[IS] [LM]

COMMODITY MARKET & MONEY MARKET & IT'S EQUILIBRIUM

• COMMODITY MARKET / PRODUCT MARKET / IS- Curve :-

* Introduction :- The commodity market help us to focus on the IS- Curve and Money market on the LM · Curve. Together we state it as the IS-LM Model. The former one focuses on the fiscal policies whereas the later on monetary policies. Together these two policies helps us to reach an equilibrium point in the commodity market & money market.

· COMMODITY MARKET —

The product market is said to be in equilibrium when aggregate demand for output in an economy is equal to the aggregate supply of output during any particular time period.

Aggregate Demand ⇒

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

Aggregate Supply

$$Y = C + S + T + R_f$$

↳ Foreign Reserve

Since, In a closed economy, consumption being equal and no international trade takes place, we are left out with

$$I + G = S + T$$

Since, Investment is a function of 'r' and Saving is a function of 'Y' (Income)

$$I(r) + G_1 = S(Y) + T$$

differentiating both sides w.r.to its variables

$$I'(r)\,dr + 0 = S'(Y)\,dY + 0$$

$$\frac{dr}{dY} = \frac{S'(Y)}{I'(r)}$$

Since, Savings and Income are positively related and Investment and Bank Rate are indirectly related. ∴ The whole function becomes negative.

* FEATURES OF IS - Curve :-

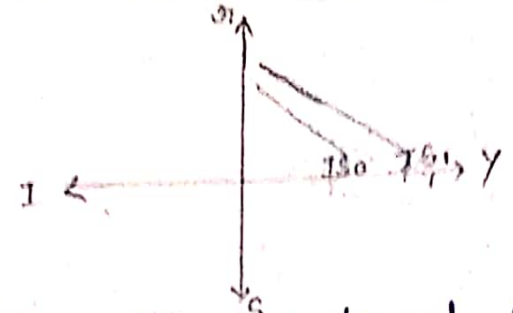
1) The IS - Curve represents different combinations of interest rate (r) and Income (Y) which keeps the product market in equilibrium.

2) Since, The function $[I(r) + G_1 = S(Y) + T]$ is a condition where the product market is in equilibrium, savings and income are positively related and rate of interest and investment are inversely related.

∴ The IS function is negatively sloped.

$$\frac{dr}{dY} = \frac{S'(Y)}{I'(r)} < 0$$

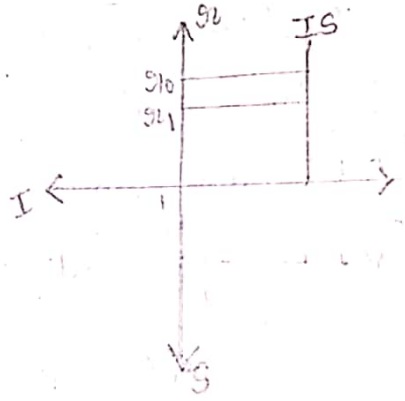
3) The IS Curve will be relatively flat, if the investment expenditure is relatively interest elastic, whereas, if the curve is stipper then it will be interest inelastic.



We can say, If investment expenditure is assume to be relatively interest elastic, then the increa in investment, consequent upon a fall in inter rate would be relatively higher. As a consequenc the required increase in savings would lead to relatively higher income.

On the otherhand if the investment is relativel inelastic, then increase by a small amount after a given fall in 'r', Savings must also be increase by a smaller amount, Hence the IS-Curve will be stipper.

4) when the investment becomes perfectly interest inelastic, the IS - Curve will be perpendicular to the x-axis.



