Classical Macroeconomics: Money, Prices and interest

Dear Students,

Hope you have read my earlier topics shared with you online! In this lecture series I am discussing the determination of equilibrium rate of interest in the classical model, policy implications and effects of changes in Government spending and taxes on output and employment. Finally we also discuss the role of money in classical model.

In the classical theory the equilibrium rate of interest is the one which equals the supply of loanable funds to the demand for loanable funds .
Borrowing consists of selling a standard bond which promises to pay certain amount in the future or a perpetuity that pays a fixed interest forever which does not have any maturity date.
Lending consists of buying such bonds. The rate of interest is the return to holding bonds and also the cost of borrowing.
Rate of Interest depends on two factors —
(a) bond supply (borrowing)
(b) bond demand (lending).

In the classical system bonds are supplied by both firms and governments.

Firms sell bonds to finance all investment expenditures. The government sell bonds to finance their deficit i.e. spending in excess of tax resources.
In the classical model, business investment is a function of the expected profitability of investment projects and the rate of interest. Expected profitability of project was assumed to vary with expectations of project demand over their entire economic lives.

And these expectations are subject to exogenous shifts in the expected profitability of investment projects. Government deficit which will be financed by selling bonds to the public is also an **exogenous policy variable.**
If we assume expected profitability to remain unchanged, then investment expenditures is inversely related to the rate of interest. And business supply of bonds equaled the level of investment expenditure. So on the supply side of bond market the government bond supply is exogenous and business supply of bonds is equal to the investment expenditure.

On the demand side there are individual savers who purchase the bonds. In the classical model, saving was positively related to the rate of interest because at higher rates of interest people saved more.

Equilibrium Rate of Interest:
Fig. 3.11 shows how the rate of interest is determined in the classical model. The equilibrium rate of interest is the rate that equates the supply of loanable funds, which consists of saving , with the demand for loanable funds, which consists of investment (I) plus the deficit of the government (G – T), i.e., the portion of the deficit the government must choose to finance by selling bonds to the public.

Stabilising Role of the Interest Rate:
The rate of interest acts as a stabiliser in the classical model. If, for example, due to an exogenous event (e.g., apprehension of a war in near future) business people lower their expectations about future profits from investment, they will reduce their investment levels which would lead to a fall in the demand for loanable funds.

If we think of a situation where the government budget is balanced (G = T), private investment will be the only source of demand for loanable funds. Now if due to a fall in expected profitability of investment projects the investment demand schedule shifts to the left from I_o to I_1, investment will fall by Δ I at the same rate of interest.

So there will be an excess supply of loanable funds at the original rate of interest which will cause the rate of interest to fall from i_o to i_1.

As a result two types of adjustment will occur:

(i) Firstly saving will fall and consumption will increase, because full employment supply of output remains fixed (as shown by the vertical line in Fig. 3.11 and Fig. 3.12).

(ii) Secondly, investment increases by Δ I' due to a fall in the rate of interest. New equilibrium occurs at the interest rate-with saving (the supply of loanable funds) again equal to investment (the demand for loanable funds).

At new equilibrium point E" the increase in consumption (fall in saving) plus the increase in investment caused by the drop in the interest rate — the distance Δ I' + A C (= – Δ 5) in Fig. 3.12 — is just equal to the original autonomous decline in investment demand, Δ I. Since the interest rate falls, the sum of private sector demands (C + I) remains unchanged even if there is an autonomous decline in investment demand.

