Classical Economics

Students in this topic we will learn about classical model of income and output determination.

Classical economist emphasized the importance of real as opposed to monetary factors in determining output. Secondly it stressed on the self- correcting mechanism of the economy.

Lets start with production function-
Aggregate Production Function:

Production function gives us a technical relationship between inputs and output. In SR capital stock is fixed and labour is the variable input.

Aggregate production function, which is expressed as:
$Y = F(K, L)$ ... (1)

Where Y is output, K is fixed stock of capital and L is the quantity of labour. Labour is homogenous. In the short run, the capital stock, the size of the population and the state of technology are all assumed to be constant.
So output varies with changes in the quantity of labour.
 i.e. Y depends on labour.
In Fig. (a) the production function shows how output y responds to an increasing amount of labour. Labour is the only variable factor of production. Fig. (b) shows the marginal product of labour. MP_L falls due to diminishing returns — with every extra worker employed output increases at a decreasing rate.
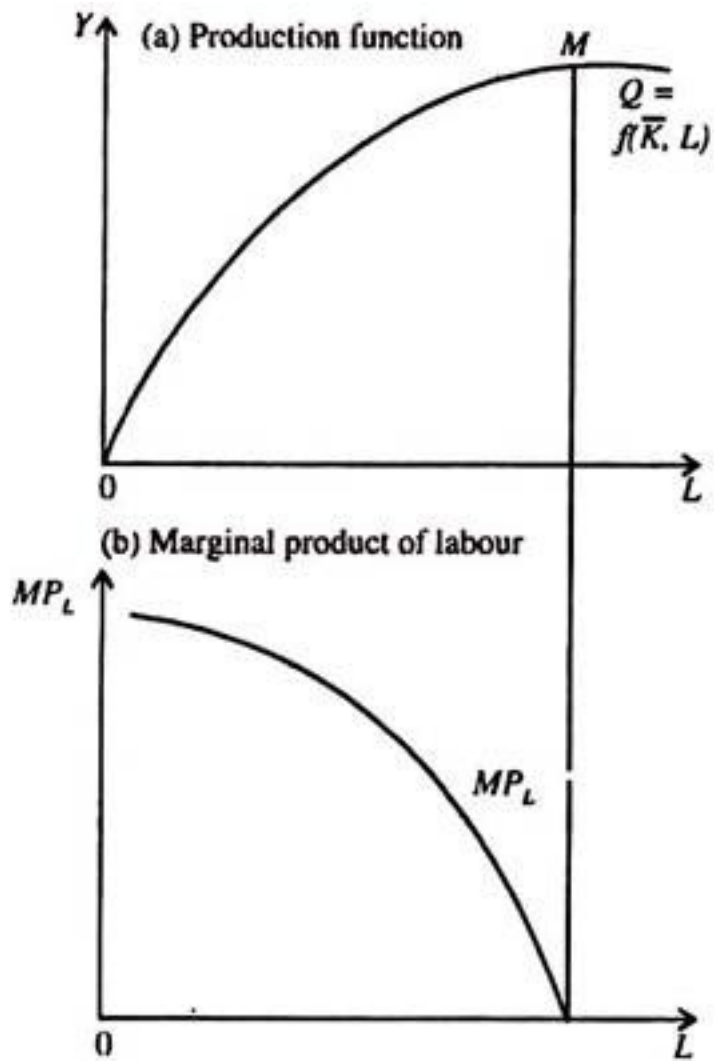
Fig. 3.1 Production Function and MP_L Curve

In the classical model,. There are no barriers to the adjustment of money wages.

Employment-Output Determination: Labour Market:

In the **classical model**, equilibrium level of output is determined by the employment of labour. The level of output and, hence, the level of employment is determined in the labour market by the demand and supply of labour.