$$\frac{dr}{dY} = \frac{S'(Y)}{I'(r)}$$

$$= \frac{S'(Y)}{0}$$

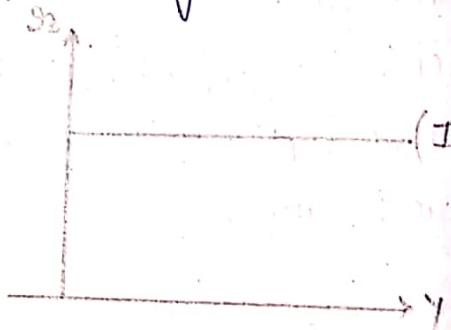
$$= \infty$$

If the investment becomes perfectly interest elasti

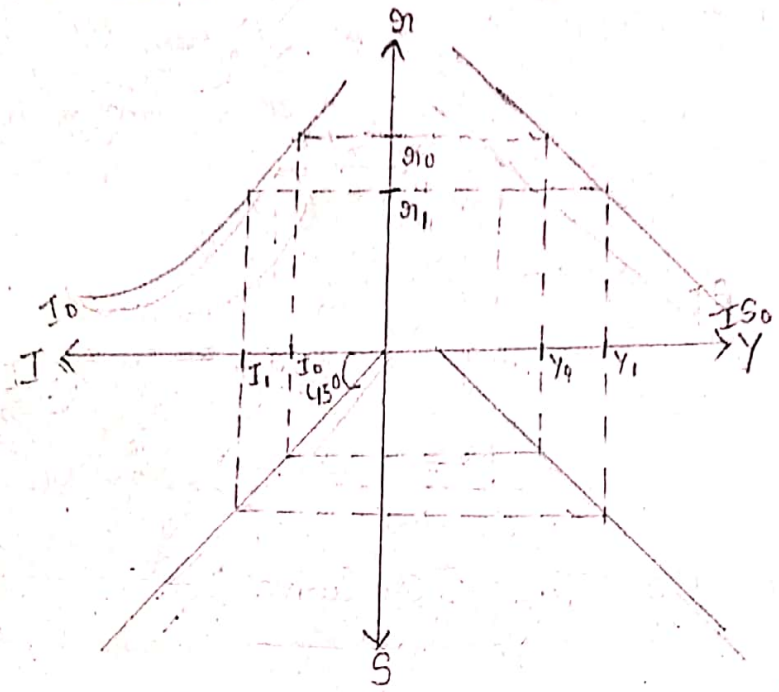
$$\frac{dr}{dY} = \frac{S'(Y)}{I'(r)}$$

$$= \frac{S'(Y)}{\infty}$$

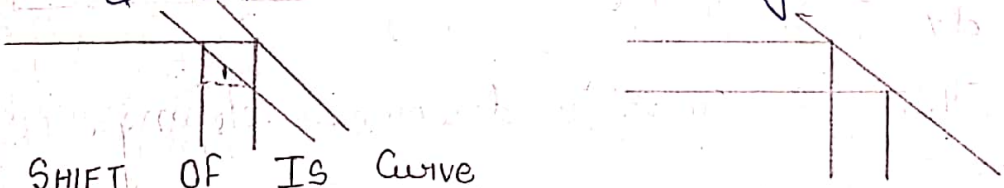
$$= 0$$



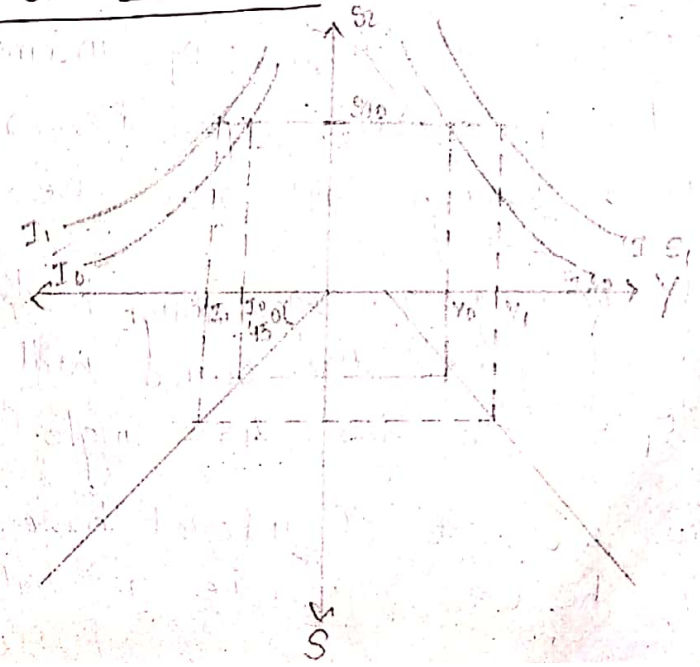
5) The slope of the IS- Curve is also determined by the slope of savings function. If the slope of the saving function is relatively higher then the IS - Curve will be stipper and vice - versa.



