

ECONOMISTS

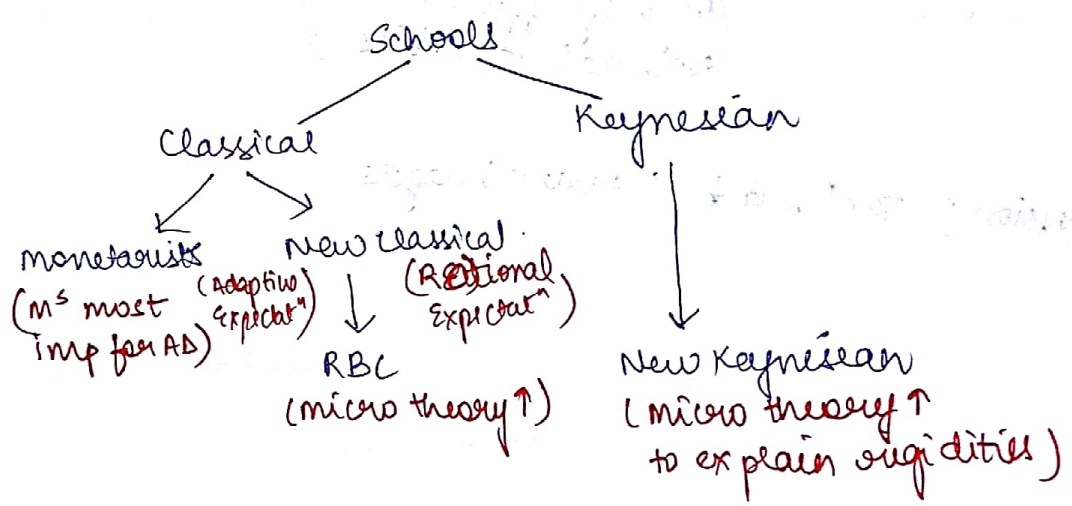
Mercantilists  
Classical: Adam Smith (Wealth of Nations) JB Say  
 David Ricardo  
 JS Mill

New Classical: Alfred Marshall (Principles of Eco)  
 Cambridge version of GTM } Pigou (Theory of unemployment)

Keynesian: JM Keynes (General Theory of Empt, Int, Money)  
 1930s 48 depression  
 Tobin, Modigliani, Solow

Monetarists: Friedman

New Classical: Lucas 1970s when ↑ inflat & unemp<sup>t</sup> both  
 Sargent, Wallace  
 Robert Barro



MACRO: AD = sum of all dd for a given output of p by each buying sector of economy: Household, businesses, govt., foreign purchasers  
 AS = Total of p firms will supply at each value of agg. price.

**CLASSICAL MODEL**

Agg. supply side

Agg. Demand side

**Labour Market**

**Goods Market**

**Money Market**

Labourer: Dd

labour market

labour supply

No role AS:

x govt. x trade

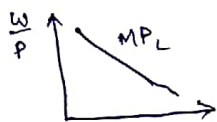
Always gives AD

• PC  
max profit

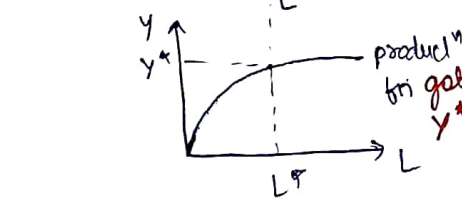
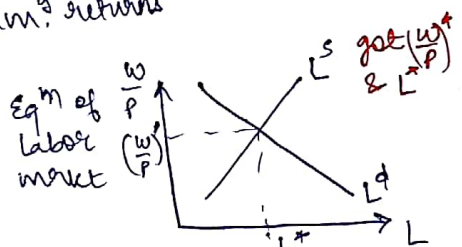
$MP_L \times P = W$   
(benefit of 1 extra labour) = (cost of 1 extra labour)

$MP_L = \frac{W}{P}$  = real wage

$MP_L$  gives dd fn



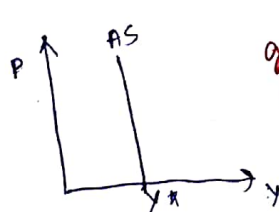
downwards as law of dim. returns



$PF = f(L, K)$

assume tech, K fixed in short run

Agg ss curve (w/ y fixed)



blw leisure & work. Cost of leisure = foregone income

$y = \frac{W}{P} (24 - l_s)$



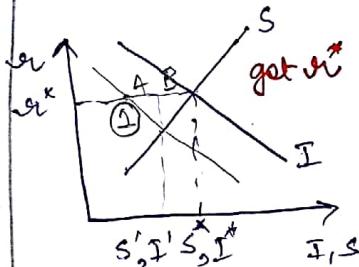
assume no backward sloping (SE > IE)

identities

output  $y = C + I$   
goods goods

Real income  $y = C + S$   
goods goods

$\Rightarrow I = S$   
How to ensure  $I = S$ ? capital market or bond market  
Both fn of  $r$   
so  $I(r) = S(r)$



• If  $r > r^*$ ,  $S > I$   
So investment will hv to ↑ so downward pressure on  $r$ .

• If  $I$  shifts left w/ of poor inv climate etc (low profit expectations) then at  $r$   $S > I$   
 $\Rightarrow$  downward pressure on  $r$   
so  $Inv^t \uparrow$  by A, saving  $\uparrow$  by B to reach new Eq<sup>m</sup>

money market

Fisher:  $M \bar{V} = P \bar{Y}$  — ①

( $\bar{V}$  velocity const institutional factors)

( $\bar{V}$  const in classical)

Cambridge

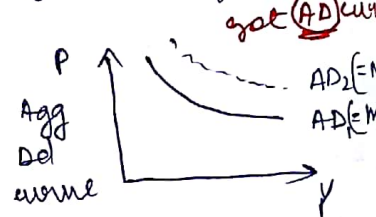
$M^d = k P \bar{Y}$  (k = const)

$M^s = M^d$  (proportion of income u want to hold for transactions)  
 $\Rightarrow M^s = k P \bar{Y}$  — ②

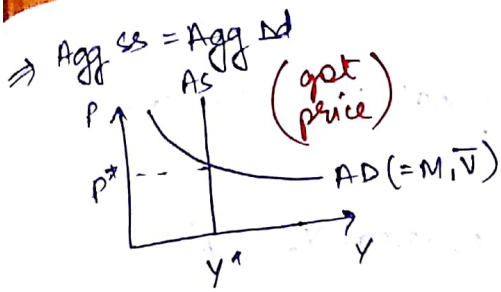
[if 2 same  $\bar{V} = \frac{1}{k}$ ]

$\Rightarrow$  Money determines price level

if  $M^s \uparrow \Rightarrow$  too much money chasing too few goods.  $\bar{P}$  is fixed, so price  $\uparrow$





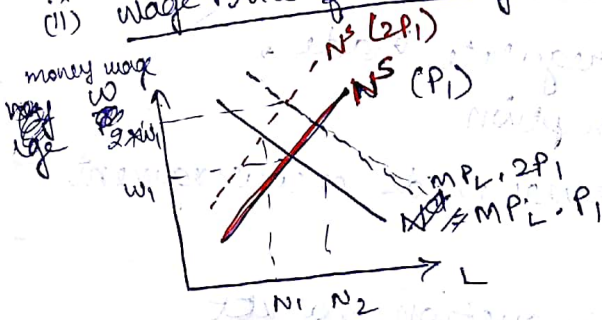


(for a given  $M_1$ )

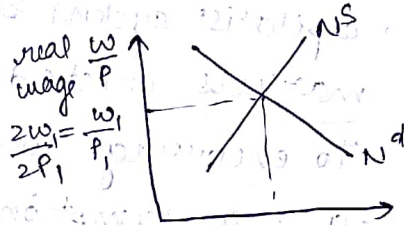
② How full emp<sup>t</sup> ensured 2 main assumptions

(i) JB say law: Never be deficiency of dd  
 Even if  $Inv^t$  & saving then also works.  
 Income ↑ don't mean we spend all & create dd (like JB said)  
 we will save a part (sort of leakage). BUT this will be  
 equal to  $Inv^t$  (through  $v_i$ ) which is like injection. So  
 net result no deficiency of demand

(ii) wage price flexibility



⇒  $(w/p)$  fixed quickly adjust



if  $P_1 \rightarrow 2*P_1$

Dd shift right

SS shift left

$N_1, N_2$  excess dd for labour

⇒ will clear when wages ↑ to  $2*W_1$

so as  $w \uparrow$ ,  $P$  also ↑  
 s.t.  $(w/p)$  const

if dd ↓, then prices alone fall (not production) to make business profitable, wages are cut (not emp<sup>t</sup>) ∴  $w/p$  remain same

③ Factors influencing ~~AS~~ AS? Determinants of  $P$  & emp<sup>t</sup>? Exogenous supply

Preferences b/w income & leisure -  $L^S$

- Stock of Capital
- State of Technology
- Productivity of labour -  $L^D$
- Populat<sup>n</sup> growth -  $L^S$  shifts left

of P Input

- change in input price - land, lab, cap, imported resources
- change in tech, productivity
- Govt. regulation, taxes subsidies

(not dd side) also (no nominal variables like  $M^S, P$ )

Classical dichotomy (Nominal var. don't affect real var.)

vice versa not true though

### ④ Neutrality of money?

If  $u \uparrow$   ~~$M^s$~~   $M^s \Rightarrow$  no change in  $u$  (nominal  $Inv^t$  & saving adjust to keep real interest rate same)

So  $\uparrow M^s \Rightarrow$  only prices  $\uparrow \Rightarrow$  no effect on real  $Y$ , emp<sup>t</sup> (inflation)

Drawback since inflat<sup>n</sup> is big issue.

⑤ Fn of money in classical - only transactions/means of exchange  
no intrinsic value, gt a vel.

### ⑥ classical attack on mercantilists

(i) C  $\rightarrow$  Imp. of real factors. They determine wealth

M  $\rightarrow$  Bullionism (wealth determined by stock of precious metals)  
If  $M^s \uparrow \Rightarrow$  ad for goods  $\uparrow \Rightarrow$  stimulate product<sup>n</sup> & emp<sup>t</sup>

(ii) C  $\rightarrow$  free market, absence of state control as self adjusts

M  $\rightarrow$  Capitalist system but state action needed to ensure  
markets existed, regulate trade,

To encourage consumption

JS mill: consumption never needs encouragement

Keynes  $\rightarrow$  Contractual

⑦ classical view of labour market is auction market

labour assumed to be traded in market & is continuously in Eq<sup>m</sup>. All participants decide based on real wages.