Assumptions of labour market
1. Perfectly flexible prices and wages
2. Perfect information

In classical model firms aims to maximize profit and workers try to maximize their wage income and the labour market clears automatically

In a profit-maximizing economy, labour will be demanded up to the point where MR=MC. Since labour is the only variable factor MC is equal to MC of labour. MC of labour is equal to the money wage divided by the marginal product of labour, MP_L, i.e.,

$MC = W/MP_L$
The condition for profit maximization is

$$P = MC = \frac{W}{MP_L} \qquad \ldots (3.4)$$

$$\text{or} \quad P.MP_L = W \qquad \ldots (3.5)$$

$$\text{or} \quad \frac{W}{P} = MP_L \qquad \ldots (3.6)$$

where W is the money wage, P is the price level, and W/P is the real wage. Thus MP curve for labour is the firm's demand for labour. More labour is demanded at a lower wage. Thus, demand for labour depends inversely on real wage. Therefore the aggregate demand curve for labour is the horizontal summation of all individual firm's demand curve for labour. Aggregate labour demand function, shown in equation , is also inversely related to the real wage rate. That is,
$D_L = f(W/p) \ldots$

Labour supply function .depends on the real wage rate. Labour supply is directly related to real wage. We can write
$S_L = g(W/P) \ldots$

Labour supply curve is derived from the income-leisure trade-off curve which shows the trade-off between leisure and work.
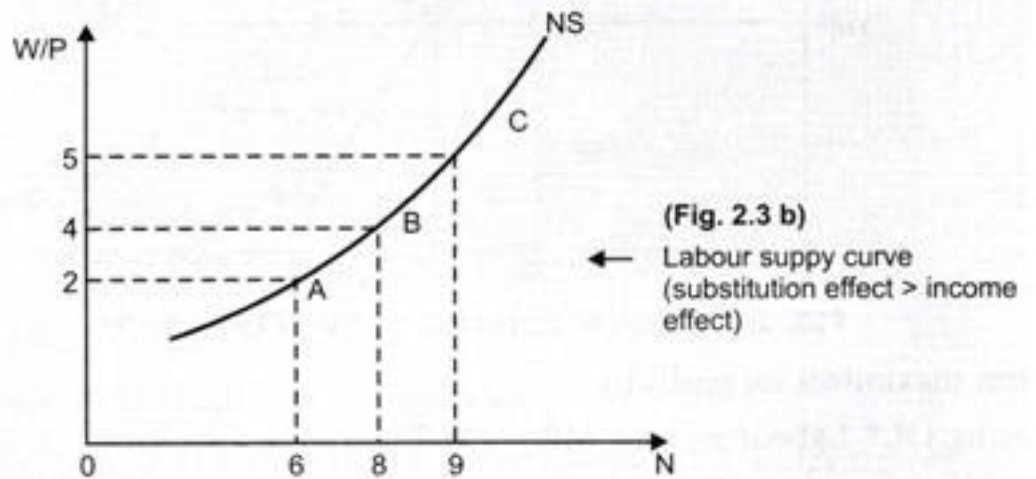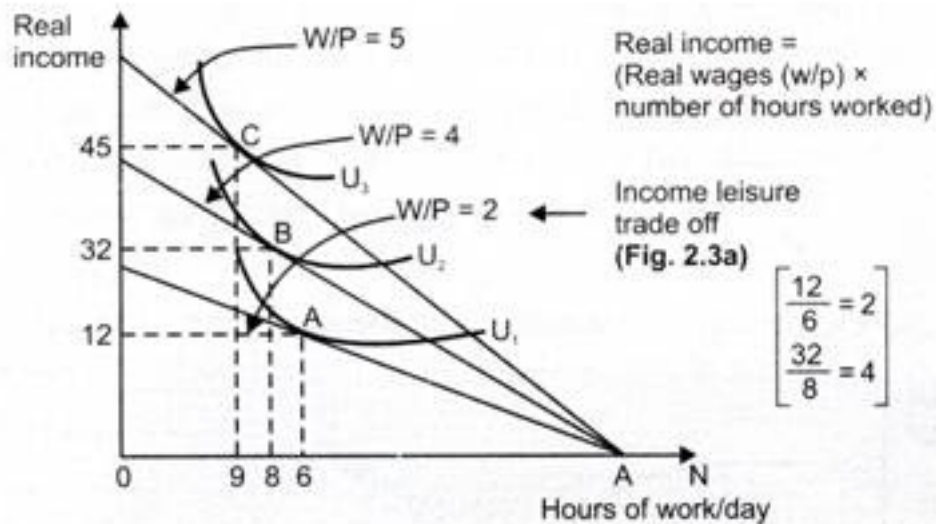

