Some Special Cases in the IS-LM Model

Liquidity Trap Zone: Till lesson 3, we considered an upward sloping LM curve. However, we know that the interest rate has a floor value, where the speculative demand for money becomes infinitely elastic. Without any exception, everybody will anticipate that interest rates can only rise in future, and not fall. Accordingly, they will keep any additional cash in the form of cash only, and not try to buy some bonds with it. Thus, there is no way that bond prices can rise, so that r may fall.

Thus, we have a horizontal stretch of the LM curve as depicted in fig 1. LM curve is perfectly interest elastic in this zone. We may also have a vertical stretch where LM curve becomes completely interest inelastic. There is no demand for money for speculation purpose (interest rate may be so high that nobody expects it to rise any further). There is only transaction demand for money. Given price level and money supply, money market is at equilibrium for a particular level of Y. This zone is called **classical zone** (also shown in fig 1).



Fig 1

The size of the fiscal policy multiplier (that is, the effectiveness of the fiscal policy) depends on the slope of the LM curve at the initial equilibrium point. Fiscal policy will be more effective in the flatter zone of the LM curve and less effective in the steeper zone. We will consider two extreme cases: 1) When at initial equilibrium LM curve is horizontal (the trap zone), 2) When at initial equilibrium LM curve is vertical (the classical zone).

Let us briefly examine the above statement with the help of the following diagram (fig 2)



Fig 2

Suppose at the initial equilibrium, the IS curve (curve 6) cuts the LM curve at its horizontal zone. Now the government adopts an expansionary fiscal policy causing IS curve to shift rightward to curve 5. Income increases from Y_1 to Y_2 by multiplier effect. Additional transaction demand can be met by the excess liquidity in the hands of people at interest rate r_0 . At the same time it may be assumed that the government finances its excess spending by taking loan at the prevailing interest rate. Interest rate will remain fixed so long as Y is less than or equal to that level for which transaction demand can be met from cash in hand. Private investment will not fall and there will be no crowding out.

On the contrary, in the vertical zone increase in demand for excess government expenditure will raise interest to such an extent that fall in private investment will totally nullify the effect of increased G. Shift of IS curve from curve 1 to curve 2 leads to such a rise in interest rate that there is full crowding out, and Y remains fixed at Y_5 .

Therefore, fiscal policy is:

- Fully effective if the LM is in the trap zone (no crowding out)
- Zero effective in the classical zone (full crowding out)
- Partially effective in the intermediate zone (partial crowding out)

Let us now partially deviate from the standard IS-LM framework and observe some policy implications. To be specific, we will modify the investment function and the consumption function to make both of them functions of income and rate of interest.

The consumption function is given by C = C (Yd, r); where Yd is disposable income (Yd= Y-T) and r is interest rate. As we have discussed earlier, C is positive function of Y. But C is negative function of r. If rate of interest increases, people will save more (as return from saving is more) and consume less. $0 < C_{yd} < 1$, $C_r < 0$

The investment function is given by I=I(r, y). Investment is a negative function of r and positive function of Y. As Y increases producers are induced to invest more to cater to higher demand ($0 < I_y < 1$, $I_r < 0$).

Also, it is assumed that $0 < C_{yd} + I_y < 1$ (This is the stability condition of the equilibrium).

The equilibrium conditions in the goods and money market are now given by the following two equations

 $Y = C ((Y-T), r) + I(Y, r) + G_{.....}$ (1)

M/P = k(Y) + l(r)....(2)

In this model we will study the impact of loan financed increase in government expenditure (G)

Case 1: Possibility of 'crowding in' as a result of loan financed increase in G

We know that equilibrium income (Y) and interest rate (r) are determined by the interaction of IS and LM curves. Say, the initial equilibrium is given by the pair (r_0, Y_0) . Now there is an increase in G (financed by loan). As a result, IS curve will shift rightwards and new equilibrium will be (r_1, Y_1) . As explained in our previous lessons,

$r_1 > r_0$ and $Y_1 > Y_0$

This creates the possibility of a 'crowding in' along with 'crowding out' for private investment and the former may dominate. Why? For, the rise in r crowds out private investment. On the other hand, the increase in Y raises private investment. If the **positive** 'income effect' is more dominant than the **negative** 'interest effect', private **investment may actually increase as a result of expansionary fiscal policy**. At the new equilibrium, the level of investment (say, I₁) is greater than original investment (say, I₀).

There are two opposing effects on consumption also. The ultimate impact on C depends on relative strength of the two effects. If the negative effect of the rise in interest on consumption is stronger than positive effect of the income rise, we shall have $C_1 < C_0$. Rise in savings due to reduced consumption may be a source of additional private investment.

Case 2: No Crowding in at Full Employment Level of Output

Let us now consider a case in the intermediate zone where initial equilibrium is at full employment level of output (say, Y_f) and interest rate (say, r_0). There is no scope to increase physical volume of output as the economy is already at the full employment level. As government expenditure increases (financing through internal borrowing), the price level starts to increase, causing LM curve to shift leftward (due to decline in real money supply) until new equilibrium is attained again at (r_1 , Y_f). As Y is the same, there is no crowding in of private investment. So increase in government spending fully crowds out private investment. On the other hand, increase in the rate of interest unambiguously reduces or crowds out private consumption expenditure as well (as shown in fig 3).



Fig 3

Conclusion: Loan-financed increase in government expenditure crowds out both private investment and private consumption in this modified version of IS-LM model.