Ass: (i) w-p flexibility

perfect info  
prices

to all market participants abt market

### ⑧ Policy implication

(i) fiscal Policy: No need, govt no role

(ii) monetary Policy:  $M^s$  affects inflation so careful  
stable  $M^s$  for stable price

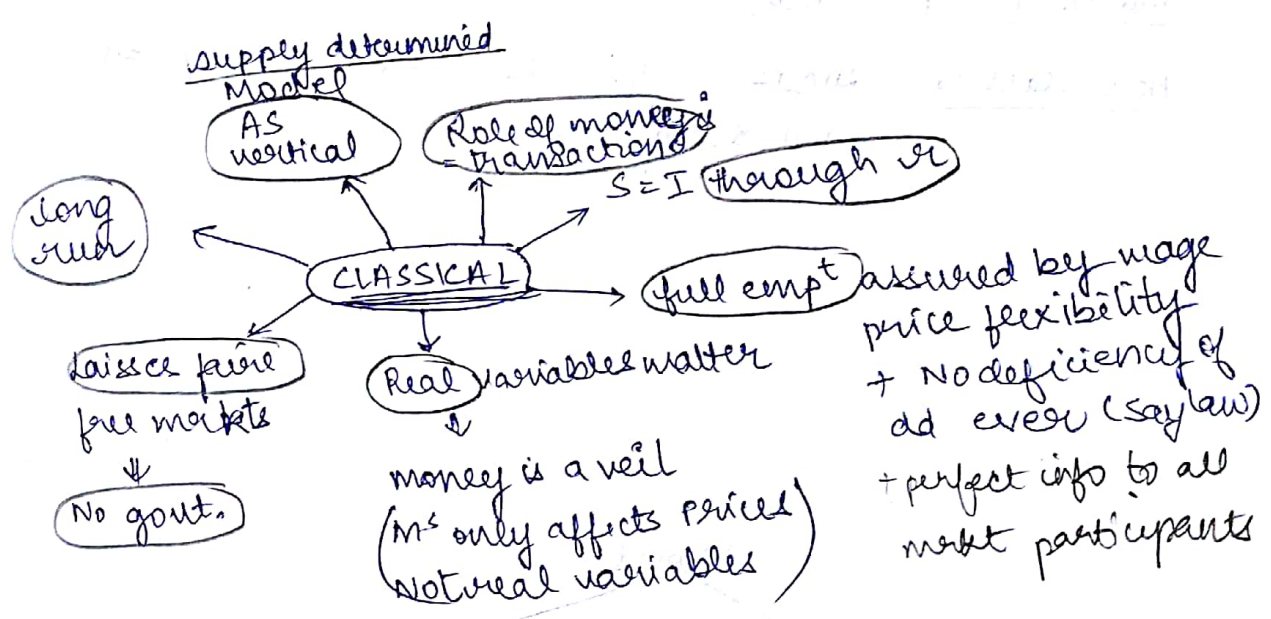
though all this will not affect real  $Y$ , emp<sup>t</sup>



⑥ Interest rate determined by forces of productivity & thrift

Invest<sup>c</sup> :  $r$  is cost of borrowing  
 depends on profit expectation etc  
 if  $r \downarrow$  more projects will become profitable

Saving : thrift  
 individuals trade off of current consumption for future consumption  
 if  $r \uparrow \Rightarrow$  terms of trade more favourable



⑦ If depression? Tax ↑,  $G \downarrow$  Balance budgets

# KEYNESIAN

- Short run
  - Only goods market
  - Underutilized capacity early Keynesian so Agg  $SE$  horizontal
- ⇒ Demand determined model

Total output (GDP) =  $Y$

Good market  $\Rightarrow$  Agg Dd = E =  $C + I + G$

Eq<sup>m</sup>  $\Rightarrow Y = E$

$$Y = C + I + G$$

$Y$  also Nat<sup>l</sup> income  $\Rightarrow Y = C + S + T$

$\Rightarrow C + I + G = C + S + T$

$$I + G = S + T$$

new things in Keynes

• consumption fm new

$C = C_A + cY_D$   $0 < c < 1$

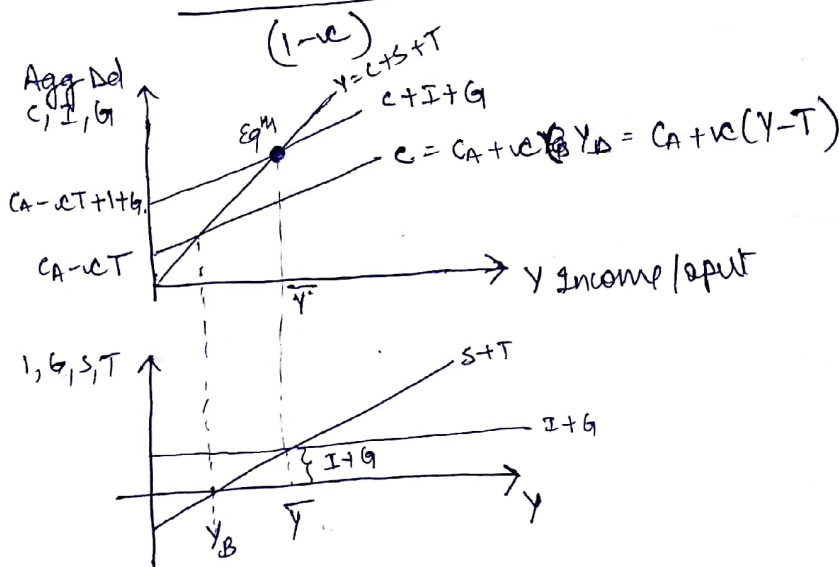
let  $I = I_A$ ,  $G = G_A$

( $A$  - autonomous independent of income)

$Y = C_A + c(Y - T) + I_A + G_A$

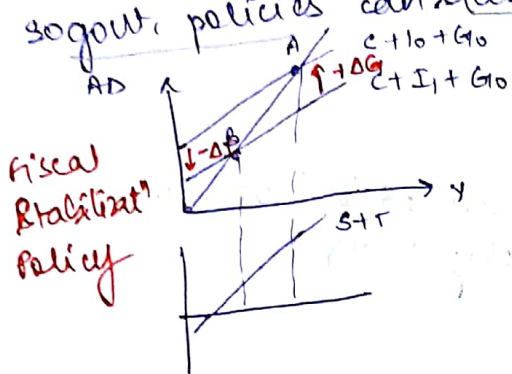
$Y(1 - c) = C_A + I_A + G_A - cT$

$Y = \frac{C_A + I_A + G_A - cT}{(1 - c)}$





- $C$  is stable fn of  $y$ ,  $i$  is stable
- $Y$  changes coz of autonomous components especially  $I_0$  so  $I$  unstable
- $G$  and  $T$  could counteract effects of  $I$  so govt. policies can stabilize economy.



initially at A  
 Now  $I_{0v} \downarrow$  to  $I_1$   
 so falls at B.  
 to stabilize govt  $\uparrow G$  to  $G_1$   
 so that we are back to A

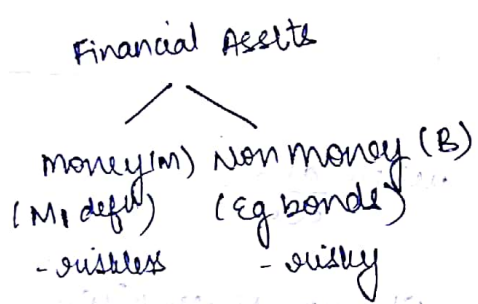
④ How money affects ~~the~~ income?  
 via  $i$ ,

$$M^s \uparrow \Rightarrow i \downarrow \Rightarrow I \uparrow \Rightarrow Y \uparrow \Rightarrow NT$$

Role of monetary policy in Keynesian framework

⑤ Keyne's theory of interest rate

(Money market introduced new earlier was only goods market)



$$\Rightarrow \text{wealth} = B + M$$

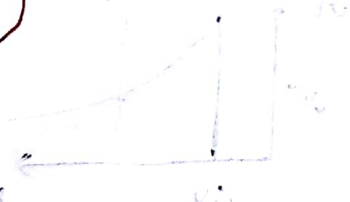
How to find  $i$

Equate ss dd of bonds  
 ie  $E_{q^m}$  in NM market

Equate ss dd of money  
 ie  $E_{q^m}$  in Money market

→ Keynes chose this method

$E_{q^m}$  in 1 market  $\rightarrow E_{q^m}$  in other



# ⑧ Keynes Theory of money Demand

// classical was BTM  $\frac{M^D}{P} = hY$  //

- Demand for money is called **liquidity preference**  
(Keyne's terminology)

- 3 motives of holding money

(i) Transaction dd

(ii) Precautionary dd (subsumed in i or both +vely to Y)

new (iii) speculative demand



If  $r$  above some fixed normal  $r$  in mind of investors  
 $\Rightarrow r$  expected to  $\uparrow \Rightarrow$  bond prices expected  $\uparrow \Rightarrow$   
 so invest in bonds so  $M^D$  less.

- Total dd for money

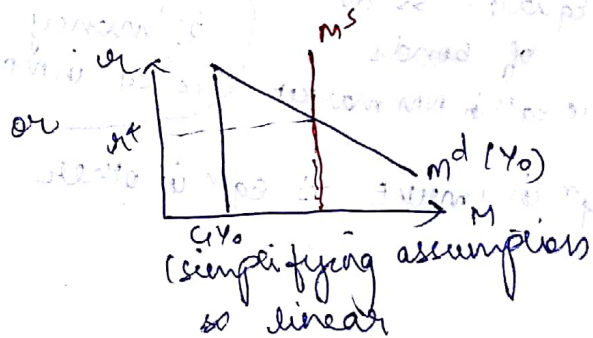
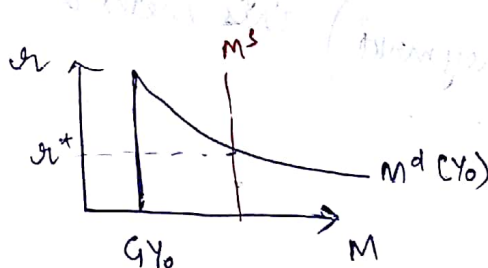
$$M^D = L(Y, r)$$

$$= \underbrace{c_1 Y}_{\text{transac}} + \underbrace{d(r)}_{\text{speculative}}$$

where  $\frac{dd}{dr} < 0$

or  $M^D = c_1 Y - c_2 r$  simplifying assumption that  $d(r)$  is linear

$c_1, c_2 > 0$

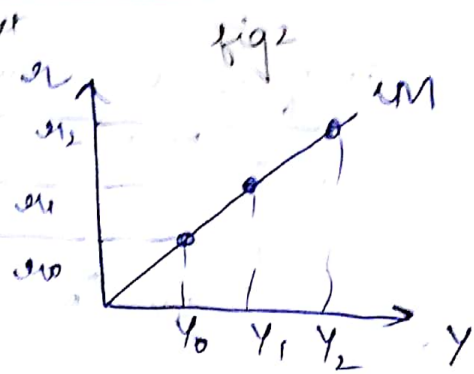
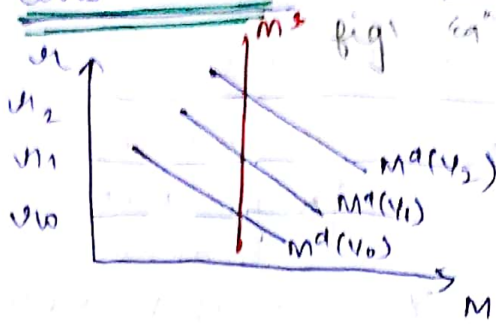




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Construct LM

$M^d = M^s \Rightarrow M^s = C_1 Y - C_2 r$  LM eqn



Keep ring Y so  $M^d$  shifts right

Factors affecting slope?

