate}}{\text{not functional literate}}$)

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~~purchasing power parity. (3rd largest)~~

- we can buy one burger in $\frac{1}{3}$ rd of price we could buy in US. why to increase income when we can buy the same thing at a lesser price?

Keynsian Take on investment function

- investment - addition to capital stock.
 - investment ≠ capital
 - flow
 - stock

10 km made today but we need to extend km means we are a dev.
 - investment - addition to capital stock
 - investment creates employment. (capital also has some capability to create " but investment directly does).
in
 - capital has to depreciate with time (eg- road maintenance requires investment)

[something owned by Household - wealth - only consumed] but
[" " " producer (tata steel) - capital good assets for both
- to produce]

- Gross investment -

- physical capital
 - human capital

demographic dividend

(India has avg age of

28 years)

1. $t_0 = 0.01$

↳ created by providing
right skill set

$$I_t^g = K_t^g - K_{t-1}^g$$

because I is
addition to
capital stock.

$$I_t^n = I_t^g - \text{Depreciation}$$

- social capital - some part of the country is disturbed due to social problems - resulting in no industrialisation
 - green capital - an economy can grow only if environment is preserved

It^g → 100 or ~~5~~ investment on new hostel but in older hostel, 5 rooms are not in good condition (equivalent to 10 cr) depreciation

$$\therefore I_t^n = 100 - 10 \text{ cr} = 90 \text{ cr}$$

- * I_1 always +ve
- * I_2 can be -ve
- * for an economy to progress, I_1 should be +ve.
, net addition to existing capital should be done.

Types of Investment : (on the basis of how much)

1. Business fixed Investment
2. Residential Investment
3. Inventory "

	Factor
variable labour to produce	fixed blast furnace

investment on fixed factors

(if you are into manufacturing something for investment of 1000cr, 900cr will go in fixed investment)

(but in IT industry, 90cr in buying human capital
and 10cr in building, computers, etc)

max^m growing in India, to build flats, residential sector.

stock piling activity

- any investment you make requires this
- Maruti had estimated demand of 1 lakh but makes 1.5 lakh
+10000 cars to meet into unprepared demands.
- of many kinds
 - ↳ finished good inventory (simple goods)
 - ↳ raw material " (Ferrari)
- multiplication effect - if Maruti loses 1 customer

13.02

Determinant factors of investment

$I = f(MEC, r)$ annual rate of rate interest

\downarrow marginal efficiency of capital

\downarrow annual rate of return on the capital invested.

It is

of MEC and annuity

How to derive MEC and σ ?

- MEC is that discount rate which equalises the present value of the prospective yields with the initial amount of capital invested.

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

$i = \text{MEC}$

present value of
prospective yield

C_t : initial amount of
capital invested

R_1 - " " in 1st yr

C_1, C_2, \dots

R_2 - " " in 2nd yr

Total investment in an economy = investment made by each company
o only motive of business is profit and maximisation of profit

* how much a company will invest will depend on MEC it will get. / MEC guaranteed in that

They do evaluation study

1) Feasibility study - studies about feasibility of place, time

company has to invest where there are no protests.

eg- Amrawati Tata Nano's investment was ^{based on} wrongly conceived feasible place as Kolkata.

* how many players are there in the market, whether you can compete or not at that time.

Once company has chosen time & place, it has to penetrate into the market. (eg- Tio)

MEC is nothing but annual/ internal rate of return. (IRR)

They derive MEC and compare with σ .

initial cost

- one time investment

1000 Cr

- on labour

- on machinery

- on land acquisition

recurring cost

- company will bear every yr

(i)

Once the company has decided initial cost, it will ~~check~~ / form the life of project. (ii)

- will depend on

nature of competition

nature of product (technology)

there was no innovation by Maruti because there was no competition.

But today, ~~the~~ every 2 yrs it launches one with the ~~product~~ of foreign investors.

(ii) net

Annual rate of ~~ret~~ return should be known.

Let's say it has estimated 5 yrs life.

2018	19	20	21	22	expected net annual returns
R_1	R_2	R_3	R_4	R_5	
500	600	700	800	900	

G	G	G
300	300	200

- has invested in 3 installments

Taking 2018 as reference year

Face value and ~~time~~ more time value of money



Keeps on changing due to

deflation / inflation, interest, risk

value of money ↑

Growth typically refers to growth of income.