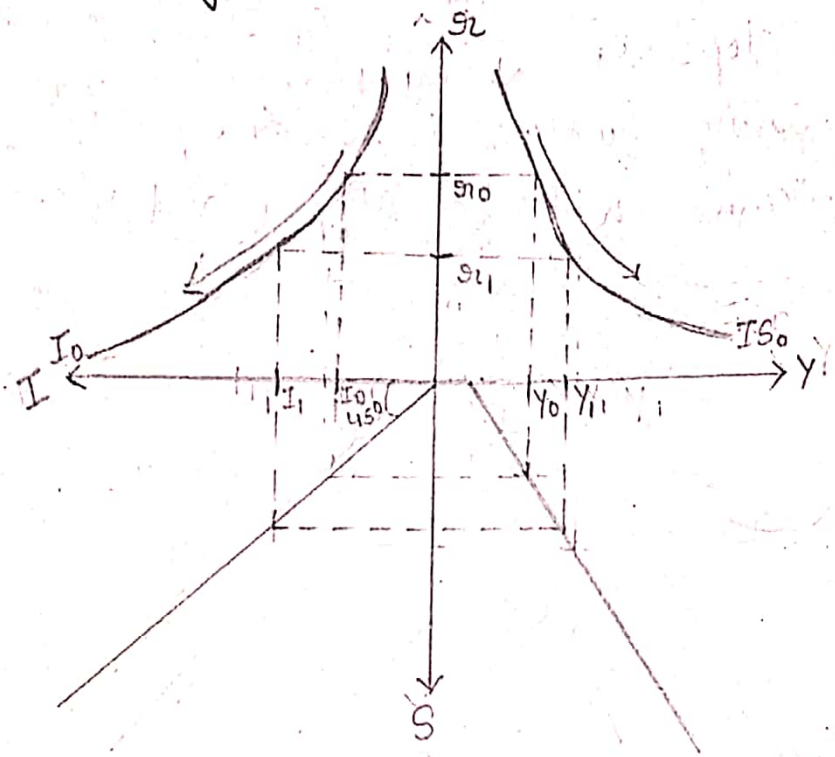
Here we take the relation of r & Y plotted in the first quardant. As the concept of demand and supply. IS Curve behaves as demand curve & LM behave as a supply curve



* SHIFT OF IS Curve



* Movement Along the demand curve :-



* DERIVATION OF THE IS Curve :-

1) The IS - Curve represents different Combinations of interest rate (r) & Income (y) which keeps the product market in equilibrium.

2) ∵ $\frac{dr}{dY}$ is negative

Y↑ → S↑ → I↑ → r↓

∴ The IS - Curve is downward sloping.

3) Since, Savings is a function of income, the curve will be positively sloped i.e. as income rises somehow savings will also rise

4) Investment and savings according to Keynes Theory are equal. Therefore the curve will be positively sloped at the 45° angle.

5) Investment and rate of interest have an inverse relationship between them. i.e as rate of intere

rises investment falls.

* STATIC AFFECTS :-

When there is a change in rate of interest —

∵ 'r' is the primary factor which affects the investment plan and even the income of the consumer, The IS Curve will slope upward or downward but will remain on the same IS. When rate of interest falls (rise), the investment increase (decrease). When we move downwards on the curve it is known as increasing otherwise decreasing.

- When there is an affect in other than rate of interest :-

When there is a sudden increase in government expenditure (let) there will be an expansion in the IS-Curve and it will shifts towards the right and if the government increases the tax rate, there will be a leftward shift in the IS-Curve. i.e IS-Curve will contract

Q) Suppose the MPC is equal to 'y'. what will be the shape of Consumption Curve function if there is no autonomus consumption? In this case what will be the value of MPS? Under which assumption will the Consumption function and Saving function will be parallel to each other?

∵ To keep the two functions parallel we have to keep the slopes equal and the slopes are MPC and MPS.

∴ MPC = MPS = 0.5

Q2) If MPC is 0.75, how much additional investment is required to increase income by ₹ 600? Also find the value of the multiplier in this case. What will be the value of the multiplier if the entire additional income is converted into additional consumption?

Solution:-

i) $$\frac{\Delta Y}{\Delta I} = \frac{1}{1-MPC}$$

$$\frac{600}{\Delta I} = \frac{1}{1-0.75}$$

$$\Delta I = 600(0.25)$$

$$= 150$$

So, to ↑ Y by ₹600 we need ₹ 150 as ↑ I.

ii) Investment Multiplier $= \frac{1}{1 - MPC}$

$= \frac{1}{1 - 0.75}$

$= \frac{1}{0.25}$

$= 4$

iii) Investment Multiplier $= \frac{1}{1 - MPC}$

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

$= \frac{1}{0} = \infty$

* LM - Curve :- [MONEY MARKET]

The money market deals with the money supply (regulated) which is totally handled by the central bank of the country (RBI). The money market is said to be in equilibrium if and only if aggregate demand for money is equal to aggregate supply of money within the economy.

The demand for money is to hold a stock of money balance which can be expressed in two ways i.e.

i) Nominal (Actual).
ii) Real (Purchasing Power).

The nominal value of money (M) Actually indicates the number of currency which are in circulation. The relation between nominal and real value of money can be expressed as $\frac{M}{P}$, where P is the price index.