$M^d = C_1 Y - C_2 r$

slope of  $M^d$

fig 1  
 $\frac{dr}{dM} = \frac{1}{C_2}$

for LM slope:  $\frac{dr}{dY} = \frac{C_1}{C_2}$  fig 2

(i)  $C_1$  affects

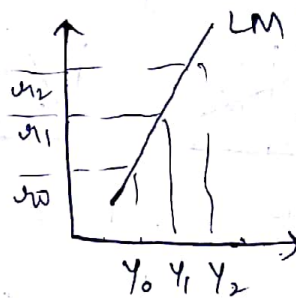
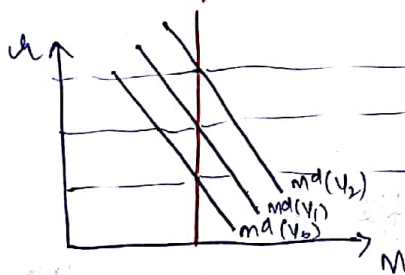
$\uparrow C_1 \Rightarrow \uparrow$  slope of LM i.e. steeper

(ii)  $C_2$  affects

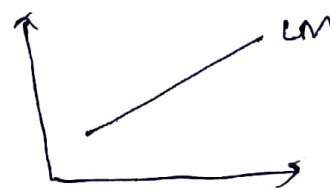
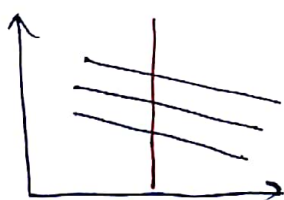
If  $M^d$  steep  $\Rightarrow$  LM steep [both  $\propto \frac{1}{C_2}$  same]

// [steep means interest elasticity low  $\Rightarrow$  u change r so much but M change by lil] //

If  $M^d$  steep or interest elasticity of  $M^d$  low

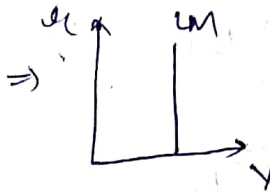


If  $M^d$  less steep or int elasticity of  $M^d$  high



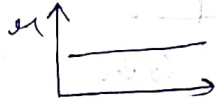
2 special cases

(i) If  $c_2 = 0$  i.e. interest insensitive (interest elasticity = 0)



classical case  
[Keynes had  
to see as extra  
which is now 0]

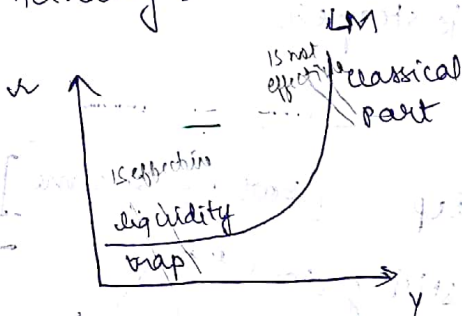
(ii) If  $c_2$  v. large i.e. interest elasticity v. large



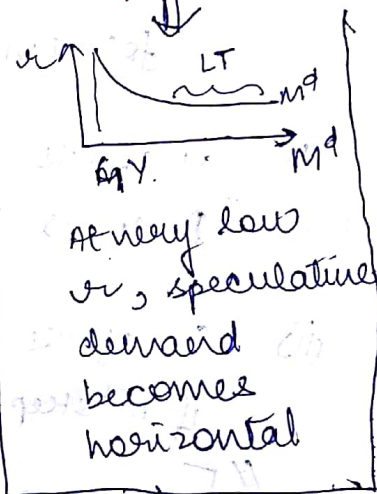
liquidity trap

Carly Keynes  
believed this  
is where we  
are i.e. MP  
not too useful

Actually:

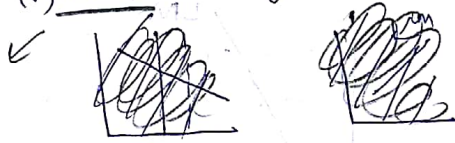


Here MS ↑  
under money  
policy doing  
to ↓ r.  
but already  
r this  
low so  
won't  
fall  
further  
∴ MP ineffective

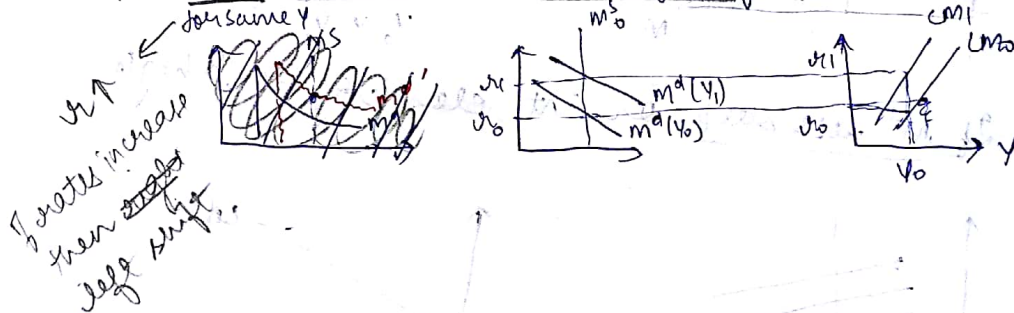


Shifts in LM

(i)  $M^s \uparrow \Rightarrow$  for same  $Y$  now  $r$  lower  $\Rightarrow$  LM shifts right



(ii)  $M^d \uparrow \Rightarrow r \uparrow \Rightarrow$  LM shifts left



↑ r  
↓ money supply

↑ r  
↑ rates increase  
then shift  
left shift



⑨ Construct IS function

$$Y = C + I + G$$

$$I + G = S + T$$

Assume  $G = T = 0$

Eq<sup>n</sup> in goods market

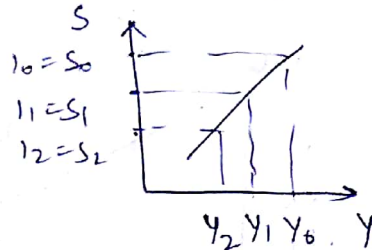
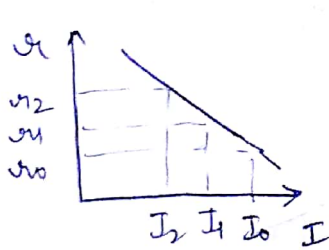
$$I(r) = S$$

[New Investment. fun introduced]

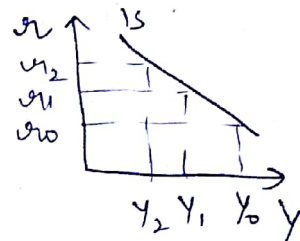
see next page Investment

Saving

IS schedule



=>



$$Y = C + I(r) \quad \text{IS eq}^n$$

$$Y = C + cY + I(r)$$

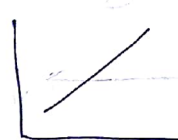
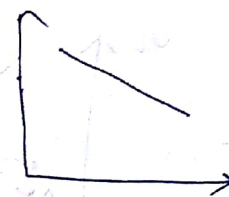
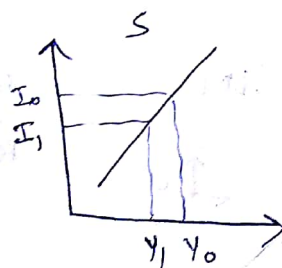
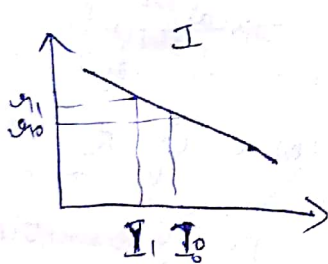
$$\frac{dY}{dr} = \frac{1}{1-c} \frac{dI}{dr}$$

Just remember & draw acc.

$$\frac{dY}{dr} = \frac{dI}{dr} \times \frac{1}{1-c} \text{ so } \frac{dY}{dr} < 0$$

Factors affecting IS slope

- (i) Investment steep => IS steep
- " flat => IS flat



(ii) depends on  $\frac{1}{1-c}$  (multiplier)

Shift IS

Include govt. sector. Eq<sup>n</sup>  $I + G = S + T$

Eq<sup>n</sup> in goods market

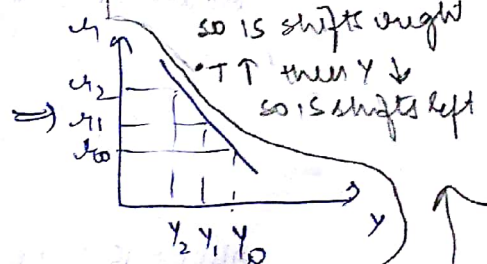
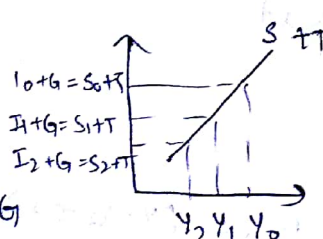
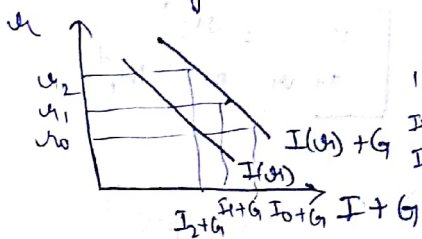
$$Y = C + c(Y - T) + G + I(r)$$

$$(1-c)Y = C + cY - cT + G + I(r)$$

For same  $r$  if

$G \uparrow$  then  $Y$  increases so IS shifts right

$T \uparrow$  then  $Y \downarrow$  so IS shifts left



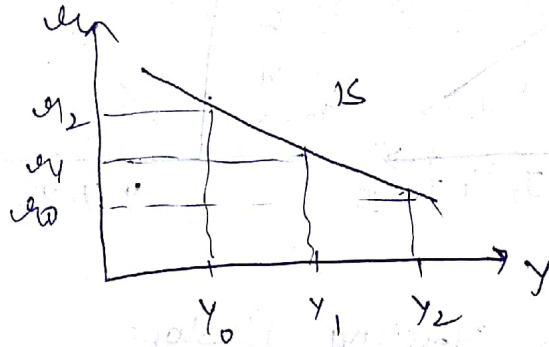
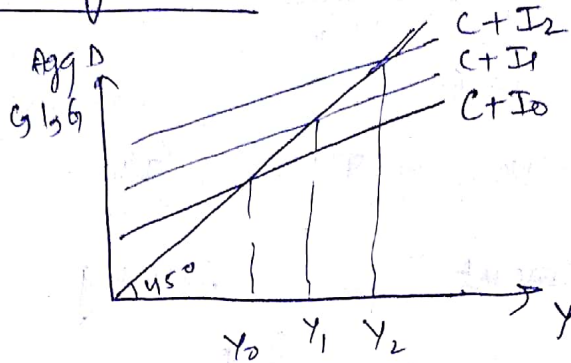
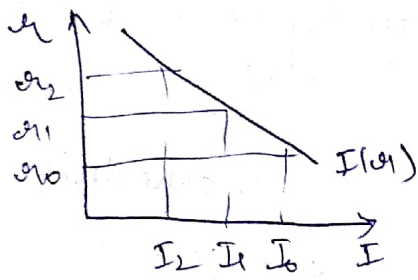
income ↑  
↑ IS shift right