If I simply add R's and compare with C's, I may be under or over estimating.

because time value of money in 2018 may not be same as in 2019. 500 of 2018 may not be same as 500 of 2019.

① If I earn 1 lakh this year, next in 1 yr time, there has been 10% inflation on every product. So, I will have less basket with 1 lakh. This means money value has decreased.

Money has an exchange value.

② Suppose inflat = 0. Then I can buy same basket with 100. But today's 100 may be 110 if interest is 10% p.a. and I have deposited it in bank.

Future value = present value + (present value) × interest

$$FV_1 = PV(1+r)$$

$$FV_2 = PV(1+r)^2$$

$$PV = \frac{FV_2}{(1+r)^2}$$

$$\begin{aligned} \text{real interest rate} &= \text{nominal interest rate} - \text{inflation} \\ &= 10\% - 5\% = 5\% \end{aligned}$$

• If we keep interest and inflation as zero (as in Japan), but risk factors are important.

e.g. - corruption, probability of loss.

$$\text{risk adjusted rate} = 5\% - 3\% = 2\%$$

If suppose we have all 3, we can estimate 'r' as risk-adjusted, inflation-adjusted interest rate (discount rate)

Suppose, I have taken 2019 as ref. yr.

$$\left(\frac{500}{1+r} + \frac{500}{(1+r)^2} + \frac{700}{(1+r)^3} + \dots \right) - \left(\frac{1500}{1+r} + \frac{300}{(1+r)^2} + \dots \right) > 0$$

for any undertaking project, it should be greater than.

Instead of doing this, if in limiting case I make the difference as 0. and calculate i : MEC

i is the cost for those who borrow money

i is the interest for those who get return

$i > r$ - accept project

$i = r$ - neutral

$i < r$ - reject.

New thing in this model.

- The belief that lower interest means higher investment was removed.
- Keynes ~~said~~ said what matters is MEC.
Why Jammu is less industrialised than TN despite of interests being same?
- depends on MEC guaranteed.

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05.03.18

America's GDP - 16 trillion dollars

India - < 3 " "

India's GDP this quarter $> \text{₹}9$. due to

\rightarrow increase in consumption demand (due to income)

eq^m income : saving must be equal to investment

$$\left. \begin{array}{l} S = I \\ Y = C + I \end{array} \right\} \text{conditions of } \text{eq}^m$$

$$Y = C + S \rightarrow \text{identity}$$

I is more with more MEC.

Given $\rightarrow C = 20 + \frac{3}{4}Y$ $\rightarrow I = 80$ C remains a stable fn of Y

For eq^m, $S = I$ or $Y = C + I$

$$Y = 20 + \frac{3}{4}Y + 80$$

$$Y = 160$$

Y less/greater than this is not eq^m.

$$\text{or } \begin{cases} S \\ = I \end{cases} = 20 + \frac{3}{4}Y$$

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

$$Y = 160$$

Total demand = income

Now, suppose $Y_A = 200$

one viewpoint - economy will automatically attain eq^m

2nd " - you need to intervene to " "

$$\text{then, } C = 20 + \frac{3}{4} \times 200 = 170$$

$$I = 80$$

$$C + I = 190 \neq Y$$

Demand \neq supply

\Rightarrow situation of overproduction

1st viewpoint:

In 2017-18, $Y = 200 = S$, $D = 190$

$(D < S - \text{sign of recession})$

so, suppliers in loss (more inventory piling up)

recession

next In 2018-19, supply reduced to $Y = 190$

② C being stable fn of Y and I unchanged.

$$C = 20 + \frac{3}{4} \times 190 = 162.5$$

$$I = 80$$

$$D = C + I = 182.5$$

Given $\rightarrow 0 = 20 + \frac{3}{4}Y$
 $\rightarrow I = 20$

C remains a stable fⁿ of Y

For eq^m,

$$S = I \quad \text{or} \quad Y = C + I$$

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

$$Y = 160$$

Y less/greater than this is not eq^m

or $\begin{cases} S \\ = I \end{cases} = -20 + \frac{3}{4}Y$

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

$$Y = 160$$

Total demand = income

Now, suppose $Y_A = 200$

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Demand \neq supply \Rightarrow situation of overproduction

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so, suppliers in loss (more inventory piling up) recession)

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② C being stable fⁿ of Y and I unchanged.

$$C = 20 + \frac{3}{4} \times 190 = 162.5$$

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$$D = C + I = 182.5$$

In macroeconomics, no one will tell what is eq^m income but it is only through iterations and gradual learning that eq^m is attained in due course.

