

# Classical Macroeconomics

In this chapter we shall introduce the main elements of classical macroeconomics. In particular, we shall discuss the following aspects:

- Basic postulates of classical macroeconomics
- Classical quantity theory of money
- Classical theory of saving and investment

## 2.1 BASIC POSTULATES OF CLASSICAL MACROECONOMICS

The classical macroeconomic structure is built upon the writings of famous classical economists like Adam Smith, David Ricardo, J.B. Say, T.R. Malthus, A.C. Pigou, Irving Fisher to mention the greatest few. Their scattered writings, when put together, produce a systematic and coherent macroeconomic framework. To understand this framework, one needs to bear in mind the basic postulates/assumptions that classical economists built around their macroeconomic conclusions. These are, broadly, as under.

### 2.1.1 Full Employment

Classicals believed that there will always be full employment (or, near full employment) in the economy – full employment not only of labour but also of other major resources such as land, capital and other factors of production. In case of labour, for instance, they held the view that all labour will normally find employment in a free enterprise capitalist economy with ‘flexible labour market’ (explained below). However, such full employment does not mean that temporary unemployment (i.e., unemployment for a temporarily short period) will not exist. But unemployment of relatively longer period or what Keynes later termed ‘involuntary unemployment’ is totally ruled out by the classicals. For instance, temporary unemployment may occur due to maladjustment between demand and supply of resources in a capitalist economy or frictions in the economy – workers changing jobs, locations, etc. – or change in the structure of the economy such

as old industries shutting down and new ones coming up or unemployment that occurs during business cycles (recessions or depression).

Full employment will, then, occur only in the **long run**. So, long run perspective is implicit in all these postulates. The classicals generally ignore short run problems however serious they may be. In the long run, total demand for labour will always be equal to total supply of labour and total output (of goods and services) will be at its full potential level.

Lapses from full employment, classicals suggest, may be corrected by appropriate wage cut given sufficient flexibility in the wage system. Thus, classical economists viewed unemployment as a passing phase in the development of capitalist economy while full employment being a normal phenomenon.

### 2.1.2 Wage-Price Flexibility

Classical economists postulated that in the capitalist system, wages as also prices (including interest rates) are flexible and not rigid. This means that these rates are capable of moving upward and downward under normal pressures of demand and supply in their respective markets. In other words, the demand and supply curves are fairly responsive to prices and wages – or, to say the same thing, demand and supply curves are price-elastic (as also wage-elastic).

In the case of wage rate flexibility, it is argued that, this is always in the interest of both the employers and workers. Employers gain from wage rate reduction because this reduces their wage cost and hence increases their profit margin. They will, therefore, be tempted to employ more workers and thereby increase output. Workers will gain in terms of increased employment of labour force (though not in terms of wage rate or wage per worker). Wage rate rise, similarly, works in opposite direction. On the other hand, workers will respond by increasing their supply when wage rate is higher and decrease their supply when wage rate is lower. These outcomes are, in fact, based on explanations, at the micro level from both employer's and worker's normal decision behaviour. The implication is that in case of any deviations from equilibrium occurring anywhere in the economic system, wage price flexibility will ensure that such deviations will soon disappear and the economy will eventually return to the equilibrium position.

Two other implications need clarification in this context.

Wage rate here means “real wage rate” and not money wage rate. Any change in money wage rate is suitably adjusted by change in price level so that the impact of price level change on real wage rate is neutralized. To state it differently, money wage and price level move in the same direction and to the same extent to leave the real wages unaffected. In case both do not move in the same direction or to the same extent, this would mean real wage rate is either rising or falling.

sector is known as absolute price level or nominal price level or simply 'level of prices'. On the other hand, the price level determined in the real sector is known as relative price level (price of one product in terms of other product). For understanding the underlying meaning of this classical dichotomy, we take an example. Let us suppose there are two goods: wheat and potato whose nominal prices are ₹ 10.00 per kg and ₹ 15.00 per kg respectively (or, their real price ratio is 1.5 units of wheat: 1 unit of potato). If, for some reason, the supply of money in the economy suddenly doubles, the prices of wheat and potato also double to ₹ 20 per kg and ₹ 30 per kg. But their relative price ratio remains the same, i.e., 1.5 units of wheat : 1 unit of potato. This is because the relative price level is something determined by factors such as, relative factor supplies of goods services and technology of production which are independent of the factors affecting the monetary sector.