FIG. 2.3: INDIVIDUAL LABOUR SUPPLY DECISION

In the above diag, the first figure shows the equilibrium choices of worker at different wage rates. On the vertical axis we measure the real income and on horizontal axis we measure leisure. With 24 hours in a day individual will divide his hours between working and enjoying leisure time. The individual's utility between work and leisure is

shown with the help of indifference curves. The budget lines are trade offs between work and leisure, the slope of these lines are real wage rate. Higher the wage, the steeper the lines would be.As the wage increases from 2 to 4 to 5 , the budget line gets steeper. For each real wage we have a unique equilibrium- A, B and C. Now point A shows that individual enjoys 6 hours of labour which can be plotted in the next diagram corresponding t real wage of 2. Similarly we get other points to get an upward sloping SC.

Here we need to note that there are 2 **effects of a change in wage rate.**
Substitution Effect and Income Effect.
When wage rate increases leisure becomes expensive, so individual would substitute leisure for work, i.e. increase work hours. In case of income effect, higher income implies greater demand for both the goods- so higher wage would mean more leisure hours and less work hours.
At lower income level, labour prefers work to leisure → Substitution Effect (SE) is stronger than Income Effect (IE). At 'extremely' higher income level, labour prefers leisure to work → IE > SE. Thus, we get backward bending supply curve of labour.
However 'extremely' high wages are rare. Therefore, it is assumed that the Aggregate labour supply curve has a positive slope. SE is strong enough to offset the IE.

In equilibrium demand for labour equals supply of labour. $D_L = S_L$ which will determine output, employment and real wage in the classical system.
Equilibrium real wage rate and the equilibrium level of employment are determined at that point where the labour demand curve cuts the labour supply curve. Once we know the equilibrium level of employment, from the aggregate production function we can derive the equilibrium level of output.
This is shown in Fig. 3.1. In the lower panel, aggregate production function has been shown. The intersection