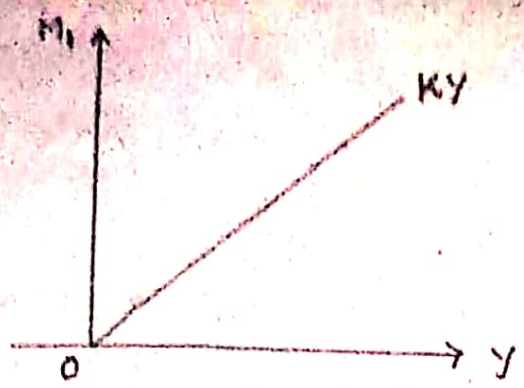
According to Keynes, there are only three motive for holding money i.e

i) Precautionery Demand.
ii) Transaction Demand and
iii) Speculative Demand.

TRANSACTION DEMAND —

It refers to people desire to hold money, to meet day to day transaction. It can be expressed as $M_1 = kY$ $[M_1 = L_1(Y)]$

k lies between 0 to 1.



PRECAUTIONARY DEMAND —

According to the market study Keynes believed that there should be a guard against unforseen emergencies in near future. For this conditions, precautionary demand for money is always present in the backmind of the consumer.

SPECULATIVE DEMAND —

The final motive for holding money is the speculative motive. Money demanded to enjoy any windfall gain through the changes in the prices of bonds and securities, is known as speculative demand for money.

$$M_2 = L_2(r)$$

Taking all the three demands for money together Keynes noticed that why would a person demand (Transaction or, Precautionary) for money which gives no interest, Rather than having a speculative demand for money. The consumer is not ready for a speculative demand because there is a risk of attaining a loss rather than running for extra profits. A risk adverse function will which have a lower speculative demand for money, On the otherhand

a risk lover will have a high speculative demand for money.

Speculative demand for money and Rate of interest have inverse relationship.

* Transaction demand for money and Income have a positive relationship between them.

* FEATURES OF the LM- Curve –

i) The LM Curve represents different combination of 'r' & 'y' which keeps the money market in equilibrium.

ii) The LM Curve is generally positively sloped the reason behind it is, when income increases the consumer depends more of M rather than other demands of money. Now M rises & M_2 falls proportionately, Therefore 'r' rises, because M_2 and 'r' are inversely related.

$$Y\uparrow \rightarrow M_1\uparrow \rightarrow M_2\downarrow \rightarrow r\uparrow$$

*

3) Under equilibrium, $M_S = M_D$

$$\frac{M}{P} = L_1(Y) + L_2(r)$$

differenting both sides w.r. to their variables

$$\Rightarrow 0 = L_1'(Y)\,dy + L_2'(r)\,dr$$

$$\Rightarrow -L_2'(r)\,dr = L_1'(Y)\,dy$$

$$\Rightarrow \frac{dr}{dy} = -\frac{L_1'(Y)}{L_2'(r)}$$

$L_1'(Y) > 0$ [As income rises transaction demand for money rises]

$L_2'(r) < 0$ [As rate of interest falls L_2 rises]

OR

is Negative

$$\therefore \frac{dr}{dy} = -\left\{\frac{+ve}{-ve}\right\}$$

$$= +ve > 0 \quad *$$

4) When 'r' is minimum $L_2'(r)$ is infinite

$$\therefore \frac{dr}{dy} = 0$$

$\therefore$ LM Curve is parallel to x axis.

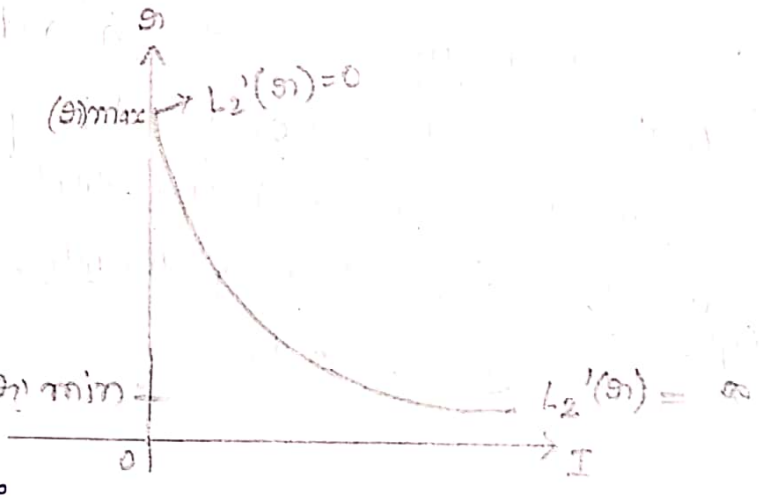
Now if 'r' is maximum $L_2'(r)$ will be ~~zero~~ 0

$$\therefore \frac{dr}{dy} = \infty$$

It will be parallel to 'y' axis.