First yr, the diff was 10

now the diff reduces to 7.5

Similarly, if next yr, S reduced to 182.5, the diff will further reduce.

\Rightarrow Producers will not keep on producing 200, they'll reduce it to decrease the diff. (no intervention)

say, $Y_A = 120$

($D > S$ - sign of prosperity)

but prosperity doesn't come without cost, it comes with inflation

Limbabue - inflation rate > 1 lakh %.

Russia after disintegration with soviet union - 1000%.

$$C = 20 + \frac{3}{4} \times 120 = 110$$

$$I = 20$$

$$\therefore D = 130 \neq Y$$

Year after year, if this happens, the inventory gets cleared. The suppliers do not know eq^m demand but they'll assume it 130 & and increase supply.

$$C = 117.5 \quad I = 20$$

$$D = 137.5$$

350

4

97.5

20

Hence, producers will keep on increasing supply. Gradually, the difference will decrease.

Though it takes time, it is automatically corrected without intervention.

$Y=160$ || to reach eq^m , you increase production, [majority]

$Y=200$ || to reach eq^m , you decrease production -

Recession

$Y=160$

Which country doesn't want to achieve more income?

- more ~~on~~ income, more output means more ~~for~~ employment

The major ^{global} problem is population ↑ and they're 2 demands -
we feel they are to be fed & employed.

both possible only with 2nd case (more supply)

targeting 200 as new eq^m income

Our concern is more production. How to achieve eq^m with this?

Keynesian Multiplier :-

$$160 \quad Y_1 = a + bY_1 + I_1 \quad = 20 + \frac{3}{4}(160) + 20$$

new income Y_2

for it to be eq^m income

$$\Delta Y = 40 \quad 200 \quad Y_2 = a + bY_2 + I_2 \quad = 20 + \frac{3}{4}(200) + 20$$

For this to happen, our autonomous investment must increase.

$\Delta Y = 40$ cannot be achieved without change in I ($\Delta I = 10$)

Keynesian proposition :

Particularly at times of recession, government intervention must be there. to change autonomous investment and the impact on income is always more than impact on aut

Govt / private investment must be for profit. Except for ~~for~~ ^{too} India example, govt. invests for profit.

-onomous investment, and this impact depends on MPC.

Private investors will not invest more during recession times as profit is not guaranteed. Hence,

some

Induced investment is induced by ~~is~~ factors. At times of more income or like profit, income recession, we cannot have profit, so autonomous investment must increase because it has no determinants done by govt.

As per the proposition,

$$\Delta Y = K \Delta I$$

↓
multiplier

Change in Y must be equal to multiplier times change in autonomous investment.

How to get K ?

$$Y_1 = a + I_1 = a_0 + b Y_1 + I_1$$

$$Y_2 = a + b Y_2 + I_2$$

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

$$\Delta Y = b \Delta Y + \Delta I$$

$$\Delta Y = \frac{\Delta I}{(1-b)} = K \Delta I$$

$$\therefore K = \frac{1}{1-b}$$

K is nothing but reciprocal of MPS.

Higher MPS (lower MPC), lower is K .

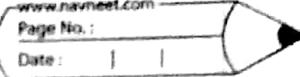
$$0 < b < 1$$

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

Greater the MPC, higher is K .

$$\text{Here, } b = \frac{3}{4}, \quad K = \frac{1}{1-\frac{3}{4}} = 4$$

$$\cancel{X} \cancel{40} = 4 \times 10$$



When Keynes said auto. investment is ~~for~~ investment in public utility. He didn't visualise that it can also be ~~done~~ through private investment. ~~too~~

Because in countries like US, roads, infrastructure already present. Where to invest then? Keynes told ~~not~~

War economy - followed by USA (selling ~~to~~ weapons)

→ But today private sector is also participating in ~~this has to be done~~ ^{anyhow} ~~anyhow~~

Ques: CSR - corporate social responsibility. ~~autonomous~~ ^{investment}

Till today, we believed ~~for~~ govt. sector ~~can~~ has to invest in education, healthcare.