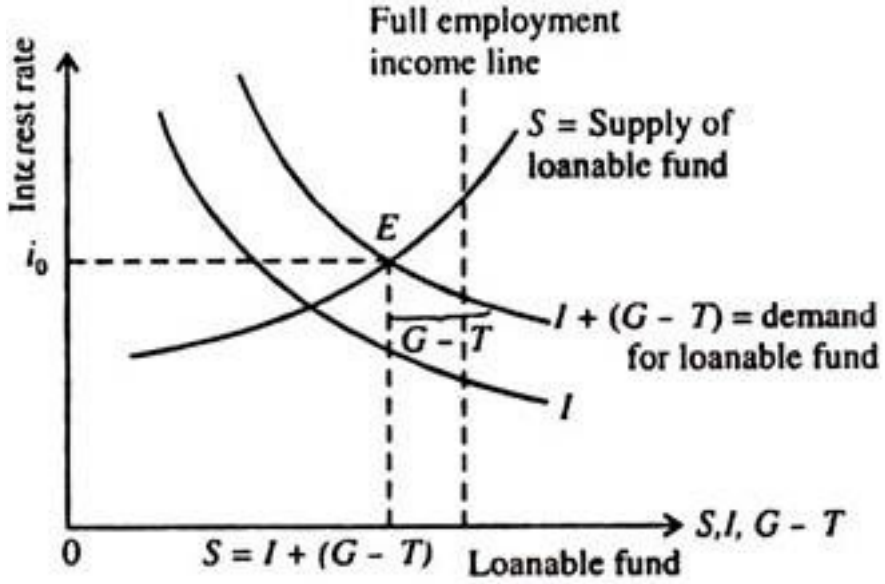

Fig. 3.11 Determination of the Rate of Interest in the Classical Model

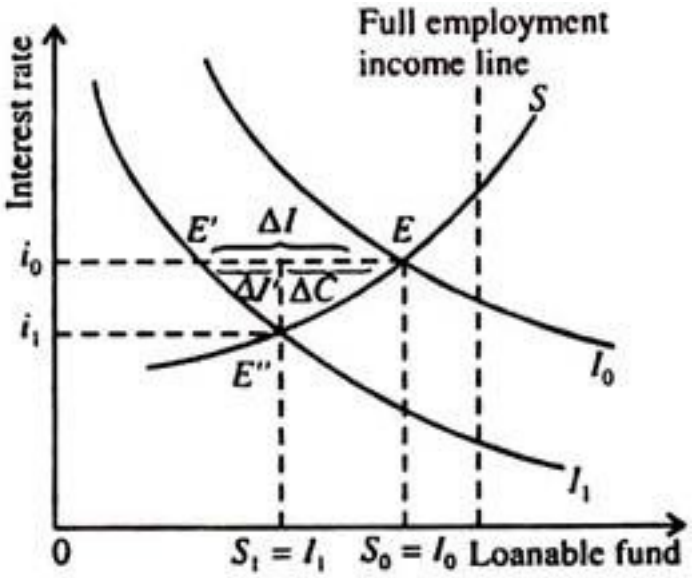

Fig. 3.12 Autonomous Decline in Investment Demand

Policy Implication of classical model

1 Fiscal Policy:

The government budget constraint is expressed as

$G = T + \Delta B + \Delta M$ ... (21)

where G is the government's expenditure on goods and services, T is tax revenue, ΔB is market borrowing (funds raised by selling bonds to the public) and ΔM is deficit spending (financed by creating/printing new money through central bank).

If we assume that T remains fixed, and money supply (M) also remains fixed , then it implies that the increased government expenditures are financed by deficit financing through sale of bonds.

Let us examine the effect of a change in government spending on the interest rate. At the equilibrium rate of interest (r_o), shown by point E, the demand for loanable funds is equal to its supply.

Due to deficit spending by the government by selling bonds, the demand curve for loanable funds shifts to the right to I + (G – T)j. The equilibrium rate of interest rises from r_o to r_1, as shown by point F.

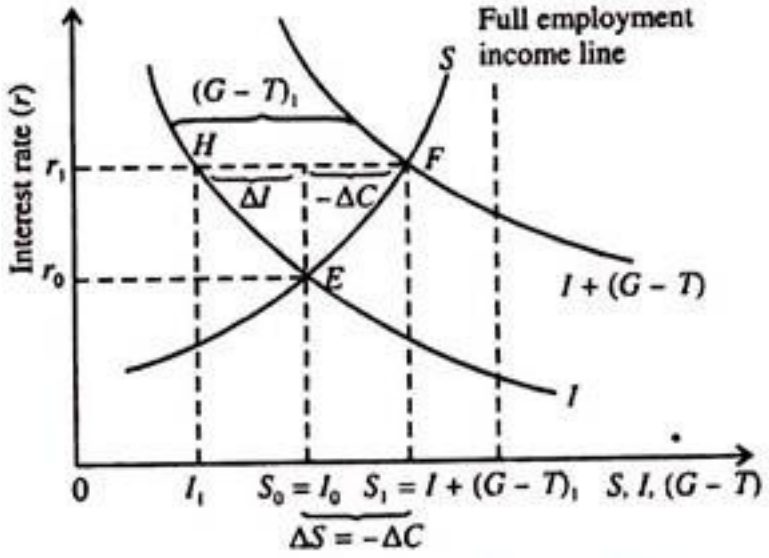

Fig. 3.13 The Effect on Increase in Government Expenditure on Interest Rate and Private Investment

As a result two things happen at the same time. The volume of investment decreases from I_o to I_1 and the volume of saving increases (or consumption falls) from S_o to S_1. The fall in investment and consumption just

balances the increase in (G- T), the government deficit spending .