Note:- The thing which is easily differentiable will stay on the 'x' axis.

- Relationship between $L_2(r)$ and Speculative demand for Money



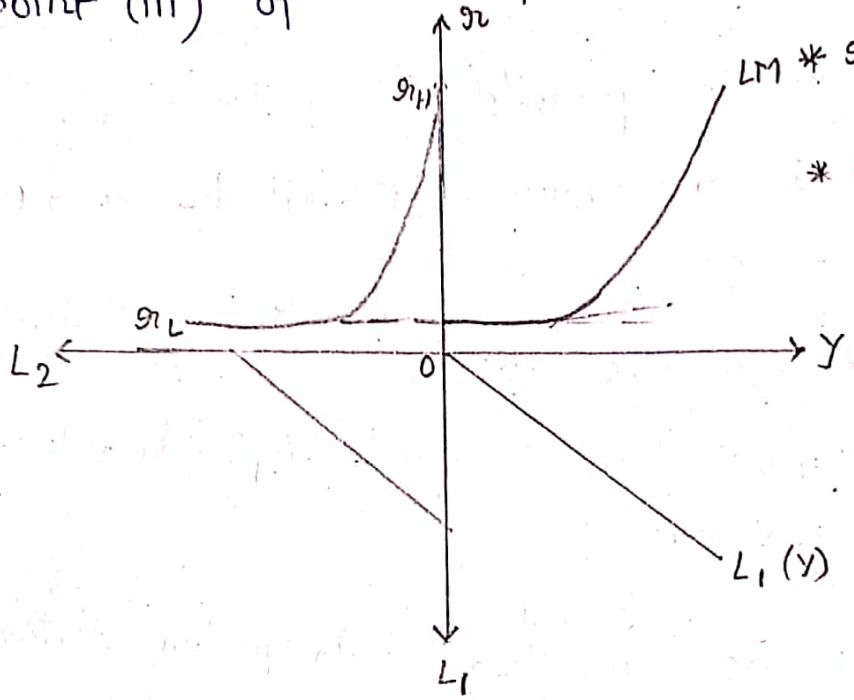
As elasticity becomes higher, the LM Curve would be flatter. On the otherhand LM Curve becomes stipper, when the demand for money is interest inelastic. In the extreme situations when the

money demanded is perfectly interest inelastic, the LM Curve becomes vertical. and horizontal line when is perfectly interest is elastic.

* Derivation of the LM - Curve :-

As we know Money Market will be stable if and only if $M_S = M_D$

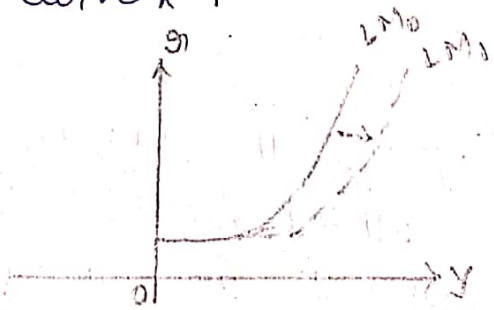
point (iii) of the features.



* r_H → rate at highest point
* r_L → rate at lowest point.

* STATIC CHANGES :-

1) The LM Curve will shift upward (downward) to the left (Right) with a fall (rise) in the quantity of money. This can be explained in the figure by increasing the M_S from M_0 to M_1 which shifts the LM Curve (Right) from LM_0 to LM_1.



2) when there is a change in rate of interest, in this case LM - Curve will move upward (downward) as 'r' rises (falls).

3) When otherthan rate of interest changes, the LM curve will shift Rightward (Leftward) with an increase (decrease) in the variable affecting the money market.

Economy of any country can be made stable by implementing two policies —

i) Fiscal Policy.
ii) Monetary Policy.

FISCAL POLICIES :— It refers to the budgetary policy of the government of any country. The principle tools of it are —

a) Government expenses (g);
b) Taxes (T).
imposed by the government.

If there is an increase in g, keeping T ~~if there is are increase~~ constant or a fall in T. keeping 'g' constant, there will be a deficit in the government budget. On the otherhand, if there is a fall in 'g' keeping T constant or an increase in T keeping 'g' constant, there will be a surplus in the government budget.

MONETARY POLICIES:— By this we mean any policy which affects quantity of money in circulation in the economy or the cost of use of money i.e 'r'.

These are two instruments that affect the monetary authorities i.e Quantitative and Qualitative.

- Quantitative :-

i) Change in bank rate.
ii) Open market operations.
iii) Variable Reserve Ratio.

- Qualitative :-

i) Selective Credit control.
ii) Moral Saussion.

