IS-LM Curve Model

Goods Market Equilibrium: IS Curve:

1. The IS curve is the schedule of combinations of the interest rate and the level of income such that the goods market is in equilibrium.

2. The IS is negatively sloped because an increase in the interest rate reduces planned (desired) investment spending and therefore reduces aggregate demand, thereby lowering the equilibrium level of income.

3. The smaller the multiplier and the less sensitive investment spending is to changes in the interest rate, the steeper the IS curve.

4. The IS curve is shifted by changes in autonomous spending. An increase in autonomous spending, such as investment spending or government expenditure, shifts the IS curve to the right.

5. At points to the right of the IS curve, there is excess supply in the goods market: at points to the left of the curve, there is excess demand for goods.

Derivation of the IS Curve

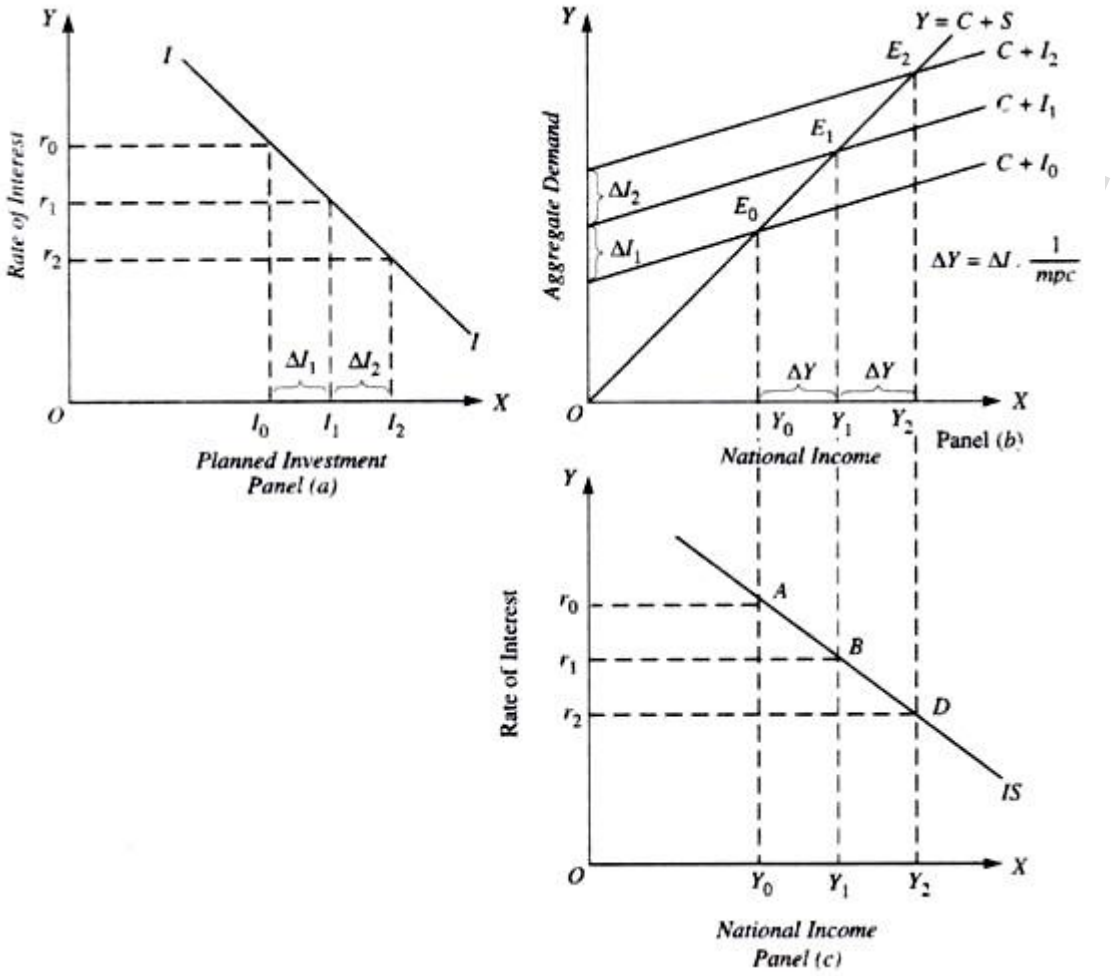
The IS-LM curve model emphasises the interaction between the goods and money markets. The goods market is in equilibrium when aggregate demand is equal to income. The aggregate demand is determined by consumption demand and investment demand.

In the Keynesian model of goods market equilibrium we also now introduce the rate of interest as an important determinant of investment. With this introduction of interest as a determinant of investment, the latter now becomes an endogenous variable in the model.

When the rate of interest falls the level of investment increases and vice versa. Thus, changes in the rate of interest affect aggregate demand or aggregate expenditure by causing changes in the investment demand. When the rate of interest falls, it lowers the cost c' investment projects and thereby raises the profitability of investment.