• public utility programme undertaken by private companies.

Tatas & Birlas are front runners in establishing CSR - eg IISc Bangalore, BITS Pilani

Today, it is mandatory for public & private sector invest ~~at~~ 2-3% of their income to in CSR activities

• An economy can rise over time with autonomous investment.

How do we say change in income is k times change in aut. investment

Let's say budget ~~allocates~~ ^{allocates} 10,000 cr ~~for~~ for construction of roads major utility programme carried out in India

This obviously would imply generation of income of 19000 cr injection

~~1000 cr initially will be~~ this would be distributed to wages, profit, rent,.

Tata, LNT part of economy not of govt.

Let $MPC = \frac{1}{2}$ $\Rightarrow \frac{1}{2}$ of this income will be spent on demanding consumer goods.

Next yr, if no in

$$b = \frac{1}{2}$$

Period	ΔI or	ΔC (in ₹)	ΔY	$\Sigma \Delta Y$
I	10,000	5,000	10,000	10,000
			general ⁿ of capital goods	↑ increase of a decreasing rate
			this amt is income for owner of capital goods.	
		shows demand of consumer goods like 5,000 which means there will be atleast 5,000 in product of consumer goods.		
II	—	2,500	5,000	15,000
	no further injection		general ⁿ of income through consumer goods	
			product they become owner of this income	
III	—	2,500	17,500	
			how much was consumed earlier will be generated in next time period	
IV	0	0	0	20,000

One time investment of 10,000 cr ₹ will lead to increase in income by 2 times if $MPC = \frac{1}{2}$ after a certain time period.

⇒ Period can be month (year will not take a long time)

Ideal situation - faster you implement the project, more is the income generated \downarrow faster
implies how fast money is changing hands, generating more employment.

creating a demand doesn't take time, but supply takes its own time
 actual true demand & desire demand

Indian economy fails to achieve the target for allocated money in that time period due to various reasons. "Allocated" next yr will depend on how well you utilised it this yr.

flow change in investment \rightarrow temporary
 \hookrightarrow permanent \rightarrow Dynamic - today's impact tomorrow

affects:

static - everything

If ΔI is one time / temporary

happening

Assume: $C = 20 + 3/Y$ $I = 20$ $Y_e = 160$ today

supply

2017-18 Economy in eq^m demand

Period	C	I	ΔC	ΔI	Total spending	\geq Total output	$Y - \Delta Y$	Realised I	Planned I
Eq ^m	140	20	0	0	160	$= 160$	$160 - 20 = 20$		

in all possible sense

$Y = C + I$, $S = I$, planned I = realised I
 govt decided Total output = Total spending

2. 140 20 80- 10 170 > 160 $160 - 20 < 30$

here, we
 take
 dynamic

Disc^m

$D \geq S$

can change
 instantaneously $S_t = D_{t-1}$

D_t can be equal to S_t - any time period

but $S_t = D_{t-1}$ (depends also on what-
 kind of good we're talking about
 - crops take 2 mnth time (6 months))

Realised I = planned I + unplanned I

Actual I what you actually plan
 140 20 = 30 + (-10)

demand is more means
 - there is decrease in
 inventory stock.

3. 140 20 7.5 0 167.5 < 170 160 10 22.5 > 20

All that is not demanded
 will go to inventory

4. 140 20 5.6 0 165.6 < 167.5 160 7.5 21.9 > 20

5. 140 20 0 0 160 = 160 100 0 20 = 20

demands supply
 \uparrow is driving demand to \uparrow

(1) k times ΔI

= sum total = 40

γ will reach 200 because $\gamma = 3/4$

$$k = 4$$

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If ΔI is continuous / permanent