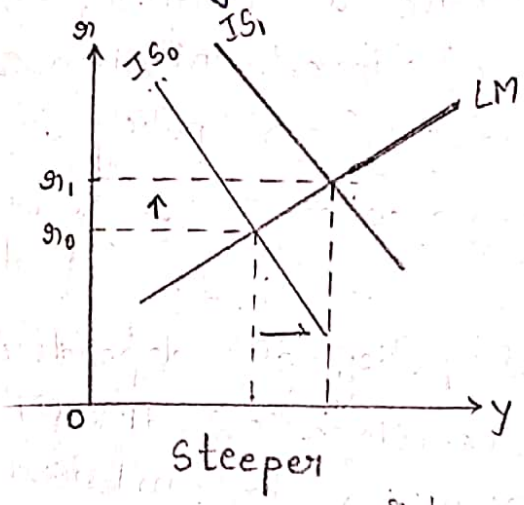
The quantitative credit control can cause and increase or decrease in the total amount of credit given by commercial banks. For instance, if the Central bank wants to restrict credit supply, It can increase the bank rate, Sell securities in the market (OMO) or Raise the CRR for the banks. If it wishes to increase the total credit flow, It can reverse the steps.

The qualitative credit control method seek to control the quality of credit given by the bank rather than total volume of credit. For Instanc even at the time of inflation, when the central bank tries to reduce the total volume of credit flow, it may wish to ensure that the credit flow to the vital sector of the economy remains uninterrupted. Central bank may wish to control it by selectively issuing credit to some of the industries, not all.

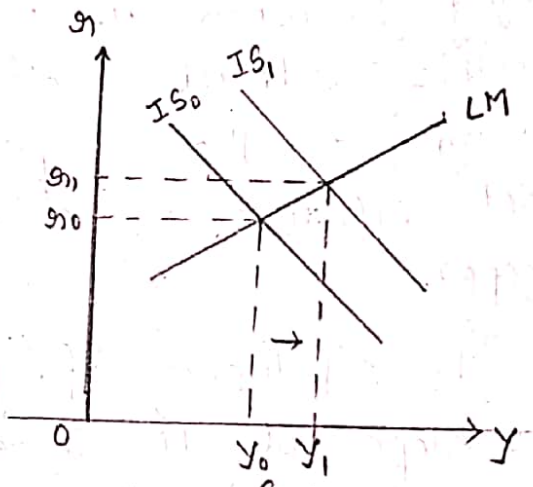
If it does it formely it is known as selective credit control and if it does it secretly it is known as Moral Saussion.

* EFFECTIVENESS OF FISCAL POLICY : —

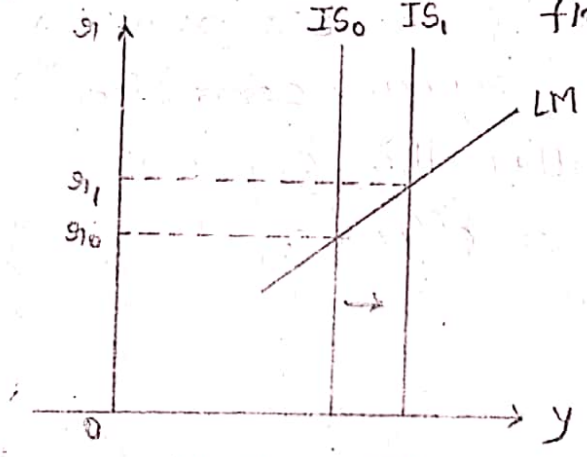
The impact of fiscal policy and its effectiveness can also be analysed under the IS-LM framework. If their is an increase in government expenses, their will be a rightward shift in the IS curve. The IS curve would be stiper when the investment is relatively interest in-elastic.



Steeper



flatter



Vertical IS

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It is important to note in this connection, that the fall in the private investment associated with an increase in the interest rate caused by the fiscal policy is called the Crowding Effect.

