The Classical Model.

The basic equations.

1. $Y = f(N, K) \rightarrow$ production Y is a fn. of Labor (N) which is the variable input and K (fixed input of services of capital).

This prod. fn. is assumed to involve the diminishing marginal returns to the inputs. ie $\frac{\partial f}{\partial N} > 0 \Rightarrow$ the marginal product of labor is positive as labor increases and

$\frac{\partial^2 f}{\partial N^2} < 0 \Rightarrow$ the MP_L declines as firm's employ more labor with constant capital.

Next we consider that the main objective of the entrepreneur is to max profit

$$\pi = Rev - Cost = P.Y - WN$$

Price = P, Y = Output, W = wage.
N = labor.

When π is max MR = MC.

$$\Rightarrow P.\frac{\partial f}{\partial N} = W.$$

$$\Rightarrow \frac{\partial f}{\partial N} = \frac{W}{P}.$$

n, We can say $W = P.\frac{\partial f}{\partial N}$

This means that profit maximizing firm (competitive firm) carries out its output and employment to the point where the market value of its workers marginal product is equal to the wage.

So the 2nd eq. is $\frac{W}{P} = \frac{\partial Y}{\partial N} = MP_L$ ... (2)

is the labor dd equation.

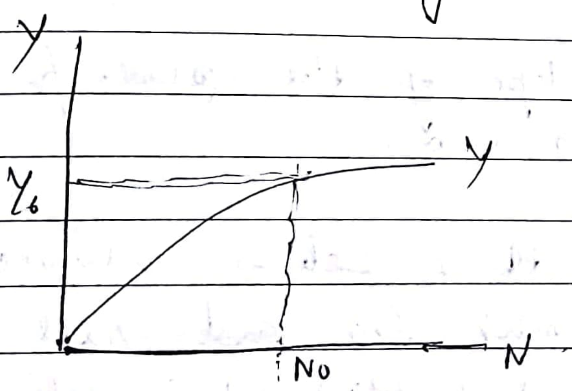
Next eq. 3 is given by.

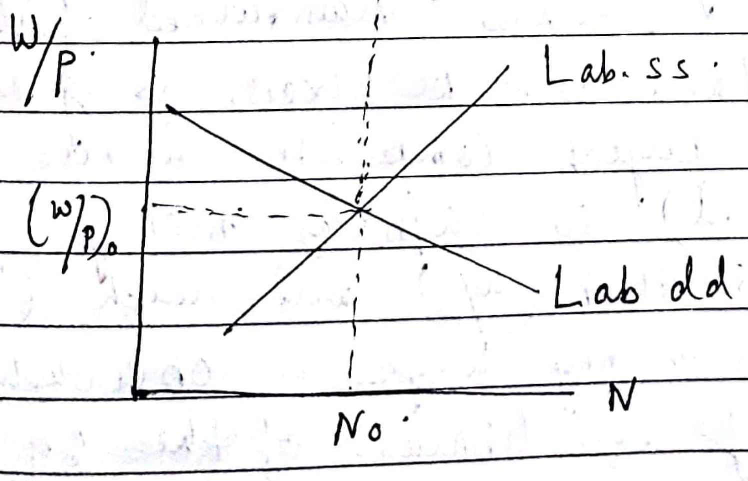
$N = f(W/P)$ This is the lab. ss fn.

It is a rising fn. As real wage ↑ the lab. ss ↑.

From these 3 eqs we can solve for Y (Output), N (labor) & W/P (real wage)

The whole thing in diagram.





(where Lab. dd & Lab ss intersect Lab. mkt is then in equilibrium).

Things to note:
The lab. dd curve is the slope of the production fn. Now the slope of the dd curve declines as more lab. is employed as production is subject to diminishing returns. Corresponding to each production fn. there is one and only one marginal product curve. If the production fn. changes its height (say shift up). Then there is no change in the slope. So the MP_L remains unchanged it is only AP_L that rises. But any change in slope of the production fn. will alter the MP_L i.e. the lab. dd curve.

Q. ~~How~~ Will the Lab dd curve change when a) The production fn. shifts from its position.
b) The slope of the prod. fn. change.
Give explanation.

Now when lab. dd & Lab. ss intersect the full employment No and real wage $(W/P)_0$ corresponding to full employment is determined. If (W/P) is somehow maintained higher than $(W/P)_0$, there will be excess ss of lab. As there ~~is~~ is perfect competition in the lab. mk (assumed) so rapidly money wage will ↓ so that (W/P) will reach $(W/P)_0$. Stability of the money wage is obviously a condition of equilibrium of the system.