Consumption demand
Investment demand

$$C = 20 + 3/4 \gamma I$$

$$I = 20$$

γ production $\gamma_e = 100$

Period	C	γ	I	ΔC	ΔI	Total	\geq Total	γ	ΔY	Married? Realise?
(At eqm) I.	140		20	-	-	160	$= 160$		160	-
(Seq II everywhere)	140		20		10	170	> 160		160	-
II.	140		20		10	170	\geq Total	$S = 160 - 140 = 20$	30	$= 30 - 20$
III.	140		20	7.5	10	177.5	\geq Total	$I = 30$	27.5	$= 30 - 22.5$
IV.	140		20	13.12	10	183.12	\geq Total	177.5	160	17.5
V.	140		20	20	10	190	\geq Total	183.12	17.5	30
VI.	140		20	30	10	180	\geq Total	190	40	30 = 30

Gradual rise in income until become eqm. income ↑ at + rate

In both case, multiplier operated but in diff ways

earlier, increase in income is temporary, growth rate of income \rightarrow to $t+t$, it will still be 100

2nd case, Permanent jump to an increase in income, we can't go back.

If you do not continue to make investment, you will go back to prev income

Growth rate $160 \rightarrow 170$

$160.5 \leftarrow$ -ve growth rate

Compared to prev yr, still a growth rate but -ve

It doesn't help economy realise a permanent ΔY .

growth rate

2005/6

5.6

→ 9.4%

→ 5.0%

why?

become UPA II was regimmed
at the time of policy paralysis
- no bold step taken.

Maintaining growth is a challenge.

- because we could not maintain injection.

One of the loopholes in Indian economy is lack of infrastructure.

no good roads, airports, etc.

public investment

You cannot invest only on warheads to make economy grow but
you need to consumer goods, capital goods.

Economic welfare vs. economic growth

building, roads improves digging, recreating roads
quality of life.

One is sustainable case, other is not.

But no one has seen 't'

But what is imp is we attain equilibrium.

Let in about 20 yrs, it reaches 199.99. Means if you
go adding 10, 10, ..., you are guaranteed an increased income

to zero.

If ΔI is temporary

1. $\Delta Y_1 = \Delta I$

2. $\Delta Y_2 = \Delta I = b \Delta Y_1 = b \Delta I$

3. $\Delta Y_3 = \Delta I = b \Delta Y_2 = b^2 \Delta I$

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

 b is a fractⁿ b^{t-1} will fall

gradual decline

If ΔI is permanent

$\Delta Y_1 = \Delta I$

$\Delta Y_2 = \frac{10}{1-b} + b \Delta I$

$\Delta Y_3 = \frac{10}{1-b} + \frac{10}{1-b} b + b^2 \Delta I$

$10 \quad 7.5 \quad 5.6$

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

sustainable

$$\Delta Y = K \Delta I \rightarrow (a)$$

This model has something else to suggest

if not only (a), but change in any

$$Y = C + I + G - \text{govt purchase}$$

consumptⁿ
Investment fⁿ

$$G = a_3 + b_3 Y \quad C = a_1 + b_1 Y \quad I = a_2 + b_2 Y$$

$$0 < b_i < 1$$

(i) Start with a "situation" when $I = a_2^{=20}$, $G = a_3^{=10}$ (no induced component, exogenous fⁿ (slope = 0))

$$C = 20 + 3Y, \quad I = 20, \quad G = 10$$

To attain eq^m, we use

$Y = C + I + G$, so we get eq^m income suppose, no take to change?

now, not just investment change but any investment will increase the income to multiplier times change in

Suppose 20 of C ↑ to 30, & G also increases means $\Delta Y = K \times \Delta I$ (increase in autonomous investment

there can be as many multipliers as no. of investors.

$$\begin{array}{c} G + C \\ \hline S + I \\ 1 + g \\ = 10 \end{array}$$

will lead to

If you open economy, it will add 2 more multipliers - export, import (leakage) negative

$$\boxed{\Delta Y = K \cdot \Delta D_a}$$

(2)

• non of the slopes are non-zero, then $K = \frac{1}{1 - b_1 - b_2}$

more no. of b we have, more is the K.

Income can rise ~~or~~ if there is increase in autonomous demand

or " " K
= ,

Capital Budgeting / Investment Project Management

Undertaking an evaluatⁿ study of a project

How a company decides to invest on a project?

- it involves an evaluatⁿ study

There are 2 types of studies

- pre- evaluatⁿ

- post - " (to see that whether all that was planned is realized or not) (will not be talked here - done every year)

Govt. plans its investment on educatⁿ, health deficit budget - govt. will plans to spend 5 lakh, income is 5 lakh.