(i) if tax ↑ => S+T shifts left => IS shifts left

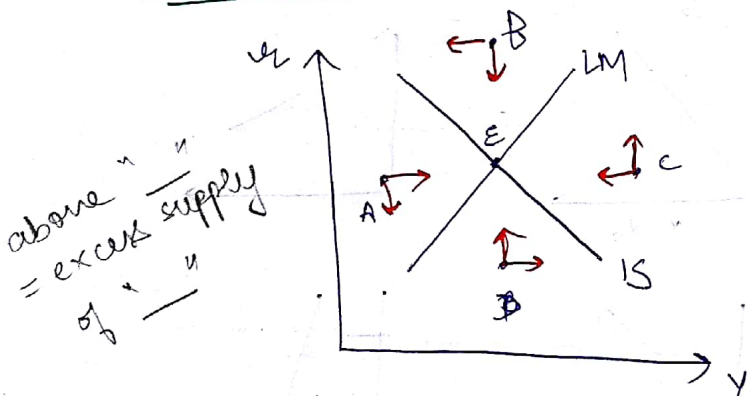
(ii) if G ↑ => IS shift right

(iii) if autonomous part ↑ => IS shift right (Investment, consumption)

# Another way of constructing IS



## ⑧ Combined IS-LM

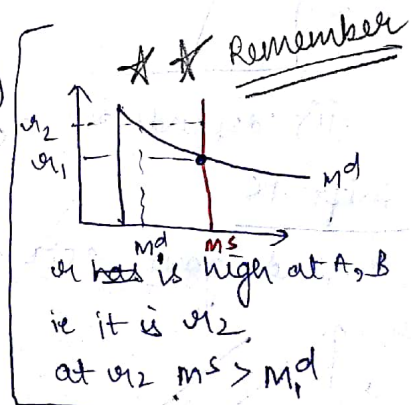


For IS:  $Y$  adjusts  
 For LM:  $i$  adjusts  
 fiscal policy to shift IS  
 monetary policy to shift LM

above " " = excess supply of " "

Above LM: ie at A & B (or has to ↓)  
 Excess supply of money

Below LM: vice versa excess dd.



Above IS: ie at B & C (Y has to ↑)  
 Excess supply of output

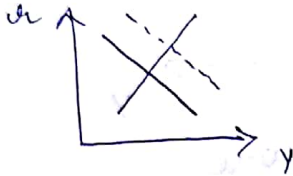
[Y is output]  
 so

Below IS: Excess dd of o/p

⑧ Policy implications

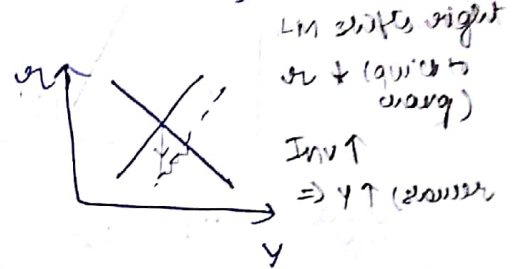
Fiscal policy:

If  $G \uparrow$  or  $T \downarrow \Rightarrow IS$  shifts right  
 $r \downarrow$   
 $r \uparrow, Y \uparrow$



monetary policy:

If  $M^s \uparrow \Rightarrow LM$  shifts right  
 $r \downarrow, Y \uparrow$

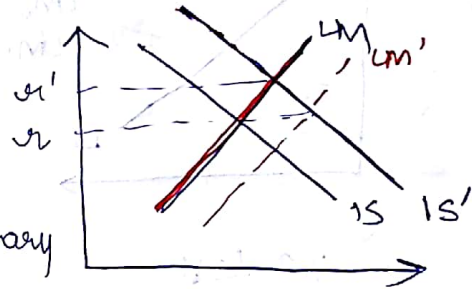


Policy Mix Interest Rate Policy (type of RRP)

We should do st  $r$  remains same if we are doing expansionary policy. coz o/w  $r \uparrow$  and then Inv will  $\downarrow$  so bad.

Eg say tax cut

$IS \rightarrow IS'$   
 $r$  increases to  $r'$

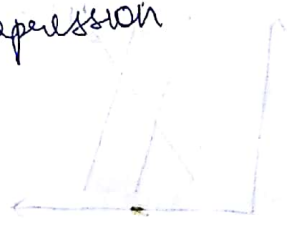
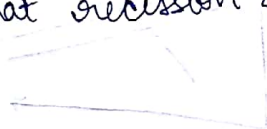


But if we do also do expansionary MP simultaneously st  $M^s \uparrow$  so

$LM \rightarrow LM'$   
 $r$  remains at  $r$

This way we prevented  $r$  from  $\downarrow$  by expansionary fiscal policy by using accommodative monetary policy  
 Passive MP (coz we did MP after FP to keep  $r$  const.)

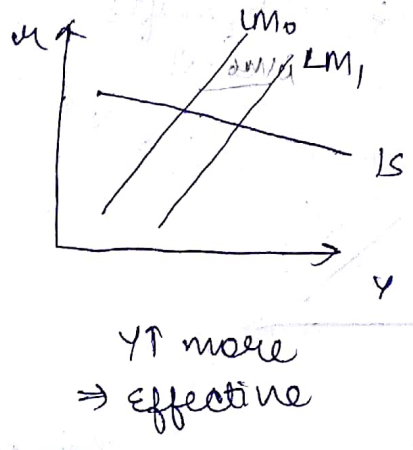
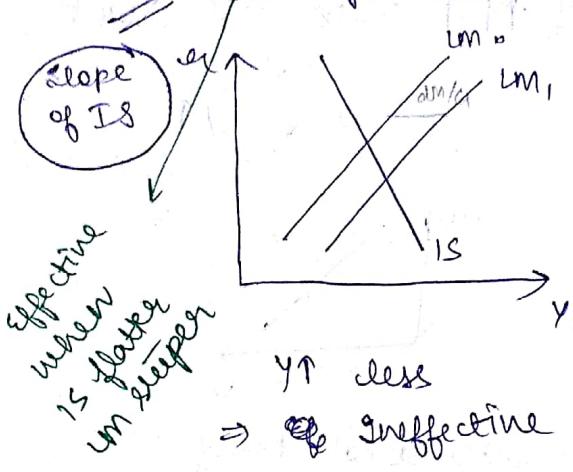
- 2007-09 GFC, MP & FP used cooperatively  
 $M^s \uparrow + G \uparrow$   
 so that recession didn't end in depression



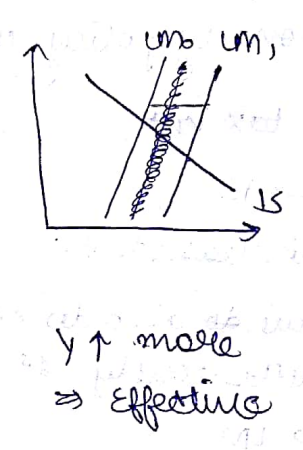
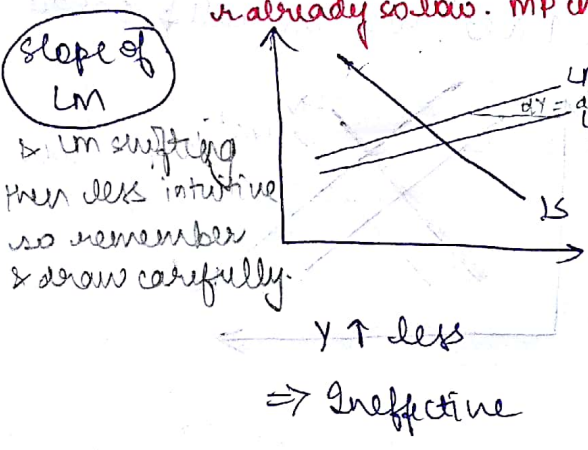


Effectiveness of MP, FP i.e. size of effect should be steeper & other flatter → for effectiveness by  $\frac{dy}{dq}$

A) Monetary Policy effectiveness (M ↑ so  $LM^0 \rightarrow LM^1$ )



LM horizontal is liquidity trap & already so low. MP ineffective

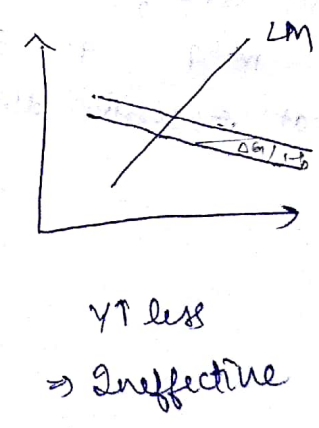
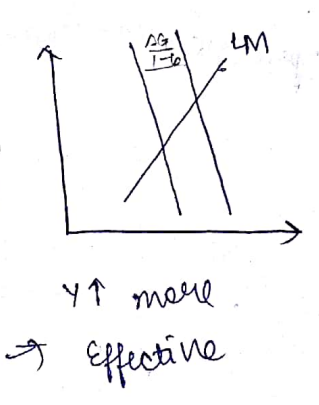


LM fn  
 $M^s = C_1 Y - C_2 i$   
 $\frac{dM}{dy} = C_1$   
 $dy = \frac{dM}{C_1}$

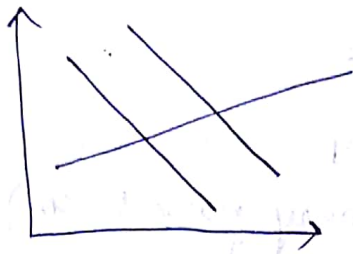
B) Fiscal Policy effectiveness

Effective when IS steeper LM flatter  
 slope of IS & IS shifting then careful

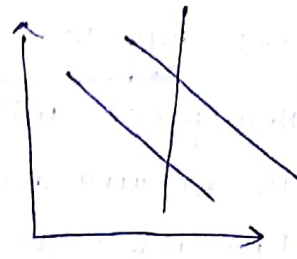
G ↑ so IS shifts right by  $\frac{\Delta G}{1-b}$   
 $Y = C_1 + c(Y-T) + G_A + I_A$   
 $\frac{dy}{dG} = \frac{1}{1-c} \Rightarrow dy = \frac{dG}{1-c}$



Slope of LM



$y \uparrow$  more  
 $\Rightarrow$  Effective

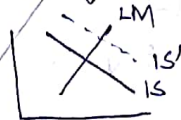


$y \uparrow$  less  
 $\Rightarrow$  Ineffective

classical case  
 LM vertical  
 govt. no  
 need to  
 play  
 (monetarists  
 use vertical  
 LM fn)

How say IS shifting right coz of  $G \uparrow$ . But how is  $G$  financed

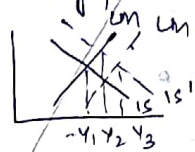
(i) Bond financed  
 (as out)



(ii) Deficit financing  $G$ . Money printed so  $M$  also  $\uparrow$  so LM also shift

$dG = dM$

Now as  $dM$  increase that much, can remain same or even fall some crowding out



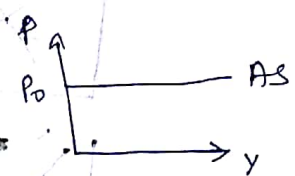
$\uparrow$  Increase in  $y$  also is more  $y_1, y_3$  instead of  $y_1, y_2$  (if bond financed)

(iii) Tax financing  $G$

Here no balance multiplier. If u calculate  $\frac{dy}{dG} < 1$  v. bad.