In the classical model money wages are flexible. So long as there is unemployment money wages will fall as there is competition among labourers. As wage falls more lab. is demanded and more employment takes place. This increases the supply of output. To dispose off the additional supply, the price level must fall. The logic of the classical model is that price level should fall in lower proportion than the money wage rate. So in other words so long there is unemployment, the real wage rate will fall, the demand for labour will increase and the supply of labor will decrease until full employment is reached. So with perfect flexibility of money wages and prices full employment will be reached in the labor market. Thus in the Classical Model there is never under employment equilibrium.

But in the Keynesian model wage is not flexible downward. There is downward rigidity of wage. So in the Keynesian model if there is more labor supply at a given wage this cannot push the wage down. So in the Keynesian model the equilibrium is not full employment level. There can be unemployment

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present in the labor mkt.

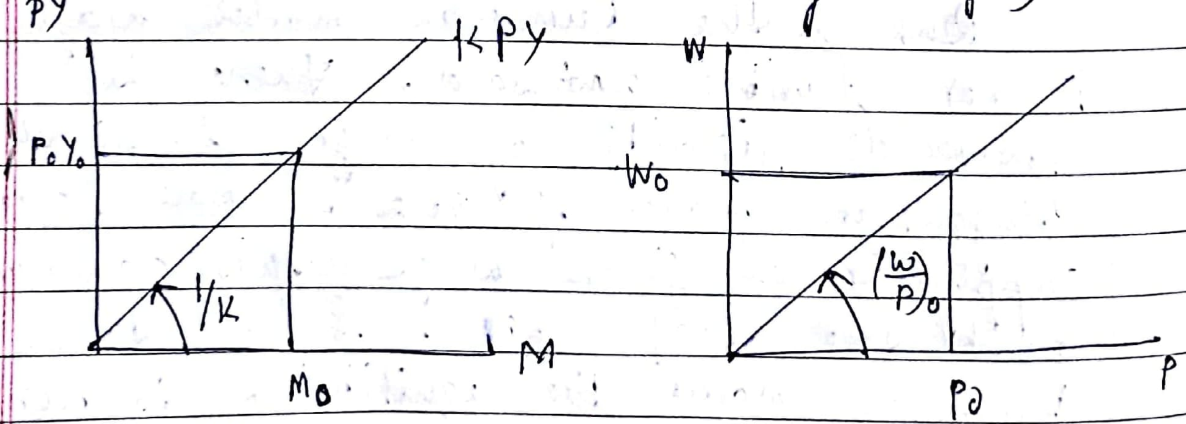
We next consider the classical money market. Classical model like other model considers one money dd fn., money ss fn. and the equilibrium condition. Classical money dd fn. considers only the transaction dd for money. So the dd for money is only a fn. of income. So $M_d = KPY$ ... (4). here M_d = money demand, P = price level, Y = income/output and K = constant. The money ss M_s is a given constant. The equilibrium in the money market is given by

$M_d = M_s$ ... (5). Again $M_s = M_0$ ... (6)

Combining of (4) & (5) we can write

$M_0 = M_s = KPY$ → here M_0 is given. Y is known from equation (1-3), K is constant. So this money mkt equilibrium condition can be used to find the price level P.

As we already know the equilibrium value of (W/P), if we know P we can determine W (money wage)



(c) (d)

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We find the equilibrium price level in part (c) of the figure. Here the straight line through the origin KPY (whose slope is 1/k) shows the amount of money required for each level of money income or in other words the level of money income which each possible quantity of money can support. If the actual stock of money is marked by the vertical line Mo, then money income must equal ~~(PY)~~ $(PY)_0$. and knowing Y_0 we can calculate for P_0.

Part (d) of the figure permits us to find the necessary level of money wage. We plot on the diagonal line the equilibrium real wage found earlier. Any real wage is a ratio of price to money wage. So corresponding to each real wage are numerous possible combinations of P and W. All of these P & W fall on a straight line through the origin whose slope measures the real wage. Given the equilibrium real wage and the equilibrium price level, there is only one money wage consistent with both of these.

The complete classical mk. also consists of the determination of interest rate. For this we consider the bond market. The households save and use the savings to purchase bonds issued by firms. Firms finance their investments by selling bonds to the households. So savings is connected with the demand for bonds while investment is connected with the supply of bonds.

According to the classical theory the equality of savings and investment gives / determines the rate of interest.

So

$$S = S(r) \quad \cdots (7) \quad \text{where } S'(r) > 0$$

and $I = I(r) \quad \cdots (8) \quad$ where $I'(r) < 0$.

The equilibrium condition $S = I \cdots (9)$

The rate of interest is determined using equations 7 - 9.

It is to be noted that the determination of the equilibrium rate of interest is in no way related with the determination of the equilibrium values of the other variables in the system.