This implies in the classical model a bond-financed increase in government spending will have no effect on the equilibrium values of output or the price level due to nature of both aggregate demand and aggregate supply curves. These two curves together determine output and the price level, irrespective of the level of government expenditure or its changes.

Policy Implication.

Neutral Demand-Side Effect of Tax Policy:

Like government expenditure, a policy of tax cut will also have no effect on aggregate demand. A cut in tax rates or lump some tax will increase disposable income and lead to increase in household consumption. But if the government sells bonds to recover the revenue loss arising from tax cut, the crowding out effect will be observed as is found in case of bond-financed increase in government spending.

Investment will fall as usual if the rate of interest rises. The increase in saving, caused by a rise in the rate of interest, will lead to a fall in consumption. So consumption will rise to its original level. Thus aggregate demand will remain unchanged because the increase in government expenditure will be offset by a cut in I and C taken together.

If, however, revenue loss due to tax cut is recovered by printing new money, then aggregate demand will increase. In this case a policy of tax cut would lead to proportional rise in the price level. However, tax cut will have no direct effect (or independent) effect on aggregate demand.

It will affect the price level independently — by inducing the government to borrow money from the central bank to cover the budget deficit.

Supply-Side Effects:

If the tax cut were simply a lump-sum one, then it would have only demand-side effect. But if the tax cut were in the form of reduced income tax rates in the classical model, then it would have a favourable incentive effect on the supply of labour. In this case employment and aggregate output will increase.

If we include an income tax in the classical model, the labour supply function becomes:

$$L^s = g\left[(1 - t^y)\frac{W}{P}\right] \qquad \ldots (23)$$

This means that for a given pre-tax real wage (W/P), a cut in the income tax represents an increase in the after-tax real wage and this, therefore, leads to an increase in labour supply.

Fig. 3.14(a) illustrates the effect of a cut in the marginal income tax rate from 40% to 20% in the context of the classical model. In part (a), a cut in the marginal income tax rate (from 0.40 to 0.20) increases the after-tax real wage for a given value of the pre-tax real wage. As a result the labour supply curve shifts to the right and equilibrium employment rises from L_0 to L_1.

This, in its turn, leads to an increase in output, in the classical model, through the production function in Fig. 3.14(b).