Assumptions IS-LM  
 In simple IS-LM, price assumed fixed.

This only when excess capacity unutilized capacity  
 $\Rightarrow$  Demand driven model



- How think in IS: ~~output~~ output = Agg Demand but what guarantees this  $0p =$  Agg supply? Ans: excess unutilized capacity so any level of  $0p$  can be produced at given price.

Keynesians think

IS steep, LM flat  $\rightarrow$  MP ineffective  
 IS flat, LM steep  $\rightarrow$  MP effective

Monetarists think



⑧ Derive Agg. Demand in Keynes

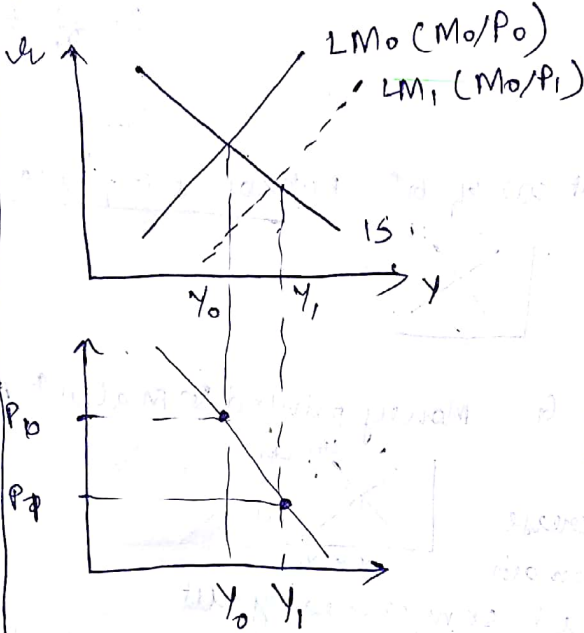
Price shifts  $\Rightarrow$   
LM shifts

- New price will be flexible
  - IS-LM will give ~~new~~ demand AD
- [Remember goods market (IS) & money market (LM) gives AD, labour market gives AS]

LM Eq<sup>m</sup>  
 $\frac{M^s}{P} = L(r, Y)$   
real money supply

---

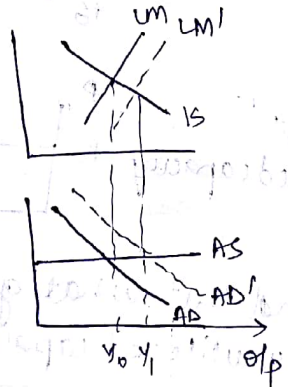
In prev. simple IS-LM, P was const so we missed writing it



~~Decrease P~~ To derive:  
Decrease P so  
LM shifts right  
Get  $Y_0, Y_1$   
Plot  $(P_0, Y_0)$  &  $(P_1, Y_1)$   
Join by line  
 $\Rightarrow$  AD curve

✓ ~~Not~~ changing P does not affect IS directly. So no shift indirectly. Yes, AS price  $\downarrow \Rightarrow$   $Y \uparrow$

⑨ why need for Keynesian AS curve?



If  $\uparrow M^s \Rightarrow$  LM shifts right  $\Rightarrow$  AD shifts right

$\Rightarrow P \uparrow$  by  $Y_1 - Y_0$

But if AS is classical type then vertical  
Then using AD of Keynes still  $OP$  is supply determined  
so classical is fundamentally incompatible with Keynes system  
cos he had AD to determine  $OP$  emp<sup>t</sup>.

$\therefore$  Need for supply side of Keynes



⑧ Derive Agg SS in Keynesian

- Use: Production function same classical  $y = F(N, K)$   
 labour market - labour dd same as classical  $MP_L = \frac{w}{P}$   
 - labour ss diff.

- Labour ss  $g(N)$

• **Money illusion**

They see nominal wage not real. They don't know price level.  
 make decision based on  $g(N) = \frac{w}{P}$   
 on expectation of price level  
 PE is usually based on past behaviour.

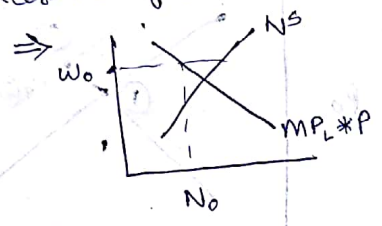
classical was  $N^S = g(w/P)$

[not  $w/P$ ]  $N^S = g(w/P_e)$  not used here coz  $N^S$  no rule

• **Contractual wage** / wage rigidity [later relaxed]  
 $w = w_0$

Over time they adjust

• Excess ss of labour



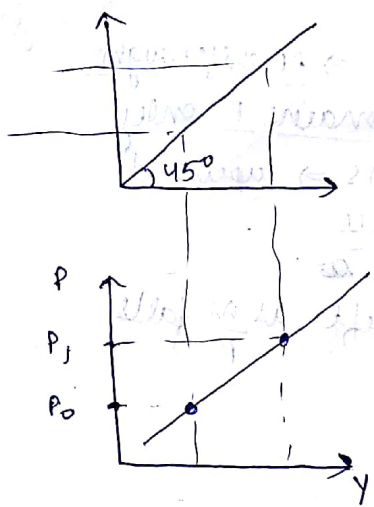
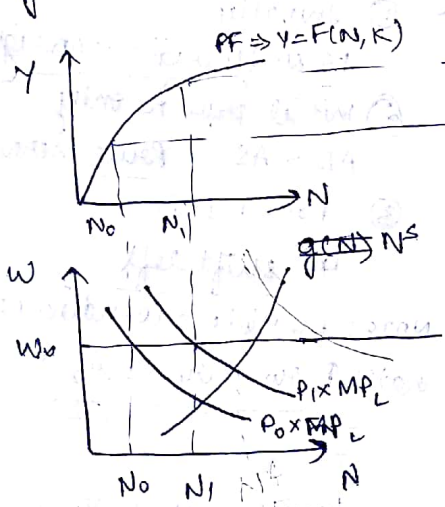
(written during G.D depression)

⇒ No will work (so labour dd determines N labour supply no rule)

2013 Paper 1 Q3(a) 1st part

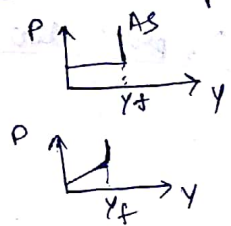
Keynes AS fn:

fixed wage Keynesian AS derivation



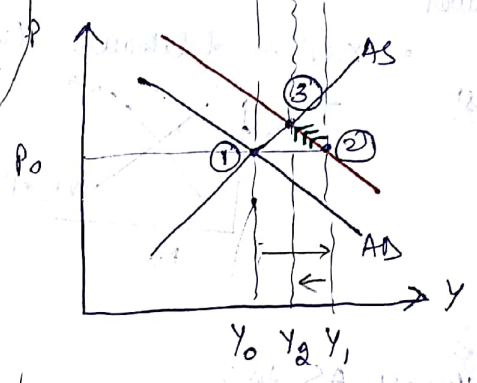
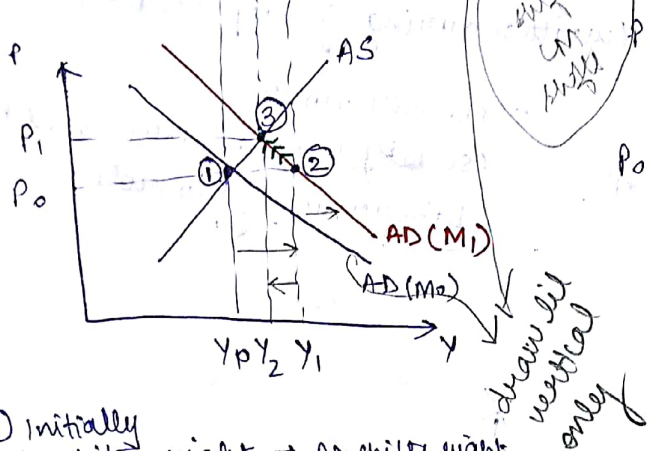
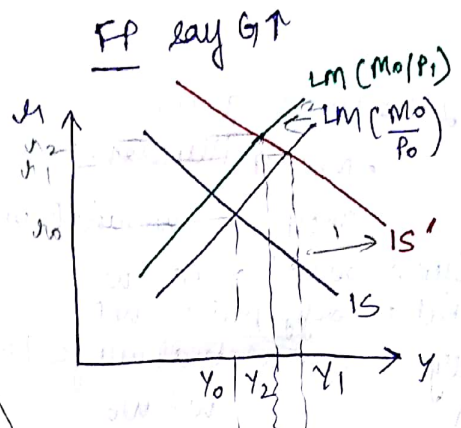
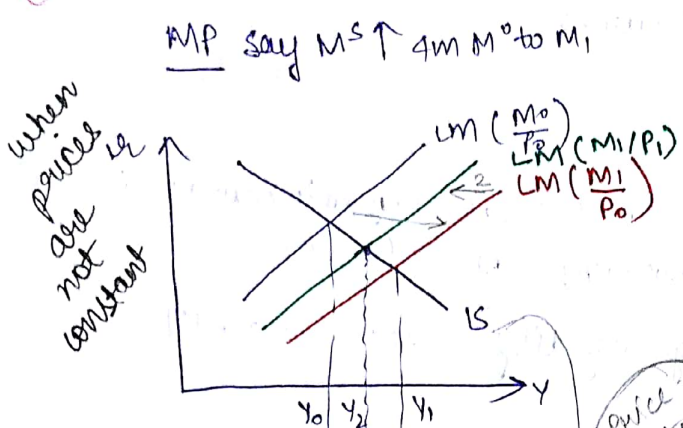
• Unemployment =  $N^S - N^D$  ↓ as  $P \uparrow$

NOTE: say  $P \uparrow$  till  $N^D \text{ (period) } > N^S$  so now  $N$  will be fixed as all employed ⇒  $y$  fixed ⇒ AS vertical ∴ Early Keynes AS:



⇒ In long term AS is vertical (like classical)

Now u have AS-AD of Keynes. Policy implications?  
shift in AD  
 - can be seen by drawing IS-LM



Price shifts  $\Rightarrow$  LM shifts  $\Rightarrow$  AD shifts

draw all vertical only

- ① Initially LM shifts right  $\Rightarrow$  AD shifts right
- ② initial price remains  $P_0$  only we have  $AD > AS \Rightarrow$  upward pressure on price
- ③ so price  $\uparrow$  to  $P_1$   $\Rightarrow$  LM shifts left as  $\frac{M}{P}$  falls