So the complete classical model has the following equations:

1. $Y = f(N, K)$, 2. $\frac{W}{P} = \frac{\partial f}{\partial N}$.

3. $N = f(W/P)$, 4. $M_d = kPY$

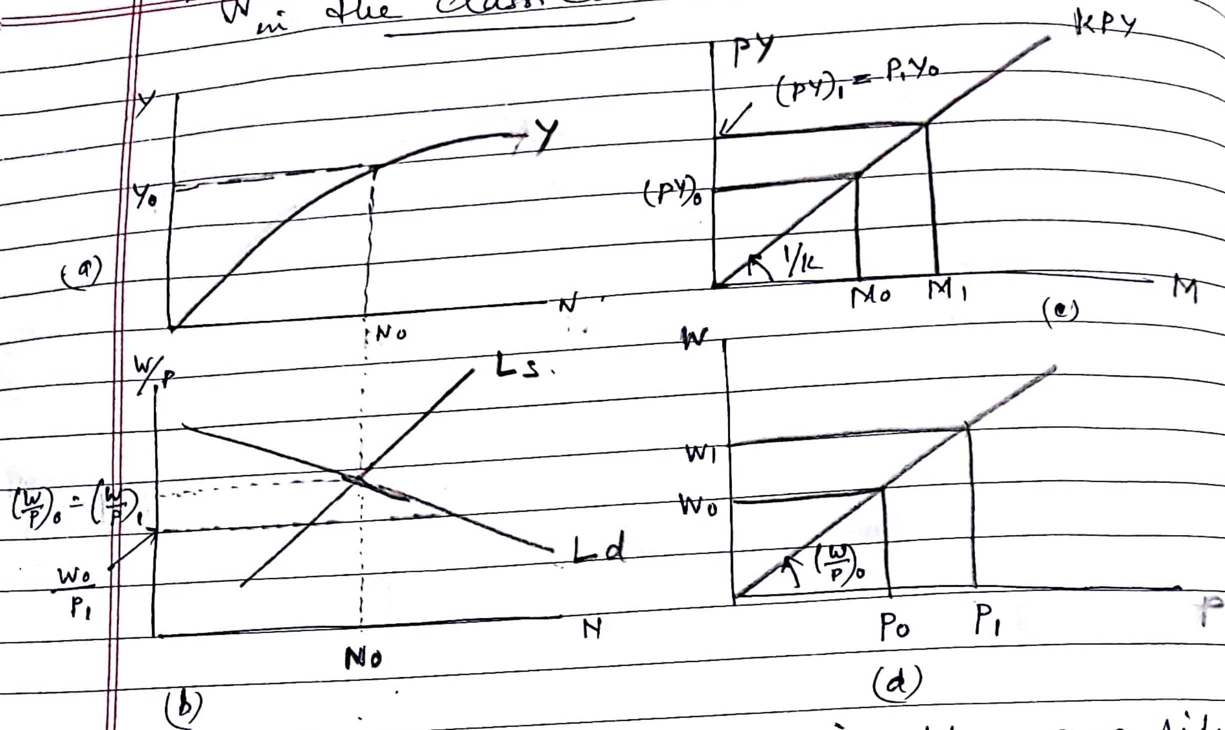
5. $M_d = M_s$, 6. $M_s = M_0$, 7. $S = S(r)$
8. $I = I(r)$ 9. $S = I$.

It is to be noted that the classical system is decomposable. We can use equation (1–3) to determine Y, N and w/P. Once Y is known equation (4–6) can determine P. And finally equation (7–9) determine the rate of interest.

So in the classical model determination of equilibrium rate of interest is not connected with the determination of the equilibrium values of other variables.

If we divide our system into two parts eq. (1–3) are called the real part of the system and eq (4–6) are the monetary part. Here real variables like real wage rate, the output, level ~~&~~ of employment are determined in the real sector while monetary variables like price level, money wage are determined in the monetary part of the system.

Effects of an increase in Money in the classical Model.



Let there be an increase in the quantity of money. ie M_0 is increased to M_1. We take up the eq. $M_0 = KPY_0$ as $Y = Y_0$ from fig (a) so when M_0 increases to M_1 the price level P has to increase. So the previous output level Y_0 could now be sold at a higher price P_1. If money wages do not rise, real wage will fall. As real wage falls the employers would want to increase output and want more labors. As the classical system is always under full-employment output so no more workers will be there. So the money wage has to rise enough to eliminate the excess dd. for labor.

So a result of increase in money is to raise wages and prices in equal proportion leaving output, real wage and employment unaffected.

Q. Explain the effects of a decrease in M in the classical model.

Effect of shift of the production fn. involving in both the average and in the marginal products of labor.