The businessmen will therefore undertake greater investment at a lower rate of interest. The increase in investment demand will bring about increase in aggregate demand which in turn will raise the equilibrium level of income. In the derivation of the IS Curve we seek to find out the equilibrium level of national income as determined by the equilibrium in goods market by a level of investment determined by a given rate of interest.

Thus IS curve relates different equilibrium levels of national income with various rates of interest. As explained above, with a fall in the rate of interest, the planned investment will increase which will cause an upward shift in aggregate demand function (C + 7) resulting in goods market equilibrium at a higher level of national income.



The lower the rate of interest, the higher will be the equilibrium level of national income. Thus, the IS curve is the locus of those combinations of rate of interest and the level of national income at which goods market is in equilibrium.

How the IS curve is derived is illustrated in figure. In panel (a) of figure, the relationship between rate of interest and planned investment is depicted by the investment demand curve II. It will be seen from panel (a) that at rate of interest Or_0 the planned investment is equal to OI_0. With OI_0 as the amount of planned investment, the aggregate demand curve is $C + I_0$ which as will be seen in panel (b) of figure, equals aggregate output at OY_0 level of national income.

Therefore, in the panel (c) at the bottom of the figure, against rate of interest Or_0, level of income equal to OY_0 has been plotted. If the rate of interest falls to Or_2, the planned investment by

businessmen increases from OI_0 to OI_1 [see panel (a)]. With this increase in planned investment, the aggregate demand curve shifts upward to the new position $C + I_1$ in panel (b), and the goods market is in equilibrium at OY_1 level of national income. Thus, in panel (c) at the bottom of figure, the level of national income OY_1 is plotted against the rate of interest Or_1.

With further lowering of the rate of interest to Or_2, the planned investment increases to OI_2 (see panel a). With this further rise in planned investment the aggregate demand curve in panel (b) shifts upward to the new position $C + I_2$ corresponding to which goods market is in equilibrium at OY_2 level of income. Therefore, in panel (c) the equilibrium income OY_2 is shown against the interest rate Or_2.

By joining points A, B, D representing various interest-income combinations at which goods market is in equilibrium we obtain the IS Curve. It will be observed that the IS Curve is downward sloping (i.e., has a negative slope) which implies that when rate of interest declines, the equilibrium level of national income increases.

Properties of the IS Curve:

1. The Slope of the IS Curve:

The IS curve is negatively sloped because a higher level of the interest rate reduces investment spending, thereby reducing aggregate demand and thus the equilibrium level of income. The steepness of the curve depends on the interest elasticity of investment (i.e., how sensitive investment spending is to changes in the interest rate) as also on the (investment) multiplier.

2. The Position of the IS Curve:

The position of the IS curve depends on the level of autonomous spending. If autonomous spending increases, the IS curve will shift to the right (with or without a change in slope, depending on interest elasticity of investment).

Shift in IS Curve

It is important to understand what determines the position of the IS curve and what causes shifts in it. It is the level of autonomous expenditure which determines the position of the IS curve and changes in the autonomous expenditure cause a shift in it. By autonomous expenditure we mean the expenditure, be it investment expenditure, the Government spending or consumption expenditure which does not depend on the level of income and the rate of interest.

The government expenditure is an important type of autonomous expenditure. Note that the Government expenditure which is determined by several factors as well as by the policies of the Government does not depend on the level of income and the rate of interest.

Similarly, some consumption expenditure has to be made if individuals have to survive even by borrowing from others or by spending their savings made in the past year. Such consumption expenditure is a sort of autonomous expenditure and changes in it do not depend on the changes in income and rate of interest. Further, autonomous changes in investment can also occur.

In the goods market equilibrium of the simple Keynesian model the investment expenditure is treated as autonomous or independent of the level of income and therefore does not vary as the level of income increases. However, in the complete Keynesian model, the investment spending is thought to be determined by the rate of interest along with marginal efficiency of investment.

Following this complete Keynesian model, in the derivation of the IS curve we consider the level of investment and changes in it as determined by the rate of interest along with marginal efficiency of capital. However, there can be changes in investment spending autonomous or independent of the changes in rate of interest and the level of income.

For instance, growing population requires more investment in house construction, school buildings, roads, etc., which does not depend on changes in level of income or rate of interest. Further, autonomous changes in investment spending can also take place when new innovations come about, that is, when there is progress in technology and new machines, equipment, tools etc., have to be built embodying the new technology.

Besides, Government expenditure is also of autonomous type as it does not depend on income and rate of interest in the economy. As is well- known government increases its expenditure for the purpose of promoting social welfare and accelerating economic growth. Increase in Government expenditure will cause a rightward shift in the IS curve.

Money Market Equilibrium: LM Curve

1. The LM curve is a schedule that describes the combinations of rate of interest and level of income at which money market is in equilibrium.

2. The LM curve slopes upward to the right.

3. The LM curve is flatter if the interest elasticity of demand for money is high. On the contrary, the LM curve is steep if the interest elasticity demand for money is low.

4. The LM curve shifts to the right when the stock of money supply is increased and it shifts to the left if the stock of money supply is reduced.