- ① Initially IS shifts right  $\Rightarrow$  AD shifts right
- ② initial price  $P_0$  only  $AD > AS \Rightarrow$  price increase
- ③ price  $\uparrow$  to  $P_1$  LM shift left

NOTE: Double counting out rates  $\uparrow r_0 \rightarrow r_1 \rightarrow r_2$

CONCLUSION:

- If simple IS-LM where prices fixed  $P$  in  $Y$  would be  $Y_0$  to  $Y_1$
- But now  $Y_0$  to  $Y_2$  so both policies become less effective
- coz as  $Y \uparrow$ , price also increase

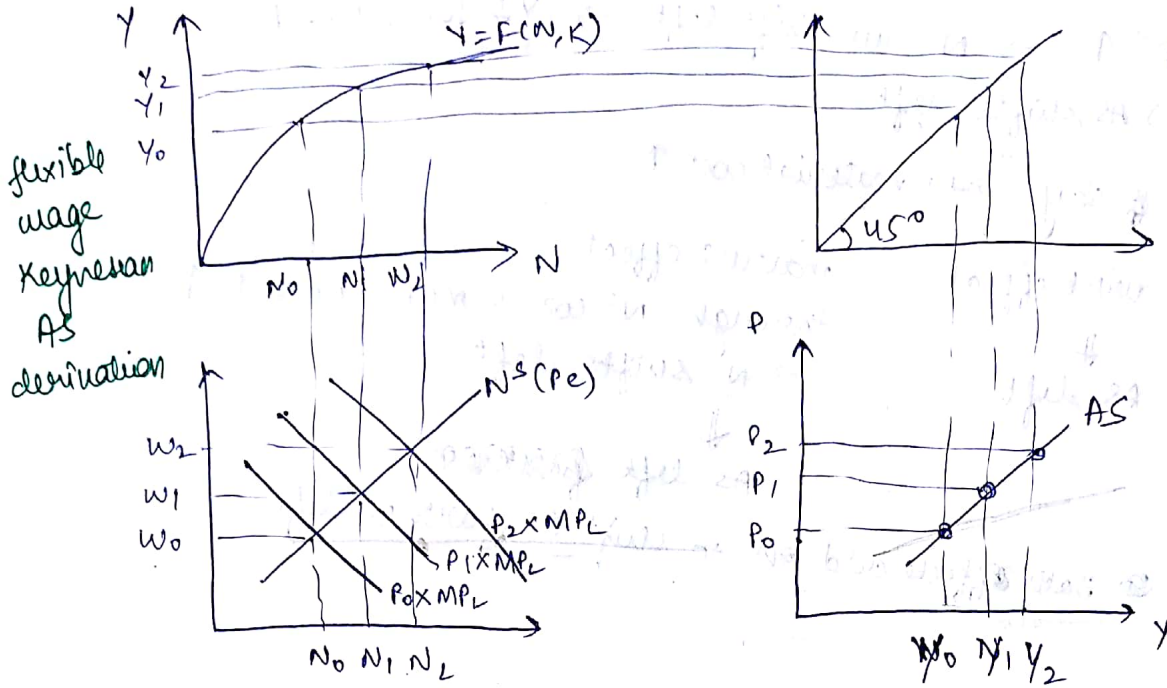
There AS was horizontal so supply no barrier to output



8) New assume money wage flexible. Then derive AS in Keynes

⇒ Now  $N^s$  also has role to play

$$N^s = g(w/p_e)$$



flexible wage  
Keynesian AS derivation

If wages rigid say  $w_0$  then  $N_1, N_2$  higher ⇒  $Y$  greater so AS would be less steep

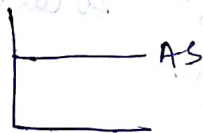
CONCLUSION:

↑ in  $o/p$  even lesser than fixed wage (which in turn was lesser than simple ISLM), why?

coz as  $o/p$  ↑ ed by ↑ ing price ⇒ wage also ↑ ing ⇒ so unit costs of product ↑ ing ⇒ so  $o/p$  not ↑ ing that much

NOTE

~~classical~~ Keynes ISLM



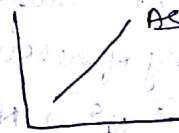
Demand determined  
Price, wage rigid

classical AS



Supply determined  
 $P, w$  flexible

Now ~~classical~~ Keynes AS



$P, w$  flexible so Keynesian now closer to classical



⑤ Shift in AS

Factors that change marginal cost  
 (coz  $P = MC$  & AS shifting say left means  $P \uparrow$  or  $MC \uparrow$  so these factors that  $\uparrow MC$  shift AS to left) cost push

Eg  $P^e \uparrow \Rightarrow N^s$  will shift left  $\Rightarrow Y \downarrow$  for same  $P$   
 $\Rightarrow AS$  shifts left

NOTE: ~~if~~ say raw material cost  $\uparrow$

direct effect

$\downarrow$   
 $AS$  left

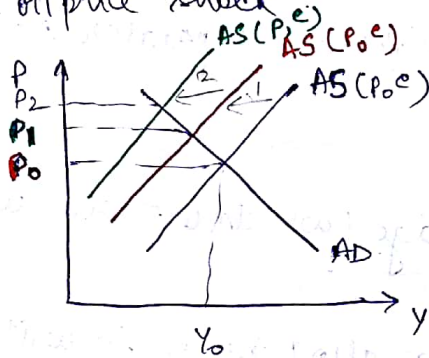
indirect effect

through  $N^s$  coz as  $MC \uparrow \Rightarrow P \uparrow \Rightarrow P^e \uparrow$   
 $\Rightarrow N^s$  shifts left

$\downarrow$   
 $AS$  left ~~more~~

Both effects add on to shift AS further left

⑥ Eg oil price shock



AS shifted left to red  
 Then wages & raw price  $\uparrow$   
 so they  $\uparrow P^e$   
 $\Rightarrow AS$  shifts further left to green

⑦ Shift of AS

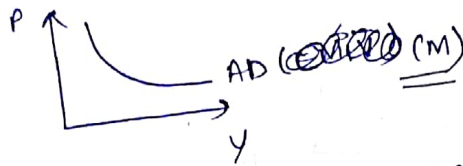
Price of inputs (done above) (wage  $\uparrow$ , AS shifts right)

- Along with AS only these shift it
- Technology  $\uparrow \Rightarrow$  Production fn shifts up  $\Rightarrow Y \uparrow$  for each price  $\Rightarrow AS$  shifts right
  - Qty of resources  $\uparrow$ . Eg ~~labor~~ population (so labor  $\uparrow$ )  $\Rightarrow N^s \Rightarrow N^T \Rightarrow Y \uparrow \Rightarrow AS$  shift right

CLASSICAL

1) Agg demand

4m STM  $M^s = PY$



Interest rate stabilizing factor  
changes in  $G, T$

2) Agg Supply

PF, labor market

lab dd  $P * MP_L = W$   
lab ss  $N^s = g\left(\frac{W}{P}\right)$



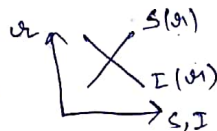
3) Policy Implication

X FP

X MP only ↑ prices no effect on real vari (OP, Empt)  
Just AD shifts up...

- supply determined  $Y, N$

- Say's law  
 $S = I$  through  $r$



- wage price fully flexible  
self correction, free market  
⇒ voluntary unemp<sup>t</sup>

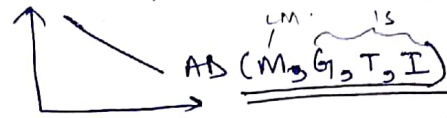
- money neutral only affects  $P$   
not real var. like  $Y, N$

KEYNES

Agg Demand

4m IS LM

$Y = C + I + G$   $\frac{M^s}{P} = f(Y, r)$  or  $M^s = \dots$   
simplifying



investment demand most unstable

Agg Supply

PF, labor market

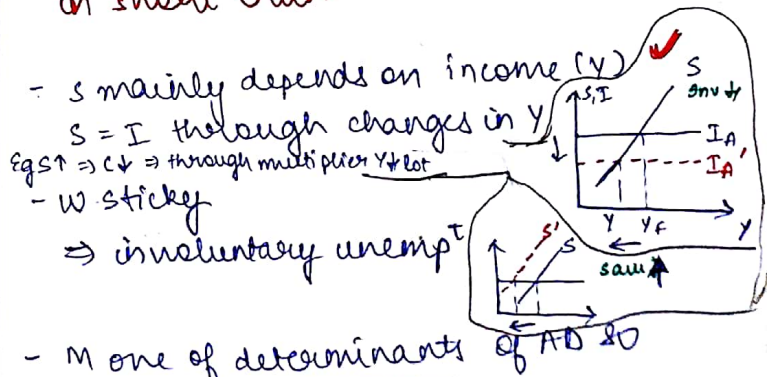
lab dd  $P * MP_L = W$   
lab ss  $N^s = g\left(\frac{W}{P}\right)$

short term imperfect info. But eventually  $P$  will approach true  $P$  so can approach full emp<sup>t</sup> (ie not ruled out)

Policy Implication

- ✓ FP  $G \uparrow \Rightarrow IS$  shifts right
- ✓ MP  $M^s \uparrow \Rightarrow LM$  shifts right

- simple / early Keynes - Demand determines data - Both AS, AD but central tenet is imp<sup>e</sup> of AD in determining  $P, emp^t$  in short run



-  $M$  one of determinants of AD so affects  $Y, N$   
( $M^d$  determines  $r \Rightarrow I^d \Rightarrow Y, N$ )



### Depression explanation

Op, N also fell but classicals said it wasn't

Friedman:  $\text{coz } M^s \downarrow$

Price  
fall  
demand  
wage

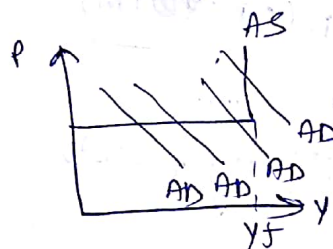
### Inflation

$M^s \uparrow$  then Price  $\uparrow$

$$(MV = PY)$$
$$\left( \frac{\Delta P}{P} = \frac{\Delta M}{M} \right)$$

$\downarrow$  Inv<sup>t</sup> demand as MEC  $\downarrow$   
(expected profits  $\downarrow$ )

AD  $\downarrow$  by multiplier effect



when AD  $\uparrow$  ed beyond  $Y_f$



MONETARIST

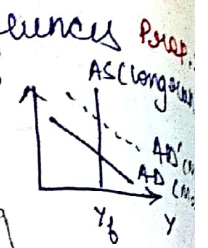
⑧ 4 propositions

Agg dd is mv  
LM Steeper  
IS flatter

1)  $M^s$  is the dominant determinant of  $NI$ .