We here consider the effects of upward shift of the production fn. in the classical model involving in both average and marginal products of labor. As both AP_L and MP_L increases the lab dd curve of part (b) if shifts from N to N'. The prod. fn. in part (a) shifts from Y to Y'. The equilibrium real wage rate increases from $\left(\frac{W}{P}\right)_0$ to $\left(\frac{W}{P}\right)_1$ in part (d) and the equilibrium level of employment increases from N_0 to N_1 and equilibrium output increases from Y_0 to Y_1 (part (a)).

As money ss remains the same the price falls from P_0 to P_1 part (d) and since real wage rises the real wage line rotates from $\left(\frac{W}{P}\right)_0$ to $\left(\frac{W}{P}\right)_1$.

product ...

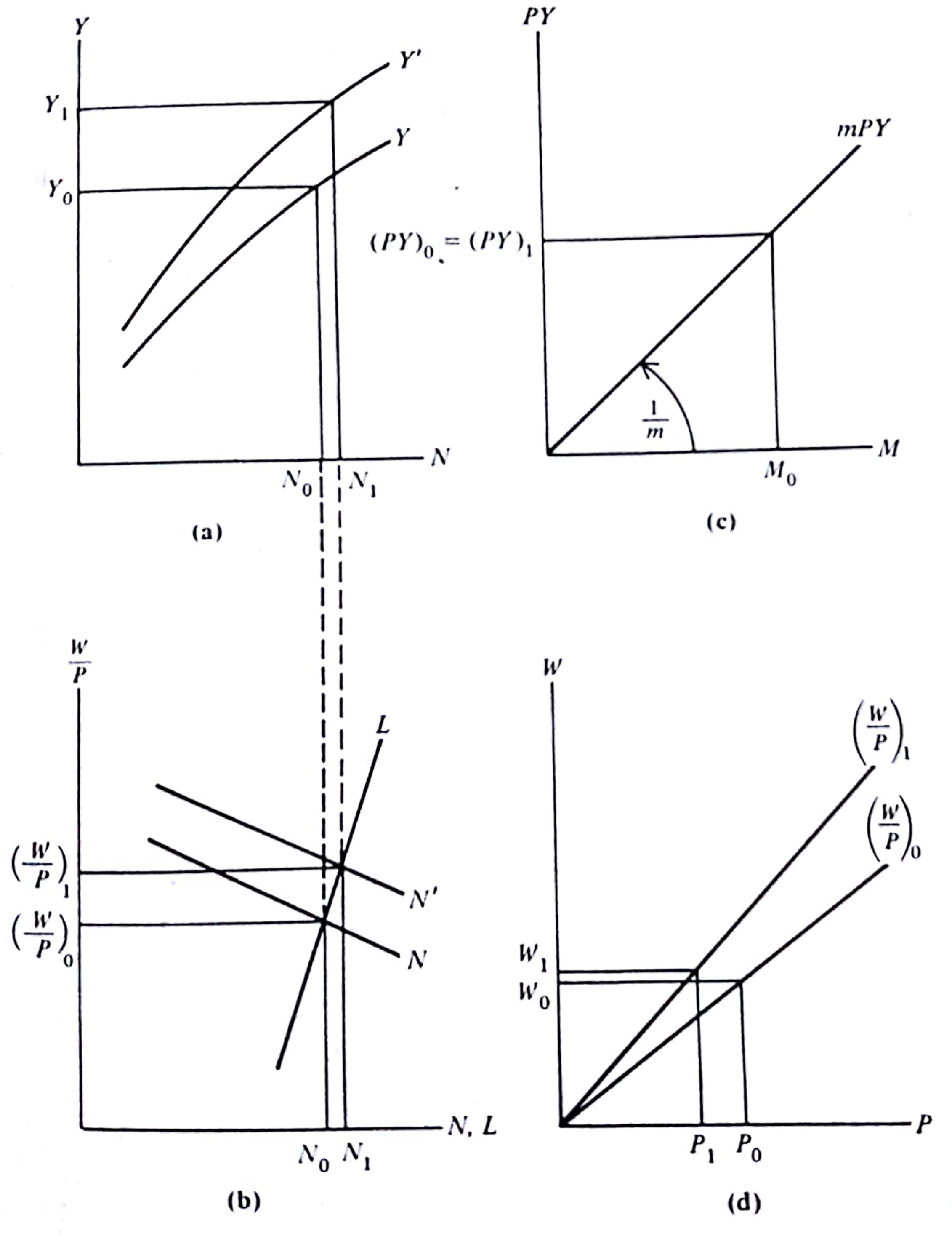


FIGURE 4-6