It may not be possible to realize all.

So, a proper evaluatⁿ is reqd.

↳ find out source of money (share, bond or borrow)

↳ how much will be returns

↳ life of project

↳ how much is the capital reqd.

↳ how much is cost of raising fund.

If you to borrow 10,000

↳ this is the investment & a interest to be given is additional cost.

↳ return > investment - realized

Steps taken :

Processes:

1. To estimate the amount of capital required for the project and determine its source
2. To derive net cash flows over the life of the project

3. To apply suitable discounting and non-discounting methods of evaluation.

1. A project can be anything, need not be newly made.
like multi estimated life of a project to be 5 yrs but then increase in demand caused project to be extended.

- extension of project life

- expansion of previous project (from north east to south,
India to ~~for~~ abroad)

This requires initial investment. Requirement depends on how big the project is. - ~~to~~ manpower, machine, training cost.

In course of progress:

Sources could be internal / external

↓
Returned

earnings

external

↓

Bank

↓
Stock market

Distributed profit ~~claim~~
among -
is called dividend.

Remaining with the
company will be returned
earnings

requires
collateral

security,

payment of

interest on

loan

Bond market

↓
share
of a company
has permission
to
each ind. share
holder is a legal

primary market

(IPO - initial
public offer)

on one day

2. secondary -

sell & buy

member of the

company

get profit/loss when
company has " / loss

someone's gain

is other's loss.

A certificate, whoever buys has to pay money
the company gives interest (more than bank)
10 people invest.

Bank loan is not transferable. (no secondary market)

Bond is transferable.

loan issued in my name, I've to pay it. Liability can't be transferred.

You are declared as defaulter or you declare yourself as bankrupt (Aiscel)

which

Maturity period - the time after, you will sell the bonds to company

Bond price - accountable money

10000

$1000 + 1000 + 1000 + 1000 + 11000$

10% interest every year. interest + principal

I can sell my share at current rate of ~~for~~ interest

high or, low

$\frac{1000}{1+r}, \frac{1000}{(1+r)^2}, \dots, \frac{11000}{(1+r)^5}$

Company can decide the ratio of debt- and equity.

(60 : 40)

2. Net cash flows :

Let proj has life of 5 yrs., initial capital to

be invested = 10000 or

depends on

- machinery cost $\frac{1}{(50000)}$ nature of competition

- reorganisation cost $\frac{1}{(30000)}$ innovation of competitors.

new manpower, $\frac{1}{(30000)}$ - how much investment is made.

training - land acquisition $\frac{1}{(20000)}$

compensation to farmers

returns \rightarrow	R_1	R_2	R_3	R_4	R_5
Gross sales revenue (P.Q)	1000	1100	1210	1331	1464
(-) variable cost (assuming 30% of R)	300	330	363	399	437
(-) Fixed cost	100	100	100	100	100
(-) Depreciation (mean life)	100	100	100	100	100

over time unlike manpower appreciates over time - salary \uparrow because you become

It decided on the basis of likely cost it sets for each product

It decided by company how much it will sell every year
additional costs

3 things to subtract

recurring cost - fixed, variable

values with output

ind. of amt of revenue company gets
(electricity, rent)

regardless of volume of business, O-bills are same

Depreciat"

flat depreciat" (if life of machine 5 yrs - it has lost all
its ability at the end of 5th year)

Profit before tax	500 cr	500	-	-	-
- Tax (25%)	125 cr	-	-	-	-
Profit after tax	375	-	-	-	-
+ depreciat"	475	-	-	-	-

Why depreciat" added?

to incentivise

profit faded & subtracting depreciat" to boost them spent on
man infrastructure, otherwise tax would A.

Set 500 cr

+ salvage value (50 cr)

(end value of machinery) -

has 2nd & hand value and by selling it, company

If salvage value is 50, every yr depr. is 90 gain

- recovery of working capital (20 cr)

keeping some inventory, raw materials in hand

more skilled (with experience)

3. Methods we can apply:

methods

non-discounting

↓
pay back period (PBP)

II, discounting

↓
net present
value method
(NPV)

↓
internal rate
of return
(IRR)

↓
profitability
index
ratio
(PIR)

a) PBP

initial capital (C_0/c), annual return (R_1, R_2, \dots)
{ comparison b/w the two gives which one is better}

- we do not consider profit gathai time under "consideration" to find out whether the project is selected

Company has A & B proposals. It will select that project which reaches break-even earlier.