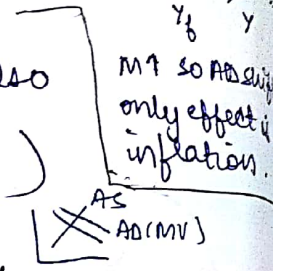
2.) long run:

Money does influence real var. of  $p, \text{empt}^t$ ; influences  $P, \text{empt}^t$ .  
AS is vertical  
only price level is in long run  
can show by PC also only price level is in long run (next chapter)



3.) short run:

$M^s$  influences real var of  $p, \text{empt}^t$ ; price also  
( $p, w$  not fully flexible  $\therefore p, \text{empt}^t$  affected)



4) private sector stable

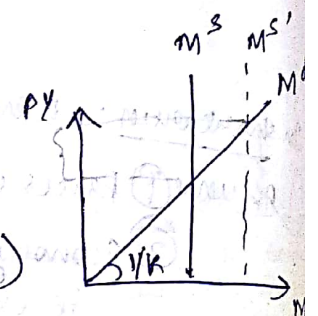
Govt. policies make economy instable

⑨ Reformulation of STM Proposition 1

$$m^d = L(p, y, \alpha_B, \alpha_E, \alpha_D)$$

$$m^d = k(\alpha_B, \alpha_E, \alpha_D) PY \quad (\text{close to Cambridge})$$

$$m^s = m^d$$

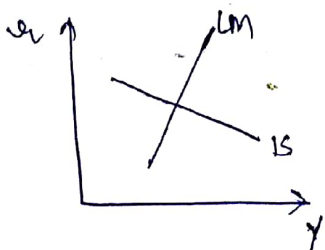


$m^s$  determines  $NI$   
Income (PY)

If  $\alpha_B, \alpha_E, \alpha_D$  have little effect on  $k$  hence on  $m^d$   
So now this version of ST of money turned into theory of Nominal income!

$k$  approximated to be const

⑩ In terms of IS-LM?



Prop. 3

LM very steep

$\Rightarrow$  interest elasticity of money low

IS very flat

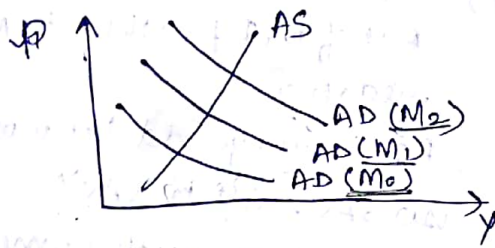
$\Rightarrow$  AD very sensitive to int rate

Intvt very sensitive to int rate

Monetarist Keynesians tend to think of non money assets as only bond so they think we can affect AD only by changing Intvt. Narrow interpretation of changes in  $r$ .  $r$  plays more imp role in AD.

// note: for ISLM we assume price const, but monetarists don't make this assumption so deficient //

⑧ In terms of AS AD Prop 3 (short run)



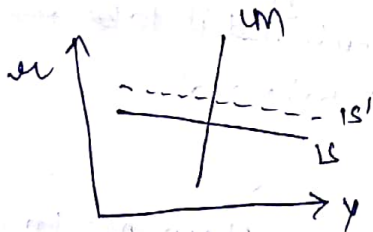
As we ↑ M ⇒ AD shifts right

In Keynes AD was dependent on  $M, G, I$ . Money is one of several factors  
~~monetarist~~ only M

// AS not talked abt //

⑨ Policy implication

FP: GT and financed by selling bond [NOT printing money as then M will ↑]



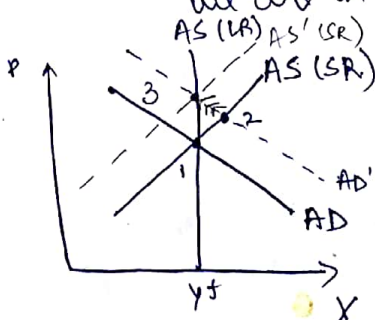
Very ltl effect  
 coz Inv't very sensitive to  $r$  (is flatter)  
 so crowding out

// [if financed by printing money then not ineffective coz  $M^s \uparrow$ ]

MP:  $M^s$  changes ⇒ strong effect on  $Y$  BUT there is a lag  
 and we are not very good at predicting the size & time lag of any shock so MP should be by rule not discretion coz fear of inflation  
 It is "too imp to be left to central bankers"!

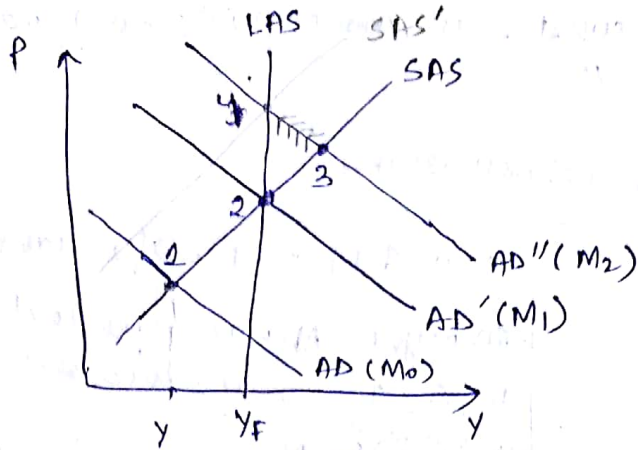
[ → Mon.: consider print. sector as stable, shock absorbing  
 Keynes: Print sector unstable, shock producing  
 discretionary MP, FP

Early ones didn't consider MP effective as they thought we are in liquidity trap so LM too flatter.



If economy at full emp. if  $M^s \uparrow \Rightarrow AD \rightarrow AD'$   
 at 2  $Y_f$  and  $P_f$  in short run  
 with some time lag wage ↑ shifting AS to AS'  
 So now at 3, same  $Y_f$  but  $P \uparrow$  so inflation





Say we are at 1  $Y < Y_F$   
 RBI wanted to  $\uparrow M$  so that we reach  $Y_F$   
 If  $M \uparrow$  to  $M_1$ , then at 2 good  
 But if  $M_1 \uparrow$  further to  $M_2$  then reach 3  
PT so wage dd by workers  
so SAS shift to SAS'  
 so reach 4 with some time

Instead of  $1 \rightarrow 2$  we reached  $1 \rightarrow 4$   
 inflation higher  
 $\therefore$  monetarists don't want active MP

Reasons for non discretionary:

- 1) variable time lag: change in policy brings desirable effect only after a lag. Friedman calculated it to be 6-24 months - 2 yrs. Extremely difficult to know
- 2) wrong target (eg graph also)

Friedman suggested following a rule like allow  $M^S$  to grow at rate equal to  $g_p$  of  $CPI$ . This way  $g_p$  of  $CPI$  will absorb extra money created w/o inflation or recession

[critique by Keynesian economists:  
 $v$  is unstable so  $\uparrow M^S$  will not ensure  $g_p$  of  $CPI$   
 Agg dd (which acc to monetarists is  $MV$ )





New classical

Policy ineffectiveness proposition

Systematic MP, FP that change AD will not affect  $p$  &  $emp^l$  even in short run

Rational Expectation hypothesis

Expectations formed on basis of ALL available info + <sup>to make forecasts</sup>  
 used intelligently to understand policy implications on variable trying to be predicted  
 // Adaptive expectation was that only past prices will be used - monetarists approach //

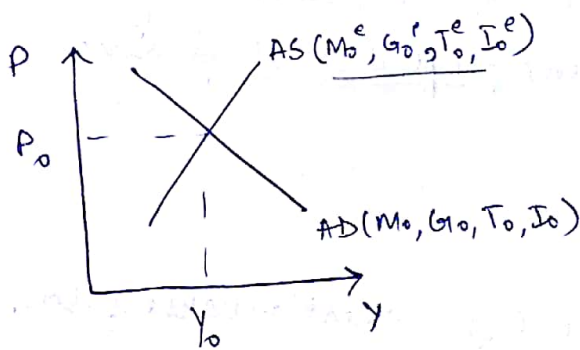
Model:

Ass: Rational expectation

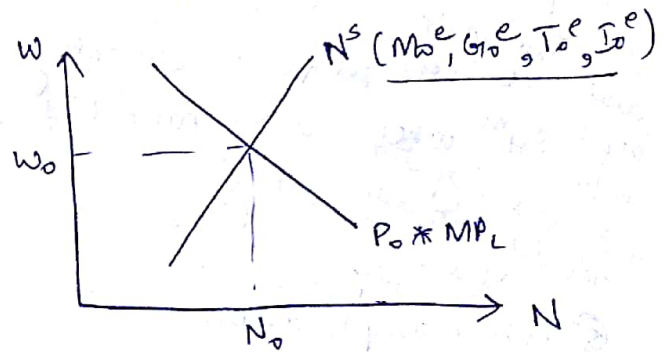
$$N^s = g\left(\frac{w}{p^e}\right) \quad \text{[like Keynes]}$$

New  $p^e$  depends on  $M^e, G^e, T^e, I^e$  & not just past prices

Price is determined by  $M, G, T, I$ . ~~Keynes P.~~ //



AS AD eq<sup>m</sup>



labour market.

Policy change

Anticipated

either

- Policy maker announced or
  - Policy maker known to act in certain way
- Eg if  $\uparrow$   $unemp^l$  then he is known to  $\uparrow M^s$

Unanticipated

"monetary surprises"

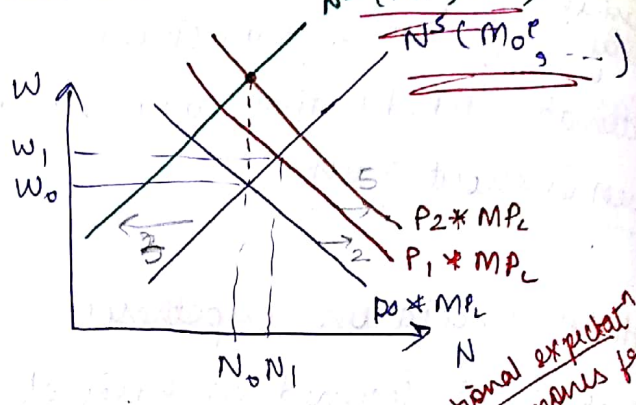
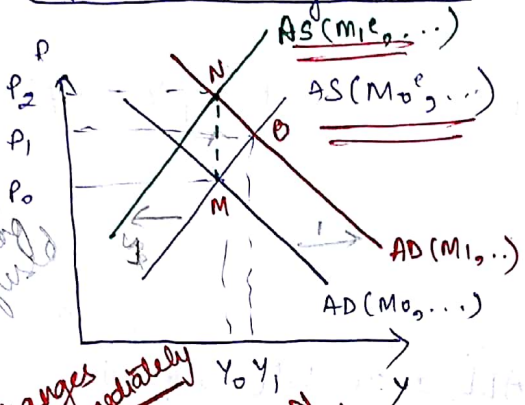
workers' expectation not affected so  $N^s$  & hence AS don't shift (like Keynesian, monetarist)

⑧

Effect of change in  $M^s$

Shutdown, Anticipated \*

draw only this graph by getting confused



All these changes take place immediately so as  $M$  shifts right immediately  $AS$  left so  $Y$  remains const.  $M \rightarrow N$  directly

$M \rightarrow M_1$  from  $M_0$  to  $M_1$   $\Rightarrow$  AD shifts right  $\Rightarrow N^d$  shifts right

Anticipated so  $M^e \uparrow$  from  $M_0^e$  to  $M_1^e$   $\Rightarrow N^s$  shifts left  $\Rightarrow AS$  shifts left

of rational expectat. Economy moves from  $M \rightarrow N$  (no intermediat) of adaptive expectat.  $M \rightarrow O \rightarrow N$  (monetary)

AS left then Price  $\uparrow \Rightarrow N^d$  shifts right

New Eq<sup>m</sup> :  $N, Y$  return to original  $(N_0, Y_0)$

$P, W$  permanently higher  $(P_2, W_2)$

anticipated change in  $M^s$  does not affect eq<sup>m</sup> when  $w$  &  $p$  have  $\uparrow$ ed in same proportion st  $\frac{w}{p}$  same

workers perceive correctly impact of  $M^s \uparrow$  & demand higher  $w$  cause fluctuations in  $p, unemp$

⑨ Policy Implication

If AD  $\downarrow$  coz of  $\downarrow$  in  $g_{net}$  then AD left. exact reverse of above if anticipated change.