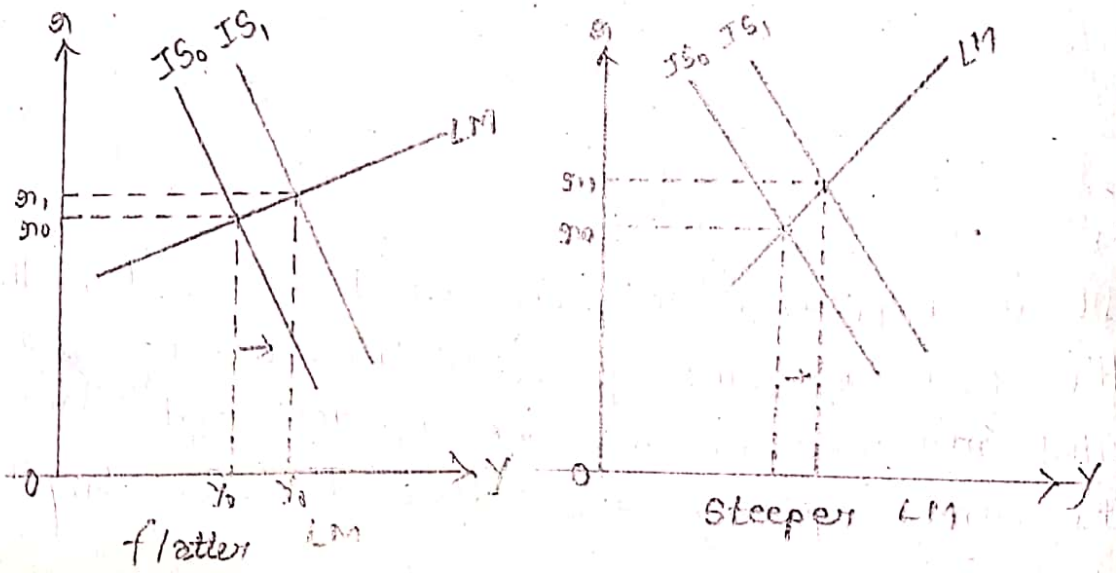
Thus, greater the interest in elasticity of the money demanded the more of fiscal policy crowds out the private investment, rather than raising the output level.

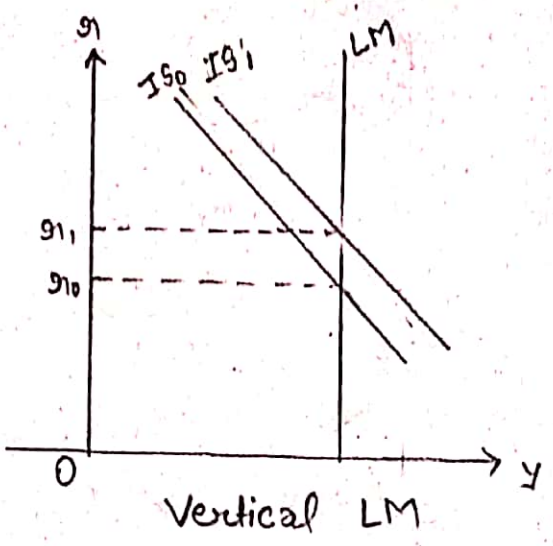
All the three diagrams drawn above depicts that the IS curve has shifted right from IS_0 to IS_1 and government expense is the reason behind it.

$$G\uparrow \rightarrow Y\uparrow \rightarrow M_1\uparrow \rightarrow M_2\downarrow \rightarrow r\uparrow$$

However, the fiscal policy becomes most effective in raising 'Y' when the IS curve is vertical, implying complete interest inelastic of investment. Hence we can say that expansionary fiscal policy is most effective in raising (y) when IS is relatively steeper.

The effectiveness of fiscal policy also depends on the slope of LM-Curve, the slope of the LM curve depends most crucially on the interest inelasticity of money demanded. As the LM Curve becomes flatter the expansionary fiscal policy becomes more effective.





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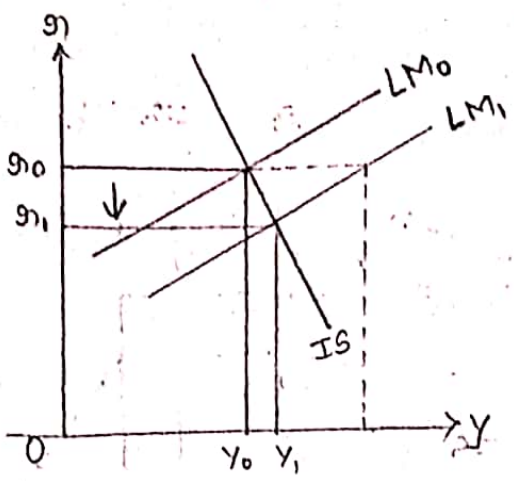
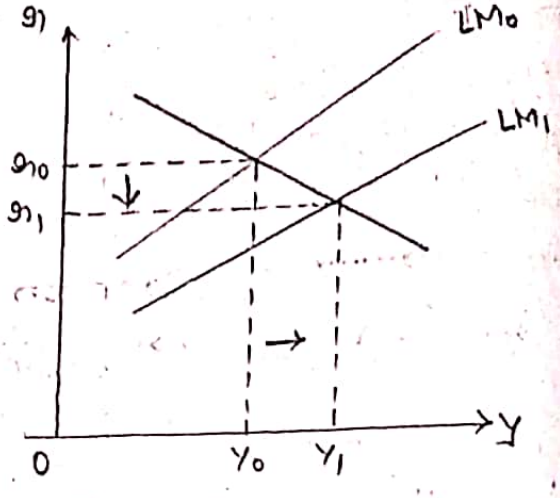
* EFFECTIVENESS OF MONETARY POLICY :-

As we know, Monetary authority of the country can influence the aggregate level of outputs through its instruments (r). It can raise the stock of money by injecting liquid cash which does not effect M_1 and M_2 rises to cover it. a fall in 'r' which helps the investment to rise and leads to rise in output level. Thus, increase in aggregate expense can create excess demand in the economy and leads to higher output level.