between D_L and S_L curves at point E in the upper part of the figure determines the equilibrium level of employment N at the equilibrium real wage rate (W/P). The equilibrium of the classical labour market is one where everyone willing to work at the real wage (W/P) is able to find work. The corresponding equilibrium level of output (at the equilibrium level of employment) is Y_*. This equilibrium output level is also called full employment output level.
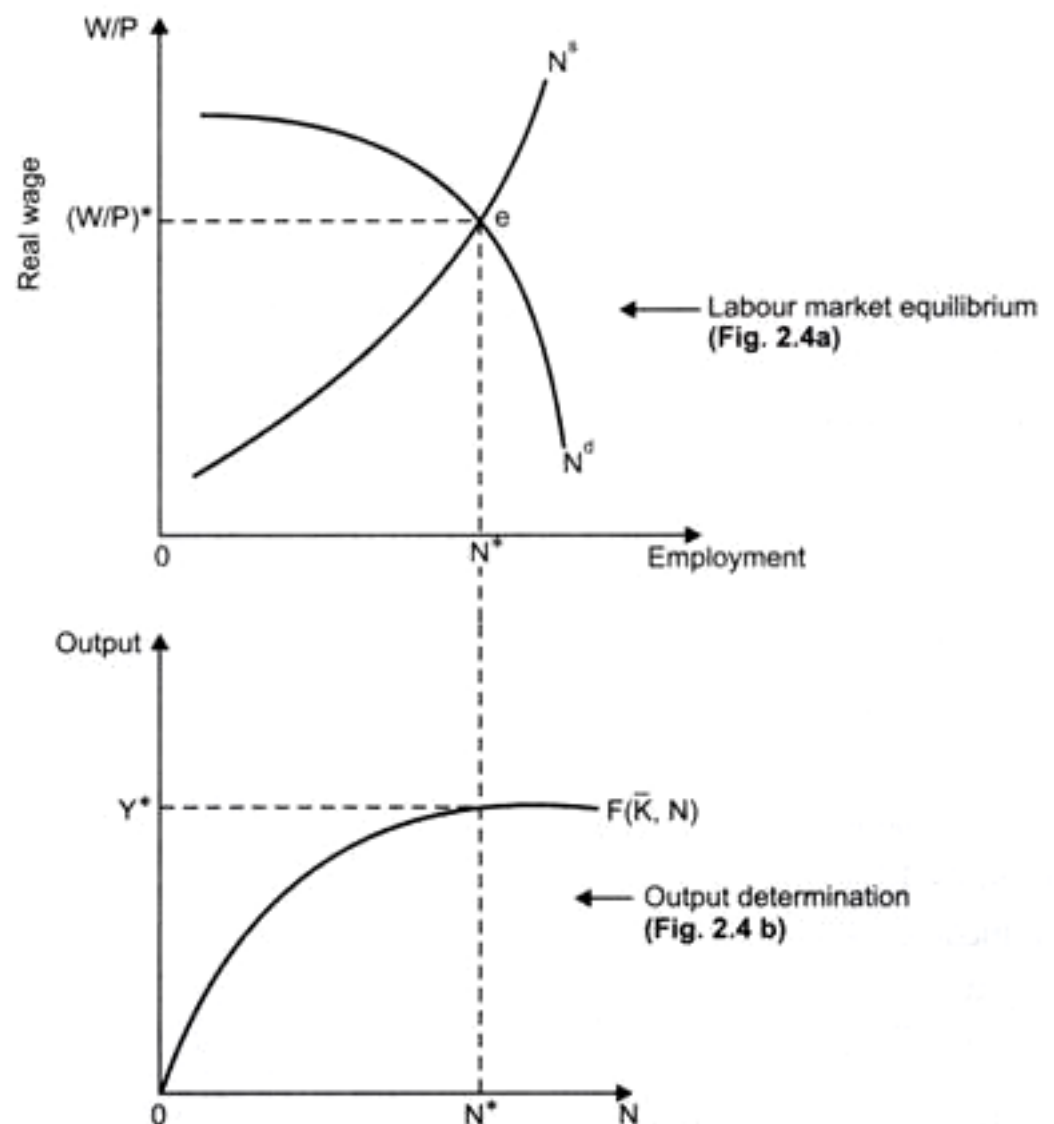

FIG. 2.4 (A): CLASSICAL OUTPUT AND (B) EMPLOYMENT DETERMINATION.

In the classical system, full employment is achieved automatically due to wage-price flexibility. For eg, at a real wage $(W/P)_1$ there exists a situation of unemployment. The excess supply of labour (AB) will reduce the real wage rate until labour supply is equal to the labour demand. Ultimately, real wage rate will decline to $(W/P)_F$ where aggregate labour demand is exactly matched by aggregate labour supply.

It may be noted that the volume of output and employment in the classical system are determined by only supply side of the market for output.

Supply curve of labour is positively sloped because at a given price, higher money wage means higher real wage. Since Real wage = W/P, Increase in money wages, with price level constant will lead to an increase in (W/P). So at each price level there will be a different (W/P) and, thus, different amount of labour supply.

 Assume at money wage $\rightarrow 2W_1$ and Price $\rightarrow 2P_1$
Labour supply $\rightarrow$ N* [Demand for labour (MP_N) = Supply of labour (N^s)]
(ii) If price level is doubled e.g.