Surprisingly, however, the reverse causation is not true, so that changes in the real sector do influence the monetary sector.

### 2.1.5 Absence of Money Illusion

According to this postulate, there is complete absence of money illusion in the economy. All groups of people in the economy – the workers, employers, savers, investors, etc., are completely free from money illusion. For instance, if workers are influenced by the money value (or, nominal value) of their wage rate and not by their real value (or real wage rate), we say workers are guided by the money illusion. If, instead, workers are only guided by real wage rate, they are said to be free from money illusion. Accordingly, if workers are willing to supply more working hours/days at higher real wages and not high money wages, we say there is no money illusion in the labour market. Similarly, if savers are guided by the real rate of interest (money rate of interest minus the rate of inflation) they are said to be not suffering from any money illusion. Also, another related assumption is that *money is neutral* – it does not affect any other price like interest rate. Needless to say that this particular assumption of the classicals also holds a key position and frees them from many complications which the later-day economists notably Keynes and his followers incorporated in their analytical framework.

## 2.2 THE CLASSICAL QUANTITY THEORY OF MONEY

One of the basic tenets of classical macroeconomics is the quantity theory of money. Simply put, this theory states that the supply (or quantity) of money determines the level of prices (or, general price level) in the economy. Essentially, quantity theory has two approaches: (a) transaction approach and (b) cash balance (or, Cambridge) approach. The transaction approach, in turn, has two versions, Fisherian equation of exchange or pure transaction version and aggregate income

or national income version. The latter version has become more popular and convenient expression of quantity theory.

The Fisherian version of quantity theory is expressed in terms of the following equation:

$$M V = P T \quad (2.1)$$

where  $M$  = Supply of money used for purchase-sale of goods,  $V$  = velocity of circulation of money,  $T$  = Total volume of transactions of all goods,  $P$  = Average price level.

Equation (2.1) is an expression that simply equates two sides of transactions (purchase and sale) of all goods in the economy, with the help of money, during a certain period of time. The right hand side of equation (2.1) shows the total quantity of goods sold valued at their average price level while the left hand side shows the total amount of money required for goods bought. This seems to be an obvious fact and shows the equilibrium condition of the economy. The explanation of the terms ( $M$ ,  $V$ ,  $P$  and  $T$ ) is as follows:

$M$ , the supply of money, refers to the money in circulation (notes and coins) as also bank money (demand deposits).  $M$  is supposed to be exogenously given. At the time when quantity theory was originally developed,  $M$  was supposed to constitute only the currency in circulation. However, when transactions by individuals and businesses included operations through banks, bank deposits were also included in  $M$ .

$V$ , the velocity of circulation of  $M$ , stands for the average number of times money is used up in the process of transaction of goods during the specified period of time. In other words, individual units of money (for instance, individual coins or notes of different denominations) may be used up different number of times, but  $V$  stands only for their average number.

$T$  refers to the total volume of goods transacted. It includes all goods – intermediate (goods used as inputs to industries) as well as final goods.

$P$  is the average price-level, i.e., money prices of all goods taken at their average value.

Referring back to equation (2.1),  $T$  is assumed given and constant and is also independent of  $M$  and  $V$ . Recalling the dichotomy postulate which states that goods sector (or, real sector) is independent of monetary sector, the constancy of  $T$  can be better understood.  $T$ , representing the total outputs of goods is determined by the factor supplies and technology. The total volume of  $T$  signifying total output of the economy, is constant at its maximum feasible level. In other words, full use of available technology and resources (including labour) is assumed to have been made to produce total volume of  $T$  (or, supply of goods) at full employment.  $V$  is a significant factor in the equation. It is also constant and unrelated to either  $M$  or  $T$ . It is determined by institutional and structural