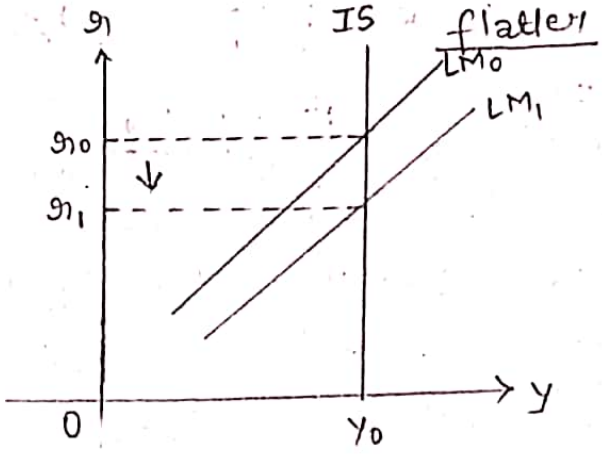
However, the effectiveness of monetary policy in raising income depends on the slope of IS curve. If the investment expenditure is relatively interest inelastic, the effectiveness of monetary policy will be limited.



Steeper



IS flatter

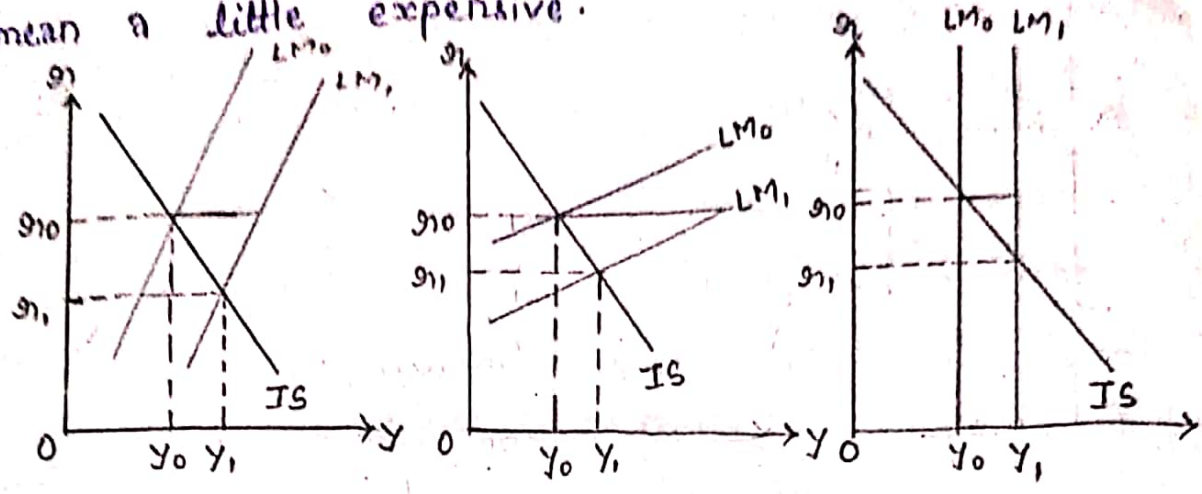


Vertical

As we see the above figures from left to right, as the IS curve converts from steeper to flatter the effectiveness of monetary policy gets more effective but when the IS curve is vertical, it is ineffective.

The effectiveness of monetary policy also depends upon the slope of LM schedule. We know that, if interest elasticity of money demand is high (relative) then the LM curve becomes relatively flat. In this case, as increase in the stock of money creates excess money supply leading to a fall in rate of interest. If the money demand is relatively interest elastic, then a small drop in the rate of interest can raise the money demand to the required level, so, that the equilibrium is restored in the money market. However,

the small drop in the rate of interest would mean a little expensive.



Steeper LM Flatter LM Vertical LM

From the above figure, we can say that the monetary policy would be more effective, when the LM Curve is relatively steep, implying relatively interest inelasticity of money demand. In this situation, relatively greater fall in 'r' is required to restore money market equilibrium after an excess supply condition is created in the money market. This means rise in investment expenditure leads to greater increase in 'y'.