If Price $\rightarrow 4P_1$ Labour supply curve shifts upwards towards the left to N^s $(4P_1)$. This is because less labour is supplied (N_2) at the given money wage $(2W_1)$ because when price increases (W/P) decreases. On the other hand, at the given money wage $(2W_1)$, when price increases, (W/P) decreases. As a result demand for labour increases and demand curve for labour shifts to the right from MP_N. $2P_1$ to MP_N. $4P_1$ and employment increases from N* to N_1. So at wage 2W1 there will be exces demand
 If there is proportionate increase in both money wage and price level, from $2W_1$ to $4W_1$ and $2P_1$ to $4P_1$

The graph shows:

$$\frac{6W_1}{6P_1} = \frac{4W_1}{4P_1} = \frac{2W_1}{2P_1}$$

W/P (Real wage)

$N^s = f(W/P)$

e

Labour supply and demand function of **real wage** (Fig. 2.4a)

$MP_N = f(W/P)$

0   N*   N

Money wage

$N^s(6P_1)$
$N^s(4P_1)$
$N^s(2P_1)$

Labour supply and dem function of **money wag** (Fig. 2.5b)

$6W_1$
$4W_1$
$2W_1$

A

$MP_N \cdot 6P_1$
$MP_N \cdot 4P_1$
$MP_N \cdot 2P_1$

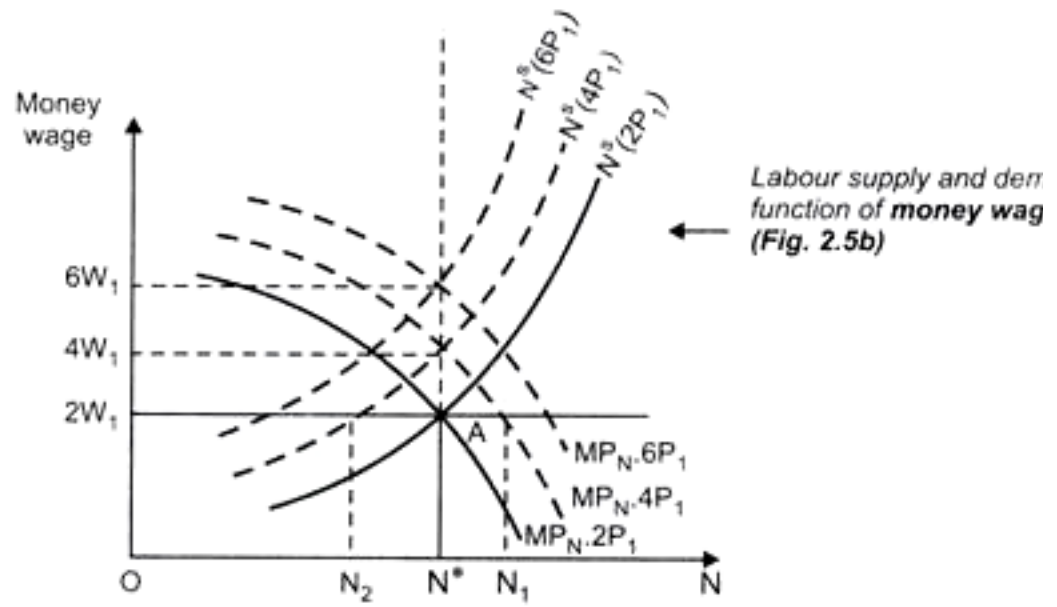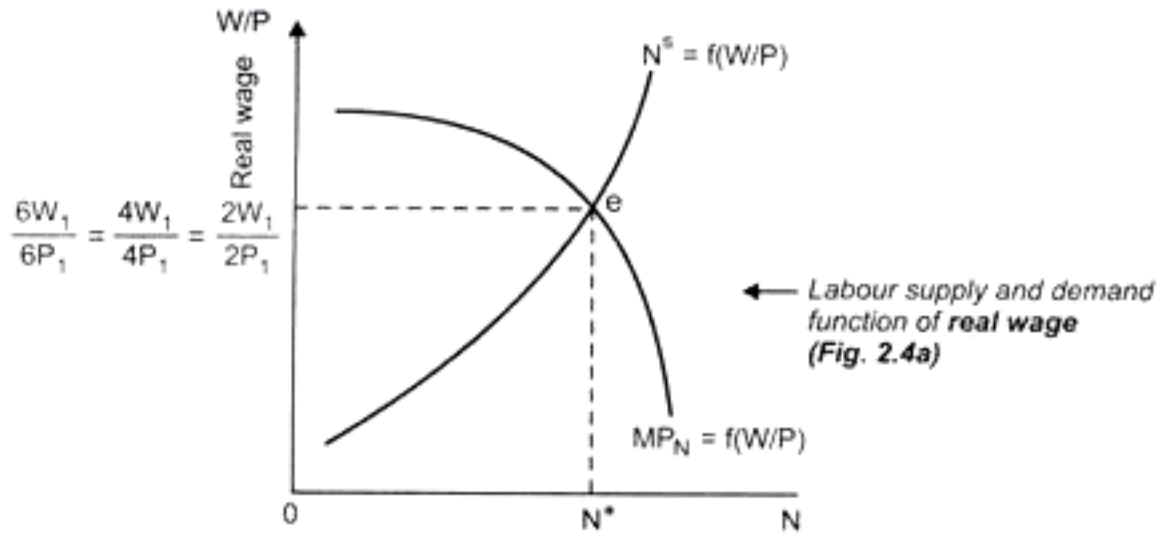O N_2 N* N_1 N