~~earlier~~ ~~return~~ (return = recovery. (return = cost))

	R_1	R_2	R_3	R_4	R_5
say A and life = 4 yrs	200	300	400	500	
$C = 500$	-B	100	300	600	1000

life = 6

We select A because it takes 2 yrs

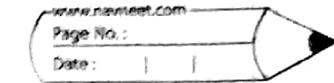
But B is more profitable

Disadv - a flawed method, but every company likes to apply it

→ we do not consider life of project

→ hence, we do not " profit we get from it, hence we may end up taking less profitable project

→ projects which give more project profit has more gestation period, unlike IT where we only need one (e.g. IT computer, man short gestat)



In India, we do not take risks to wait for longer period, hence not attracting more investment. Most of the new players are in IT. But this happens because countries like China will be chosen because in India, as govt changes, policies change (digging out older projects).

In China, govt is stable. Therefore Investors can even rule out early recovery, they only will think of profit, longer life, less risk. Investors not fascinated with change in govt.

Ans:

1. So, in India, any company will want to collect returns as fast as possible with fear of changed policies.
2. If company waits for 10 yrs, they cannot take up other project companies like to diversify activities. If Reliance's ROI is at least other projects will be at par profit. Quicker they get back money, they can quickly invest in other projects.

Second: We are simply adding R_1, R_2, \dots . We need to find present value of future returns. $\frac{R_1}{1+r}, \frac{R_2}{(1+r)^2}, \dots$ (taking ratios but still, we can end up taking non-profitable projects.)

II(a) NPV:

we compare the present value of inflows with the present value of outflows.

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

= present value of cash inflows - present value of cash outflows.

C_t can be weighted cost.

Let $C = 10000$ Cr

debt : equity \equiv bond : share ratio

Let 60 : 40 \Rightarrow 6000 Cr : 4000 Cr

Cost of raising capital 15% : 12%

If we take 13.5%, we are wrong.

We must give 60% ~~10%~~, 40% weightage to these
(*) calculated by weighted avg of these above
costs with inflat* & risk adjusted values

dividend value estimation

NPV > 0 — accept project

NPV < 0 — reject

NPV = 0 — neutral

It means no profit, no loss

What will the company do?

— It can deposit the money in bank & get interest

— Company can choose either but more possibility
of the undertaking a project.

Eg - TCS has no project in hand. It gets proposal from
US. Company evaluates & finds $NPV = 0$. But it has
no other projects without this project. Also all
fixed cost (salary) has to be incurred. If it takes
it, salary's cost can be paid by Returns. At least ~~year~~
company is not at loss.

— better for already established companies.

b) IRR

— is itself a discount rate

$$\text{IRR} \Rightarrow \sum \frac{R_t}{(1+i)^t} - \sum \frac{C_t}{(1+i)^t} = 0$$

Decision rule : $i > r$ — accepted $\Rightarrow NPV > 0$

$i < r$ — rejected $\Rightarrow NPV < 0$

$i = r$ — neutral $\Rightarrow NPV = 0$

We have same propositions.

simultaneous

Say, we have two mutually exclusive (cannot select both) projects A & B

	NPV	IRR (greater than 8%)
A	100	12%
B	120	10%

B has more NPV can be due to more C. initially.

- NPV approach easier for long period.
- It is time neutral, IRR estimation - longer the time period we can have fluctuations in data set, this will lead to estimating multiple IRR. then we'll have to find best / average hence, this makes it complex.
- NPV leads to better results due to more profit for more gestatⁿ period than IRR.

Assumptⁿ in IRR & NPV - return from the re-investible amount is same as the return from the investible amount.

Investment - initial (100000)

$$R_e = R_1 + \text{return from } R_1$$

No problem with NPV method, but IRR is overestimating

disadv of NPV

- more NPV could mean more initial cost / capital investment
- Optimisatⁿ of capital is not done. which is a -
- hence rather than finding NPV alone, we should take

$$\frac{NPV}{C}$$