So,  $F_b$  Policy change

Anticipated  
 No need of stabilization policy

Unanticipated  
 Desirable but not feasible becoz policy makers like others lack knowledge & unable to foresee. If repeated in future then others can also anticipate then no need to effect shock.



∴ Neinterventionist

✓ Policy rule targeting inflat<sup>n</sup> or money growth so that all can anticipate credibility

- FP: instability in it makes it difficult for agents to form RE

### ② classical critique of Keynes

- Keynes rule of thumb based on C demand, Money dd for not based on classical optimization behaviour (react in own self interest)
- Expectat<sup>n</sup> only on basis of past prices i.e. economic agents choose to ignore useful info. Not correct. Make systematic errors (not true)
- Labour market P, w move to clear markets i.e. wage not sticky  
∴ hence employment is vs. voluntary unemp<sup>t</sup> only.

### ③ Keynes' critique <sup>counter</sup>

1) How to explain prolonged recessions?

coz if AD decline, by next yr shud be apparent & it'll no longer be unanticipated, then how it goes for yrs

NC: shock maybe short term but effects persist  
Adjustment lags as tests involved in adjusting  $\phi$   
+ gov. intervention further delays

2) Rational expectation assumption

• All info used in expectation - unrealistic

~~costly~~ gathering info, knowing relationship & able to understand also - not psbl in short run, maybe in long run

- For policymakers, RE reasonable. They have information advantage ∴ stabilisation policy

3) Labour market

NC - auction market - characteristics i.e. w adjusts quickly

Keynes - contractual view. sticky ~~price~~ downward

∴ when AD ↓, then employers ↓ hours or layoffs (i.e.  $N \downarrow$ ) instead of cutting wages

## RBC

2<sup>nd</sup> gen of New Classical  
more focus on individual's optimization behaviour

### ① Model

Behaviour of individual say Representative Agent  
Utility  $U_t = U(c_t, l_t)$  [Consumption, leisure]

$$Y_t = z_t F(K_t, N_t)$$

↳ shock to production process

Eg. tech. shock

→ K not fixed

$$Y_t = C_t + S_t$$

$$K_{t+1} = S_t + (1-\delta)K_t$$

↓  
depreciation

(Savings today will ↑ C 2moro)

If tech ~~shock~~ shock - direct effect 1 period  $Y \uparrow, N \uparrow$   
But coz higher K  $\uparrow$  in future periods also  $\uparrow$

### ② Policy Implication

MP: No role

Role of money only for price (like classical)

Real factors determine op, emp<sup>t</sup> fluctuations

FP: will hv supply side effects (not AD like Keynes)

of tax - can be distortionary - chooses too much leisure

To ↓ this, finance G by printing money - **seigniorage**

So combine MP, FP to ↓ distortions from inflation, tax

### ③ Critique

- 1) Tech shock how affects so many segments like in q18 Dep<sup>n</sup>
- 2) very flat  $N^s$  assumed ~~only~~  
As tech  $\uparrow$   $\Rightarrow$  MP improves  $\Rightarrow N \uparrow$



## New Keynesian

Improve microeconomic foundation of Keynes.  
Use micros to explain wage, price rigidities

### ② Common elements of NK

- 1) imperfect competition for goods market  
(Earlier Keynesians was PC)
- 2) Price rigidity
- 3) Real wage rigidity (K - money wage rigid)

### ③ Models

#### 1.) Sticky Price / menu cost model

Prices of products not changed as ~~cost~~ costs involved  
↳ "menu costs"

In oligopolies, Monopolies as ~~price~~ <sup>but</sup> price not  $\downarrow$

- managerial cost (to gather info, explain to customers)
- customer goodwill
- can lead to price war

So as AD  $\uparrow$ , NBY  $\downarrow$  but price don't

Policy - menu imp to offset declines in dd than offsetting  $\uparrow$

#### 2.) Efficiency wage model

Real wage set higher to maximize efficiency

- incentive not to shirk since if fired won't get such high paying job
- $\downarrow$  quit rate recruiting training costs, more experiences
- improves morale

Involuntary unemp<sup>t</sup> results as workers continue to seek jobs in high wage sector.

#### 3.) Insider - Outsider model & hysteresis

To explain persistent high unemp<sup>t</sup> rates

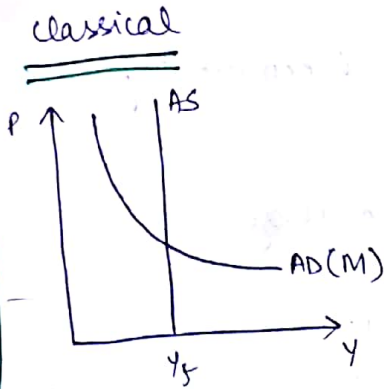
Insiders (union members), outsiders (non union members)

Insiders bargain to push real wage abv market clearing level  
so outsiders remain unemployed

Recession - layoffs - some insiders become outsiders  
Remaining insiders bargain for  $\uparrow$  real w

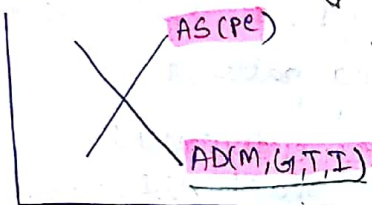
COMPARISON

CLASSICAL



•  $M^s$  only causes change in P (Neutrality of money)  
 • AD shift only P change  
 AS determines  $Y, N$

KEYNES



SR:  $M^s$  influence  $Y, N$   
 in fact main determinant  
 "Money alone matters"  
 Philips curve short run:  $N^s$  & so AS shift coz PE change so w/ change

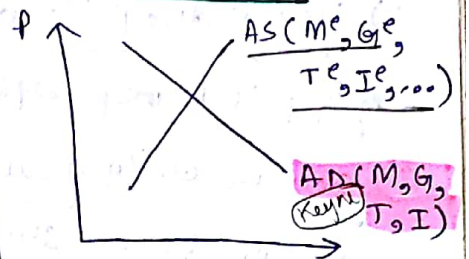
•  $AD_K$  - money only 1 of the determinants (Keynes)  
 •  $AD_M$  - Money dominant determinant (Monetarist)  $AD = MV$

• supply side no fundamental difference  
 • changes in AD affect  $o/p, N$  in short term only not long term  
 • Philips short run:  $N^s$  don't shift coz PE constant, based on past prices  
 [long run Philips curve similar in both]

Classical:  $\rightarrow$  3 markets  
 (i) labor market - Gives  $L^d, Y^d$  (and  $P^d$  and  $M^d$ )  
 (ii) money market - Gives  $L^s, Y^s$  (and  $P^s$  and  $M^s$ )  
 (iii) capital market - Gives  $I = S$   
 Neoclassical  $\rightarrow$  3 markets  
 (i) labor  
 (ii) commodity goods  
 (iii) capital

Rational expectation

New Classical



• classical assumption of perfect info replaced with Rational Expectation  
 • AD shifts but  $Y, N$  same so  $N^s$  able to play like classical

• NC: RE so based on  $m^e, G^e, T^e, I^e$   
 K: PE based on past prices only  
 • In short run as AD shifts NC: AS,  $N^s$  also shift so  $o/p, N$  same  
 New Classical shift so  $o/p, N$  same  
 K: AS,  $N^s$  don't shift so  $o/p, N$  changes  
 AS does shift

Consensus

- ABC & New Keynesian both try to ↑ microeconomic basis so considerable convergence

accepted by all {  $MV = PY$  (STM) (classical, monetarist)  
 Credibility of policy makers matter (new classical)  
 AD imp for determining  $o/p$  (Keynes)



Monetarist

1) Agg demand

$MV = PQ = Y$  (nominal GDP)

2) Money supply role

money alone matters

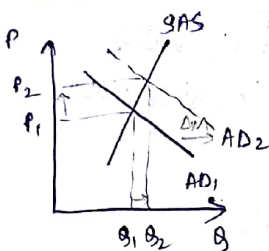
Agg dd =  $Y = M\dot{V}$   
and  $v$  is stable

ie  $M^s \uparrow \Rightarrow Y \uparrow$

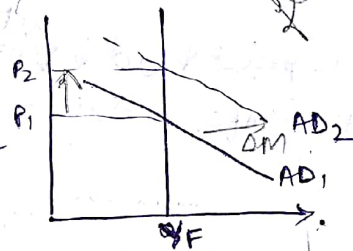
AD = MV along  
 $v$  const  
IS-LM: LM  
vertical very steep  
AS-AD  
AS is steep

2014  
2011  
paper 9/1  
draw  
IS-LM

3) AS curve



short run



long run

- short run: steep AS,  $\uparrow$  in AD in creases  $P$  more &  $Y$  less  
(cos of  $\uparrow$  in  $M^s$ )

- long run: vertical cos of wage price flexibility in long run  
if  $M^s \uparrow$  ed only  $P$   $\uparrow$  es,  $Y$  unaffected

4) Velocity of money  $v$  constant

5) In long run wage price flexibility & natural rate of emp<sup>t</sup>/income

6) MP rule based, PP useless cos insignificant impact on Agg dd

7) Philips curve

1) Agg dd

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

$AD = f(m, c, i, G, x, m)$

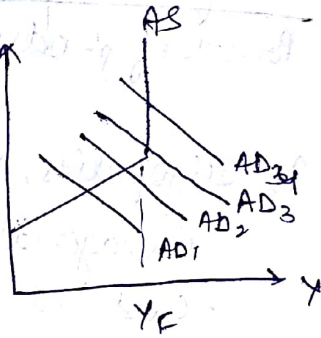
2) Money

indirectly affects Agg dd

$M^s \uparrow \Rightarrow$

$r \downarrow \Rightarrow I^{nv} \uparrow \Rightarrow Y \uparrow$

3)  $P$



- short run AS quite flat (extreme case horizontal), if AD  $\uparrow$  ed (say by  $\uparrow$  in  $I^{nv}$ ) then  $P$   $\uparrow$  es more, price level  
Excess capacity  
large unemp  
Recession

- if at full emp<sup>t</sup> level, then AS vertical

4)  $v$  unpredictable

$M^d = C + Y - C_2 r = M^s$

$v = \frac{Y}{M^d} = \frac{Y}{C + Y - C_2 r}$

inversely related to  $M^s$ , and directly related to  $r$

5) wage, price sticky