FIG. 2.5 (A, B): EQUILIBRIUM IN THE LABOUR MARKET AND THE DETERMINATION OF MONEY WAGE.

Supply of labour and demand for labour will not change because the ratio of (W/P) remains same i.e., $2W_1/2P_1 = 4W_1/4P_1 = 6W_1/6P_1$ Thus, demand of labour will be constant at N*, that is, at full employment level. So if money wage rise proportionally to rise in prices , the real wage is constant and level of employment is unchanged.

Derivation of AS

Now let us derive the classical AS curve. In part (a) at equilibrium point E, the price level is P_1, the money wage is W_1 and employment L_1. When the price level rises to P_2, equilibrium is at point F, where the money wage is W_2 but the level of employment remains constant. This means that in the classical model output is not a function of price. Since increase in price will reduce W/P and shift the demand and supply curves. Reduction in real wage increases the demand for labour and reduces the supply of labour. At new equilibrium point F , wages increase in the same proportion as increase in price

(a) Labour supply and demand
as functions of money wage

Money wage : W

$L^s(P_2)$

$L^s(P_1)$

W_2 — — — — — — — — — F

W_1 — — — — — — — — — E

$MP_L.P_2$

$MP_L.P_1$

0 L_1 Employment (L)

(b) Classical AS Curve Y^s

Aggregate price level (P)