5. The LM curve shifts to the left if there is an increase in the money demand function which raises the quantity of money demanded at the given interest rate and income level. On the other hand, the LM curve shifts to the right if there is a decrease in the money demand function which lowers the amount of money demanded at given levels of interest rate and income.

Derivation of LM Curve

The LM curve can be derived from the Keynesian theory from its analysis of money market equilibrium. According to Keynes, demand for money to hold depends upon transactions motive and speculative motive.

It is the money held for transactions motive which is a function of income. The greater the level of income, the greater the amount of money held for transactions motive and therefore higher the level of money demand curve.

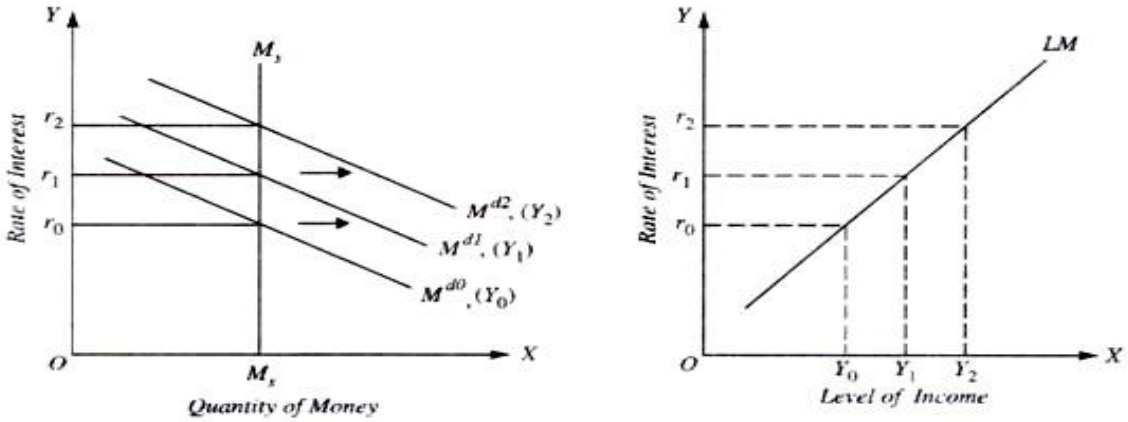
The demand for money depends on the level of income because they have to finance their expenditure, that is, their transactions of buying goods and services. The demand for money also depends on the rate of interest which is the cost of holding money. This is because by holding money rather than lending it and buying other financial assets, one has to forgo interest.

Thus demand for money (M^d) can be expressed as:

$M^d – L(Y, r)$, where M^d stands for demand for money, Y for real income and r for rate of interest. Thus, we can draw a family of money demand curves at various levels of income. Now, the intersection of these various money demand curves corresponding to different income levels with the supply curve of money fixed by the monetary authority would gives us the LM curve.

The LM curve relates the level of income with the rate of interest which is determined by money-market equilibrium corresponding to different levels of demand for money. The LM curve tells what the various rates of interest will be (given the quantity of money and the family of demand curves for money) at different levels of income.

But the money demand curve or what Keynes calls the liquidity preference curve alone cannot tell us what exactly the rate of interest will be. In figure (a) and (b) we have derived the LM curve from a family of demand curves for money.



As income increases, money demand curve shifts outward and therefore the rate of interest which equates supply of money, with demand for money rises. In figure (b) we measure income on the X-axis and plot the income level corresponding to the various interest rates determined at those income levels through money market equilibrium by the equality of demand for and the supply of money in figure (a).

Properties of the LM Curve:

1. The Slope of the LM Curve:

The LM schedule is positively sloped. This means that an increase in the interest rate reduces the demand for money. To maintain the demand for money equal to the fixed supply, the level of income has to rise. Accordingly, money market equilibrium implies that an increase in the interest rate is accompanied by an increase in the level of income.

2. The Position of the LM Curve:

The money supply is held constant along the LM curve. It follows then that a change in the money supply shifts the LM curve.

Shifts in the LM Curve

Another important thing to know about the IS-LM curve model is that what brings about shifts in the LM curve or, in other words, what determines the position of the LM curve. As seen above, a LM curve is drawn by keeping the stock or money supply fixed.

Therefore, when the money supply increases, given the money demand function, it will lower the rate of interest at the given level of income. This is because with income fixed, the rate of interest must fall so that demands for money for speculative and transactions motive rises to become equal to the greater money supply. This will cause the LM curve to shift outward to the right.

The other factor which causes a shift in the LM curve is the change in liquidity preference (money demand function) for a given level of income. If the liquidity preference function for a given level of income shifts upward, this, given the stock of money, will lead to the rise in the rate of interest for a given level of income. This will bring about a shift in the LM curve to the left.

It therefore follows from above that increase in the money demand function causes the LM curve to shift to the left. Similarly, on the contrary, if the money demand function for a given level of income declines, it will lower the rate of interest for a given level of income and will therefore shift the LM curve to the right.