factors of the economy and society such as payment system (payment habits and patterns) as also the structure of the economy. For instance, if the receipt and payment pattern of either an individual or business is once a week as against once a month, the velocity of money in the case of the former will be greater than in the latter. Similarly, if the structure of the economy requires that most payments are made in cash than in any other form, the velocity will be higher. Now,  $V$  is not only constant but its value will be maximum, given the assumption that money is meant only for transaction purposes, and hence, people would hold money for minimum period necessary. Constancy of  $V$  is also obvious from the fact that it is the ratio between  $PT$  and  $M$  ( $V = PT/M$ ) and while  $T$  part is independent,  $M$  is exogenously determined and  $P$ , of course, is calculated part depending on measurement yardsticks. Thus, if  $V$  is constant (at maximum value),  $T$  is also constant, it is easy to establish that  $P$  varies proportionately (and, of course, directly) with  $M$ . If  $M$  increases (decreases) by say 100 per cent,  $P$  also increases (decreases) by 100 per cent.

Another version of the classical quantity theory, known as Income Version has gained popularity on account of aggregation and of problem of measurement of large number of physical goods under the volume of transactions ( $T$ ) and the problem of measurement of price levels of all such goods. The income version, instead, can be stated as:

$$MW = P_0Y \quad (2.2)$$

where,  $M$  = money supply,  $W$  = income velocity of money,  $Y$  = real national income or product  $P_0$  = average price level of  $Y$ .  $P_0$  can be defined as GNP deflator also (an index number used to obtain real GNP – from GNP at current prices to GNP at constant prices), see Chapter 1 page 7)

In equation (2.2),  $W$  is the average number of times  $M$  (or, units of money) is used for transaction of final goods and services only, i.e.,  $Y$  or GNP. Obviously, the value of  $W$  is less than  $V$  since volume of  $Y$  is less than  $T$ .

In the present formulation also, the earlier conditions and implications of equation (2.1) hold, viz., the constancy of  $W$  and  $Y$ , both being at their maximum feasible levels as also both being independent of  $M$  or  $P_0$  for reasons explained in the context of equation (2.1). Thus, the ultimate conclusion –  $M$  and  $P_0$  are directly and proportionately related hold equally truly.

One significant implication of equation (2.2) is that now  $W$ , the velocity, can be expressed as a ratio of nominal GNP ( $P_0Y$ ) and money supply ( $M$ ). If both  $P_0Y$  and  $M$  change proportionately  $W$  remains constant. If, by assumption,  $Y$  is at full employment level and hence constant, proportionate change in  $M$  will produce proportionate change in  $P_0$ .<sup>1</sup>

<sup>1</sup> The constant velocity characteristic will further be discussed in the Theory of Demand for Money by Milton Friedman in Chapter 6.

### 2.2.1 Quantity Theory and Demand for Money

From the quantity theory formulation in equation (2.2), a demand for money equation can be derived. This approach suggested by Cambridge economists in general and Alfred Marshall in particular, is known as Cash Balance Approach of quantity theory. A relationship between,  $Y$ , the real income (or, real GNP) and the proportion of  $Y$  held in cash balance by the community is sought to be established. This is opposite of spending of money for transaction purposes as shown in equation (2.1). The demand for money equation can be expressed as:

$$Md = mP_0Y \quad (2.3)$$

where,  $Md$  = demand for money,  $P_0$  = average price level (the same as in equation 2.2)  $Y$  = real national income or product (GNP) and  $m$  = fraction of money national income (nominal GNP) that the community desires to hold in cash balance.

From equation (2.3) it is evident that the value of  $m$  being high or low suggests the high or low proportion of GNP kept in cash by the community. If, for instance,  $m = 0.2$ ,  $Md$  will be 20 per cent of GNP and if  $m = 0.4$ ,  $Md$  will be 40 per cent of GNP. However, just as  $V$  is assumed constant in the earlier formulation,  $m$  is also assumed constant in the present formulation for reasons not related to either  $M$  or  $Y$ . The value of  $m$  is opposite (reciprocal) of  $V$ , i.e.,  $m = 1/V$ . Therefore, if  $V$  is at its maximum feasible level,  $m$  is at its minimum feasible level. In other words, people hold money in cash only for the minimum period necessary.