P_2 — — — — — — — — — F

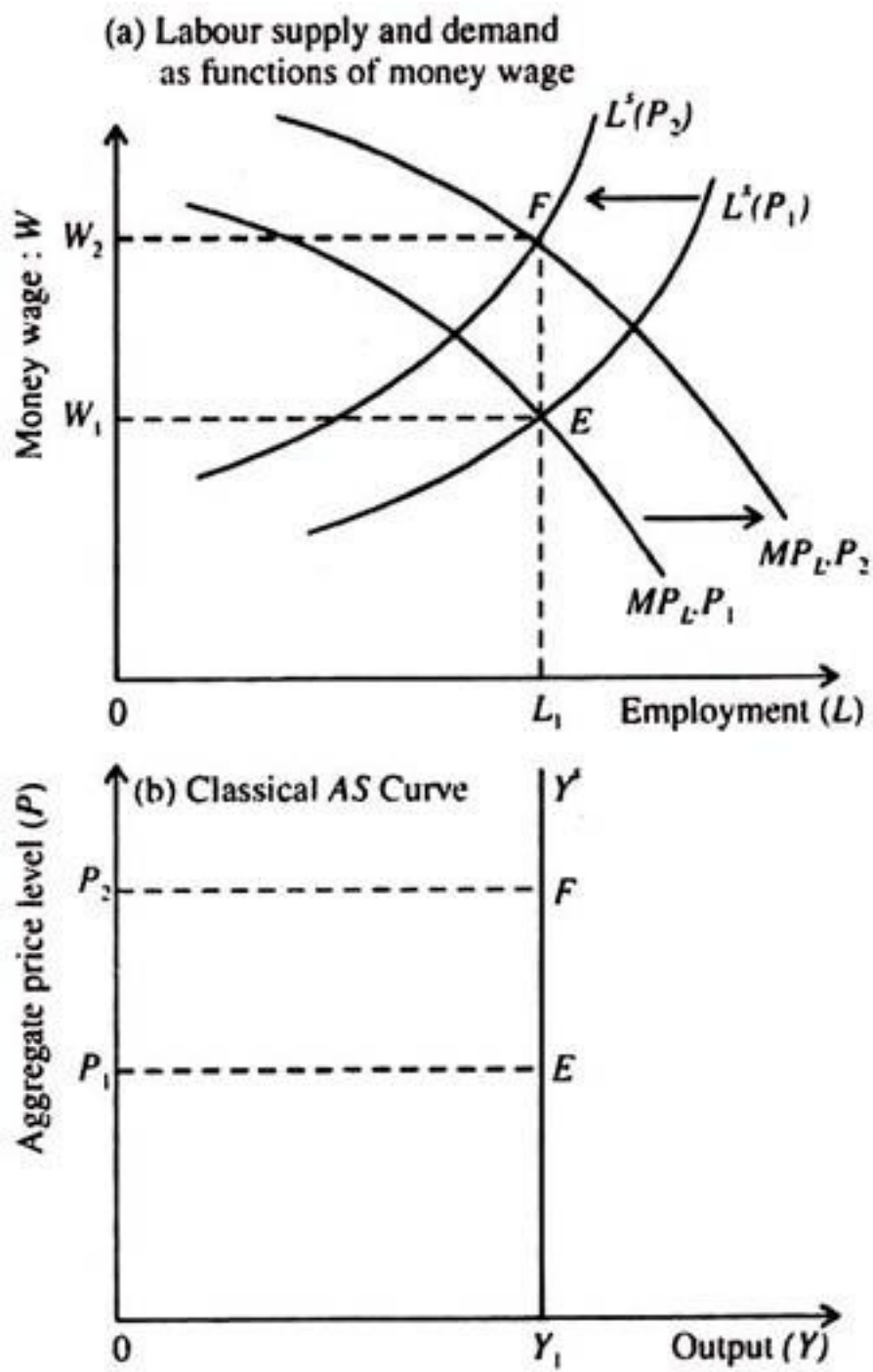P_1 — — — — — — — — — E

0 Y_1 Output (Y)

Fig. 3.7 The Classical AS Curve

Any change in the price level leads to proportional change in the money wage, leaving the real wage unchanged. As a result there is no change in equilibrium employment and, so, in aggregate output. This is why the classical aggregate supply (AS) curve is a vertical straight line.

This reflects the fact that higher price level require proportionately higher levels of the money wage for maintaining equilibrium in the labour market.
The real wage, employment, and, therefore, level of output, remain the same at P_1 and P_2. **The vertical aggregate supply curve implies that output (Y) is completely supply-determined in the classical model**. Output is determined by the relationship of the labour market with the aggregate production function. For output to be in equilibrium the economy must be on the aggregate supply curve; output must be Y_1.

Factors that do not affect output:
Since output and employment are supply determined, the level of aggregate demand has no effect on output. Demand side factors like quantity of money, level of government spending, investment demand have no role in determining the level of output and employment.