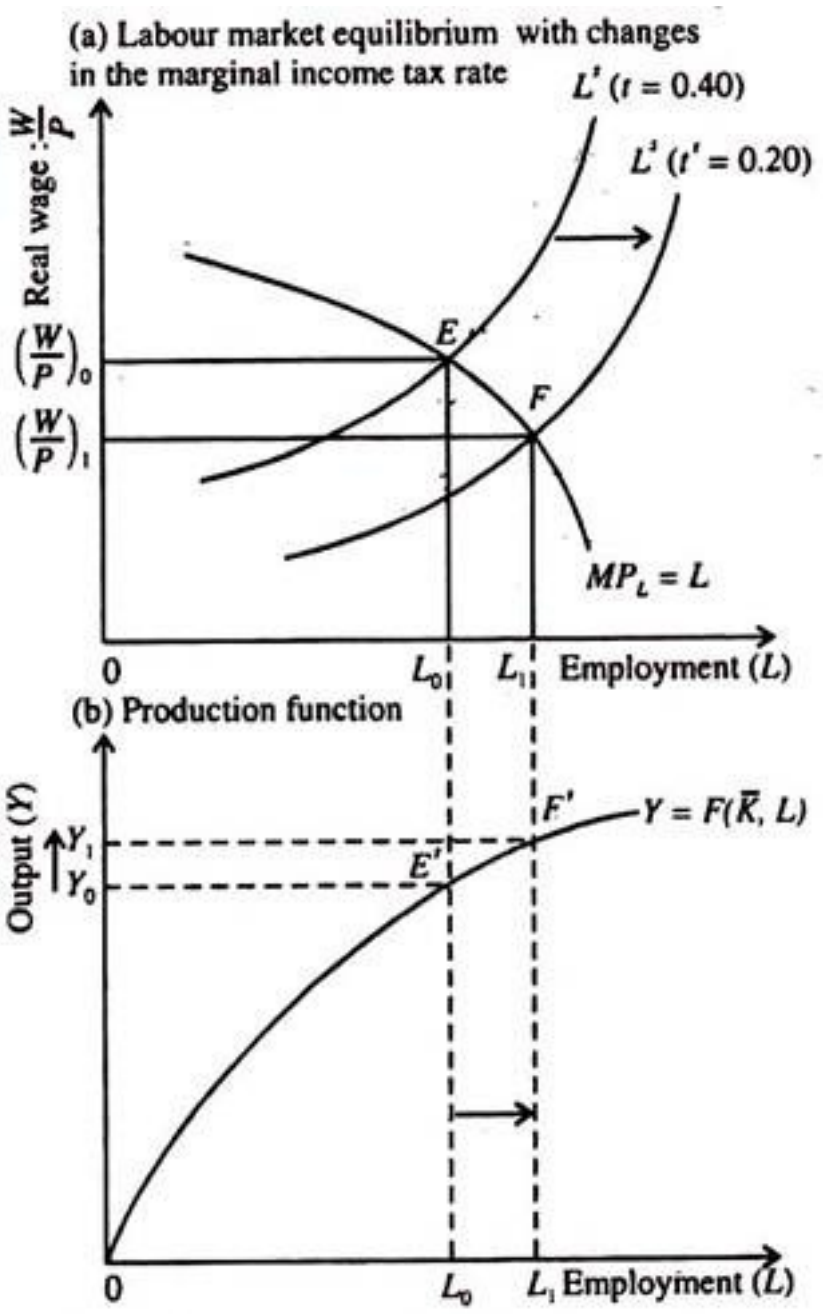

Fig. 3.14 Employment and output (supply-side) effects of an income tax cut

The end result is a rightward shift of the vertical aggregate supply curve, as shown in Fig. 3.15. Since output is supply-determined, a rightward shift of the aggregate supply curve from Y_s (corresponding to a tax rate of 40%) to Y_s (corresponding to a tax rate of 20%) leads to an increase in output from Y_0 to Y_1.

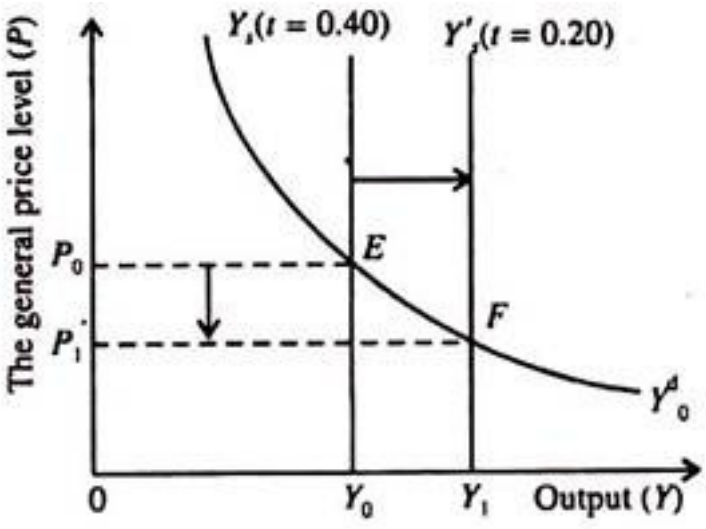

Fig. 3.15 Shift of the *AS* Curve in the Classical Model due to Supply-side Effects of a Tax Cut

Since the aggregate demand curve is downward sloping, the general price level falls from P_0 to P_1. Thus, in the classical model, where the level of aggregate demand remains unchanged because it is determined by the money supply (there is only movement along the aggregate demand curve, no shift of the curve), an increase in aggregate supply due to tax cut and fall in real wage leads to a fall in the price level.

Importance of Money in Classical Model:

In the classical system, the quantity of money determines the general price level and, for a given real income, the level of nominal income. So the stability of money supply is important for ensuring price level stability. If M rises, P will also rise proportionately. But the quantity of money does not affect the equilibrium values of any of the real variables, viz., output, employment, and the interest rate. In the classical model employment and output are supply

determined. The theory of equilibrium interest rate is also a real theory, not a monetary theory.
In the classical model the rate of interest is determined by the real forces of 'productivity and thrift' such as real investment demand, real saving and the real value of the government deficit.

Classical Dichotomy:
Due to neutrality of money there is a dichotomy between the factors determining real and nominal variables. In the classical theory, real (supply-side) factors determine real variables'. Employment and output depend primarily on the size of the population, capital formation and technology.
Interest rate is determined by productivity and thrift. But monetary factors (such as the demand for and the supply of money) do not play any role in determining these real quantities.
In short, money determines only the normal values in which quantities are measured. But it has no effect on real quantities such as employment, output and the interest rate.