Now, if we divide through equation (2.2) by  $V$ , we get

$$M = 1/V P_0Y \quad (2.3a)$$

so that  $m = 1/V$ . Alternately,  $V = 1/m$

Equation (2.3) is an equation in two unknowns, viz., demand for money ( $Md$ ) and price level ( $P_0$ ). This equation can be supplemented by the equilibrium condition of the money economy, i.e., total demand for money is equal to its total supply:  $Md = M$ , further, substituting this condition into equation (2.3) yields

$$M = mP_0Y \quad (2.4)$$

Equation (2.4) states that supply of money (nominal) is a fraction,  $M$ , of the value of real national income. It is an equilibrium condition of the economy stating that the community's desired cash balance is always equal to the actual cash balance at any point in time. If this equilibrium is disturbed by any discrepancy between the desired cash balance and the actual cash balance, the economy eventually regains its equilibrium by appropriate changes in community's expenditure. For instance, if money supply increases, so that actual cash balance of the community is in excess of the desired cash balance (everyone finds his balance more than he desires), people would be willing to spend this 'excess' for purchasing goods and services. This would raise price level since total supply

of goods or real income ( $Y$ ) is constant. Subsequently, higher prices of goods would necessitate the holding of cash balance of the community at a higher level. Ultimately, the higher desired cash balance will be equal to actual cash balance and the economy will again be in equilibrium.

The formulations in terms of equations (2.3) and (2.4) suggest that quantity theory is, indeed, a theory of the demand for money which has, in the middle of twentieth century, been taken up for further analysis by Milton Friedman and his associates.

### 2.3 THE CLASSICAL THEORY OF SAVING AND INVESTMENT

In order to further ensure full employment, the classical economists provided a separate theory of saving and investment. This theory also allows the Say's law to hold in an economy where all incomes are not spent but a part is saved and also the same take the form of investment by entrepreneur class. Investment refers to production and acquisition of any real capital asset such as factories, raw materials, machinery, inventories of finished and semifinished goods etc. It is the time rate of increase in capital asset.

At the outset, it ought to be remembered that the theory of saving and investment explains the determination of the rate of interest, which in classical's view, is real phenomenon in the sense that interest rate is determined by real factors. While productivity of capital is the main factor behind the behaviour of investment, time preference is the factor behind the behaviour of savings. Both these factors are real factors and are not influenced by monetary factors. Further, interest rate acts as a mechanism for bringing about equality between volumes of investment and savings. Let us elaborate these factors in some detail.

The meaning of investment is addition to capital stock. If, at any point in time (say at the end of a year), the capital stock valued is rupees ₹ 500 crore and at any other point in time (say at the end of next year), the capital stock is valued at ₹ 550 crore, then this addition of ₹ 50 crore in one year period is investment. The value must, however, be at constant price level so that ₹ 50 crore must, necessarily be the addition to physical capital stock in real terms.

Now the classical economists believe that such investment takes place in the economy mainly because capital is more productive. Now, the acquisition of new capital asset, such as purchasing a new machine involves costs – costs in terms of interest for borrowed fund from savers. But, as more and more investment is taken up, the marginal productivity of capital declines just as the marginal productivity of labour or any other factor declines with its increasing volume. Therefore, any rational entrepreneur would be interested in acquiring more capital assets (investment) so long as the marginal productivity of an additional capital is higher than the interest cost. Hence, investment is higher at lower rate

volume of investment by  $CD$  amount. This disequilibrium point will, however, automatically restore equilibrium through appropriate changes in the rate of interest by competitive forces of demand and supply of saving and investment. Thus, in equilibrium,  $S = I$ . Hence, we conclude that classical macroeconomics provides a consistent set of theories, viz., an employment theory (in fact, a full employment theory), a monetary theory and a saving-investment theory, each of which, even though seemingly separate, is connected with other and supporting one another.

## 2.4 WAGE-PRICE RELATIONSHIP AND FULL EMPLOYMENT

In this section, we examine the relationship between wages and prices in the classical system that would ensure full employment. We refer to Fig. 2.2(b), given below, which shows the equilibrium condition in the labour market in terms of total demand for labour being equal to the total supply of labour. The real wage rate  $W/P$ , in this situation, is  $(W/P)_0$ . In other words, the labour market clears only at  $(W/P)_0$  real wage rate; hence this is the full employment equilibrium. This is because employers optimize their resources in order to maximize their profits at the output level of  $Y_p$ —the potential output and at  $(W/P)_0$  wage rate. According to classical, this situation is easily attainable the capitalist system given sufficient flexibility of wages and prices.

It should be mentioned here that this presupposes the existence of full competition in the labour market which means that the employers compete among themselves for hiring labour.

Assuming for the time being that all labourers are homogeneous and wages paid to them are standardized wages paid in terms of money, i.e., money wages ( $w$ ). This is because, normally all employers pay their workers in terms of money wages. But how do they get at the real wages then? In other words, what is the relevant price level to be chosen? Since workers generally consider the average price level (taking all important items that enter their cost of living, may be, including the price of the product of the firm in which they are presently employed), the real wage rate is evaluated as money wage rate divided by the average price level. Alternatively, money wage rate can be taken, for simplicity, the economy-wide money wages since we are assuming homogenized labour force. Now we suppose there is unemployment in the labour market so that there is excess supply of labour over the total demand for labour and the real wage rate is well above the equilibrium wage rate  $(W/P)_0$ . The actual output is also below the potential level of  $Y_p$ . Now, if there is flexibility of wage rate, the employers will be induced to hire more labourers only when  $(W/P)$  falls from the present level. Also, the unemployed labourers are prepared to accept lower wage rate rather than remaining unemployed. This would, most likely, happen given the type of competition we have assumed in the labour market. However, falling  $(W/P)$  implies any of the following possibilities:

$DL$  curve is decreasing throughout. The supply of labour curve,  $SL$ , is rising from left to right reflecting the labour supply behaviour – more and more labour hours are offered at higher and higher real wage rates. This is consistent with the normal behaviour of the labour at microeconomic level. Given such behaviour of the labour market, the total available labour supply,  $N_0$ , is equal to its total demand at the real wage rate equal to  $(W/P)_0$ .

Panel (c) shows the demand for money for different levels of national income ( $PY$ ). The straight line  $mPY$  from the origin shows that given the value of  $m$  – the proportion of  $PY$  demanded in the form of money – there are different combinations of money supply (= demand) and national income. For instances, for  $M_0$  money supply, the corresponding national income is  $(PY)_0$  and for  $M_1$  money supply, national income is  $(PY)_1$ . The slope of the line  $mPY$  is  $1/m$  since,  $P_0Y/Md = 1/m$ . (if for instance,  $m = 0.4$ ,  $1/m = 2.5$ ; if  $m = 0.5$ ,  $1/m = 2$  and so higher the value of  $m$ , lower the value of the slope and lower the value of  $m$ , higher the value of the slope). Interpreted otherwise, it shows that  $(PY)_0$  level of national income can be sustained by  $M_0$  money supply and  $(PY)_1$  level of national income can, similarly, be sustained by  $M_1$  money supply. But since  $Y$  is constant at  $Y_0$ , an increased money supply will simply push up the price level from  $P_0$  to  $P_1$ . Therefore,  $(PY)$  level of national income will be equal to the original level of national income ( $Y_0$ ) measured at increased price level ( $P_1$ ); that is  $(PY)_1 = P_1Y_0$ .

Finally, we can determine the level of money wage rate for different price levels such as  $P_0$  and  $P_1$  as shown in panel (d). The straight line  $W/P$  indicates the real wage rate for different values of  $W$  and  $P$ , provided they change by equal proportions. Thus, if  $M_0$  level of money supply generates  $P_0$  price level, the corresponding money wage rate will be  $W_0$ . Similarly, if  $M_1$  money supply results in  $P_1$  price level, the corresponding money wage rate will be  $W_1$  and so on, although the real wage rate,  $W/P$  is the same.

Thus, the diagrammatic representation of the classical macroeconomic structure also tries to demonstrate the following results:

Real sector (labour and commodity) is independent of the monetary sector. Employment and output and real wage rates are determined in the real sector.

Monetary sector determines the price level which, in turn, determines the money wage rate.

Let us use mathematical equations for the graphical relations stated above.

**Example 1** Let us suppose our aggregate production function is

$$Y = 10N - 0.1 N^2 \quad (1)$$

(since the total outputs  $Y$  is a non-linear function of labour input with  $dY/dN > 0$  and  $d^2Y/dN^2 < 0$ )

$$\Rightarrow P = 225/75 = 3.00$$

So,  $P$  increases from 2.667 to 3.00, i.e., by 12.5%.

Thus, an increase in money supply raises price level by the same extent. Therefore, the relationship between money supply and price level is direct and proportionate. Let us examine if this change has any impact on money wage rate.

The real wage rate,  $W/P$  is now  $W/3 = 5$ ; giving  $W = 15$ .

But,  $W/P = 15/3 = 5$ .

$W$  has now increased from 13.335 to 15.00, i.e., by 12.4859% or, 12.5%. Thus, money wage rate has also increased by the same extent as the price-level and money wage rate has changed by the same extent and in the same direction but real wage rate remains the same.

- (b) Secondly, we can analyse the impact of change in real sector variables on the monetary sector in the following manner:

Let the supply curve of labour change from

$15 + 2W/P$  to  $20 + 2W/P$  (a shift of the supply curve to the right)

The labour market equilibrium will now be solved by equating the demand curve with the new supply curve of labour:

$$50 - 5W/P = 20 + 2W/P \text{ which gives } W/P = 4.2857.$$

The corresponding demand and supply of labour will be 28.5714.

Substituting this value in eqn. (1) we obtain,

$$\begin{aligned} Y &= 10 \times 28.574 - 0.1 (28.5714)^2 \\ &= 285.714 - 81.6325 = 204.0815 \end{aligned}$$

Thus output increases from 187.5 to 204.08, i.e., by 8.84 per cent. The employment of labour increases from 25 to 28.57, i.e., by 3.57 units or, by 14.28 per cent.

Now money supply remaining the same, i.e.,

$$200 = 0.4 PY,$$

and  $Y$  being higher now at 204.0815, by substituting we obtain,

$$200 = 0.4P (204.0815)$$

$$\Rightarrow 200 = 81.6325 P$$

giving the value of  $P = 2.45$ .

Thus, price level is now lower as compared to 2.667 earlier. In percentage terms,  $P$  has fallen by 8.14 per cent.

However, we have seen earlier that the real wage rate has already fallen to 4.2857. Hence, money wage rate now is solved as  $4.2857 = W/2.45 = 10.4999$ .

Thus,  $W$  has decreased from 13.335 to 10.4999, i.e., by 21.26 per cent which is larger percentage fall than fall the price level.

Thus, the shift in the supply curve of labour to the right results in:

(a) Increase in output, (b) increase in employment, (c) fall in real wage rate, (d) fall in price level and (e) fall in money wage rate.

In the similar vein, we can analyze the effect of change in technology (shift in production function) on the real sector as well as monetary sector variables (shift in production function upward means better and improved technology)<sup>1</sup>

### 2.5.1 Critical Evaluation

In spite of many shortcomings and simplistic assumptions of the classical macroeconomic system and Keynesian revolution in the post-1930s, the 1970s and period thereafter has witnessed a kind of revival of classical system. The new classical macroeconomics has focussed on further refinements of the basic classical tenets and popularization of policy tools based on these tenets. The rise of supply side economics with its root is Say's law, market fundamentalism of the capitalist economy with minimum government intervention in the functioning of the economic system and rising importance of monetary policy vis-a-vis fiscal policy are some of the recent developments in the macroeconomics field with their application in most of the western capitalist economies and gradual policy changes in emerging economies of the world. The most important drawback of the classical/new classical economic policies being pursued in most of western capitalist world based on free enterprise and market economy rules is the failure of predicting correctly the occurrence of 'crises'. Business cycles do occur in spite of tall claims by the authors belonging to this group which virtually jeopardize the functioning of the capitalist system.

### SUMMARY

1. Classical macroeconomics is based on a set of postulates/assumptions such as long period, Say's law of market, full employment, flexibility of wages and prices, neutrality of money, absence of money illusion and dichotomy between real and monetary sectors. If these postulates are accepted, classical macroeconomics produces a neat systematic and logical theory to explain the working of the economy.
2. Long period is the key assumption which allow economic agents to sufficiently adjust and revise their decisions and attain the new level of equilibrium. Even though they do consider changes occurring during short period, but such changes are not important for the classicals.

<sup>1</sup> In this case the production function might be:  $Y = 16N - 0.1N^2$  or any higher value of the intercept.

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